ARCADIS

**RACER Trust**

# PFAS Groundwater Sampling Summary

## Pontiac North Campus

Original Submittal: January 19, 2024
Re-Submittal: April 24, 2024

# PFAS Groundwater Sampling Summary

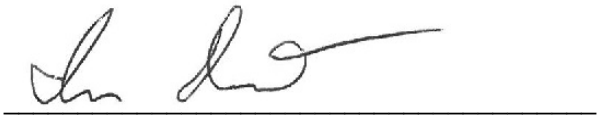
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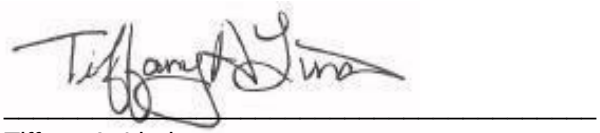
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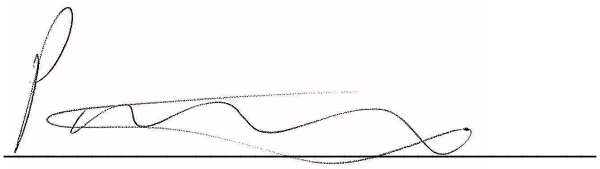
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# Acronyms and Abbreviations

| | |
|---|---|
| AOI | area of interest |
| bgs | below ground surface |
| COC | contaminant of concern |
| CSM | conceptual site model |
| DW | drinking water |
| EGLE | Michigan Department of Environment, Great Lakes, and Energy |
| EIS | extracted internal standard |
| FTS (6:2) | fluorotelomer sulfonic acid 6:2 |
| GSI | groundwater surface water interface |
| HDPE | high density polyethylene |
| J/UJ | estimated result |
| LC-MS/MS | liquid chromatography-tandem mass |
| LOQ | limit of quantitation |
| MS/MSD | matrix spike and matrix spike duplicate |
| ng/L | nanograms per liter |
| NMFD | Northern Metal Fabrication Division |
| PCBs | polychloride biphenyls |
| PFAS | per- and polyfluoroalkyl substances |
| PFBA | perfluorobutanoic acid |
| PFHxA | perfluoroheanoic acid |
| PFHxS | perfluorohexanesulfonic acid |
| PFNA | perfluorononanoic acid |
| PFOA | perfluorooctanoic acid |
| PFOS | perfluorooctane sulfonate |
| PFPeS | perfluoropentanesulfonic acid |
| RACER | Revitalizing Auto Communities Environmental Response Trust |
| RPD | relative percent difference |
| RFI | Resource Conservation and Recovery Act Facilities Investigation |
| SMFD | Southern Metal Fabrication Division |
| SVOC | semi-volatile organic compounds |

| | |
|---|---|
| TGI | Technical Guidance Instruction |
| USEPA | United States Environmental Protection Agency |
| USPS | United States Postal Service |
| VOC | volatile organic compounds |
| WCA | Water Resources Comission |

# 1 Introduction

This report summarizes the results of the initial and supplemental per- and polyfluoroalkyl substances (PFAS) groundwater sampling events completed at the Revitalizing Auto Communities Environmental Response Trust (RACER) Pontiac North Campus Site (Site) located in Pontiac, Michigan. Sampling activities consisted of gauging and sampling of existing monitoring well locations across the Site during two sampling events. The Site is divided into three main sections including the Northern Metal Fabrication Division (NMFD), Southern Metal Fabrication Division (SMFD), and Former Fiero Properties. The monitoring locations included in the sampling event are shown on **Figure 1**.

The purpose of this report is to describe the results of the PFAS sampling events detailed in the *Initial PFAS Sampling Plan* (Arcadis 2023a) submitted to the United States Environmental Protection Agency (USEPA) on April 18, 2023, and the supplemental event described in the *Initial Sampling Summary and Proposed 2023 Supplemental PFAS Sampling Plan* (Arcadis 2023b) submitted to the USEPA on September 29, 2023 and re-submitted on December 8, 2023 after addressing USEPA comments provided. The following sections summarize the results of the sampling performed, a brief description of the relevant exposure pathways, proposed next steps and includes revisions based on USEPA's email comments dated February 27, 2024, on the January 19, 2024 Draft PFAS Summary and subsequent discussions between USEPA and RACER.

# 2 Monitoring Well Sampling

Two sampling events were completed utilizing the existing monitoring well network at the Site to determine the general distribution of PFAS-impacts at the Site. For the initial event, 27 monitoring well locations were selected across the Site in areas of interest (AOIs) most likely to be impacted by PFAS used during former operations. Historical operations targeted for sampling included wastewater treatment, metal plating and fabrication, and waste storage. Based on the results of the initial event, the supplemental event included sampling 39 on-site and off-site monitoring wells, some of which were sampled during the initial event. Locations of monitoring wells sampled during the two events are shown on **Figure 1**. A summary of each monitoring event follows:

- Initial Sampling Event: On April 24th, 2023, Arcadis began monitoring activities by gauging Site monitoring wells. Following the gauging event, monitoring wells were sampled for PFAS over a 5-day period from April 25 to May 2, 2023. All groundwater samples were submitted to Pace Analytical (Pace) and analyzed for 28 PFAS compounds in accordance with modified USEPA Method 537M. The analytical reports from Pace are provided as **Appendix A**. The results of the gauging and sampling are provided **Table 1** and **Table 2**, respectively. The initial sampling event was to include monitoring well MWM16-40, but upon inspection the well was damaged and could not be sampled.
- Supplemental Sampling Event: On September 11th, 2023, Arcadis began monitoring activities by gauging Site monitoring wells. Following the gauging event, monitoring wells were sampled for PFAS over a 13-day period from September 12 through 25, 2023. All groundwater samples were submitted to Pace and analyzed for the same 28 PFAS compounds in accordance with modified USEPA Method 537M. The analytical reports from Pace are provided as **Appendix A**. The results of the gauging and sampling are provided **Table 1** and **Table 2**, respectively.

## 2.1 Field Methods

Sampling for PFAS presents unique challenges to typical field sampling protocols, as PFAS can be found in many materials such as Teflon tape, pump bladders, and water and oil resistant gear. While most of these materials will not present a large source of contamination of PFAS, they should be considered. Sampling was conducted in accordance with the Arcadis PFAS Sampling Technical Guidance Instruction (TGI) to help ensure the chance of cross-contamination is minimized. The PFAS Sampling TGI was provided to the field staff and is included as **Appendix B**. In general, the following methods were utilized during each event during sample collection:

- Monitoring wells were gauged for depth to water and total depth prior to sampling. Gauging was used to verify monitoring well construction and condition (e.g., free of obstructions and/or excessive sediment accumulation). Gauging data was not used to generate groundwater elevation contour maps. A more complete dataset used to construct contour maps is collected during the Site annual groundwater sampling event.
- Groundwater samples were collected from each monitoring well using a submersible pump.
- Low-flow sampling procedures were used to collect the samples. Groundwater sampling logs from each event are provided in **Appendix C**.
- Equipment was decontaminated between samples in accordance with the PFAS Sampling TGI (**Appendix B**).
- Samples were collected near the surface of the water column in the well once low-flow purging was completed.
- Unfiltered samples were collected in laboratory supplied high density polyethylene (HDPE) plastic containers.
- Samples were stored in a cooler with ice for transport to the laboratory.
- Samples were submitted to the laboratory utilizing laboratory provided chain of custody forms.

## 2.2 Laboratory Methods and Data Validation

Groundwater samples were analyzed by Pace in West Columbia, South Carolina. A summary of the laboratory methods and procedures is provided below:

- Samples were analyzed by liquid chromatography-tandem mass spectrometry (LC-MS/MS) with isotope dilution by modified USEPA Method 537M. The modified method includes analysis of 28 PFAS, including perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) and all other PFAS for which the Michigan Department of Environment, Great Lakes, and Energy (EGLE) has a Part 201 Drinking Water Criteria and USEPA has proposed a Maximum Contaminant Level.

A Tier II validation was performed on the 12 data packages. The validation checked chain of custodies (COC), holding times, blank contamination, extracted internal standards (EIS), matrix spike/matrix spike duplicate recoveries and relative percent difference (RPDs), laboratory duplicate RPDs and field duplicate RPDs. A summary of the data validation is provided below:

- Several samples exhibited EIS above the upper control limit or below the lower control limit, but greater than twenty percent. The associated PFAS compounds in the associated field samples were qualified as estimated (J/UJ).

- The EIS for 13C4_PFBA was less than twenty percent in samples MWM30-01_GW, TW-01-03_GW and TW-10-01_GW. The compound perfluorobutanoic acid (PFBA) was qualified as rejected (R) for these samples and the results are not useable.
- The laboratory duplicate performed on sample TW-10-01_GW exhibited RPDs above the control limit for 6:2 FTS (fluorotelomer sulfonic acid 6:2), PFPeS (perfluoropentanesulfonic acid), PFHxS (perflourohexanesulfonic acid), PFHxA (perfluorohexanoic acid), PFOA and PFOS. This sample was qualified as estimated (J) for these compounds.
- Samples from monitoring wells MWM32-01 and MWM2-22 collected on May 1, 2023, were diluted by the lab due to the foamy nature of the sample matrix. As a result, the limit of quantitation (LOQ) was elevated to reflect the dilution.

Laboratory analytical reports are provided in **Appendix A** and data validation reports are included in **Appendix D**.

# 3 Conceptual Site Model

Based on investigations and characterization completed across the Site, the following are key elements of the conceptual site model (CSM):

- The Site has been used as an industrial automotive manufacturing facility since the 1920s and operations included machining, assembly, and waste storage and disposal.
- The Site overburden geology consists of varying thicknesses of a fill unit underlain by an interbedded unit of clays, silts, sands, and gravel, followed by a fine-grained sand unit underlain by a laterally extensive basal clay unit.
- Depth to groundwater on-site is typically encountered between 15 and 20 feet below ground surface (bgs) but has been observed as shallow as 10 feet bgs in localized areas. Off-site, south of the Former Fiero properties, depth to groundwater typically ranges from 4 to 8 feet bgs. Off-site, west of the Former Fiero Properties, depth to groundwater typically ranges between 28 and 32 feet bgs.
- Groundwater flow is generally in a south – southwest flow direction based on the September 19, 2022, groundwater monitoring event, as shown on **Figure 1**.
- Other than PFAS, Site groundwater impacts include volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and polychloride biphenyls (PCBs) and are typically found in the lower interbedded unit and fine-grained sand unit above the basal clay.
- Much of on-site soil and groundwater is restricted by Land and Resource Use Deed Restrictions. Off-site to the south there is a Well and Groundwater Use Restriction Ordinance, as shown on **Figure 2**.

Additional details about the CSM are discussed in the *Draft Corrective Action Summary Report* (Arcadis 2023c).

## 3.1 Initial Sampling Results

A total of 26 groundwater samples were collected from 26 monitoring wells and submitted for analysis of PFAS. In addition, laboratory quality assurance/quality control samples were collected including field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples. A summary of the monitoring wells sampled and exceedances of the EGLE Part 201 Drinking Water (DW) Criteria and Groundwater Surface Water Interface (GSI) Criteria for groundwater is shown on **Figure 1**. Complete analytical results are provided in **Table 2** and laboratory analytical

reports are provided in **Appendix A**. Groundwater sampling logs can be found in **Appendix C**. The following is based on the analytical results from the initial groundwater sampling:

- Of the 26 groundwater samples collected, 13 exceed the EGLE Part 201 DW Criteria and 9 exceed the GSI Criteria for one or more PFAS.
- Regulated PFAS that exceed Part 201 Criteria include PFOS, PFOA, PFNA (perfluorononanoic acid), and PFHxS.
- The range of PFAS concentrations were similar across the Site with PFOS detected at concentrations up to 140 nanograms per liter (ng/L) and PFOA detected at concentrations up to 78 ng/L. Detections of the remaining regulated compounds were sporadic with none exceeding 100 ng/L.
- Although PFAS impacts were widespread across the Site high concentrations (e.g., >500 parts per trillion total PFAS) indicative of source areas were not observed.
- Several monitoring well locations along the Site boundary exceed DW or GSI criteria suggesting the potential for off-site migration. West of the former Fiero property, one location, MWF16-26 exceeds the DW Criteria for PFAS and the off-site area west of MWF16-26 is not currently included in the Groundwater Use Restriction Ordinance (see **Figure 2**).

A summary of the regulated PFAS that exceed Part 201 Criteria is provided in the table below:

| Location ID | Date Collected | PFHxS (ng/L) | PFNA (ng/L) | PFOS (ng/L) | PFOA (ng/L) |
|---|---|---|---|---|---|
| MW-02-17 | 4/25/2023 | 10 | < 4.0 | < 4.0 | 7.7 |
| MWF12-02R | 4/25/2023 | 5.9 | < 3.8 | 4.0 | 11 |
| MWF16-23 | 4/25/2023 | 26 | < 3.5 | < 3.5 | 63 |
| MWM16-37 | 4/25/2023 | 5.8 | < 3.5 | 4.4 | 2.5 J |
| MWM30-01 | 4/25/2023 | 8.3 | < 4.0 | < 4.0 | 45 |
| MWM5-02 | 4/25/2023 | < 3.5 | < 3.5 | 1.3 J | 1.0 J |
| MWW10-04 | 4/26/2023 | 6.9 | 12 | 18 | 78 |
| MWW10-SEN01 | 4/26/2023 | < 40 | < 40 | 15 J | < 40 |
| SEEPVAULT | 4/26/2023 | 12 J | < 40 | 100 | 11 J |
| TW-01-03 | 4/26/2023 | 19 J | < 40 | 97 | 29 J |
| TW-MD-01 | 4/26/2023 | 5.6 | < 3.6 | 1.3 J | 4.6 |
| MWF12-01R | 4/27/2023 | 1.8 J | < 3.5 | < 3.5 | 3.2 J |
| MWF16-05 | 4/27/2023 | 6.8 | < 3.7 | < 3.7 | 4.8 |
| MWF16-06 | 4/27/2023 | 18 | < 3.5 | 38 | 42 |
| MWF16-18 | 4/27/2023 | 33 | < 3.5 | < 3.5 | 41 |
| MWF8-01 | 4/27/2023 | < 3.6 | < 3.6 | < 3.6 | < 3.6 |
| MWOS-05 | 4/27/2023 | 2.3 J | < 3.5 | 2.7 J | 2.1 J |
| MWM16-30 | 5/1/2023 | 4.7 | < 3.9 | 1.3 J | 3.8 J |
| MWM2-22 | 5/1/2023 | < 40 | < 40 | 77 | 28 J |
| MWM2-28 | 5/1/2023 | 4.2 | 5.0 | 56 | 18 |
| MWM32-01 | 5/1/2023 | < 40 | < 40 | < 40 | < 40 |
| MWM4-05 | 5/1/2023 | 2.2 J | < 3.7 | 2.2 J | 4.2 |
| MW-03-17 | 5/2/2023 | 58 | 2.4 J | 140 | 27 |
| MWF16-26 | 5/2/2023 | 24 | < 3.6 | < 3.6 | 34 |
| MWM32-09 | 5/2/2023 | < 3.5 | < 3.5 | < 3.5 | < 3.5 |
| MWW1-04 | 5/2/2023 | 4.1 | < 3.5 | 98 | 2.8 J |

## 3.2 Supplemental Sampling Results

A total of 39 groundwater samples were collected from 39 monitoring wells and submitted for analysis of PFAS. In addition, laboratory quality assurance/quality control samples were collected including field duplicate and MS/MSD samples. A summary of the monitoring wells sampled and exceedances of the EGLE Part 201 Drinking Water Criteria and GSI Criteria for groundwater is shown on **Figure 1**. Complete analytical results are provided in **Table 2** and laboratory analytical reports are provided in **Appendix A**. Groundwater sampling logs can be found in **Appendix C**. The following is based on the analytical results from the supplemental groundwater sampling:

- Of the 40 groundwater samples collected, 28 samples exceed the EGLE Part 201 DW Criteria and 19 samples exceed the GSI Criteria.
- Regulated PFAS that exceed Part 201 Criteria include PFOS, PFOA, and PFNA.
- Concentrations were similar to the initial sampling event with PFOS detected at concentrations up to 150 ng/L and PFOA detected at concentrations up to 54 ng/L.
- PFAS concentrations indicative of active source areas were not identified during the supplemental event.
- Off-site sampling results indicate that groundwater exceeds the DW Criteria for PFAS to the southwest of the Former Fiero Properties and groundwater exceeds the DW Criteria and GSI Criteria to the southwest of the Former South Metal Fabrication Division (SMFD, currently the United States Postal Service [USPS] property). The Groundwater Use Restriction Ordinance currently includes the area south of the Former SMFD but does not include the area southwest of the Former Fiero Properties.

A summary of the regulated PFAS that exceed Part 201 Criteria is provided in the table below:

| Location ID | Date Collected | PFNA (ng/L) | PFOS (ng/L) | PFOA (ng/L) |
|---|---|---|---|---|
| MW-02-17 | 9/12/2023 | < 3.4 | < 3.4 | 5.9 |
| MW-05-18 | 9/12/2023 | < 3.8 | < 3.8 | 5.3 |
| MWF12-02R | 9/12/2023 | < 3.4 | 9.0 | 9.6 |
| MWF15-01 | 9/12/2023 | < 4.0 | 17 | 11 |
| MWF16-23 | 9/12/2023 | < 4.6 | < 4.6 | 19 |
| MWF16-25 | 9/12/2023 | < 4.0 | < 4.0 | 20 |
| MWF16-26 | 9/12/2023 | < 4.0 | 2.0 J | 34 |
| MWF7-02 | 9/12/2023 | < 4.2 | 12 | 50 |
| MWOS-09R | 9/12/2023 | < 3.5 | < 3.5 | 19 |
| MWOS-10 | 9/12/2023 | < 4.4 | < 4.4 | 10 |
| MWOS-01 | 9/13/2023 | < 3.5 | 7.8 | 3.8 |
| MWOS-02 | 9/13/2023 | < 4.0 | 9.5 | 7.0 |
| MWOS-03 | 9/13/2023 | < 3.9 | < 3.9 | < 3.9 |
| MWOS-04 | 9/13/2023 | < 3.7 | < 3.7 | < 3.7 |
| MWW1-06 | 9/13/2023 | < 4.1 | 22 | 6.8 |
| TW-ROW-01 | 9/13/2023 | < 3.4 | 12 | 5.5 |
| TW-ROW-03 | 9/13/2023 | 0.74 J | 36 | 5.8 |
| MWM30-01 | 9/14/2023 | < 3.5 | < 3.5 | 54 |
| MWM5-03 | 9/14/2023 | < 3.7 | < 3.7 | < 3.7 |

| Location ID | Date Collected | PFNA (ng/L) | PFOS (ng/L) | PFOA (ng/L) |
|---|---|---|---|---|
| MWM5-03 | 9/14/2023 | < 3.8 | < 3.8 | 1.3 J |
| MWF16-06 | 9/15/2023 | < 3.5 | 49 | 40 |
| MWF16-18 | 9/15/2023 | 0.91 J | 13 | 12 |
| MWW10-03 | 9/15/2023 | < 3.8 | < 3.8 | 50 |
| MWW10-04 | 9/15/2023 | 16 | 48 | 45 |
| MWW1-04 | 9/15/2023 | 1.3 J | 130 | 6.8 |
| PZF17-05 | 9/15/2023 | < 3.7 | < 3.7 | < 3.7 |
| MW-01-17 | 9/18/2023 | 0.67 J | 13 | 14 |
| MWF16-12 | 9/18/2023 | 2.2 J | 110 | 24 |
| MWW10-SEN01 | 9/18/2023 | < 3.9 | 18 | 8.7 |
| TW-01-03 | 9/18/2023 | 1.1 J | 150 | 21 |
| TW10-01 | 9/18/2023 | < 3.8 | 81 | 15 |
| MWM16-52 | 9/19/2023 | < 40 | 65 | 21 J |
| MWM30-02 | 9/19/2023 | < 3.9 | 3.1 J | 6.7 |
| MWW1-02 | 9/19/2023 | < 40 | 66 | 15 J |
| MW-03-17 | 9/21/2023 | 2.5 J | 140 | 20 |
| MWDP-02R | 9/21/2023 | < 3.5 | 4.2 | 2.2 J |
| SUMP | 9/21/2023 | 0.71 J | 120 | 12 |
| MW-43-14R | 9/25/2023 | 1.0 J | 99 | 12 |
| MWM2-22 | 9/25/2023 | 5.4 | 95 | 26 |
| MWM2-28 | 9/25/2023 | 4.0 | 65 | 16 |

## 3.3 Subsurface Utilities Evaluation

The existing on-site subsurface utilities include water, natural gas, electrical, storm sewer, and sanitary sewer. Active water, electrical, and natural gas lines are installed above the water table. Functional sanitary sewer lines only serve the existing buildings found in the northern area of the Former Fiero Property and the USPS building found in the Former SMFD. Storm sewer lines found in the Former NMFD and Former SMFD were in contact with groundwater but have been bulkheaded at several locations to prevent off-site flow. The storm sewer lines are still functional over an area of the Former Fiero Properties. Storm sewer invert depths measured during the Resource Conservation and Recovery Act Facilities Investigation (RFI) Addendum No. 13 ranged from 2.7 to 4.6 feet bgs (ENCORE 2004). Depth to groundwater at the Former Fiero Properties has ranged from about 10 to 27.5 feet bgs. Based on the depths of the storm sewers and depth to groundwater on site, impacted groundwater does not encounter the on-site utilities. In addition, Outfall 002 at the Fiero Assembly (AOI-16) portion of the Site is believed to still be functioning and the on-site storm sewers flowing from the Fiero Assembly portion of the Site to the Fiero Powerhouse portion of the Site were bulkheaded in 2020 to prevent flow from the Fiero Assembly portion to the Fiero Powerhouse portion as the parcels have different owners. The remaining storm sewers from the other portions of the property are believed to be still functioning, including the two outfalls: Outfall 001 and Outfall 003. Outfalls 001 and 003 discharge to Harris Lake, south of the Site (see **Figure 1**). Outfall 002 discharges further to the west at Osmun Lake.

Off-site subsurface utilities are present including electrical, water, natural gas, storm sewer, and sanitary sewer. In general, subsurface electrical, water, and natural gas are shallow and are above the water table. Unfortunately, the depths of the sanitary sewers are not known but generally they are installed below storm sewers. The depth of the storm sewers near the Site are similar to the depth of the on-site storm sewers and are not in contact with groundwater, except for potentially south of the Site where the ground surface elevation decreases and groundwater is encountered at shallower depths eventually coming to surface at Harris Lake. There is potential for impacted groundwater to be in contact with storm sewers south of the Site, as shown on **Figure 1**.

# 4 Exposure Pathway Analysis

Arcadis has analyzed each of the exposure pathways to be considered for protection of human health with respect to PFAS in groundwater and relevant site-specific conditions applicable to each. When an exposure pathway is considered complete or potentially complete, media-specific, pathway-specific Generic Cleanup Criteria can be used to determine whether further evaluation is warranted. Site data can then be evaluated by comparison to applicable cleanup criteria to determine if additional site-specific activities are necessary. If a site is adequately characterized and site data are below pathway-specific criteria, then no further action is warranted to address that exposure pathway.

This exposure pathway analysis indicates which pathways and conditions are relevant, which criteria are applicable, and documents the reasons for those conclusions. Based on the results of the exposure pathway assessment, applicable cleanup criteria were identified for the Site.

Exposure can only occur when the potential exists for a receptor to contact PFAS or when there is a mechanism for PFAS to be transported to a receptor. An exposure pathway is defined by the following four elements:

1. A source and mechanism of constituent release to the environment.
2. An environmental transport medium for the released constituent.
3. A point of potential contact by the receptor with the medium containing the constituent (the exposure point).
4. A route of exposure to the receptor at the exposure point (i.e., ingestion, inhalation, or dermal contact).

PFAS may have been released to the environment during historical operations, and subsequently migrated to and within groundwater. Low-level PFAS impacts in groundwater are currently present at various areas of the Site and to the south of the Site. In addition, storm sewers from the Site outfall to Harris Lake to the south and Osmun Lake to the west. Certain storm sewers located off-site and downgradient may be in contact with groundwater.

Groundwater under much of the on-site property is restricted or can be restricted to prohibit potable use through current Land and Resource Use Deed Restrictions. In addition, a Groundwater Use Restriction Ordinance that prohibits potable use of groundwater is in place for much of the off-site area to the south, between the Site and Harris Lake and to the east of Harris Lake. However, the area south of AOI F-17 (the western Former Fiero Property) is not currently included in the Groundwater Use Restriction Ordinance. Based on October 2023 updated well survey (Arcadis 2023d) there are only two drinking water wells located downgradient or sidegradient within 1-mile of the Site, these include:

- A household well approximately 2,930 feet west of the Site, located at 370 Lakeside Drive, Wellogic Well – 63000041589 with a well screen installed from 38-42 feet bgs in a sand and gravel water bearing unit below a clay unit that extends from 5-35 feet bgs.

- An industrial well approximately 1,800 feet west of Site on Columbia Avenue, Wellogic Well – 63000019429, was drilled to 280 feet bgs. No well screen was installed, and this well is listed as a bedrock well. The well casing extends down to 100 feet bgs into a clay and gravel unit below a clay unit from 32-90 feet bgs.

Based on the distance from the Site and/or depth of these wells, the drinking water pathway is not complete.

Based on the pathway evaluation described above, the following Part 201 Generic Cleanup Criteria (EGLE 2023) are applicable:

- Residential DW Criteria may be technically applicable in areas that are not restricted by the on-site Land and Resource Use Deed Restrictions or the off-site Groundwater Use Restriction Ordinance; however, the Oakland County Water Resources Commissioner (WRC) operates the City of Pontiac's water system and provides drinking water to the area. Use of groundwater near the Site for potable purposes is not expected.
- GSI Criteria where storm sewer lines are in contact with impacted groundwater, or where impacted groundwater may reach Harris Lake.

Groundwater data have been compared to these applicable criteria in **Table 2** and locations with exceedances are shown on **Figure 1**.

# 5 Conclusions and Data Gaps

Based on the findings from the two sampling events, the following conclusions can be made:

- PFOA or PFOS is present in groundwater at similar and relatively low concentrations across the Former Fiero and SMFD properties with no apparent source areas or "hot spots" identified. The primary PFAS compounds detected above the DW and GSI criteria are PFOA and PFOS, with PFOA being more prevalent in the western portion of the Site (Former Fiero Properties) and PFOS more widespread in the east-southeast portion of the Former SMFD.
- DW Criteria is not applicable on-site due to Land and Resource Use Deed Restrictions, and the GSI Criteria is not applicable on-site due to the depth of on-site utilities and lack of utility contact with groundwater.
- The Groundwater Use Restriction Ordinance currently includes the area south of the Former SMFD and south of the Former Fiero Property.
- At the western boundary of the Former Fiero Property, MWF16-26 exceeds DW Criteria. The area west of the Former Fiero Property is not included within the Groundwater Use Restriction Ordinance. However, groundwater is not used and not expected to be used for drinking water in this area and the nearest water well located outside of the Groundwater Use Restriction Ordinance is 1,800 feet to the west on Columbia Avenue (Arcadis 2023d).
- To the southwest of the Former Fiero Property, within the area included as part of the Groundwater Use Restriction Ordinance, off-site monitoring wells MWOS-09R and MWOS-10 groundwater results exceed the DW Criteria for PFOA.
- At the southern boundary of the Former SMFD monitoring wells MWW1-04, MW-01-17, TW-ROW-03, MWW1-02, and TW-ROW-01, as well as the Montcalm Seep vault, exceed criteria for PFOS and/or PFOA. However, monitoring wells MW-OS4 located south of the southern boundary of the Former SMFD did not have any exceedances.
- To the southeast of the Former SMFD, off-site monitoring well MWW1-06 exceeds DW and GSI criteria for PFOS. Although this area is within the Groundwater Use restriction Ordinance area, the GSI exceedance is not delineated between the site and Harris Lake.

# 6 Recommendations

PFAS concentrations across the Pontiac North Campus are relatively low with no obvious source areas indicated by the distribution of groundwater impacts. Although there are DW Criteria exceedances at the Site perimeter, the majority of the potentially impacted off-site areas are included under the Groundwater Use Restriction Ordinance, except for the area west of former Fiero at monitoring well MWF16-26. The nearest well to former Fiero is located 1,800 feet to the west and drinking water for nearby residents is provided by the City of Pontiac and groundwater is not expected to be used for drinking water.

Most storm sewers on-site are located above the water table and not expected to be impacted by on-site groundwater impacts. The storm sewers associated with Outfall 003 may potentially be in contact with on-site groundwater and further evaluation is warranted. Due to the ubiquitous nature of PFAS in the environment, including non-point residential source areas (i.e., background concentrations), we do not recommend sampling storm sewers on-site that are above the water table currently. Based on the results of PFAS monitoring events and the relevant exposure pathways discussed above, the following next steps are recommended.

A summary of the proposed additional work is included as **Figure 3**:

- Request access and install a monitoring well at parcel 14-20-256-027. Following installation, collect a groundwater sample from the new well to assess the extent of GSI Criteria exceedances in groundwater southwest of the Former SMFD, between monitoring well MWW1-06 and Harris Lake.
- Collect a sample from MWW1-06 at the same time a sample is collected from the proposed new well and analyze the sample for PFAS. Collect a sample in 2024 from MWM1-06 and if possible, the proposed new well in either the second or fourth quarter (depending on when the first sample is collected).
- Collect additional PFAS samples from of the perimeter monitoring wells that currently show exceedances of GSI or DW Criteria (**Figure 3**). Samples will be collected during the second quarter 2024 and during the annual groundwater monitoring event that takes place during the fourth quarter 2024. Groundwater samples will be collected from the following:
  - MWF16-26, MWF16-23, MWOS-09R, MWOS-10, MWF12-02R, MWW1-06, MWW1-04, MW-01-17, and MWW1-02
- Following additional site reconnaissance to confirm the location of Outfall 003 and access to a manhole for sample collection, collect a sample from a manhole immediately upstream from Outfall 003 for PFAS analysis (**Figure 3**). Additional stormwater sampling will be evaluated based on the result of the manhole sample.

# 7 References

Arcadis 2023a. Initial PFAS Sampling Plan, RACER Trust Pontiac North Campus, April 18.

Arcadis 2023b. Initial Sampling Summary and Proposed 2023 Supplemental PFAS Sampling Plan, RACER Trust Pontiac North Campus, original submittal September 29, revised submittal December 8.

Arcadis 2023c. Draft Correct Action Summary Report, RACER Trust Pontiac North Campus, July 25.

Arcadis 2023d. Revised DRAFT - RACER Pontiac North Campus Water Well Survey. October 20.

ENCORE. 2004. RCRA Facility Investigation Work Plan Addendum No. 13. September 24, 2004.

# Tables

**Table 1**
**Groundwater Elevation Summary**
**RACER Trust Pontiac North Campus**
**Pontiac, Michigan**

| Well ID | Well Elevation [1] | Total Depth (ft) | Initial Sampling Event | | | Second Sampling Event | | |
|---|---|---|---|---|---|---|---|---|
| | | | Date | Depth to Water (ft) | Groundwater Elevation | Date | Depth to Water (ft) | Groundwater Elevation |
| **OFFSITE** | | | | | | | | |
| MWOS-01 | 943.79 | 12.95 | -- | -- | -- | 9/11/2023 | 7.25 | 936.54 |
| MWOS-02 | 943.46 | 15.89 | -- | -- | -- | 9/11/2023 | 6.95 | 936.51 |
| MWOS-03 | 944.35 | 18.72 | -- | -- | -- | 9/11/2023 | 7.30 | 937.05 |
| MWOS-04 | 942.52 | 12.85 | -- | -- | -- | 9/11/2023 | 3.80 | 938.72 |
| **FIERO** | | | | | | | | |
| **F-7** | | | | | | | | |
| MWF7-02 | 970.58 | 21.87 | -- | -- | -- | 9/11/2023 | 18.60 | 951.98 |
| **F-8** | | | | | | | | |
| MWF8-01 | 972.94 | 27.20 | 4/24/2023 | 18.90 | 954.04 | -- | -- | -- |
| **F-12** | | | | | | | | |
| MWF12-01R | 967.99 | 23.25 | 4/24/2023 | 20.09 | 947.90 | -- | -- | -- |
| MWF12-02R | 961.91 | 22.48 | 4/24/2023 | 13.17 | 948.74 | 9/11/2023 | 13.06 | 948.85 |
| **F-15** | | | | | | | | |
| MWF15-01 | 973.57 | 28.66 | -- | -- | -- | 9/11/2023 | 18.12 | 955.45 |
| **F-16** | | | | | | | | |
| MWF16-05 | 973.68 | 22.75 | 4/24/2023 | 19.87 | 953.81 | -- | -- | -- |
| MWF16-06 | 973.77 | 28.65 | 4/24/2023 | 13.32 | 960.45 | 9/11/2023 | 11.72 | 962.05 |
| MWF16-12 | 973.20 | 18.88 | -- | -- | -- | 9/11/2023 | 12.76 | 960.44 |
| MWF16-18 | 973.22 | 31.96 | 4/24/2023 | 21.02 | 952.20 | 9/11/2023 | 20.49 | 952.73 |
| MWF16-23 | 973.39 | 30.50 | 4/24/2023 | 24.15 | 949.24 | 9/11/2023 | 23.72 | 949.67 |
| MWF16-25 | 975.24 | 37.18 | -- | -- | -- | 9/11/2023 | 25.86 | 949.38 |
| MWF16-26 | 974.14 | 36.70 | 4/24/2023 | 24.80 | 949.34 | 9/11/2023 | 24.40 | 949.74 |
| MW-02-17 | 972.52 | 29.70 | 4/24/2023 | 25.80 | 946.72 | 9/11/2023 | 25.66 | 946.86 |
| MW-05-18 | 975.21 | 33.56 | -- | -- | -- | 9/11/2023 | 27.02 | 948.19 |
| **Offsite** | | | | | | | | |
| MWOS-09R | 976.42 | 32.18 | -- | -- | -- | 9/11/2023 | 27.06 | 949.36 |
| MWOS-10 | 976.55 | 32.72 | -- | -- | -- | 9/11/2023 | 28.31 | 948.24 |
| **DEMOLITION AREA** | | | | | | | | |
| **W-1** | | | | | | | | |
| MWW1-02 | 946.08 | 15.07 | -- | -- | -- | 9/19/2023 | 5.17 | 940.91 |
| MWW1-04 | 947.49 | 16.35 | 4/24/2023 | 6.85 | 940.64 | 9/11/2023 | 6.93 | 940.56 |
| MWW1-06 | 943.63 | 14.15 | -- | -- | -- | 9/11/2023 | 5.04 | 938.59 |
| MW-01-17 | 949.40 | 10.73 | -- | -- | -- | 9/11/2023 | 7.46 | 941.94 |
| TW-01-03 | 969.06 | 23.10 | 4/24/2023 | 14.23 | 954.83 | 9/11/2023 | 14.11 | 954.95 |
| MW-43-14R | 969.90 | 33.50 | -- | -- | -- | 9/25/2023 | 26.87 | 943.03 |
| **W-8** | | | | | | | | |
| TW-10-01 | 971.91 | 32.78 | -- | -- | -- | 9/11/2023 | 19.05 | 952.86 |
| **W-10** | | | | | | | | |
| MWW10-03 | 958.20 | 11.92 | -- | -- | -- | 9/11/2023 | 7.78 | 950.42 |
| MWW10-04 | 961.49 | 17.92 | 4/24/2023 | 8.42 | 953.07 | 9/11/2023 | 8.49 | 953.00 |
| MWW10-SEN01 | 967.31 | 22.45 | 4/24/2023 | 16.04 | 951.27 | 9/11/2023 | 16.48 | 950.83 |

See Notes on last page.

**Table 1**
**Groundwater Elevation Summary**
**RACER Trust Pontiac North Campus**
**Pontiac, Michigan**

| Well ID | Well Elevation [1] | Total Depth (ft) | Date | Depth to Water (ft) | Groundwater Elevation | Date | Depth to Water (ft) | Groundwater Elevation |
|---|---|---|---|---|---|---|---|---|
| **MFD** | | | | | | | | |
| **M-2** | | | | | | | | |
| MWM2-22 | 970.82 | 24.24 | 4/24/2023 | 16.96 | 953.86 | 9/11/2023 | 16.52 | 954.30 |
| MWM2-28 | 971.07 | 25.80 | 4/24/2023 | 16.68 | 954.39 | 9/11/2023 | 16.16 | 954.91 |
| **M-4** | | | | | | | | |
| MWM4-05 | 985.70 | 23.05 | 4/24/2023 | 6.50 | 979.20 | -- | -- | -- |
| **M-5** | | | | | | | | |
| MWM5-02 | 977.07 | 27.32 | 4/24/2023 | 19.57 | 957.50 | -- | -- | -- |
| MWM5-03 | 978.78 | 33.70 | -- | -- | -- | 9/11/2023 | 21.13 | 957.65 |
| **M-16** | | | | | | | | |
| MWM16-30 | 985.37 | 30.82 | 4/24/2023 | 27.46 | 957.91 | -- | -- | -- |
| MWM16-37 | 980.37 | 35.30 | 4/24/2023 | 23.23 | 957.14 | -- | -- | -- |
| MWM16-52 | 983.71 | 37.20 | -- | -- | -- | 9/11/2023 | 26.94 | 956.77 |
| **M-30** | | | | | | | | |
| MWM30-01 | 979.76 | 34.63 | 4/24/2023 | 23.87 | 955.89 | 9/11/2023 | 23.57 | 956.19 |
| MWM30-02 | 979.64 | 32.35 | -- | -- | -- | 9/11/2023 | 20.21 | 959.43 |
| **M-31/M-32** | | | | | | | | |
| MWM32-01 | 983.64 | 35.10 | 4/24/2023 | 27.38 | 956.26 | -- | -- | -- |
| MWM32-09 | 982.10 | 26.00 | 4/24/2023 | 23.00 | 959.10 | -- | -- | -- |
| **Montcalm** | | | | | | | | |
| MW-03-17 | 964.77 | 21.90 | 4/24/2023 | 8.29 | 956.48 | 9/11/2023 | 8.35 | 956.42 |
| TW-MD-01 | 946.20 | 10.32 | 4/24/2023 | 5.19 | 941.01 | -- | -- | -- |
| **Montcalm ROW** | | | | | | | | |
| TW-ROW-01 | 942.53 | 7.96 | -- | -- | -- | 9/11/2023 | 1.85 | 940.68 |
| TW-ROW-03 | 942.38 | 7.98 | -- | -- | -- | 9/11/2023 | 1.93 | 940.45 |
| **Former Fiero Parking Lot** | | | | | | | | |
| PZF17-05 | 975.97 | 34.00 | -- | -- | -- | 9/11/2023 | 26.03 | 949.94 |
| **Duck Pond** | | | | | | | | |
| MWOS-05 | 944.26 | 11.42 | 4/24/2023 | 1.85 | 942.41 | -- | -- | -- |
| MWDP-2R | 947.90 | 14.41 | -- | -- | -- | 9/11/2023 | 4.18 | 943.72 |

**Notes:**
1. All depth to waters measured from Top of Casing.

**Abbreviations:**

| | |
|---|---|
| **--** | Not available |
| LNAPL | Light non-aqueous phase liquid |

**Footnotes:**
[1] Top of Casing Elevation is in feet National Vertical Geodetic Datum (1988)

Table 2
Summary of PFAS Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan

| Location ID: / Date Collected: / Sample Name: | MI Groundwater Surface Water Interface | MI Groundwater Residential Drinking Water | Units | MW-01-17 9/18/2023 MW-01-17_GW-091823 | MW-02-17 4/25/2023 MW-02-17_GW-042523 | MW-02-17 9/12/2023 MW-02-17_GW-091223 | MW-03-17 5/2/2023 MW-03-17-GW-050223 | MW-03-17 9/21/2023 MW-03-17_GW-092123 | MW-05-18 9/12/2023 MW-05-18_GW-091223 | MW-43-14R 9/25/2023 MW-43-14R_GW-092523 | MWDP-02R 9/21/2023 MWDP-2R_GW-092123 | MWF12-01R 4/27/2023 MWF12-01R_GW-042723 | MWF12-02R 4/25/2023 MWF12-02R_GW-042523 | MWF12-02R 9/12/2023 MWF12-02R_GW-091223 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PFAS** | | | | | | | | | | | | | | |
| 11Cl-PF3OUdS (F-53B Minor) | -- | -- | ng/L | < 7.3 U [< 7.4 U] | < 8.0 U | < 6.7 U | < 7.8 U [< 7.2 U] | < 7.3 U | < 7.5 U | < 7.1 U | < 7.0 U | < 7.0 UQ [< 7.2 U] | < 7.6 U | < 6.9 U |
| 4:2 FTS | -- | -- | ng/L | < 7.3 UQ [< 7.4 UQ] | < 8.0 U | < 6.7 UQ | < 7.8 UQ [< 7.2 UQ] | < 7.3 UQ | < 7.5 UQ | < 7.1 UQ | < 7.0 UQ | < 7.0 UQ [< 7.2 UQ] | < 7.6 UQ | < 6.9 UQ |
| 6:2FTS | -- | -- | ng/L | < 7.3 UQ [< 7.4 UQ] | < 8.0 U | < 6.7 UQ | 8.8 Q [9.6 Q] | 8.0 Q | < 7.5 U | < 7.1 UQ | < 7.0 UQ | < 7.0 UQ [< 7.2 U] | < 7.6 UQ | < 6.9 UQ |
| 8:2FTS | -- | -- | ng/L | < 7.3 UQ [< 7.4 UQ] | < 8.0 U | < 6.7 U | < 7.8 UQ [< 7.2 UQ] | < 7.3 UQ | < 7.5 U | < 7.1 UQ | < 7.0 U | < 7.0 UQ [< 7.2 U] | < 7.6 U | < 6.9 U |
| 9Cl-PF3ONS (F-53B Major) | -- | -- | ng/L | < 7.3 U [< 7.4 U] | < 8.0 U | < 6.7 U | < 7.8 U [< 7.2 U] | < 7.3 U | < 7.5 U | < 7.1 U | < 7.0 U | < 7.0 UQ [< 7.2 U] | < 7.6 U | < 6.9 U |
| ADONA | -- | -- | ng/L | < 7.3 U [< 7.4 U] | < 8.0 U | < 6.7 U | < 7.8 U [< 7.2 U] | < 7.3 U | < 7.5 U | < 7.1 U | < 7.0 U | < 7.0 UQ [< 7.2 U] | < 7.6 U | < 6.9 U |
| HFPO-DA (GenX) | -- | 370 | ng/L | < 7.3 U [< 7.4 U] | < 8.0 U | < 6.7 U | < 7.8 U [< 7.2 U] | < 7.3 U | < 7.5 U | < 7.1 U | < 7.0 U | < 7.0 UQ [< 7.2 U] | < 7.6 U | < 6.9 U |
| N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA) | -- | -- | ng/L | < 7.3 U [< 7.4 U] | < 8.0 U | < 6.7 U | < 7.8 U [< 7.2 U] | < 7.3 U | < 7.5 U | < 7.1 U | < 7.0 U | < 7.0 UQ [< 7.2 U] | < 7.6 U | < 6.9 U |
| N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA) | -- | -- | ng/L | < 7.3 U [< 7.4 U] | < 8.0 U | < 6.7 U | < 7.8 U [< 7.2 U] | < 7.3 U | < 7.5 U | < 7.1 U | < 7.0 U | < 7.0 UQ [< 7.2 U] | < 7.6 U | < 6.9 U |
| Perfluorobutanesulfonic acid (PFBS) | **670,000** | 420 | ng/L | 7.0 [4.9 ] | 9.3 | 7.4 | 5.2 [4.0 ] | 3.3 J | 7.4 | < 3.6 U | 5.3 | 1.8 JQ [3.5 J] | 3.7 J | 3.9 |
| Perfluorobutanoic acid (PFBA) | -- | -- | ng/L | 18 Q [< 3.7 UQ] | 12 | 16 | 18 Q [17 Q] | 15 | 15 | < 3.6 UQ | 18 | 4.3 [9.0 ] | 22 | 20 |
| Perfluorodecanesulfonic acid (PFDS) | -- | -- | ng/L | < 3.7 U [< 3.7 U] | < 4.0 U | < 3.4 U | < 3.9 U [< 3.6 U] | < 3.6 U | < 3.8 U | < 3.6 U | < 3.5 U | < 3.5 UQ [< 3.6 U] | < 3.8 U | < 3.4 U |
| Perfluorodecanoic acid (PFDA) | -- | -- | ng/L | < 3.7 U [< 3.7 U] | < 4.0 U | < 3.4 U | < 3.9 U [< 3.6 U] | < 3.6 U | < 3.8 U | < 3.6 U | < 3.5 U | < 3.5 UQ [< 3.6 U] | < 3.8 U | < 3.4 U |
| Perfluoroheptanesulfonic Acid (PFHpS) | -- | -- | ng/L | < 3.7 U [< 3.7 U] | < 4.0 U | < 3.4 U | 4.7 [5.1 ] | 4.5 | < 3.8 U | < 3.6 U | < 3.5 U | < 3.5 UQ [< 3.6 U] | < 3.8 U | < 3.4 U |
| Perfluoroheptanoic acid (PFHpA) | -- | -- | ng/L | 5.7 [6.0 ] | 6.4 | 4.9 | 9.1 [8.8 ] | 8.6 | 5.7 | 4.9 | 1.1 J | 0.90 JQ [1.6 J] | 4.4 | 3.5 |
| Perfluorohexanesulfonic acid (PFHxS) | **210** | 51 | ng/L | 13 [13 ] | 10 | 9.3 | 58 [57 ] | 32 | 7.0 | 16 | 2.3 J | 1.8 JQ [4.0 ] | 5.9 | 4.6 |
| Perfluorohexanoic acid (PFHxA) | -- | 400,000 | ng/L | 9.2 [9.6 ] | 11 | 8.3 | 14 [15 ] | 14 | 11 | < 3.6 U | 3.5 | 1.8 JQ [2.6 J] | 12 | 8.9 |
| Perfluorononanesulfonic acid (PFNS) | -- | -- | ng/L | < 3.7 U [< 3.7 U] | < 4.0 U | < 3.4 U | < 3.9 U [< 3.6 U] | < 3.6 U | < 3.8 U | < 3.6 U | < 3.5 U | < 3.5 UQ [< 3.6 U] | < 3.8 U | < 3.4 U |
| Perfluorononanoic acid (PFNA) | **30** | 6 | ng/L | 0.67 J [0.72 J] | < 4.0 U | < 3.4 U | 2.4 J [2.2 J] | 2.5 J | < 3.8 U | 1.0 J | < 3.5 U | < 3.5 UQ [< 3.6 U] | < 3.8 U | < 3.4 U |
| Perfluorooctane Sulfonamide (FOSA) | -- | -- | ng/L | < 3.7 U [< 3.7 U] | < 4.0 U | < 3.4 U | < 3.9 U [< 3.6 U] | 1.4 J | < 3.8 U | < 3.6 U | < 3.5 U | < 3.5 UQ [< 3.6 U] | < 3.8 U | < 3.4 U |
| Perfluorooctane sulfonic acid (PFOS) | **12** | 16 | ng/L | **13 [14 ]** | < 4.0 U | < 3.4 U | **140 [140 ]** | **140** | < 3.8 U | **99** | 4.2 | < 3.5 UQ [0.90 J] | 4.0 | 9.0 |
| Perfluorooctanoic acid (PFOA) | **170** | 8 | ng/L | 14 [13 ] | 7.7 | 5.9 | 27 [27 ] | 20 | 5.3 | 12 | 2.2 J | 3.2 JQ [6.7 ] | 11 | 9.6 |
| Perfluoropentanesulfonic acid (PFPeS) | -- | -- | ng/L | 3.4 J [< 3.7 U] | 5.8 | 5.5 | 4.0 [3.8 ] | 2.7 J | 5.2 | < 3.6 U | 0.84 J | < 3.5 UQ [< 3.6 U] | 1.6 J | < 3.4 U |
| Perfluoropentanoic acid (PFPeA) | -- | -- | ng/L | < 3.7 U [< 3.7 U] | 7.2 | 7.7 | 16 [16 ] | 15 | 9.3 | < 3.6 U | 3.5 | 1.9 JQ [2.7 J] | 14 | 11 |
| Perfluorotetradecanoic acid (PFTeA) | -- | -- | ng/L | < 3.7 U [< 3.7 U] | < 4.0 U | < 3.4 U | < 3.9 U [< 3.6 U] | < 3.6 U | < 3.8 U | < 3.6 U | < 3.5 U | < 3.5 UQ [< 3.6 U] | < 3.8 U | < 3.4 U |
| Perfluorotridecanoic Acid (PFTriA) | -- | -- | ng/L | < 3.7 U [< 3.7 U] | < 4.0 U | < 3.4 U | < 3.9 U [< 3.6 U] | < 3.6 U | < 3.8 U | < 3.6 U | < 3.5 U | < 3.5 UQ [< 3.6 U] | < 3.8 U | < 3.4 U |
| Perfluoroundecanoic acid (PFUnA) | -- | -- | ng/L | < 3.7 U [< 3.7 U] | < 4.0 U | < 3.4 U | < 3.9 U [< 3.6 U] | < 3.6 U | < 3.8 U | < 3.6 U | < 3.5 U | < 3.5 UQ [< 3.6 U] | < 3.8 U | < 3.4 U |

Table 2
Summary of PFAS Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan

| Location ID: | MI Groundwater Surface Water Interface | MI Groundwater Residential Drinking Water | Units | MWF15-01 | MWF16-05 | MWF16-06 | MWF16-06 | MWF16-12 | MWF16-18 | MWF16-18 | MWF16-23 | MWF16-23 | MWF16-25 | MWF16-26 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date Collected: | | | | 9/12/2023 | 4/27/2023 | 4/27/2023 | 9/15/2023 | 9/18/2023 | 4/27/2023 | 9/15/2023 | 4/25/2023 | 9/12/2023 | 9/12/2023 | 5/2/2023 |
| Sample Name: | | | | MWF15-01_GW-091223 | MWF16-05_GW-042723 | MWF16-06_GW-042723 | MWF16-06_GW-091523 | MWF16-12_GW-091823 | MWF16-18_GW-042723 | MWF16-18_GW-091523 | MWF16-23_GW-042523 | MWF16-23_GW-091223 | MWF16-25_GW-091223 | MWF16-26-GW-050223 |
| **PFAS** | | | | | | | | | | | | | | |
| 11Cl-PF3OUdS (F-53B Minor) | -- | -- | ng/L | < 7.9 U | < 7.4 U | < 7.0 U | < 6.9 U | < 7.8 U | < 7.1 U | < 6.9 U | < 6.9 U | < 9.1 U | < 8.0 U | < 7.1 U |
| 4:2 FTS | -- | -- | ng/L | < 7.9 UQ | < 7.4 UQ | < 7.0 UQ | < 6.9 UQ | < 7.8 UQ | < 7.1 UQ | < 6.9 UQ | < 6.9 U | < 9.1 UQ | < 8.0 UQ | < 7.1 U |
| 6:2FTS | -- | -- | ng/L | 4.7 JQ | < 7.4 UQ | < 7.0 U | < 6.9 UQ | < 7.8 UQ | < 7.1 UQ | < 6.9 UQ | < 6.9 U | 7.8 J | < 8.0 UQ | < 7.1 U |
| 8:2FTS | -- | -- | ng/L | < 7.9 U | < 7.4 U | < 7.0 U | < 6.9 U | < 7.8 U | < 7.1 U | < 6.9 U | < 6.9 U | < 9.1 U | < 8.0 U | < 7.1 U |
| 9Cl-PF3ONS (F-53B Major) | -- | -- | ng/L | < 7.9 U | < 7.4 U | < 7.0 U | < 6.9 U | < 7.8 U | < 7.1 U | < 6.9 U | < 6.9 U | < 9.1 U | < 8.0 U | < 7.1 U |
| ADONA | -- | -- | ng/L | < 7.9 U | < 7.4 U | < 7.0 U | < 6.9 U | < 7.8 U | < 7.1 U | < 6.9 U | < 6.9 U | < 9.1 U | < 8.0 U | < 7.1 U |
| HFPO-DA (GenX) | -- | 370 | ng/L | < 7.9 U | < 7.4 U | < 7.0 U | < 6.9 U | < 7.8 U | < 7.1 U | < 6.9 U | < 6.9 U | < 9.1 U | < 8.0 U | < 7.1 U |
| N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA) | -- | -- | ng/L | < 7.9 U | < 7.4 U | < 7.0 U | < 6.9 U | 1.4 J | < 7.1 U | < 6.9 U | < 6.9 U | < 9.1 U | < 8.0 U | < 7.1 U |
| N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA) | -- | -- | ng/L | < 7.9 U | < 7.4 U | < 7.0 U | < 6.9 U | < 7.8 U | < 7.1 U | < 6.9 U | < 6.9 U | < 9.1 U | < 8.0 U | < 7.1 U |
| Perfluorobutanesulfonic acid (PFBS) | **670,000** | 420 | ng/L | 5.9 | 3.3 J | 3.4 J | 4.2 | < 3.9 U | 10 | < 3.5 U | 6.7 | 4.8 | 12 | 15 |
| Perfluorobutanoic acid (PFBA) | -- | -- | ng/L | 10 | 8.8 | 9.1 | 9.6 | 3.7 J | 14 Q | 10 | 9.8 | 13 | 13 | 8.6 |
| Perfluorodecanesulfonic acid (PFDS) | -- | -- | ng/L | < 4.0 U | < 3.7 U | < 3.5 U | < 3.5 U | < 3.9 U | < 3.5 U | < 3.5 U | < 3.5 U | < 4.6 U | < 4.0 U | < 3.6 U |
| Perfluorodecanoic acid (PFDA) | -- | -- | ng/L | < 4.0 U | < 3.7 U | < 3.5 U | < 3.5 U | 0.91 J | < 3.5 U | < 3.5 U | < 3.5 U | < 4.6 U | < 4.0 U | < 3.6 U |
| Perfluoroheptanesulfonic Acid (PFHpS) | -- | -- | ng/L | 0.96 J | < 3.7 U | 5.7 | 5.1 | 1.8 J | 1.3 J | < 3.5 U | 1.3 J | < 4.6 U | < 4.0 U | < 3.6 U |
| Perfluoroheptanoic acid (PFHpA) | -- | -- | ng/L | 5.2 | 2.8 J | 7.5 | 7.7 | 6.0 | 20 | 3.5 | 23 | 5.5 | 8.0 | 7.3 |
| Perfluorohexanesulfonic acid (PFHxS) | **210** | 51 | ng/L | 13 | 6.8 | 18 | 17 | 3.4 J | 33 | 2.2 J | 26 | 8.0 | 22 | 24 |
| Perfluorohexanoic acid (PFHxA) | -- | 400,000 | ng/L | 7.8 | 8.6 | 8.8 | 14 | 12 | 21 | 4.2 | 12 | 9.3 | 13 | 17 |
| Perfluorononanesulfonic acid (PFNS) | -- | -- | ng/L | < 4.0 U | < 3.7 U | < 3.5 U | < 3.5 U | < 3.9 U | < 3.5 U | < 3.5 U | < 3.5 U | < 4.6 U | < 4.0 U | < 3.6 U |
| Perfluorononanoic acid (PFNA) | **30** | 6 | ng/L | < 4.0 U | < 3.7 U | < 3.5 U | < 3.5 U | 2.2 J | < 3.5 U | 0.91 J | < 3.5 U | < 4.6 U | < 4.0 U | < 3.6 U |
| Perfluorooctane Sulfonamide (FOSA) | -- | -- | ng/L | < 4.0 U | < 3.7 U | < 3.5 U | < 3.5 U | 3.5 J | < 3.5 U | < 3.5 U | < 3.5 U | < 4.6 U | < 4.0 U | < 3.6 U |
| Perfluorooctane sulfonic acid (PFOS) | **12** | 16 | ng/L | **17** | < 3.7 U | **38** | **49** | **110** | < 3.5 U | **13** | < 3.5 U | < 4.6 U | < 4.0 U | < 3.6 U |
| Perfluorooctanoic acid (PFOA) | **170** | 8 | ng/L | 11 | 4.8 | 42 | 40 | 24 | 41 | 12 | 63 | 19 | 20 | 34 |
| Perfluoropentanesulfonic acid (PFPeS) | -- | -- | ng/L | 5.8 | 2.8 J | 5.1 | 4.8 | < 3.9 U | 13 | < 3.5 U | 6.1 | 2.5 J | 10 | 14 |
| Perfluoropentanoic acid (PFPeA) | -- | -- | ng/L | 7.3 | 7.4 | 10 | 13 | 11 | 16 | 4.8 | 14 | 7.1 | 9.2 | 12 |
| Perfluorotetradecanoic acid (PFTeA) | -- | -- | ng/L | < 4.0 U | < 3.7 U | < 3.5 U | < 3.5 U | < 3.9 U | < 3.5 U | < 3.5 U | < 3.5 U | < 4.6 U | < 4.0 U | < 3.6 U |
| Perfluorotridecanoic Acid (PFTriA) | -- | -- | ng/L | < 4.0 U | < 3.7 U | < 3.5 U | < 3.5 U | < 3.9 U | < 3.5 U | < 3.5 U | < 3.5 U | < 4.6 U | < 4.0 U | < 3.6 U |
| Perfluoroundecanoic acid (PFUnA) | -- | -- | ng/L | < 4.0 U | < 3.7 U | < 3.5 U | < 3.5 U | < 3.9 U | < 3.5 U | < 3.5 U | < 3.5 U | < 4.6 U | < 4.0 U | < 3.6 U |

Table 2
Summary of PFAS Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan

| Location ID: / Date Collected: / Sample Name: | MI Groundwater Surface Water Interface | MI Groundwater Residential Drinking Water | Units | MWF16-26 9/12/2023 MWF16-26_GW-091223 | MWF7-02 9/12/2023 MWF7-02_GW-091223 | MWF8-01 4/27/2023 MWF8-01_GW-042723 | MWM16-30 5/1/2023 MWM16-30_GW-050123 | MWM16-37 4/25/2023 MWM16-37_GW-042523 | MWM16-52 9/19/2023 MWM16-52_GW-091923 | MWM2-22 5/1/2023 MWM2-22_GW-050123 | MWM2-22 9/25/2023 MWM2-22_GW-092523 | MWM2-28 5/1/2023 MWM2-28_GW-050123 | MWM2-28 9/25/2023 MWM2-28_GW-092523 | MWM30-01 4/25/2023 MWM30-01_GW-042523 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PFAS** | | | | | | | | | | | | | | |
| 11Cl-PF3OUdS (F-53B Minor) | -- | -- | ng/L | < 8.0 U | < 8.4 U | < 7.1 U | < 7.7 U [< 7.4 U] | < 6.9 U | < 80 U | < 80 U | < 7.2 U | < 7.0 U | < 7.3 U | < 8.1 U |
| 4:2 FTS | -- | -- | ng/L | < 8.0 U | < 8.4 UQ | < 7.1 U | < 7.7 UQ [< 7.4 UQ] | < 6.9 UQ | < 80 UQ | < 80 UQ | < 7.2 UQ | < 7.0 UQ | < 7.3 UQ | < 8.1 UQ |
| 6:2FTS | -- | -- | ng/L | 8.4 | 4.9 JQ | < 7.1 U | < 7.7 UQ [< 7.4 UQ] | < 6.9 U | 28 JQ | < 80 UQ | < 80 U | 3.9 JQ | 3.4 JQ | 34 Q |
| 8:2FTS | -- | -- | ng/L | < 8.0 U | < 8.4 U | < 7.1 U | < 7.7 U [< 7.4 U] | < 6.9 U | < 80 UQ | < 80 UQ | < 80 U | 2.3 JQ | 2.0 JQ | < 8.1 UQ |
| 9Cl-PF3ONS (F-53B Major) | -- | -- | ng/L | < 8.0 U | < 8.4 U | < 7.1 U | < 7.7 U [< 7.4 U] | < 6.9 U | < 80 U | < 80 U | < 7.2 U | < 7.0 U | < 7.3 U | < 8.1 U |
| ADONA | -- | -- | ng/L | < 8.0 U | < 8.4 U | < 7.1 U | < 7.7 U [< 7.4 U] | < 6.9 U | < 80 U | < 80 U | < 7.2 U | < 7.0 U | < 7.3 U | < 8.1 U |
| HFPO-DA (GenX) | -- | 370 | ng/L | < 8.0 U | < 8.4 U | < 7.1 U | < 7.7 U [< 7.4 U] | < 6.9 U | < 80 U | < 80 U | < 7.2 U | < 7.0 U | < 7.3 U | < 8.1 U |
| N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA) | -- | -- | ng/L | < 8.0 U | < 8.4 U | < 7.1 U | < 7.7 U [< 7.4 U] | < 6.9 U | < 80 U | < 80 U | 2.0 J | < 7.0 U | < 7.3 U | < 8.1 U |
| N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA) | -- | -- | ng/L | < 8.0 U | < 8.4 U | < 7.1 U | < 7.7 U [< 7.4 U] | < 6.9 U | < 80 U | < 80 U | < 7.2 U | < 7.0 U | < 7.3 U | < 8.1 U |
| Perfluorobutanesulfonic acid (PFBS) | **670,000** | 420 | ng/L | 17 | 7.0 | 3.6 | 3.0 J [3.0 J] | 1.4 J | < 40 U | < 40 U | 7.4 | 3.7 | < 3.6 U | 4.6 |
| Perfluorobutanoic acid (PFBA) | -- | -- | ng/L | 11 | 15 | 1.6 J | 12 Q [11 Q] | 6.4 | < 40 U | 27 J | 28 | 14 Q | 16 | 24 Q |
| Perfluorodecanesulfonic acid (PFDS) | -- | -- | ng/L | < 4.0 U | < 4.2 U | < 3.6 U | < 3.9 U [< 3.7 U] | < 3.5 U | < 40 U | < 40 U | < 3.6 U | < 3.5 U | < 3.6 U | < 4.0 U |
| Perfluorodecanoic acid (PFDA) | -- | -- | ng/L | < 4.0 U | < 4.2 U | < 3.6 U | < 3.9 U [< 3.7 U] | < 3.5 U | < 40 U | < 40 U | 1.9 J | 2.2 J | 2.2 J | < 4.0 U |
| Perfluoroheptanesulfonic Acid (PFHpS) | -- | -- | ng/L | 0.98 J | 1.6 J | < 3.6 U | < 3.9 U [< 3.7 U] | < 3.5 U | < 40 U | < 40 U | < 3.6 U | 1.1 J | < 3.6 U | < 4.0 U |
| Perfluoroheptanoic acid (PFHpA) | -- | -- | ng/L | 5.8 | 8.9 | < 3.6 U | 6.7 [6.5 ] | 1.5 J | 8.6 J | 15 J | 14 | 8.1 | 8.3 | 15 |
| Perfluorohexanesulfonic acid (PFHxS) | **210** | 51 | ng/L | 21 | 16 | < 3.6 U | 4.7 [4.6 ] | 5.8 | 25 J | < 40 U | 8.7 | 4.2 | 7.0 | 8.3 |
| Perfluorohexanoic acid (PFHxA) | -- | 400,000 | ng/L | 22 | 16 | < 3.6 U | 7.7 [7.0 ] | 1.9 J | 12 J | 28 J | 28 | 16 | 18 | 20 |
| Perfluorononanesulfonic acid (PFNS) | -- | -- | ng/L | < 4.0 U | < 4.2 U | < 3.6 U | < 3.9 U [< 3.7 U] | < 3.5 U | < 40 U | < 40 U | < 3.6 U | < 3.5 U | < 3.6 U | < 4.0 U |
| Perfluorononanoic acid (PFNA) | **30** | 6 | ng/L | < 4.0 U | < 4.2 U | < 3.6 U | < 3.9 U [< 3.7 U] | < 3.5 U | < 40 U | < 40 U | 5.4 | 5.0 | 4.0 | < 4.0 U |
| Perfluorooctane Sulfonamide (FOSA) | -- | -- | ng/L | < 4.0 U | < 4.2 U | < 3.6 U | < 3.9 U [< 3.7 U] | < 3.5 U | < 40 U | < 40 U | < 3.6 U | < 3.5 U | < 3.6 U | < 4.0 U |
| Perfluorooctane sulfonic acid (PFOS) | **12** | 16 | ng/L | 2.0 J | **12** | < 3.6 U | 1.3 J [1.2 J] | 4.4 | **65** | **77** | **95** | **56** | **65** | < 4.0 U |
| Perfluorooctanoic acid (PFOA) | **170** | 8 | ng/L | 34 | 50 | < 3.6 U | 3.8 J [4.1 ] | 2.5 J | 21 J | 28 J | 26 | 18 | 16 | 45 |
| Perfluoropentanesulfonic acid (PFPeS) | -- | -- | ng/L | 11 | 6.0 | < 3.6 U | 1.0 J [< 3.7 U] | 0.93 J | < 40 U | < 40 U | < 3.6 U | < 3.5 U | < 3.6 U | 2.4 J |
| Perfluoropentanoic acid (PFPeA) | -- | -- | ng/L | 24 | 9.6 | < 3.6 U | 11 [13 ] | 2.0 J | < 40 U | 26 J | 27 | 14 | 17 | 18 |
| Perfluorotetradecanoic acid (PFTeA) | -- | -- | ng/L | < 4.0 U | < 4.2 U | < 3.6 U | < 3.9 U [< 3.7 U] | < 3.5 U | < 40 U | < 40 U | < 3.6 U | < 3.5 U | < 3.6 U | < 4.0 U |
| Perfluorotridecanoic Acid (PFTriA) | -- | -- | ng/L | < 4.0 U | < 4.2 U | < 3.6 U | < 3.9 U [< 3.7 U] | < 3.5 U | < 40 U | < 40 U | < 3.6 U | < 3.5 U | < 3.6 U | < 4.0 U |
| Perfluoroundecanoic acid (PFUnA) | -- | -- | ng/L | < 4.0 U | < 4.2 U | < 3.6 U | < 3.9 U [< 3.7 U] | < 3.5 U | < 40 U | < 40 U | < 3.6 U | < 3.5 U | < 3.6 U | < 4.0 U |

Table 2
Summary of PFAS Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan

| Location ID: / Date Collected: / Sample Name: | MI Groundwater Surface Water Interface | MI Groundwater Residential Drinking Water | Units | MWM30-01 9/14/2023 MWM30-01_GW-091423 | MWM30-02 9/19/2023 MWM30-02_GW-091923 | MWM32-01 5/1/2023 MWM32-01_GW-050123 | MWM32-09 5/2/2023 MWM32-09-GW-050223 | MWM4-05 5/1/2023 MWM4-05_GW-050123 | MWM5-02 4/25/2023 MWM5-02_GW-042523 | MWM5-03 9/14/2023 MWM5-03_GW-091423 | MWM5-03 9/14/2023 DUP-02_GW-091423 | MWOS-01 9/13/2023 MWOS-01_GW-091323 | MWOS-02 9/13/2023 MWOS-02_GW-091323 | MWOS-03 9/13/2023 MWOS-03_GW-091323 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PFAS** | | | | | | | | | | | | | | |
| 11Cl-PF3OUdS (F-53B Minor) | -- | -- | ng/L | < 7.1 U | < 7.7 U | < 80 U | < 7.0 U | < 7.4 U | < 6.9 U | < 7.4 U | < 7.6 U | < 7.0 U | < 8.0 U | < 7.7 U |
| 4:2 FTS | -- | -- | ng/L | < 7.1 UQ | < 7.7 UQ | < 80 UQ | < 7.0 U | < 7.4 UQ | < 6.9 UQ | < 7.4 UQ | < 7.6 UQ | < 7.0 UQ | < 8.0 UQ | < 7.7 UQ |
| 6:2FTS | -- | -- | ng/L | 37 Q | < 7.7 UQ | < 80 UQ | < 7.0 U | < 7.4 UQ | < 6.9 UQ | < 7.4 UQ | < 7.6 UQ | < 7.0 U | < 8.0 UQ | < 7.7 UQ |
| 8:2FTS | -- | -- | ng/L | < 7.1 UQ | < 7.7 U | < 80 UQ | < 7.0 U | < 7.4 U | < 6.9 U | < 7.4 U | < 7.6 U | < 7.0 U | < 8.0 U | < 7.7 U |
| 9Cl-PF3ONS (F-53B Major) | -- | -- | ng/L | < 7.1 U | < 7.7 U | < 80 U | < 7.0 U | < 7.4 U | < 6.9 U | < 7.4 U | < 7.6 U | < 7.0 U | < 8.0 U | < 7.7 U |
| ADONA | -- | -- | ng/L | < 7.1 U | < 7.7 U | < 80 U | < 7.0 U | < 7.4 U | < 6.9 U | < 7.4 U | < 7.6 U | < 7.0 U | < 8.0 U | < 7.7 U |
| HFPO-DA (GenX) | -- | 370 | ng/L | < 7.1 U | < 7.7 U | < 80 U | < 7.0 U | < 7.4 U | < 6.9 U | < 7.4 U | < 7.6 U | < 7.0 U | < 8.0 U | < 7.7 U |
| N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA) | -- | -- | ng/L | < 7.1 U | < 7.7 U | < 80 U | < 7.0 U | < 7.4 U | < 6.9 U | < 7.4 U | < 7.6 U | < 7.0 U | < 8.0 U | < 7.7 U |
| N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA) | -- | -- | ng/L | < 7.1 U | < 7.7 U | < 80 U | < 7.0 U | < 7.4 U | < 6.9 U | < 7.4 U | < 7.6 U | < 7.0 U | < 8.0 U | < 7.7 U |
| Perfluorobutanesulfonic acid (PFBS) | **670,000** | 420 | ng/L | < 3.5 U | 2.9 J | < 40 U | < 3.5 U | 2.5 J | 0.95 J | < 3.7 U | 2.8 J | 18 | 4.3 | < 3.9 U |
| Perfluorobutanoic acid (PFBA) | -- | -- | ng/L | < 3.5 UQ | 6.5 | < 40 U | < 3.5 U | 8.5 | 2.5 J | 2.5 J | 3.4 J | 14 | 7.9 | < 3.9 U |
| Perfluorodecanesulfonic acid (PFDS) | -- | -- | ng/L | < 3.5 U | < 3.9 U | < 40 U | < 3.5 U | < 3.7 U | < 3.5 U | < 3.7 U | < 3.8 U | < 3.5 U | < 4.0 U | < 3.9 U |
| Perfluorodecanoic acid (PFDA) | -- | -- | ng/L | < 3.5 U | < 3.9 U | < 40 U | < 3.5 U | < 3.7 U | < 3.5 U | < 3.7 U | < 3.8 U | < 3.5 U | < 4.0 U | < 3.9 U |
| Perfluoroheptanesulfonic Acid (PFHpS) | -- | -- | ng/L | < 3.5 U | < 3.9 U | < 40 U | < 3.5 U | < 3.7 U | < 3.5 U | < 3.7 U | < 3.8 U | < 3.5 U | < 4.0 U | < 3.9 U |
| Perfluoroheptanoic acid (PFHpA) | -- | -- | ng/L | 16 | 3.3 J | < 40 U | < 3.5 U | 2.6 J | < 3.5 U | 0.57 J | 0.70 J | 1.8 J | 1.5 J | < 3.9 U |
| Perfluorohexanesulfonic acid (PFHxS) | **210** | 51 | ng/L | 12 | 3.3 J | < 40 U | < 3.5 U | 2.2 J | < 3.5 U | 1.8 J | 1.5 J | 2.2 J | 6.8 | < 3.9 U |
| Perfluorohexanoic acid (PFHxA) | -- | 400,000 | ng/L | 23 | 3.4 J | < 40 U | < 3.5 U | 3.5 J | < 3.5 U | < 3.7 U | < 3.8 U | 3.3 J | 2.9 J | < 3.9 U |
| Perfluorononanesulfonic acid (PFNS) | -- | -- | ng/L | < 3.5 U | < 3.9 U | < 40 U | < 3.5 U | < 3.7 U | < 3.5 U | < 3.7 U | < 3.8 U | < 3.5 U | < 4.0 U | < 3.9 U |
| Perfluorononanoic acid (PFNA) | **30** | 6 | ng/L | < 3.5 U | < 3.9 U | < 40 U | < 3.5 U | < 3.7 U | < 3.5 U | < 3.7 U | < 3.8 U | < 3.5 U | < 4.0 U | < 3.9 U |
| Perfluorooctane Sulfonamide (FOSA) | -- | -- | ng/L | < 3.5 U | < 3.9 U | < 40 U | < 3.5 U | < 3.7 U | < 3.5 U | < 3.7 U | < 3.8 U | < 3.5 U | < 4.0 U | < 3.9 U |
| Perfluorooctane sulfonic acid (PFOS) | **12** | 16 | ng/L | < 3.5 U | 3.1 J | < 40 U | < 3.5 U | 2.2 J | 1.3 J | < 3.7 U | < 3.8 U | 7.8 | 9.5 | < 3.9 U |
| Perfluorooctanoic acid (PFOA) | **170** | 8 | ng/L | 54 | 6.7 | < 40 U | < 3.5 U | 4.2 | 1.0 J | < 3.7 U | 1.3 J | 3.8 | 7.0 | < 3.9 U |
| Perfluoropentanesulfonic acid (PFPeS) | -- | -- | ng/L | 2.6 J | < 3.9 U | < 40 U | < 3.5 U | < 3.7 U | < 3.5 U | < 3.7 U | < 3.8 U | < 3.5 U | 1.6 J | < 3.9 U |
| Perfluoropentanoic acid (PFPeA) | -- | -- | ng/L | 21 | 3.0 J | < 40 U | < 3.5 U | 3.8 | < 3.5 U | < 3.7 U | < 3.8 U | 5.7 | 2.5 J | < 3.9 U |
| Perfluorotetradecanoic acid (PFTeA) | -- | -- | ng/L | < 3.5 U | < 3.9 U | < 40 U | < 3.5 U | < 3.7 U | < 3.5 U | < 3.7 U | < 3.8 U | < 3.5 U | < 4.0 U | < 3.9 U |
| Perfluorotridecanoic Acid (PFTriA) | -- | -- | ng/L | < 3.5 U | < 3.9 U | < 40 U | < 3.5 U | < 3.7 U | < 3.5 U | < 3.7 U | < 3.8 U | < 3.5 U | < 4.0 U | < 3.9 U |
| Perfluoroundecanoic acid (PFUnA) | -- | -- | ng/L | < 3.5 U | < 3.9 U | < 40 U | < 3.5 U | < 3.7 U | < 3.5 U | < 3.7 U | < 3.8 U | < 3.5 U | < 4.0 U | < 3.9 U |

Table 2
Summary of PFAS Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan

| Location ID:<br>Date Collected:<br>Sample Name: | MI Groundwater Surface Water Interface | MI Groundwater Residential Drinking Water | Units | MWOS-04<br>9/13/2023<br>MWOS-04_GW-091323 | MWOS-05<br>4/27/2023<br>MW0S-05_GW-042723 | MWOS-09R<br>9/12/2023<br>MWOS-09R_GW-091223 | MWOS-10<br>9/12/2023<br>MWOS-10_GW-091223 | MWW10-03<br>9/15/2023<br>MWW10-03_GW-091523 | MWW10-04<br>4/26/2023<br>MWW10-04_GW-042623 | MWW10-04<br>9/15/2023<br>MWW10-04_GW-091523 | MWW1-02<br>9/19/2023<br>MWW1-02_GW-091923 | MWW1-04<br>5/2/2023<br>MWW1-04-GW-050223 | MWW1-04<br>9/15/2023<br>MWW1-04_GW-091523 | MWW1-06<br>9/13/2023<br>MWW1-06_GW-091323 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PFAS** | | | | | | | | | | | | | | |
| 11Cl-PF3OUdS (F-53B Minor) | -- | -- | ng/L | < 7.4 U | < 6.9 U | < 7.0 U | < 8.8 U | < 7.5 U | < 7.3 U | < 7.7 U [< 7.5 U] | < 80 U | < 7.1 U | < 7.8 U | < 8.2 U |
| 4:2 FTS | -- | -- | ng/L | < 7.4 UQ | < 6.9 UQ | < 7.0 UQ | < 8.8 UQ | < 7.5 UQ | < 7.3 UQ | < 7.7 UQ [< 7.5 UQ] | < 80 UQ | < 7.1 UQ | < 7.8 UQ | < 8.2 UQ |
| 6:2FTS | -- | -- | ng/L | < 7.4 UQ | < 6.9 U | 3.5 J | 3.0 J | < 7.5 UQ | < 7.3 UQ | < 7.7 UQ [< 7.5 UQ] | < 80 U | < 7.1 UQ | < 7.8 UQ | 16 |
| 8:2FTS | -- | -- | ng/L | < 7.4 U | < 6.9 U | < 7.0 U | < 8.8 U | < 7.5 UQ | < 7.3 UQ | < 7.7 UQ [< 7.5 UQ] | < 80 U | < 7.1 UQ | < 7.8 UQ | < 8.2 U |
| 9Cl-PF3ONS (F-53B Major) | -- | -- | ng/L | < 7.4 U | < 6.9 U | < 7.0 U | < 8.8 U | < 7.5 U | < 7.3 U | < 7.7 U [< 7.5 U] | < 80 U | < 7.1 U | < 7.8 U | < 8.2 U |
| ADONA | -- | -- | ng/L | < 7.4 U | < 6.9 U | < 7.0 U | < 8.8 U | < 7.5 U | < 7.3 U | < 7.7 U [< 7.5 U] | < 80 U | < 7.1 U | < 7.8 U | < 8.2 U |
| HFPO-DA (GenX) | -- | 370 | ng/L | < 7.4 U | < 6.9 U | < 7.0 U | < 8.8 U | < 7.5 U | < 7.3 U | < 7.7 U [< 7.5 U] | < 80 U | < 7.1 U | < 7.8 U | < 8.2 U |
| N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA) | -- | -- | ng/L | < 7.4 U | < 6.9 U | < 7.0 U | < 8.8 U | < 7.5 U | < 7.3 U | < 7.7 U [< 7.5 U] | < 80 U | 8.9 | 15 | < 8.2 U |
| N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA) | -- | -- | ng/L | < 7.4 U | < 6.9 U | < 7.0 U | < 8.8 U | < 7.5 U | < 7.3 U | < 7.7 U [< 7.5 U] | < 80 U | < 7.1 U | 1.0 J | < 8.2 U |
| Perfluorobutanesulfonic acid (PFBS) | **670,000** | 420 | ng/L | < 3.7 U | 2.9 J | 6.3 | 7.5 | 12 | < 3.7 U | < 3.9 U [< 3.8 U] | < 40 U | < 3.5 U | < 3.9 U | 2.7 J |
| Perfluorobutanoic acid (PFBA) | -- | -- | ng/L | < 3.7 UQ | 12 | 9.8 | 14 | 21 | 11 Q | 8.3 J [< 40 U] | 43 | < 3.5 UQ | < 40 U | 6.1 |
| Perfluorodecanesulfonic acid (PFDS) | -- | -- | ng/L | < 3.7 U | < 3.5 U | < 3.5 U | < 4.4 U | < 3.8 U | < 3.7 U | < 3.9 U [< 3.8 U] | < 40 U | < 3.5 U | 0.88 J | < 4.1 U |
| Perfluorodecanoic acid (PFDA) | -- | -- | ng/L | < 3.7 U | < 3.5 U | < 3.5 U | < 4.4 U | < 3.8 U | < 3.7 U | 0.94 J [1.1 J] | < 40 U | < 3.5 U | 0.87 J | < 4.1 U |
| Perfluoroheptanesulfonic Acid (PFHpS) | -- | -- | ng/L | < 3.7 U | < 3.5 U | < 3.5 U | < 4.4 U | 1.6 J | 1.2 J | < 3.9 U [< 3.8 U] | < 40 U | < 3.5 U | < 3.9 U | < 4.1 U |
| Perfluoroheptanoic acid (PFHpA) | -- | -- | ng/L | < 3.7 U | < 3.5 U | 10 | 11 | 30 | 17 | 11 [14 ] | < 40 U | < 3.5 U | 3.1 J | 1.3 J |
| Perfluorohexanesulfonic acid (PFHxS) | **210** | 51 | ng/L | < 3.7 U | 2.3 J | 10 | 13 | 44 | 6.9 | 5.7 [5.0 ] | 15 J | 4.1 | 4.5 | 0.96 J |
| Perfluorohexanoic acid (PFHxA) | -- | 400,000 | ng/L | < 3.7 U | < 3.5 U | 11 | 15 | 29 | 19 | 18 [15 ] | < 40 U | < 3.5 U | < 3.9 U | 1.3 J |
| Perfluorononanesulfonic acid (PFNS) | -- | -- | ng/L | < 3.7 U | < 3.5 U | < 3.5 U | < 4.4 U | < 3.8 U | < 3.7 U | < 3.9 U [< 3.8 U] | < 40 U | < 3.5 U | < 3.9 U | < 4.1 U |
| Perfluorononanoic acid (PFNA) | **30** | 6 | ng/L | < 3.7 U | < 3.5 U | < 3.5 U | < 4.4 U | < 3.8 U | 12 | 16 [15 ] | < 40 U | < 3.5 U | 1.3 J | < 4.1 U |
| Perfluorooctane Sulfonamide (FOSA) | -- | -- | ng/L | < 3.7 U | < 3.5 U | < 3.5 U | < 4.4 U | < 3.8 U | < 3.7 U | < 3.9 U [< 3.8 U] | < 40 U | 1.2 J | 1.7 J | < 4.1 U |
| Perfluorooctane sulfonic acid (PFOS) | **12** | 16 | ng/L | < 3.7 U | 2.7 J | < 3.5 U | < 4.4 U | < 3.8 U | **18** | **48 [47 ]** | **66** | **98** | **130** | **22** |
| Perfluorooctanoic acid (PFOA) | **170** | 8 | ng/L | < 3.7 U | 2.1 J | 19 | 10 | 50 | 78 | 45 [45 ] | 15 J | 2.8 J | 6.8 | 6.8 |
| Perfluoropentanesulfonic acid (PFPeS) | -- | -- | ng/L | < 3.7 U | < 3.5 U | 5.0 | 5.0 | 15 | < 3.7 U | < 3.9 U [< 3.8 U] | < 40 U | < 3.5 U | < 3.9 U | < 4.1 U |
| Perfluoropentanoic acid (PFPeA) | -- | -- | ng/L | < 3.7 U | 2.5 J | 11 | 14 | 27 | 18 | 15 [15 ] | < 40 U | < 3.5 U | 5.2 | 0.92 J |
| Perfluorotetradecanoic acid (PFTeA) | -- | -- | ng/L | < 3.7 U | < 3.5 U | < 3.5 U | < 4.4 U | < 3.8 U | < 3.7 U | < 3.9 U [< 3.8 U] | < 40 U | < 3.5 U | < 3.9 U | < 4.1 U |
| Perfluorotridecanoic Acid (PFTriA) | -- | -- | ng/L | < 3.7 U | < 3.5 U | < 3.5 U | < 4.4 U | < 3.8 U | < 3.7 U | < 3.9 U [< 3.8 U] | < 40 U | < 3.5 U | < 3.9 U | < 4.1 U |
| Perfluoroundecanoic acid (PFUnA) | -- | -- | ng/L | < 3.7 U | < 3.5 U | < 3.5 U | < 4.4 U | < 3.8 U | < 3.7 U | < 3.9 U [< 3.8 U] | < 40 U | < 3.5 U | < 3.9 U | < 4.1 U |

Table 2
Summary of PFAS Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan

| Location ID: / Date Collected: / Sample Name: | MI Groundwater Surface Water Interface | MI Groundwater Residential Drinking Water | Units | MWW10-SEN01 4/26/2023 MWW10-SEN01_GW-042623 | MWW10-SEN01 9/18/2023 MWW10-SEN01-091823 | PZF17-05 9/15/2023 PZF17-05_GW-091523 | SEEPVAULT 4/26/2023 SEEPVAULT_GW-042623 | SUMP 9/21/2023 SUMP_GW-092123 | TW-01-03 4/26/2023 TW-01-03_GW-042623 | TW-01-03 9/18/2023 TW-01-03_GW-091823 | TW10-01 9/18/2023 TW-10-01_GW-091823 | TW-MD-01 4/26/2023 TW-MD-01_GW-042623 | TW-ROW-01 9/13/2023 TW-ROW-01_GW-091323 | TW-ROW-03 9/13/2023 TW-ROW-03_GW-091323 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PFAS** | | | | | | | | | | | | | | |
| 11Cl-PF3OUdS (F-53B Minor) | -- | -- | ng/L | < 80 U | < 7.9 U | < 7.4 U | < 80 U | < 7.5 U | < 80 U | < 7.1 U | < 7.7 U | < 7.2 U | < 6.9 U | < 6.9 U |
| 4:2 FTS | -- | -- | ng/L | < 80 UQ | < 7.9 UQ | < 7.4 U | < 80 UQ | < 7.5 UQ | < 80 UQ | < 7.1 UQ | < 7.7 UQ | < 7.2 UQ | < 6.9 UQ | < 6.9 UQ |
| 6:2FTS | -- | -- | ng/L | < 80 UQ | < 7.9 UQ | < 7.4 U | < 80 UQ | < 7.5 UQ | < 80 UQ | < 7.1 UQ | 24 Q | < 7.2 UQ | < 6.9 UQ | 2.1 JQ |
| 8:2FTS | -- | -- | ng/L | < 80 U | < 7.9 UQ | < 7.4 U | < 80 U | < 7.5 UQ | < 80 UQ | < 7.1 UQ | < 7.7 U | < 7.2 U | < 6.9 U | < 6.9 U |
| 9Cl-PF3ONS (F-53B Major) | -- | -- | ng/L | < 80 U | < 7.9 U | < 7.4 U | < 80 U | < 7.5 U | < 80 U | < 7.1 U | < 7.7 U | < 7.2 U | < 6.9 U | < 6.9 U |
| ADONA | -- | -- | ng/L | < 80 U | < 7.9 U | < 7.4 U | < 80 U | < 7.5 U | < 80 U | < 7.1 U | < 7.7 U | < 7.2 U | < 6.9 U | < 6.9 U |
| HFPO-DA (GenX) | -- | 370 | ng/L | < 80 U | < 7.9 U | < 7.4 U | < 80 U | < 7.5 U | < 80 U | < 7.1 U | < 7.7 U | < 7.2 U | < 6.9 U | < 6.9 U |
| N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA) | -- | -- | ng/L | < 80 U | < 7.9 U | < 7.4 U | < 80 U | < 7.5 U | < 80 UQ | < 7.1 U | < 7.7 U | < 7.2 U | < 6.9 U | < 6.9 U |
| N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA) | -- | -- | ng/L | < 80 U | < 7.9 U | < 7.4 U | < 80 U | < 7.5 U | < 80 UQ | < 7.1 U | < 7.7 U | < 7.2 U | < 6.9 U | < 6.9 U |
| Perfluorobutanesulfonic acid (PFBS) | **670,000** | 420 | ng/L | < 40 U | < 3.9 U | 0.67 J | < 40 U | < 3.8 U | < 40 U | < 3.6 U | 43 | 1.3 J | < 3.4 U | 4.8 |
| Perfluorobutanoic acid (PFBA) | -- | -- | ng/L | 10 J | < 3.9 UQ | 1.1 J | 14 J | < 3.8 UQ | < 40 U | < 3.6 UQ | < 3.8 UQ | 2.7 JQ | 8.6 | 12 |
| Perfluorodecanesulfonic acid (PFDS) | -- | -- | ng/L | < 40 U | < 3.9 U | < 3.7 U | < 40 U | < 3.8 U | < 40 U | < 3.6 U | < 3.8 U | < 3.6 U | < 3.4 U | < 3.5 U |
| Perfluorodecanoic acid (PFDA) | -- | -- | ng/L | < 40 U | < 3.9 U | < 3.7 U | < 40 U | < 3.8 U | < 40 U | < 3.6 U | < 3.8 U | < 3.6 U | < 3.4 U | < 3.5 U |
| Perfluoroheptanesulfonic Acid (PFHpS) | -- | -- | ng/L | < 40 U | < 3.9 U | < 3.7 U | < 40 U | 2.1 J | < 40 U | 3.1 J | 3.1 J | < 3.6 U | 0.88 J | 0.95 J |
| Perfluoroheptanoic acid (PFHpA) | -- | -- | ng/L | < 40 U | 3.4 J | < 3.7 U | < 40 U | 4.4 | < 40 U | < 3.6 U | 7.0 | < 3.6 U | 2.1 J | 1.7 J |
| Perfluorohexanesulfonic acid (PFHxS) | **210** | 51 | ng/L | < 40 U | 2.9 J | < 3.7 U | 12 J | 11 | 19 J | 19 | 47 | 5.6 | 3.5 | 6.3 |
| Perfluorohexanoic acid (PFHxA) | -- | 400,000 | ng/L | < 40 U | 6.0 | < 3.7 U | < 40 U | 7.4 | < 40 U | < 3.6 U | 45 | 1.2 J | 4.2 | 4.1 |
| Perfluorononanesulfonic acid (PFNS) | -- | -- | ng/L | < 40 U | < 3.9 U | < 3.7 U | < 40 U | < 3.8 U | < 40 U | < 3.6 U | < 3.8 U | < 3.6 U | < 3.4 U | < 3.5 U |
| Perfluorononanoic acid (PFNA) | **30** | 6 | ng/L | < 40 U | < 3.9 U | < 3.7 U | < 40 U | 0.71 J | < 40 U | 1.1 J | < 3.8 U | < 3.6 U | < 3.4 U | 0.74 J |
| Perfluorooctane Sulfonamide (FOSA) | -- | -- | ng/L | < 40 U | < 3.9 U | < 3.7 U | < 40 U | < 3.8 U | < 40 U | < 3.6 U | < 3.8 U | < 3.6 U | < 3.4 U | < 3.5 U |
| Perfluorooctane sulfonic acid (PFOS) | **12** | 16 | ng/L | **15 J** | **18** | < 3.7 U | **100** | **120** | **97** | **150** | **81** | 1.3 J | **12** | **36** |
| Perfluorooctanoic acid (PFOA) | **170** | 8 | ng/L | < 40 U | 8.7 | < 3.7 U | 11 J | 12 | 29 J | 21 | 15 | 4.6 | 5.5 | 5.8 |
| Perfluoropentanesulfonic acid (PFPeS) | -- | -- | ng/L | < 40 U | < 3.9 U | < 3.7 U | < 40 U | < 3.8 U | < 40 U | < 3.6 U | 13 | 0.97 J | < 3.4 U | 1.3 J |
| Perfluoropentanoic acid (PFPeA) | -- | -- | ng/L | < 40 U | < 3.9 U | < 3.7 U | < 40 U | < 3.8 U | < 40 U | < 3.6 U | < 3.8 U | < 3.6 U | < 3.4 U | 4.5 |
| Perfluorotetradecanoic acid (PFTeA) | -- | -- | ng/L | < 40 U | < 3.9 U | < 3.7 U | < 40 U | < 3.8 U | < 40 U | < 3.6 U | < 3.8 U | < 3.6 U | < 3.4 U | < 3.5 U |
| Perfluorotridecanoic Acid (PFTriA) | -- | -- | ng/L | < 40 U | < 3.9 U | < 3.7 U | < 40 U | < 3.8 U | < 40 U | < 3.6 U | < 3.8 U | < 3.6 U | < 3.4 U | < 3.5 U |
| Perfluoroundecanoic acid (PFUnA) | -- | -- | ng/L | < 40 U | < 3.9 U | < 3.7 U | < 40 U | < 3.8 U | < 40 U | < 3.6 U | < 3.8 U | < 3.6 U | < 3.4 U | < 3.5 U |

**Table 2**
**Summary of PFAS Analytical Results**
**RACER Trust Pontiac North Campus**
**Pontiac, Michigan**

**Notes:**

1) Criteria listed are from the State of Michigan's groundwater clean-up rules, Michigan Department of Environment Great Lakes and Energy (EGLE) updated on October 12, 2023
2) Bold values denote exceedance and/or equal to Michigan Groundwater Surface Water Interface criteria
3) Gray highlighted values denote exceedance and/or equal to Michigan Residential Drinking Water criteria
4) Samples were analyzed by LC-MS/MS with isotope dilution by modified USEPA Method 537M. The modified method includes analysis of 28 per- and polyfluoroalkyl substances (PFAS), including Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) and all other PFAS for which EGLE has a Part 201 Drinking Water Criteria and USEPA has proposed a Maximum Contaminant Level.

**Abbreviations**

| | |
|---|---|
| < | Not detected above the laboratory reporting limit |
| ng/L | Nanograms per liter |
| MI | Michigan |
| J | Estimated result less than limit of quantitation (LOQ) and greater than or equal to detection limit (DL) |
| U | Compound was analyzed for but not detected. The associated value is the compound quantitation limit. |
| Q | Surrogate failure |

# Figures

| MWM4-05 | |
|---|---|
| Analyte | 5/1/2023 |
| PFOA | 4.2 |
| PFOS | 2.2 J |
| PFNA | < 3.7 |
| PFHxS | 2.2 J |

| MWM16-30 | |
|---|---|
| Analyte | 5/1/2023 |
| PFOA | 3.8 J |
| PFOS | 1.3 J |
| PFNA | < 3.9 |
| PFHxS | 4.7 |

| MWM5-02 | |
|---|---|
| Analyte | 4/25/2023 |
| PFOA | 1.0 J |
| PFOS | 1.3 J |
| PFNA | < 3.5 |
| PFHxS | < 3.5 |

| MWM5-03 | |
|---|---|
| Analyte | 9/14/2023 |
| PFOA | < 3.7 |
| PFOS | < 3.7 |
| PFNA | < 3.7 |
| PFHxS | 1.8 J |

| MWM16-37 | |
|---|---|
| Analyte | 4/25/2023 |
| PFOA | 2.5 J |
| PFOS | 4.4 |
| PFNA | < 3.5 |
| PFHxS | 5.8 |

| MWM16-52 | |
|---|---|
| Analyte | 9/19/2023 |
| PFOA | 21 J |
| PFOS | 65 |
| PFNA | < 40 |
| PFHxS | 25 J |

| MWM32-01 | |
|---|---|
| Analyte | 5/1/2023 |
| PFOA | < 40 |
| PFOS | < 40 |
| PFNA | < 40 |
| PFHxS | < 40 |

| MWM32-09 | |
|---|---|
| Analyte | 5/2/2023 |
| PFOA | < 3.5 |
| PFOS | < 3.5 |
| PFNA | < 3.5 |
| PFHxS | < 3.5 |

| MWM30-02 | |
|---|---|
| Analyte | 9/19/2023 |
| PFOA | 6.7 |
| PFOS | 3.1 J |
| PFNA | < 3.9 |
| PFHxS | 3.3 J |

| MWM30-01 | |
|---|---|
| Analyte | 4/25/2023 |
| PFOA | 45 |
| PFOS | < 4.0 |
| PFNA | < 4.0 |
| PFHxS | 8.3 |
| Analyte | 9/14/2023 |
| PFOA | 54 |
| PFOS | < 3.5 |
| PFNA | < 3.5 |
| PFHxS | 12 |

| MWF8-01 | |
|---|---|
| Analyte | 4/27/2023 |
| PFOA | < 3.6 |
| PFOS | < 3.6 |
| PFNA | < 3.6 |
| PFHxS | < 3.6 |

| MWF16-05 | |
|---|---|
| Analyte | 4/27/2023 |
| PFOA | 4.8 |
| PFOS | < 3.7 |
| PFNA | < 3.7 |
| PFHxS | 6.8 |

| MWF16-18 | |
|---|---|
| Analyte | 4/27/2023 |
| PFOA | 41 |
| PFOS | < 3.5 |
| PFNA | < 3.5 |
| PFHxS | 33 |
| Analyte | 9/15/2023 |
| PFOA | 12 |
| PFOS | 13 |
| PFNA | 0.91 J |
| PFHxS | 2.2 J |

| MWF16-12 | |
|---|---|
| Analyte | 9/18/2023 |
| PFOA | 24 |
| PFOS | 110 |
| PFNA | 2.2 J |
| PFHxS | 3.4 J |

| MWM2-22 | |
|---|---|
| Analyte | 5/1/2023 |
| PFOA | 28 J |
| PFOS | 77 |
| PFNA | < 40 |
| PFHxS | < 40 |
| Analyte | 9/25/2023 |
| PFOA | 26 |
| PFOS | 95 |
| PFNA | 5.4 |
| PFHxS | 8.7 |

| MWM2-28 | |
|---|---|
| Analyte | 5/1/2023 |
| PFOA | 18 |
| PFOS | 56 |
| PFNA | 5 |
| PFHxS | 4.2 |
| Analyte | 9/25/2023 |
| PFOA | 16 |
| PFOS | 65 |
| PFNA | 4 |
| PFHxS | 7 |

| MWF16-26 | |
|---|---|
| Analyte | 5/2/2023 |
| PFOA | 34 |
| PFOS | < 3.6 |
| PFNA | < 3.6 |
| PFHxS | 24 |
| Analyte | 9/12/2023 |
| PFOA | 34 |
| PFOS | 2.0 J |
| PFNA | < 4.0 |
| PFHxS | 21 |

| PZF17-05 | |
|---|---|
| Analyte | 9/15/2023 |
| PFOA | < 3.7 |
| PFOS | < 3.7 |
| PFNA | < 3.7 |
| PFHxS | < 3.7 |

| MWF16-25 | |
|---|---|
| Analyte | 9/12/2023 |
| PFOA | 20 |
| PFOS | < 4.0 |
| PFNA | < 4.0 |
| PFHxS | 22 |

| MWF16-23 | |
|---|---|
| Analyte | 4/25/2023 |
| PFOA | 63 |
| PFOS | < 3.5 |
| PFNA | < 3.5 |
| PFHxS | 26 |
| Analyte | 9/12/2023 |
| PFOA | 19 |
| PFOS | < 4.6 |
| PFNA | < 4.6 |
| PFHxS | 8 |

| MWOS-09R | |
|---|---|
| Analyte | 9/12/2023 |
| PFOA | 19 |
| PFOS | < 3.5 |
| PFNA | < 3.5 |
| PFHxS | 10 |

| MWOS-10 | |
|---|---|
| Analyte | 9/12/2023 |
| PFOA | 10 |
| PFOS | < 4.4 |
| PFNA | < 4.4 |
| PFHxS | 13 |

| MW-05-18 | |
|---|---|
| Analyte | 9/12/2023 |
| PFOA | 5.3 |
| PFOS | < 3.8 |
| PFNA | < 3.8 |
| PFHxS | 7 |

| MW-02-17 | |
|---|---|
| Analyte | 4/25/2023 |
| PFOA | 7.7 |
| PFOS | < 4.0 |
| PFNA | < 4.0 |
| PFHxS | 10 |
| Analyte | 9/13/2023 |
| PFOA | 5.9 |
| PFOS | < 3.4 |
| PFNA | < 3.4 |
| PFHxS | 9.3 |

| MWF7-02 | |
|---|---|
| Analyte | 9/12/2023 |
| PFOA | 50 |
| PFOS | 12 |
| PFNA | < 4.2 |
| PFHxS | 16 |

| MWF15-01 | |
|---|---|
| Analyte | 9/12/2023 |
| PFOA | 11 |
| PFOS | 17 |
| PFNA | < 4.0 |
| PFHxS | 13 |

| MWW10-04 | |
|---|---|
| Analyte | 4/26/2023 |
| PFOA | 78 |
| PFOS | 18 |
| PFNA | 12 |
| PFHxS | 6.9 |
| Analyte | 9/15/2023 |
| PFOA | 45 |
| PFOS | 48 |
| PFNA | 16 |
| PFHxS | 5.7 |

| MWW10-03 | |
|---|---|
| Analyte | 9/15/2023 |
| PFOA | 50 |
| PFOS | < 3.8 |
| PFNA | < 3.8 |
| PFHxS | 44 |

| MWF12-01R | |
|---|---|
| Analyte | 4/27/2023 |
| PFOA | 3.2 J |
| PFOS | < 3.5 |
| PFNA | < 3.5 |
| PFHxS | 1.8 J |

| MWF12-02R | |
|---|---|
| Analyte | 4/25/2023 |
| PFOA | 1.1 |
| PFOS | 4 |
| PFNA | < 3.8 |
| PFHxS | 5.9 |
| Analyte | 9/12/2023 |
| PFOA | 9.6 |
| PFOS | 9 |
| PFNA | < 3.4 |
| PFHxS | 4.6 |

| MWW10-SEN01 | |
|---|---|
| Analyte | 4/26/2023 |
| PFOA | < 40 |
| PFOS | 15 J |
| PFNA | < 40 |
| PFHxS | < 40 |
| Analyte | 9/18/2023 |
| PFOA | 8.7 |
| PFOS | 18 |
| PFNA | < 3.9 |
| PFHxS | 2.9 J |

| TW-10-01 | |
|---|---|
| Analyte | 9/19/2023 |
| PFOA | 15 |
| PFOS | 81 |
| PFNA | < 3.8 |
| PFHxS | 47 |

| TW-01-03 | |
|---|---|
| Analyte | 4/26/2023 |
| PFOA | 29 J |
| PFOS | 97 |
| PFNA | < 40 |
| PFHxS | 19 J |
| Analyte | 9/18/2023 |
| PFOA | 21 |
| PFOS | 150 |
| PFNA | 1.1 J |
| PFHxS | 19 |

| MW-43-14R | |
|---|---|
| Analyte | 9/25/2023 |
| PFOA | 12 |
| PFOS | 99 |
| PFNA | 1.0 J |
| PFHxS | 16 |

| MWW1-02 | |
|---|---|
| Analyte | 9/19/2023 |
| PFOA | 15 J |
| PFOS | 66 |
| PFNA | < 40 |
| PFHxS | 15 J |

| TW-ROW-01 | |
|---|---|
| Analyte | 9/13/2023 |
| PFOA | 5.5 |
| PFOS | 12 |
| PFNA | < 3.4 |
| PFHxS | 3.5 |

| SEEPVAULT | |
|---|---|
| Analyte | 4/26/2023 |
| PFOA | 11 J |
| PFOS | 100 |
| PFNA | < 40 |
| PFHxS | 12 J |
| Analyte | 9/27/2023 |
| PFOA | 12 |
| PFOS | 120 |
| PFNA | 0.71 J |
| PFHxS | 11 |

| MW-03-17 | |
|---|---|
| Analyte | 4/25/2023 |
| PFOA | 27 |
| PFOS | 140 |
| PFNA | 2.4 J |
| PFHxS | 58 |
| Analyte | 9/12/2023 |
| PFOA | 20 |
| PFOS | 140 |
| PFNA | 2.5 J |
| PFHxS | 32 |

| MWOS-01 | |
|---|---|
| Analyte | 9/13/2023 |
| PFOA | 3.8 |
| PFOS | 7.8 |
| PFNA | < 3.5 |
| PFHxS | 2.2 J |

| MWOS-02 | |
|---|---|
| Analyte | 9/13/2023 |
| PFOA | 7 |
| PFOS | 9.5 |
| PFNA | < 4.0 |
| PFHxS | 6.8 |

| MWW1-04 | |
|---|---|
| Analyte | 5/2/2023 |
| PFOA | 2.8 J |
| PFOS | 98 |
| PFNA | < 3.5 |
| PFHxS | 4.1 |
| Analyte | 9/15/2023 |
| PFOA | 6.8 |
| PFOS | 130 |
| PFNA | 1.3 J |
| PFHxS | 4.5 |

| MWOS-03 | |
|---|---|
| Analyte | 9/13/2023 |
| PFOA | < 3.9 |
| PFOS | < 3.9 |
| PFNA | < 3.9 |
| PFHxS | < 3.9 |

| MWW1-06 | |
|---|---|
| Analyte | 9/13/2023 |
| PFOA | 6.8 |
| PFOS | 22 |
| PFNA | < 4.1 |
| PFHxS | 0.96 J |

| MW-01-17 | |
|---|---|
| Analyte | 9/13/2023 |
| PFOA | 14 |
| PFOS | 13 |
| PFNA | 0.67 J |
| PFHxS | 13 |

| MWOS-04 | |
|---|---|
| Analyte | 9/13/2023 |
| PFOA | < 3.7 |
| PFOS | < 3.7 |
| PFNA | < 3.7 |
| PFHxS | < 3.7 |

| TW-ROW-03 | |
|---|---|
| Analyte | 9/13/2023 |
| PFOA | 5.8 |
| PFOS | 36 |
| PFNA | 0.74 J |
| PFHxS | 6.3 |

| TW-MD-01 | |
|---|---|
| Analyte | 4/26/2023 |
| PFOA | 4.6 |
| PFOS | 1.3 J |
| PFNA | < 3.6 |
| PFHxS | 5.6 |

| MWOS-05 | |
|---|---|
| Analyte | 4/27/2023 |
| PFOA | 2.1 J |
| PFOS | 2.7 J |
| PFNA | < 3.5 |
| PFHxS | 2.3 J |

| MWDP-02R | |
|---|---|
| Analyte | 9/21/2023 |
| PFOA | 2.2 J |
| PFOS | 4.2 |
| PFNA | < 3.5 |
| PFHxS | 2.3 J |

| MWF16-06 | |
|---|---|
| Analyte | 4/27/2023 |
| PFOA | 42 |
| PFOS | 38 |
| PFNA | < 3.5 |
| PFHxS | 18 |
| Analyte | 9/15/2023 |
| PFOA | 40 |
| PFOS | 49 |
| PFNA | < 3.5 |
| PFHxS | 17 |

| PZF17-05 | |
|---|---|
| Analyte | 9/15/2023 |
| PFOA | < 3.7 |
| PFOS | < 3.7 |
| PFNA | < 3.7 |
| PFHxS | < 3.7 |

## LEGEND

- BULKHEAD LOCATION
- EXISTING MONITORING WELLL
- EXISTING TEMPORARY MONITORING WELL
- SEEP VAULT
- EXCEEDS RESIDENTIAL DRINKING WATER CRITERIA FOR PFAS
- DOES NOT EXCEED RESIDENTIAL DRINKING WATER OR GSI CRITERIA FOR PFAS
- EXCEEDS RESIDENTIAL DRINKING WATER AND GSI CRITERIA FOR PFAS
- EXCEEDS GSI CRITERIA FOR PFAS
- MONITORING WELLS PROPOSED FOR SEMI-ANNUAL SAMPLING (2Q AND 4Q 2024)
- OUTFALL LOCATION
- STORM AND SANITARY SEWER LINES POTENTIALLY IN CONTACT WITH GROUNDWATER
- APPROXIMATE LOCATION OF SANITARY SEWER LINES
- APPROXIMATE LOCATION OF STORM SEWER LINES
- GENERAL MOTORS, LLC PROPERTY BOUNDARY
- CURRENT OR FORMER RACER PROPERTY
- GROUNDWATER CONTOUR (2.0 FEET INTERVAL)
- INFERRED GROUNDWATER CONTOUR
- APPROXIMATE GROUNDWATER FLOW DIRECTION

ABBREVIATIONS:

< - NOT DETECTED ABOVE THE LABORATORY REPORTING LIMIT

ng/L - NANOGRAMS PER LITER

J - ESTIMATED RESULT LESS THAN LIMIT OF QUANTITATION (LOQ) AND GREATER THAN OR EQUAL TO DETECTION LIMIT (DL)

U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.

GSI - GROUNDWATER SURFACE WATER INTERFACE

PFAS - PER-AND POLYFLUOROALKYL SUBSTANCES

NOTES:
CRITERIA LISTED ARE FROM THE STATE OF MICHIGAN'S GROUNDWATER CLEAN-UP RULES, PART 201, MICHIGAN DEPARTMENT OF ENVIRONMENTAL GREAT LAKES AND ENERGY (EGLE) UPDATED ON FEBRUARY 15, 2022.

0 300 600
SCALE IN FEET

| Analyte | P201 Residential Drinking Water | P201 Groundwater Surface Water Interface | Units |
|---|---|---|---|
| Perfluorooctane sulfonic acid (PFOS) | 16 | 12 | ng/L |
| Perfluorooctanoic acid (PFOA) | 8 | 12,000 | ng/L |
| Perfluorononanoic acid (PFNA) | 6 | 30 | ng/L |
| Perfluorohexanesulfonic acid (PFHxS) | 51 | 210 | ng/L |

RACER TRUST
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

**SEWER LAYOUT SHOWING PFAS ANALYTICAL DATA**

ARCADIS

FIGURE 1

CITY: NOVI DIV: ENV DB: TRY PIC: S.INSALACO PM: T. LINDER TM: L. CRISP TR: PROJECT NUMBER: 30075936.0005 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet D:\GIS\Project Files\MotorsLiquidationCompany\PontiacNorthCampus\Documents\Former_Fiero_Property\SiteInvestigation_2023\MonitoringPlan_2024\MonitoringPlan_2024.aprx PLOTTED: 4/22/2024 5:42 PM BY: TYarbrough

Service Layer Credits: Google Earth Pro Aerial Dated March 19, 2021

SPO PARKING

RAIL PARCEL

FORMER BUILDING 25

SPO

CONSUMER'S SUBSTATION

FORMER BUILDING 15

FORMER PLANT 12

BUILDING 14

FORMER FIERO PARKING LOT

FORMER FIERO PLANT 17

RAIL PARCEL

FORMER POWER HOUSE FACILITY

FORMER PLANT 14S (PLANTS 5 AND 23)

GM POWERTRAIN

USPS REGIONAL DISTRIBUTION CENTER

FORMER STORMWATER DETENTION FACILITY

W Walton Blvd
E Walton Blvd
Alpine Ln
Bellmore Ln
Concord Ln
Deerfield Ln
Highwood
Highwood Blvd
Lehigh Ave
Laurel
Jaycee Park Rd
W Sheffield
E Sheffield
Hollywood
W Princeton
E Princeton
W Hopkins
E Hopkins
W Yale
E Yale
W Ypsilanti
E Ypsilanti
E Ann Arbor
Price
Peacock
Clara
W Columbia
E Columbia
W Longfellow
E Longfellow
W Strathmore
E Strathmore
W Fairmount
E Fairmount
W Rutgers
E Rutgers
W Cornell
E Cornell
Baldwin Ave
W Beverly Ave
E Beverly Ave
W Tennyson
Saint Louis Ave
W Kennett Rd
E Kennett Rd
Parkdale Ave
N Merrimac St
S Merrimac
Owens St
Saint Clair St
Young
Wing
Portland
W Montcalm
E Montcalm
Hillside Dr
Burt
City Line Rd
Le Grande
Garner
Hudson
Riker
McNeil St
Hood
W Rundell
Tacoma Ct
Hamilton
Cadillac
Jefferson
Virginia
Kimball
Grandie
Home
Whitfield
Kemp
N Saginaw St
Edison
Wolfe
Marquette
N Glenwood
Nelson
Hammond
Glenwood Ave
4th St
3rd Ave
2nd Ave
1st Ave
Ivy
Beverly Ave
E Beverly Ave
Joslyn Ave
E Tennyson
E Mansfield
E Madison
Le Baron
Wesbrook
Lenox
Markle
Raskob
E Kennett Rd
Lowell

**LEGEND**

- PROPERTY BOUNDARY
- WATER WELL RESTRICTION ORDINANCE AREA
- PROPERTY SOLD BY RACER
- GENERAL MOTORS, LLC (GM)
- CURRENT OR FORMER RACER PROPERTY

SPO – SERVICE PARTS OPERATION

USPS – UNITED STATES POSTAL SERVICE

WWTP – WASTEWATER TREATMENT PLANT

NOTE: ALL BOUNDARIES ARE APPROXIMATE

0 300 600

SCALE IN FEET

RACER TRUST
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

**LAND AND RESOURCE USE RESTRICTIONS**

ARCADIS

FIGU 2

CITY: NOVI, MI DIV: ENV DB: TRY PIC: PM: B.SANDERS TM: TR: PROJECT NUMBER: 30006882
COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet
D:\GIS\Project Files\MotorsLiquidationCompany\PontiacNorthCampus\Documents\InspectionReport\2022_01\01_2022_InspectionReport_PropertyLayout.mxd PLOTTED: 8/17/2023 1:19:16 PM BY: TYarbrough

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CITY: NOVI, MI DIV: ENV DB: TRY PIC: PM: TM: TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
D:\GIS\Project Files\MotorsLiquidationCompany\PontiacNorthCampus\Documents\Former_Fiero_Property\SiteInvestigation_2023\MonitoringPlan_2024\MonitoringPlan_2024.aprx PLOTTED: 4/22/2024 5:03 PM BY: TYarbrough

MWF16-26
MWF16-06
MWF16-25
MWF16-23
MWF7-02
MWOS-09R
MWF15-01
MWOS-10
MW-05-18
MW-02-17
MWF12-01R
MWF12-02R
MWW10-04
MWW10-03
TW-10-01
MWM2-28
MW-03-17
MWW10-SEN01
TW-01-03
MW-43-14R
MWOS-01
MWOS-02
OUTFALL 001
OUTFALL 003
MW-01-17
TW-MD-01
SEEP VAULT
MWW1-04
MWW1-02
TW-ROW-03
TW-ROW-01
MWOS-03
MWOS-04
MWW1-06
MWOS-05
MWDP-2R
14-20-256-027

960 958 956 954 952 950 948 946 944 942 940 938

21" 18" 24" 15" 84" STORM 42" 42" SAN

MERRIMAC STREET
OWENS STREET
BALDWIN AVENUE
ST CLAIR STREET
YOUNG STREET
WING STREET
CORTLAND STREET
OXFORD STREET
PONTIAC STREET
HARRIS LAKE
AARON - PERRY

## LEGEND

- PROPOSED MONITORING WELL INSTALLATION
- PROPOSED SAMPLING POINT FOR OUTFALL 003
- MONITORING WELLS PROPOSED FOR SEMI-ANNUAL SAMPLING (2Q AND 4Q 2024)
- BULKHEAD LOCATION
- EXISTING MONITORING WELLL
- EXISTING TEMPORARY MONITORING WELL
- SEEP VAULT
- EXCEEDS RESIDENTIAL DRINKING WATER CRITERIA FOR PFAS
- DOES NOT EXCEED RESIDENTIAL DRINKING WATER OR GSI CRITERIA FOR PFAS
- EXCEEDS RESIDENTIAL DRINKING WATER AND GSI CRITERIA FOR PFAS
- EXCEEDS GSI CRITERIA FOR PFAS
- OUTFALL LOCATION
- SEWER FLOW DIRECTION
- STORM AND SANITARY SEWER LINES POTENTIALLY IN CONTACT WITH GROUNDWATER
- APPROXIMATE LOCATION OF SANITARY SEWER LINES
- APPROXIMATE LOCATION OF STORM SEWER LINES
- GROUNDWATER CONTOUR (2.0 FEET INTERVAL)
- INFERRED GROUNDWATER CONTOUR
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- GENERAL MOTORS, LLC PROPERTY BOUNDARY
- CURRENT OR FORMER RACER PROPERTY
- PARCEL BOUNDARY

0 250 500
SCALE IN FEET

RACER TRUST
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

**PROPOSED ADDITIONAL WORK**

ARCADIS

FIGURE
**3**

# Appendix A

## Laboratory Analytical Reports

# Report of Analysis

**Arcadis U.S., Inc.**
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Tiffany Linder

Project Name: RACER PNC

Project Number: 30167840.00030

Lot Number:**YD27025**

Date Completed:06/07/2023

Kathy Smith

06/08/2023 9:03 AM
Approved and released by:
Project Manager II: **Kathy E. Smith**

The electronic signature above is the equivalent of a handwritten signature.
This report shall not be reproduced, except in its entirety, without the written approval of Pace Analytical Services, LLC.

Pace Analytical Services, LLC (*formerly Shealy Environmental Services, Inc.*)
106 Vantage Point Drive West Columbia, SC 29172
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

## Case Narrative
## Arcadis U.S., Inc.
**Lot Number: YD27025**

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.4 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples were compliant with DOD QSM 5.4 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). The CF is calculated as follows:

CF = DF * FV / Vo

FV is volume of extract (mL)
Vo is initial sample volume (mL)
DF is dilution factor. For undiluted analysis, DF = 1.

Sample concentration for aqueous samples:
Concentration (ng/L) = Cs*CF,

$$C_s = \frac{\left(\frac{(A_s x C_{is})}{A_{is}}\right) - B}{M1}$$

Where

$C_s$ is on column concentration of target analyte in the sample (ng/L)
$C_{is}$ is concentration of internal standard in the sample (ng/L)
$A_s$ is peak response of target analyte in the sample
$A_{is}$ is peak response of internal standard in the sample
M1 is the average RF from ICAL or the slope from linear regression ICAL
B is the y-intercept from the ICAL

Pace is a DoD/DOE accredited laboratory; however, the following analyses are currently not listed on our DoD/DOE scope of accreditation: Drinking Water: pH EPA 150.1, Turbidity EPA 180.1, Metals EPA 200.7 & 200.8, Mercury EPA 245.1, Anions EPA 300.0, Cyanide EPA 335.4, Nitrates EPA 353.2, Orthophosphate & Phosphorus EPA 365.1, EDB/DBCP EPA 504.1, HPC SIMPLATE, Color SM 2120 B-2011, Alkalinity SM 2320 B-2011, Specific Conductance SM 2510 B-2011, Residue-filterable (TDS) SM 2540 C, Calcium Hardness (CaCO2) SM 3500-Ca B-2011, TRC SM 4500 Cl G-2011, pH SM 4500 H=B-2011, E.Coli, Total Coliform. Non-Potable Water: Metals EPA 200.7, Strontium EPA 200.8, Chlorate EPA 300.0, Cyanide EPA 335.4, Phenolics EPA 420.4, 2-Methyl-4,6-Dinitrophenol EPA 625.1, Propane RSK-175, Specific Conductance SM 2510 B-2011, Salinity SM2520 B, Residue- total SM 2540 B, Sulfite SM 4500 SO32- B-2011, Amenable Cyanide SM 4500-CN- G-2011, BOD & CBOD SM 5210 B, MBAS SM 5540 C-2011, Boron & Titanium SW-846 6010D, Boron, Molybdenum, & Titanium SW-846 6020B, Alcohols & Glycols SW-846 8015C, Pentachlorophenol SW-846 8151A, Ethyl Acetate, Hexane, & n-Hexane SW-846 8260D, SVOC 1,4-Dioxane, 4-Dimethyl aminoazobenzene, 1,4-Naphthoquinone, 3,5-Dinitroaniline, PETN SW-846 8270E, Amenable Cyanide SW-846 9012B. Solid and Chemical Materials: Boron & Titanium SW-846 6010D, Molybdenum SW-846 6020B, Ethylene Glycol SW-846 8015B, Pentachlorophenol SW-846 8151A, Chloroprene SW-846 8260B, SVOC 1,4-Dioxane, 1,3,5-Trinitrobenzene, 1,4- Naphthoquinone, 1,4-Phenylenediamine, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 3-Methylcholanthrene, 4-Aminobiphenyl, 4-Dimethyl aminoazobenzene, 4-Nitroquinoline-1-oxide, 7,12-Dimethylbenzo(a)anthracene, Chlorobenzilate, Diallate, Ethyl methanesulfonate, Isodrin, Isosafrole, Methyl methanesulfonate, n-Nitrosomethylethylamine, n-Nitrosomorpholine, n-Nitrosopiperidine, Piperonyl butoxide, Pronamide, Safrole, 3,5- Dinitroaniline, PETN SW-846 8270E, Oil & Grease SW-846 9071B.

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18.

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

PFAS
The following samples were diluted due to the nature of the sample matrix: YD27025-003, YD27025-004, YD27025-005. The LOQ has been elevated to reflect the dilution. Samples were diluted due to samples being foamy.

Surrogate recovery for the following sample was outside control limits: YD27025-001. DUP was performed with concurring results. The data has been reported.

Surrogate recovery for the following samples was outside the upper control limit: YD27025-003, YD27025-004, YD27025-005. These samples did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

Surrogate recovery for the following sample was outside control limits: YD27025-006. Re-extraction and/or re-analysis was performed outside of holding time with concurring results. All data has been reported.

## Manual Integration Summary

## Arcadis U.S., Inc.

### Lot Number: YD27025

### Project Name: RACER PNC

### Project Number: 30167840.00030

Where applicable, analytes for which manual integration occurred have been flagged with the following:

| Qualifier | Technical Justification | Qualifier | Technical Justification | Qualifier | Technical Justification |
|---|---|---|---|---|---|
| M-01 | Split peak | M-07 | Low fit | M-13 | Error |
| M-02 | Peak tailing | M-08 | Peak not found | M-14 | Baseline |
| M-03 | Incorrect auto integration | M-09 | Analyte not Identified by the Data System | M-15 | Other |
| M-04 | Poor chromatography | M-10 | Analyte misidentified by the Data System | M-16 | Retention time shift |
| M-05 | Manually assigned peak | M-11 | Invalid integration | M-17 | Shouldering |
| M-06 | Wrong isomer | M-12 | Wrong peak | | |

A summary of instances where manual integration occurred is included below:

| Method | Sample | Run Number | Parameter | Qualifier |
|---|---|---|---|---|
| PFAS by ID SOP | YD27025-001 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YD27025-001 | 1 | Perfluoro-1-pentanesulfonic acid | M-03 |
| PFAS by ID SOP | YD27025-001 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD27025-001 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD27025-001 | 1 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YD27025-001 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD27025-001 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD27025-003 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD27025-003 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD27025-003 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD27025-003 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD27025-004 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD27025-004 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD27025-004 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD27025-005 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD27025-005 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD27025-005 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD27025-006 | 1 | Perfluoro-1-heptanesulfonic acid | M-03 |
| PFAS by ID SOP | YD27025-006 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD27025-006 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD27025-006 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD27025-006 | 1 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YD27025-006 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD27025-006 | 2 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD27025-006 | 2 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD27025-006 | 2 | Perfluoro-n-heptanoic acid (PFHpA) | M-03 |
| PFAS by ID SOP | YD27025-006 | 2 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YD27025-006 | 2 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD27025-006 | 2 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YD27025-006 | 2 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD27025-006 | 2 | 13C8_PFOS | M-03 |
| PFAS by ID SOP | YQ75308-002 | 1 | N-methylperfluoro-1- | M-03 |
| PFAS by ID SOP | YQ75308-003 | 1 | N-methylperfluoro-1- | M-03 |
| PFAS by ID SOP | YD27025-001DU | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YD27025-001DU | 1 | Perfluoro-1-pentanesulfonic acid | M-03 |
| PFAS by ID SOP | YD27025-001DU | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD27025-001DU | 1 | Perfluoro-n-heptanoic acid (PFHpA) | M-03 |

## Manual Integration Summary

## Arcadis U.S., Inc.

**Lot Number: YD27025**

**Project Name: RACER PNC**

**Project Number: 30167840.00030**

Where applicable, analytes for which manual integration occurred have been flagged with the following:

| Qualifier | Technical Justification | Qualifier | Technical Justification | Qualifier | Technical Justification |
|---|---|---|---|---|---|
| M-01 | Split peak | M-07 | Low fit | M-13 | Error |
| M-02 | Peak tailing | M-08 | Peak not found | M-14 | Baseline |
| M-03 | Incorrect auto integration | M-09 | Analyte not Identified by the Data System | M-15 | Other |
| M-04 | Poor chromatography | M-10 | Analyte misidentified by the Data System | M-16 | Retention time shift |
| M-05 | Manually assigned peak | M-11 | Invalid integration | M-17 | Shouldering |
| M-06 | Wrong isomer | M-12 | Wrong peak | | |

A summary of instances where manual integration occurred is included below:

| Method | Sample | Run Number | Parameter | Qualifier |
|---|---|---|---|---|
| PFAS by ID SOP | YQ75308-002 | 1 | Perfluoro-n-nonanoic acid (PFNA) | M-03 |
| PFAS by ID SOP | YD27025-001DU | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YQ75308-003 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD27025-001DU | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YQ76891-002 | 1 | 1H, 1H, 2H, 2H-perfluorodecane | M-03 |
| PFAS by ID SOP | YQ76891-002 | 1 | N-methylperfluoro-1- | M-03 |
| PFAS by ID SOP | YQ76891-002 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

## Sample Summary

## Arcadis U.S., Inc.

**Lot Number: YD27025**

**Project Name: RACER PNC**

**Project Number: 30167840.00030**

| Sample Number | Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| 001 | TW-MD-01_GW-042623 | Aqueous | 04/26/2023 1000 | 04/27/2023 |
| 002 | EB-02_042623 | Aqueous | 04/26/2023 1010 | 04/27/2023 |
| 003 | SEEPVAULT_GW-042623 | Aqueous | 04/26/2023 1030 | 04/27/2023 |
| 004 | MWW10-SEN01_GW-042623 | Aqueous | 04/26/2023 1255 | 04/27/2023 |
| 005 | TW-01-03_GW-042623 | Aqueous | 04/26/2023 1515 | 04/27/2023 |
| 006 | MWW10-04_GW-042623 | Aqueous | 04/26/2023 1650 | 04/27/2023 |
| 007 | Trip Blank | Aqueous | 04/26/2023 1710 | 04/27/2023 |

(7 samples)

## Detection Summary

## Arcadis U.S., Inc.

**Lot Number: YD27025**

**Project Name: RACER PNC**

**Project Number: 30167840.00030**

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 001 | TW-MD-01_GW-042623 | Aqueous | PFBS | PFAS by ID | 1.3 | JM-03 | ng/L | 8 |
| 001 | TW-MD-01_GW-042623 | Aqueous | PFPeS | PFAS by ID | 0.97 | JM-03 | ng/L | 8 |
| 001 | TW-MD-01_GW-042623 | Aqueous | PFHxS | PFAS by ID | 5.6 | M-03 | ng/L | 8 |
| 001 | TW-MD-01_GW-042623 | Aqueous | PFBA | PFAS by ID | 2.7 | JQM-03 | ng/L | 8 |
| 001 | TW-MD-01_GW-042623 | Aqueous | PFHxA | PFAS by ID | 1.2 | JM-03 | ng/L | 8 |
| 001 | TW-MD-01_GW-042623 | Aqueous | PFOA | PFAS by ID | 4.6 | M-03 | ng/L | 8 |
| 001 | TW-MD-01_GW-042623 | Aqueous | PFOS | PFAS by ID | 1.3 | JM-03 | ng/L | 8 |
| 003 | SEEPVAULT_GW-042623 | Aqueous | PFHxS | PFAS by ID | 12 | JM-03 | ng/L | 12 |
| 003 | SEEPVAULT_GW-042623 | Aqueous | PFBA | PFAS by ID | 14 | JM-03 | ng/L | 12 |
| 003 | SEEPVAULT_GW-042623 | Aqueous | PFOA | PFAS by ID | 11 | JM-03 | ng/L | 12 |
| 003 | SEEPVAULT_GW-042623 | Aqueous | PFOS | PFAS by ID | 100 | M-03 | ng/L | 12 |
| 004 | MWW10-SEN01_GW-042623 | Aqueous | PFBA | PFAS by ID | 10 | JM-03 | ng/L | 14 |
| 004 | MWW10-SEN01_GW-042623 | Aqueous | PFOS | PFAS by ID | 15 | JM-03 | ng/L | 14 |
| 005 | TW-01-03_GW-042623 | Aqueous | PFHxS | PFAS by ID | 19 | JM-03 | ng/L | 16 |
| 005 | TW-01-03_GW-042623 | Aqueous | PFOA | PFAS by ID | 29 | JM-03 | ng/L | 16 |
| 005 | TW-01-03_GW-042623 | Aqueous | PFOS | PFAS by ID | 97 | M-03 | ng/L | 16 |
| 006 | MWW10-04_GW-042623 | Aqueous | PFHpS | PFAS by ID | 1.2 | JM-03 | ng/L | 18 |
| 006 | MWW10-04_GW-042623 | Aqueous | PFHxS | PFAS by ID | 6.9 | M-03 | ng/L | 18 |
| 006 | MWW10-04_GW-042623 | Aqueous | PFBA | PFAS by ID | 11 | QM-03 | ng/L | 18 |
| 006 | MWW10-04_GW-042623 | Aqueous | PFHpA | PFAS by ID | 17 | | ng/L | 18 |
| 006 | MWW10-04_GW-042623 | Aqueous | PFHxA | PFAS by ID | 19 | | ng/L | 18 |
| 006 | MWW10-04_GW-042623 | Aqueous | PFNA | PFAS by ID | 12 | | ng/L | 18 |
| 006 | MWW10-04_GW-042623 | Aqueous | PFOA | PFAS by ID | 78 | M-03 | ng/L | 18 |
| 006 | MWW10-04_GW-042623 | Aqueous | PFPeA | PFAS by ID | 18 | M-03 | ng/L | 18 |
| 006 | MWW10-04_GW-042623 | Aqueous | PFOS | PFAS by ID | 18 | M-03 | ng/L | 18 |

(25 detections)

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-001**

Description: **TW-MD-01_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1000** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/30/2023 2008 | ARC2 | 05/15/2023 1720 | 75308 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.2 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.2 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **1.3** | **JM-03** | **3.6** | **0.90** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **0.97** | **JM-03** | **3.6** | **0.90** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **5.6** | **M-03** | **3.6** | **0.90** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **2.7** | **JQM-03** | **3.6** | **0.90** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **1.2** | **JM-03** | **3.6** | **0.90** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **4.6** | **M-03** | **3.6** | **0.90** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **1.3** | **JM-03** | **3.6** | **0.90** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 259 | 50-150 |
| 13C2_6:2FTS | N | 187 | 50-150 |
| 13C2_8:2FTS | | 130 | 50-150 |
| 13C2_PFDoA | | 102 | 50-150 |
| 13C2_PFTeDA | | 101 | 50-150 |
| 13C3_PFBS | | 85 | 50-150 |
| 13C3_PFHxS | | 99 | 50-150 |
| 13C3-HFPO-DA | | 90 | 50-150 |
| 13C4_PFBA | N | 40 | 50-150 |
| 13C4_PFHpA | | 108 | 50-150 |
| 13C5_PFHxA | | 98 | 50-150 |
| 13C5_PFPeA | | 73 | 50-150 |
| 13C6_PFDA | | 112 | 50-150 |
| 13C7_PFUdA | | 106 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-001**

Description: **TW-MD-01_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1000** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 112 | 50-150 |
| 13C8_PFOS | | 109 | 50-150 |
| 13C8_PFOSA | | 117 | 50-150 |
| 13C9_PFNA | | 112 | 50-150 |
| d5-EtFOSAA | | 111 | 50-150 |
| d3-MeFOSAA | | 110 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-002**

Description: **EB-02_042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1010** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/30/2023 2033 | ARC2 | 05/15/2023 1720 | 75308 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 89 | 50-150 |
| 13C2_6:2FTS | | 90 | 50-150 |
| 13C2_8:2FTS | | 96 | 50-150 |
| 13C2_PFDoA | | 92 | 50-150 |
| 13C2_PFTeDA | | 93 | 50-150 |
| 13C3_PFBS | | 84 | 50-150 |
| 13C3_PFHxS | | 91 | 50-150 |
| 13C3-HFPO-DA | | 87 | 50-150 |
| 13C4_PFBA | | 89 | 50-150 |
| 13C4_PFHpA | | 91 | 50-150 |
| 13C5_PFHxA | | 93 | 50-150 |
| 13C5_PFPeA | | 88 | 50-150 |
| 13C6_PFDA | | 89 | 50-150 |
| 13C7_PFUdA | | 93 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-002**

Description: **EB-02_042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1010** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 92 | 50-150 |
| 13C8_PFOS | | 91 | 50-150 |
| 13C8_PFOSA | | 100 | 50-150 |
| 13C9_PFNA | | 91 | 50-150 |
| d5-EtFOSAA | | 95 | 50-150 |
| d3-MeFOSAA | | 95 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-003**

Description: **SEEPVAULT_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1030** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/30/2023 2046 | ARC2 | 05/15/2023 1720 | 75308 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **12** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **14** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **11** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **100** | **M-03** | **40** | **10** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 215 | 50-150 |
| 13C2_6:2FTS | N | 173 | 50-150 |
| 13C2_8:2FTS | | 150 | 50-150 |
| 13C2_PFDoA | | 105 | 50-150 |
| 13C2_PFTeDA | | 109 | 50-150 |
| 13C3_PFBS | | 106 | 50-150 |
| 13C3_PFHxS | | 105 | 50-150 |
| 13C3-HFPO-DA | | 104 | 50-150 |
| 13C4_PFBA | | 79 | 50-150 |
| 13C4_PFHpA | | 118 | 50-150 |
| 13C5_PFHxA | | 117 | 50-150 |
| 13C5_PFPeA | | 96 | 50-150 |
| 13C6_PFDA | | 120 | 50-150 |
| 13C7_PFUdA | | 120 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-003**

Description: **SEEPVAULT_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1030** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 119 | 50-150 |
| 13C8_PFOS | | 116 | 50-150 |
| 13C8_PFOSA | | 126 | 50-150 |
| 13C9_PFNA | | 119 | 50-150 |
| d5-EtFOSAA | | 124 | 50-150 |
| d3-MeFOSAA | | 127 | 50-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-004**

Description: **MWW10-SEN01_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1255** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/30/2023 2059 | ARC2 | 05/15/2023 1720 | 75308 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **10** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | M-03 | 40 | 10 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **15** | **JM-03** | **40** | **10** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 202 | 50-150 |
| 13C2_6:2FTS | N | 170 | 50-150 |
| 13C2_8:2FTS | | 134 | 50-150 |
| 13C2_PFDoA | | 101 | 50-150 |
| 13C2_PFTeDA | | 113 | 50-150 |
| 13C3_PFBS | | 109 | 50-150 |
| 13C3_PFHxS | | 111 | 50-150 |
| 13C3-HFPO-DA | | 105 | 50-150 |
| 13C4_PFBA | | 87 | 50-150 |
| 13C4_PFHpA | | 115 | 50-150 |
| 13C5_PFHxA | | 119 | 50-150 |
| 13C5_PFPeA | | 101 | 50-150 |
| 13C6_PFDA | | 117 | 50-150 |
| 13C7_PFUdA | | 117 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-004**

Description: **MWW10-SEN01_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1255** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 124 | 50-150 |
| 13C8_PFOS | | 115 | 50-150 |
| 13C8_PFOSA | | 127 | 50-150 |
| 13C9_PFNA | | 114 | 50-150 |
| d5-EtFOSAA | | 120 | 50-150 |
| d3-MeFOSAA | | 124 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-005**

Description: **TW-01-03_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1515** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/31/2023 1617 | ARC2 | 05/15/2023 1720 | 75308 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **19** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **29** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **97** | **M-03** | **40** | **10** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 385 | 50-150 |
| 13C2_6:2FTS | N | 327 | 50-150 |
| 13C2_8:2FTS | N | 344 | 50-150 |
| 13C2_PFDoA | | 134 | 50-150 |
| 13C2_PFTeDA | | 118 | 50-150 |
| 13C3_PFBS | | 113 | 50-150 |
| 13C3_PFHxS | | 125 | 50-150 |
| 13C3-HFPO-DA | | 107 | 50-150 |
| 13C4_PFBA | | 84 | 50-150 |
| 13C4_PFHpA | | 115 | 50-150 |
| 13C5_PFHxA | | 115 | 50-150 |
| 13C5_PFPeA | | 102 | 50-150 |
| 13C6_PFDA | | 131 | 50-150 |
| 13C7_PFUdA | | 144 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-005**

Description: **TW-01-03_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1515** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 117 | 50-150 |
| 13C8_PFOS | | 125 | 50-150 |
| 13C8_PFOSA | | 128 | 50-150 |
| 13C9_PFNA | | 126 | 50-150 |
| d5-EtFOSAA | N | 183 | 50-150 |
| d3-MeFOSAA | N | 162 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-006**

Description: **MWW10-04_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1650** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/31/2023 1630 | ARC2 | 05/15/2023 1720 | 75308 |
| 2 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/06/2023 2308 | ARC2 | 06/05/2023 1453 | 76891 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.3 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.3 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.3 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **1.2** | **JM-03** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **6.9** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **11** | **QM-03** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **17** | | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **19** | | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **12** | | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **78** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **18** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **18** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |

| Surrogate | Run 1 Q | Run 1 % Recovery | Run 1 Acceptance Limits | Run 2 Q | Run 2 % Recovery | Run 2 Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C2_4:2FTS | N | 292 | 50-150 | HN | 280 | 50-150 |
| 13C2_6:2FTS | N | 299 | 50-150 | HN | 304 | 50-150 |
| 13C2_8:2FTS | N | 277 | 50-150 | HN | 321 | 50-150 |
| 13C2_PFDoA | | 119 | 50-150 | H | 91 | 50-150 |
| 13C2_PFTeDA | | 104 | 50-150 | H | 73 | 50-150 |
| 13C3_PFBS | | 90 | 50-150 | H | 61 | 50-150 |
| 13C3_PFHxS | | 107 | 50-150 | H | 68 | 50-150 |
| 13C3-HFPO-DA | | 80 | 50-150 | HN | 41 | 50-150 |
| 13C4_PFBA | N | 33 | 50-150 | HN | 18 | 50-150 |
| 13C4_PFHpA | | 91 | 50-150 | HN | 44 | 50-150 |
| 13C5_PFHxA | | 82 | 50-150 | HN | 44 | 50-150 |
| 13C5_PFPeA | | 61 | 50-150 | HN | 28 | 50-150 |
| 13C6_PFDA | | 108 | 50-150 | H | 82 | 50-150 |

LOQ = Limit of Quantitation
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DL = Detection Limit
Q = Surrogate failure
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N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-006**

Description: **MWW10-04_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1650** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C7_PFUdA | | 124 | 50-150 | H | 93 | 50-150 |
| 13C8_PFOA | | 91 | 50-150 | H | 60 | 50-150 |
| 13C8_PFOS | | 115 | 50-150 | HM-03 | 82 | 50-150 |
| 13C8_PFOSA | | 111 | 50-150 | H | 69 | 50-150 |
| 13C9_PFNA | | 108 | 50-150 | H | 77 | 50-150 |
| d5-EtFOSAA | | 145 | 50-150 | H | 105 | 50-150 |
| d3-MeFOSAA | | 126 | 50-150 | H | 98 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-006**

Description: **MWW10-04_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1650** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/31/2023 1630 | ARC2 | 05/15/2023 1720 | 75308 |
| 2 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/06/2023 2308 | ARC2 | 06/05/2023 1453 | 76891 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | H | 7.1 | 1.8 | ng/L | 2 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | H | 7.1 | 1.8 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | HQ | 7.1 | 1.8 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | HQ | 7.1 | 1.8 | ng/L | 2 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | HQ | 7.1 | 1.8 | ng/L | 2 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | HQ | 7.1 | 1.8 | ng/L | 2 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | H | 7.1 | 1.8 | ng/L | 2 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | H | 7.1 | 1.8 | ng/L | 2 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | H | 7.1 | 1.8 | ng/L | 2 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **6.8** | **HM-03** | **3.6** | **0.89** | **ng/L** | **2** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **9.1** | **HQM-03** | **3.6** | **0.89** | **ng/L** | **2** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **19** | **HQM-03** | **3.6** | **0.89** | **ng/L** | **2** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **25** | **HQM-03** | **3.6** | **0.89** | **ng/L** | **2** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **11** | **H** | **3.6** | **0.89** | **ng/L** | **2** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **79** | **HM-03** | **3.6** | **0.89** | **ng/L** | **2** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **21** | **HQM-03** | **3.6** | **0.89** | **ng/L** | **2** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **21** | **HM-03** | **3.6** | **0.89** | **ng/L** | **2** |

| Surrogate | Run 1 Q | Run 1 % Recovery | Run 1 Acceptance Limits | Run 2 Q | Run 2 % Recovery | Run 2 Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C2_4:2FTS | N | 292 | 50-150 | HN | 280 | 50-150 |
| 13C2_6:2FTS | N | 299 | 50-150 | HN | 304 | 50-150 |
| 13C2_8:2FTS | N | 277 | 50-150 | HN | 321 | 50-150 |
| 13C2_PFDoA | | 119 | 50-150 | H | 91 | 50-150 |
| 13C2_PFTeDA | | 104 | 50-150 | H | 73 | 50-150 |
| 13C3_PFBS | | 90 | 50-150 | H | 61 | 50-150 |
| 13C3_PFHxS | | 107 | 50-150 | H | 68 | 50-150 |
| 13C3-HFPO-DA | | 80 | 50-150 | HN | 41 | 50-150 |
| 13C4_PFBA | N | 33 | 50-150 | HN | 18 | 50-150 |
| 13C4_PFHpA | | 91 | 50-150 | HN | 44 | 50-150 |
| 13C5_PFHxA | | 82 | 50-150 | HN | 44 | 50-150 |
| 13C5_PFPeA | | 61 | 50-150 | HN | 28 | 50-150 |
| 13C6_PFDA | | 108 | 50-150 | H | 82 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-006**

Description: **MWW10-04_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1650** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C7_PFUdA | | 124 | 50-150 | H | 93 | 50-150 |
| 13C8_PFOA | | 91 | 50-150 | H | 60 | 50-150 |
| 13C8_PFOS | | 115 | 50-150 | HM-03 | 82 | 50-150 |
| 13C8_PFOSA | | 111 | 50-150 | H | 69 | 50-150 |
| 13C9_PFNA | | 108 | 50-150 | H | 77 | 50-150 |
| d5-EtFOSAA | | 145 | 50-150 | H | 105 | 50-150 |
| d3-MeFOSAA | | 126 | 50-150 | H | 98 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-007**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1710** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/31/2023 1643 | ARC2 | 05/15/2023 1720 | 75308 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 129 | 50-150 |
| 13C2_6:2FTS | | 108 | 50-150 |
| 13C2_8:2FTS | | 110 | 50-150 |
| 13C2_PFDoA | | 114 | 50-150 |
| 13C2_PFTeDA | | 115 | 50-150 |
| 13C3_PFBS | | 113 | 50-150 |
| 13C3_PFHxS | | 114 | 50-150 |
| 13C3-HFPO-DA | | 117 | 50-150 |
| 13C4_PFBA | | 114 | 50-150 |
| 13C4_PFHpA | | 118 | 50-150 |
| 13C5_PFHxA | | 122 | 50-150 |
| 13C5_PFPeA | | 109 | 50-150 |
| 13C6_PFDA | | 110 | 50-150 |
| 13C7_PFUdA | | 112 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-007**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1710** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 116 | 50-150 |
| 13C8_PFOS | | 117 | 50-150 |
| 13C8_PFOSA | | 119 | 50-150 |
| 13C9_PFNA | | 114 | 50-150 |
| d5-EtFOSAA | | 120 | 50-150 |
| d3-MeFOSAA | | 113 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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S = MS/MSD failure

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# QC Summary

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ75308-001
**Batch:** 75308
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/15/2023 1720

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/30/2023 1723 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/30/2023 1723 |
| 8:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/30/2023 1723 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/30/2023 1723 |
| 4:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/30/2023 1723 |
| GenX | ND | | 1 | 8.0 | 2.0 | ng/L | 05/30/2023 1723 |
| ADONA | ND | | 1 | 8.0 | 2.0 | ng/L | 05/30/2023 1723 |
| EtFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 05/30/2023 1723 |
| MeFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 05/30/2023 1723 |
| PFBS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFDS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFHpS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFNS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFOSA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFPeS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFHxS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFBA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFDA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFDoA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFHpA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFHxA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFNA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFOA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFPeA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFTeDA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFTrDA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFUdA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |
| PFOS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/30/2023 1723 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 107 | 50-150 |
| 13C2_6:2FTS | | 105 | 50-150 |
| 13C2_8:2FTS | | 101 | 50-150 |
| 13C2_PFDoA | | 95 | 50-150 |
| 13C2_PFTeDA | | 100 | 50-150 |
| 13C3_PFBS | | 97 | 50-150 |
| 13C3_PFHxS | | 96 | 50-150 |
| 13C3-HFPO-DA | | 99 | 50-150 |
| 13C4_PFBA | | 100 | 50-150 |
| 13C4_PFHpA | | 102 | 50-150 |
| 13C5_PFHxA | | 106 | 50-150 |
| 13C5_PFPeA | | 102 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ75308-001
**Batch:** 75308
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/15/2023 1720

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 102 | 50-150 |
| 13C7_PFUdA | | 104 | 50-150 |
| 13C8_PFOA | | 107 | 50-150 |
| 13C8_PFOS | | 100 | 50-150 |
| 13C8_PFOSA | | 115 | 50-150 |
| 13C9_PFNA | | 100 | 50-150 |
| d5-EtFOSAA | | 108 | 50-150 |
| d3-MeFOSAA | | 102 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ75308-002
**Batch:** 75308
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/15/2023 1720

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 14 | | 1 | 95 | 50-150 | 05/30/2023 1736 |
| 11Cl-PF3OUdS | 15 | 15 | | 1 | 97 | 50-150 | 05/30/2023 1736 |
| 8:2 FTS | 15 | 13 | | 1 | 87 | 67-138 | 05/30/2023 1736 |
| 6:2 FTS | 15 | 14 | | 1 | 95 | 64-140 | 05/30/2023 1736 |
| 4:2 FTS | 15 | 16 | | 1 | 104 | 63-143 | 05/30/2023 1736 |
| GenX | 32 | 31 | | 1 | 97 | 50-150 | 05/30/2023 1736 |
| ADONA | 15 | 15 | | 1 | 99 | 50-150 | 05/30/2023 1736 |
| EtFOSAA | 16 | 15 | | 1 | 91 | 61-135 | 05/30/2023 1736 |
| MeFOSAA | 16 | 16 | M-03 | 1 | 99 | 65-136 | 05/30/2023 1736 |
| PFBS | 14 | 14 | | 1 | 100 | 72-130 | 05/30/2023 1736 |
| PFDS | 15 | 15 | | 1 | 95 | 53-142 | 05/30/2023 1736 |
| PFHpS | 15 | 15 | | 1 | 99 | 69-134 | 05/30/2023 1736 |
| PFNS | 15 | 14 | | 1 | 90 | 69-127 | 05/30/2023 1736 |
| PFOSA | 16 | 15 | | 1 | 94 | 67-137 | 05/30/2023 1736 |
| PFPeS | 15 | 14 | | 1 | 93 | 71-127 | 05/30/2023 1736 |
| PFHxS | 15 | 15 | | 1 | 101 | 68-131 | 05/30/2023 1736 |
| PFBA | 16 | 15 | | 1 | 96 | 73-129 | 05/30/2023 1736 |
| PFDA | 16 | 15 | | 1 | 95 | 71-129 | 05/30/2023 1736 |
| PFDoA | 16 | 17 | | 1 | 106 | 72-134 | 05/30/2023 1736 |
| PFHpA | 16 | 16 | | 1 | 102 | 72-130 | 05/30/2023 1736 |
| PFHxA | 16 | 15 | | 1 | 94 | 72-129 | 05/30/2023 1736 |
| PFNA | 16 | 16 | M-03 | 1 | 103 | 69-130 | 05/30/2023 1736 |
| PFOA | 16 | 16 | | 1 | 100 | 71-133 | 05/30/2023 1736 |
| PFPeA | 16 | 15 | | 1 | 94 | 72-129 | 05/30/2023 1736 |
| PFTeDA | 16 | 16 | | 1 | 101 | 71-132 | 05/30/2023 1736 |
| PFTrDA | 16 | 16 | | 1 | 99 | 65-144 | 05/30/2023 1736 |
| PFUdA | 16 | 16 | | 1 | 99 | 69-133 | 05/30/2023 1736 |
| PFOS | 15 | 14 | | 1 | 93 | 65-140 | 05/30/2023 1736 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 106 | 50-150 |
| 13C2_6:2FTS | | 104 | 50-150 |
| 13C2_8:2FTS | | 100 | 50-150 |
| 13C2_PFDoA | | 96 | 50-150 |
| 13C2_PFTeDA | | 106 | 50-150 |
| 13C3_PFBS | | 99 | 50-150 |
| 13C3_PFHxS | | 99 | 50-150 |
| 13C3-HFPO-DA | | 102 | 50-150 |
| 13C4_PFBA | | 100 | 50-150 |
| 13C4_PFHpA | | 105 | 50-150 |
| 13C5_PFHxA | | 107 | 50-150 |
| 13C5_PFPeA | | 101 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ75308-002
**Batch:** 75308
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/15/2023 1720

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 104 | 50-150 |
| 13C7_PFUdA | | 104 | 50-150 |
| 13C8_PFOA | | 104 | 50-150 |
| 13C8_PFOS | | 103 | 50-150 |
| 13C8_PFOSA | | 113 | 50-150 |
| 13C9_PFNA | | 105 | 50-150 |
| d5-EtFOSAA | | 108 | 50-150 |
| d3-MeFOSAA | | 105 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCSD

**Sample ID:** YQ75308-003
**Batch:** 75308
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/15/2023 1720

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | % RPD | %Rec Limit | % RPD Limit | Analysis Date |
|---|---|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 16 | | 1 | 106 | 11 | 50-150 | 30 | 05/30/2023 1748 |
| 11Cl-PF3OUdS | 15 | 15 | | 1 | 99 | 2.8 | 50-150 | 30 | 05/30/2023 1748 |
| 8:2 FTS | 15 | 16 | | 1 | 101 | 15 | 67-138 | 30 | 05/30/2023 1748 |
| 6:2 FTS | 15 | 16 | | 1 | 106 | 11 | 64-140 | 30 | 05/30/2023 1748 |
| 4:2 FTS | 15 | 15 | | 1 | 103 | 0.57 | 63-143 | 30 | 05/30/2023 1748 |
| GenX | 32 | 33 | | 1 | 102 | 4.8 | 50-150 | 30 | 05/30/2023 1748 |
| ADONA | 15 | 15 | | 1 | 101 | 2.1 | 50-150 | 30 | 05/30/2023 1748 |
| EtFOSAA | 16 | 16 | | 1 | 102 | 11 | 61-135 | 30 | 05/30/2023 1748 |
| MeFOSAA | 16 | 17 | M-03 | 1 | 107 | 6.9 | 65-136 | 30 | 05/30/2023 1748 |
| PFBS | 14 | 14 | | 1 | 101 | 1.8 | 72-130 | 30 | 05/30/2023 1748 |
| PFDS | 15 | 16 | | 1 | 103 | 7.4 | 53-142 | 30 | 05/30/2023 1748 |
| PFHpS | 15 | 15 | | 1 | 99 | 0.30 | 69-134 | 30 | 05/30/2023 1748 |
| PFNS | 15 | 16 | | 1 | 104 | 15 | 69-127 | 30 | 05/30/2023 1748 |
| PFOSA | 16 | 15 | | 1 | 92 | 2.5 | 67-137 | 30 | 05/30/2023 1748 |
| PFPeS | 15 | 16 | | 1 | 104 | 10 | 71-127 | 30 | 05/30/2023 1748 |
| PFHxS | 15 | 15 | | 1 | 105 | 3.5 | 68-131 | 30 | 05/30/2023 1748 |
| PFBA | 16 | 16 | | 1 | 98 | 1.5 | 73-129 | 30 | 05/30/2023 1748 |
| PFDA | 16 | 17 | | 1 | 105 | 9.9 | 71-129 | 30 | 05/30/2023 1748 |
| PFDoA | 16 | 17 | | 1 | 105 | 1.5 | 72-134 | 30 | 05/30/2023 1748 |
| PFHpA | 16 | 16 | | 1 | 103 | 0.63 | 72-130 | 30 | 05/30/2023 1748 |
| PFHxA | 16 | 17 | | 1 | 104 | 10 | 72-129 | 30 | 05/30/2023 1748 |
| PFNA | 16 | 18 | | 1 | 115 | 11 | 69-130 | 30 | 05/30/2023 1748 |
| PFOA | 16 | 17 | | 1 | 105 | 4.9 | 71-133 | 30 | 05/30/2023 1748 |
| PFPeA | 16 | 16 | | 1 | 98 | 4.7 | 72-129 | 30 | 05/30/2023 1748 |
| PFTeDA | 16 | 17 | | 1 | 105 | 3.4 | 71-132 | 30 | 05/30/2023 1748 |
| PFTrDA | 16 | 17 | | 1 | 104 | 4.7 | 65-144 | 30 | 05/30/2023 1748 |
| PFUdA | 16 | 16 | | 1 | 103 | 3.9 | 69-133 | 30 | 05/30/2023 1748 |
| PFOS | 15 | 15 | M-03 | 1 | 100 | 7.6 | 65-140 | 30 | 05/30/2023 1748 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 99 | 50-150 |
| 13C2_6:2FTS | | 96 | 50-150 |
| 13C2_8:2FTS | | 103 | 50-150 |
| 13C2_PFDoA | | 93 | 50-150 |
| 13C2_PFTeDA | | 97 | 50-150 |
| 13C3_PFBS | | 94 | 50-150 |
| 13C3_PFHxS | | 96 | 50-150 |
| 13C3-HFPO-DA | | 97 | 50-150 |
| 13C4_PFBA | | 101 | 50-150 |
| 13C4_PFHpA | | 106 | 50-150 |
| 13C5_PFHxA | | 103 | 50-150 |
| 13C5_PFPeA | | 99 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCSD

**Sample ID:** YQ75308-003
**Batch:** 75308
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/15/2023 1720

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 102 | 50-150 |
| 13C7_PFUdA | | 100 | 50-150 |
| 13C8_PFOA | | 105 | 50-150 |
| 13C8_PFOS | | 95 | 50-150 |
| 13C8_PFOSA | | 112 | 50-150 |
| 13C9_PFNA | | 98 | 50-150 |
| d5-EtFOSAA | | 103 | 50-150 |
| d3-MeFOSAA | | 101 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - Duplicate

**Sample ID:** YD27025-001DU
**Batch:** 75308
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/15/2023 1720

| Parameter | Sample Amount (ng/L) | Result (ng/L) | Q | Dil | % RPD | %RPD Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| 11Cl-PF3OUdS | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| 8:2 FTS | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| 6:2 FTS | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| 4:2 FTS | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| GenX | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| ADONA | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| EtFOSAA | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| MeFOSAA | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| PFBS | 1.3 | 1.8 | JM-03,+ | 1 | 28 | 20 | 05/30/2023 2021 |
| PFDS | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| PFHpS | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| PFNS | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| PFOSA | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| PFPeS | 0.97 | 1.1 | JM-03 | 1 | 13 | 20 | 05/30/2023 2021 |
| PFHxS | 5.6 | 6.1 | | 1 | 8.0 | 20 | 05/30/2023 2021 |
| PFBA | 2.7 | 2.8 | JM-03 | 1 | 4.2 | 20 | 05/30/2023 2021 |
| PFDA | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| PFDoA | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| PFHpA | ND | 0.98 | JM-03 | 1 | 19 | 20 | 05/30/2023 2021 |
| PFHxA | 1.2 | 0.95 | J,+ | 1 | 24 | 20 | 05/30/2023 2021 |
| PFNA | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| PFOA | 4.6 | 4.9 | M-03 | 1 | 6.2 | 20 | 05/30/2023 2021 |
| PFPeA | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| PFTeDA | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| PFTrDA | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| PFUdA | ND | ND | | 1 | 0.00 | 20 | 05/30/2023 2021 |
| PFOS | 1.3 | 1.4 | JM-03 | 1 | 11 | 20 | 05/30/2023 2021 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | N | 266 | 50-150 |
| 13C2_6:2FTS | N | 200 | 50-150 |
| 13C2_8:2FTS | | 130 | 50-150 |
| 13C2_PFDoA | | 101 | 50-150 |
| 13C2_PFTeDA | | 104 | 50-150 |
| 13C3_PFBS | | 89 | 50-150 |
| 13C3_PFHxS | | 104 | 50-150 |
| 13C3-HFPO-DA | | 92 | 50-150 |
| 13C4_PFBA | N | 39 | 50-150 |
| 13C4_PFHpA | | 110 | 50-150 |
| 13C5_PFHxA | | 101 | 50-150 |
| 13C5_PFPeA | | 78 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - Duplicate

**Sample ID:** YD27025-001DU
**Batch:** 75308
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/15/2023 1720

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 114 | 50-150 |
| 13C7_PFUdA | | 115 | 50-150 |
| 13C8_PFOA | | 118 | 50-150 |
| 13C8_PFOS | | 109 | 50-150 |
| 13C8_PFOSA | | 124 | 50-150 |
| 13C9_PFNA | | 115 | 50-150 |
| d5-EtFOSAA | | 115 | 50-150 |
| d3-MeFOSAA | | 120 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ76891-001
**Batch:** 76891
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 06/05/2023 1453

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 2.0 | ng/L | 06/06/2023 2023 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 2.0 | ng/L | 06/06/2023 2023 |
| 8:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 06/06/2023 2023 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 06/06/2023 2023 |
| 4:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 06/06/2023 2023 |
| GenX | ND | | 1 | 8.0 | 2.0 | ng/L | 06/06/2023 2023 |
| ADONA | ND | | 1 | 8.0 | 2.0 | ng/L | 06/06/2023 2023 |
| EtFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 06/06/2023 2023 |
| MeFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 06/06/2023 2023 |
| PFBS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFDS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFHpS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFNS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFOSA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFPeS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFHxS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFBA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFDA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFDoA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFHpA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFHxA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFNA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFOA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFPeA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFTeDA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFTrDA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFUdA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |
| PFOS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/06/2023 2023 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 114 | 50-150 |
| 13C2_6:2FTS | | 99 | 50-150 |
| 13C2_8:2FTS | | 103 | 50-150 |
| 13C2_PFDoA | | 100 | 50-150 |
| 13C2_PFTeDA | | 95 | 50-150 |
| 13C3_PFBS | | 112 | 50-150 |
| 13C3_PFHxS | | 101 | 50-150 |
| 13C3-HFPO-DA | | 101 | 50-150 |
| 13C4_PFBA | | 107 | 50-150 |
| 13C4_PFHpA | | 110 | 50-150 |
| 13C5_PFHxA | | 110 | 50-150 |
| 13C5_PFPeA | | 105 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ76891-001
**Batch:** 76891
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 06/05/2023 1453

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 94 | 50-150 |
| 13C7_PFUdA | | 100 | 50-150 |
| 13C8_PFOA | | 110 | 50-150 |
| 13C8_PFOS | | 103 | 50-150 |
| 13C8_PFOSA | | 103 | 50-150 |
| 13C9_PFNA | | 107 | 50-150 |
| d5-EtFOSAA | | 103 | 50-150 |
| d3-MeFOSAA | | 103 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ76891-002
**Batch:** 76891
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 06/05/2023 1453

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 17 | | 1 | 112 | 50-150 | 06/06/2023 2034 |
| 11Cl-PF3OUdS | 15 | 17 | | 1 | 110 | 50-150 | 06/06/2023 2034 |
| 8:2 FTS | 15 | 16 | M-03 | 1 | 104 | 67-138 | 06/06/2023 2034 |
| 6:2 FTS | 15 | 18 | | 1 | 116 | 64-140 | 06/06/2023 2034 |
| 4:2 FTS | 15 | 16 | | 1 | 108 | 63-143 | 06/06/2023 2034 |
| GenX | 32 | 37 | | 1 | 116 | 50-150 | 06/06/2023 2034 |
| ADONA | 15 | 17 | | 1 | 114 | 50-150 | 06/06/2023 2034 |
| EtFOSAA | 16 | 17 | | 1 | 109 | 61-135 | 06/06/2023 2034 |
| MeFOSAA | 16 | 17 | M-03 | 1 | 106 | 65-136 | 06/06/2023 2034 |
| PFBS | 14 | 14 | | 1 | 102 | 72-130 | 06/06/2023 2034 |
| PFDS | 15 | 18 | | 1 | 114 | 53-142 | 06/06/2023 2034 |
| PFHpS | 15 | 18 | | 1 | 118 | 69-134 | 06/06/2023 2034 |
| PFNS | 15 | 16 | | 1 | 107 | 69-127 | 06/06/2023 2034 |
| PFOSA | 16 | 16 | | 1 | 103 | 67-137 | 06/06/2023 2034 |
| PFPeS | 15 | 15 | | 1 | 103 | 71-127 | 06/06/2023 2034 |
| PFHxS | 15 | 16 | | 1 | 110 | 68-131 | 06/06/2023 2034 |
| PFBA | 16 | 18 | | 1 | 111 | 73-129 | 06/06/2023 2034 |
| PFDA | 16 | 17 | | 1 | 103 | 71-129 | 06/06/2023 2034 |
| PFDoA | 16 | 19 | | 1 | 117 | 72-134 | 06/06/2023 2034 |
| PFHpA | 16 | 18 | | 1 | 114 | 72-130 | 06/06/2023 2034 |
| PFHxA | 16 | 17 | | 1 | 106 | 72-129 | 06/06/2023 2034 |
| PFNA | 16 | 16 | | 1 | 102 | 69-130 | 06/06/2023 2034 |
| PFOA | 16 | 18 | | 1 | 114 | 71-133 | 06/06/2023 2034 |
| PFPeA | 16 | 18 | | 1 | 110 | 72-129 | 06/06/2023 2034 |
| PFTeDA | 16 | 19 | | 1 | 116 | 71-132 | 06/06/2023 2034 |
| PFTrDA | 16 | 18 | | 1 | 113 | 65-144 | 06/06/2023 2034 |
| PFUdA | 16 | 18 | | 1 | 112 | 69-133 | 06/06/2023 2034 |
| PFOS | 15 | 15 | M-03 | 1 | 101 | 65-140 | 06/06/2023 2034 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 96 | 50-150 |
| 13C2_6:2FTS | | 85 | 50-150 |
| 13C2_8:2FTS | | 89 | 50-150 |
| 13C2_PFDoA | | 88 | 50-150 |
| 13C2_PFTeDA | | 87 | 50-150 |
| 13C3_PFBS | | 96 | 50-150 |
| 13C3_PFHxS | | 85 | 50-150 |
| 13C3-HFPO-DA | | 89 | 50-150 |
| 13C4_PFBA | | 92 | 50-150 |
| 13C4_PFHpA | | 90 | 50-150 |
| 13C5_PFHxA | | 98 | 50-150 |
| 13C5_PFPeA | | 90 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ76891-002
**Batch:** 76891
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 06/05/2023 1453

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 89 | 50-150 |
| 13C7_PFUdA | | 92 | 50-150 |
| 13C8_PFOA | | 93 | 50-150 |
| 13C8_PFOS | | 94 | 50-150 |
| 13C8_PFOSA | | 94 | 50-150 |
| 13C9_PFNA | | 96 | 50-150 |
| d5-EtFOSAA | | 94 | 50-150 |
| d3-MeFOSAA | | 91 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Chain of Custody
# and
# Miscellaneous Documents

**PACE ANALYTICAL SERVICES, LLC**
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 146504

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Tiffany. Linder Alexis Crisp | Telephone No / E-mail: Alexis.Crisp@arcadis.com tiffany.linder@arcadis.com | Quote No. |
| Address: 28555 Cabot Dr #500 | Sampler's Signature: x Sommer Guy | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds | Page 1 of |
| City: Novi / State: MI / Zip Code: 48377 | Printed Name: Sommer Guy | | YD27025 |
| Project Name: Racer PNC | | | RES2 |
| Project No.: 30167840.00030 | P.O. No.: | | |

| Sample ID / Description (Containers for each sample may be combined on one line) | Collection Date(s) | Collection Time (Military) | Grab G / Composite C | Matrix: Aqueous | Soil | Non-Aqueous | No of Containers by Preservative Type: Unpres. | HCl | HNO3 | H2SO4 | NaOH | Na2S2O3 | Field Filtered | PFAS Method 537 mod. with isotope dilution (533 Table 4) | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW-MD-01_GW-042623 | 4/26/23 | 1000 | G | 2 | | | 2 | | | | | | | X | |
| EB-02_042623 | 4/26/23 | 1010 | G | 2 | | | 2 | | | | | | | X | Equipment Blank |
| SEEPVAULT_GW-042623 | 4/26/23 | 1030 | G | 2 | | | 2 | | | | | | | X | |
| MWM10-SEN01_GW-042623 | 4/26/23 | 1255 | G | 2 | | | 2 | | | | | | | X | |
| TW-01-03_GW-042623 | 4/26/23 | 1515 | G | 2 | | | 2 | | | | | | | X | |
| MWM10-04_GW-042623 | 4/26/23 | 1650 | G | 2 | | | 2 | | | | | | | X | |
| tripblank | 4/26/23 | 1710 | G | 1 | | | 1 | | | | | | | X | tripblank |

Turn Around Time Required (Prior lab approval required for expedited TAT): ☒ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Guy | 4/26/23 | 1750 | 1. Received by: FedEx | 4/26/23 | 1750 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | 4.27.23 | 1010 | 4. Laboratory received by: Kayem Reams | 4.27.23 | 1010 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY: Received on Ice (Circle) (Yes) No Ice Pack — Receipt Temp 2.8 °C — Temp Blank ☒ Y ☐ N

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: ME003N2-01



PACE ANALYTICAL SERVICES, LLC

DC#_Title: ENV-FRM-WCOL-0286 v02_Samples Receipt Checklist (SRC)
Effective Date: 8/2/2022

# Sample Receipt Checklist (SRC)

Client: ARCADIS  Cooler Inspected by/date: KDRW / 04/27/2023  Lot #: YD27025

Means of receipt: ☐ Pace ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | | 1. Were custody seals present on the cooler? |
| ☑ Yes | ☐ No | ☐ NA | 2. If custody seals were present, were they intact and unbroken? |

pH Strip ID: NA  Chlorine Strip ID: NA  Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt  %Solid Snap-Cup ID: NA

2.8 / 2.8 °C  NA / NA °C  NA / NA °C  NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles  IR Gun ID: 8  IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | ☐ NA | 3. Were all coolers received at or below 6.0°C? If no, was Project Manager notified? PM was Notified by: phone / email / face-to-face (circle one). |
| ☑ Yes | ☐ No | ☐ NA | 4. Is the commercial courier's packing slip attached to this form? |
| ☑ Yes | ☐ No | | 5. Were proper custody procedures (relinquished/received) followed? |
| ☑ Yes | ☐ No | | 6. Were sample IDs listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 7. Was collection date & time listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 8. Did all container label information (ID, date, time) agree with the COC? |
| ☑ Yes | ☐ No | | 9. Were tests to be performed listed on the COC? |
| ☑ Yes | ☐ No | | 10. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____ |
| ☑ Yes | ☐ No | | 11. Was adequate sample volume available? |
| ☑ Yes | ☐ No | | 12. Were all samples received within ½ the holding time or 48 hours, whichever comes first? |
| ☑ Yes | ☐ No | | 13. Were all samples containers accounted for? (No missing/excess) |
| ☐ Yes | ☐ No | ☑ NA | 14. Were VOA, 8015C and RSK-175 samples free of bubbles >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials? |
| ☐ Yes | ☐ No | ☑ NA | 15. Were all DRO/metals/nutrient samples received at a pH of < 2? |
| ☐ Yes | ☐ No | ☑ NA | 16. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9? |
| ☐ Yes | ☐ No | ☑ NA | 17. Were all applicable $NH_3$/TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine? |
| ☐ Yes | ☑ No | ☐ NA | 18. Was the quote number listed on the container label? If yes, Quote # _____ |

**Sample Preservation** (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: $H_2SO_4$, $HNO_3$, HCl, NaOH using SR # NA. Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Unique ID: NA.

Comments:

# Report of Analysis

**Arcadis U.S., Inc.**
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Tiffany Linder

Project Name: Racer PNC

Project Number: 30171056.0370B

Lot Number:**YD28005**

Date Completed:05/26/2023

Project Manager:**Kathy E. Smith**



05/26/2023 10:10 AM
Approved and released by:
Project Manager II: **Edward Barnett**

The electronic signature above is the equivalent of a handwritten signature.
This report shall not be reproduced, except in its entirety, without the written approval of Pace Analytical Services, LLC.

Pace Analytical Services, LLC (*formerly Shealy Environmental Services, Inc.*)
106 Vantage Point Drive West Columbia, SC 29172
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

## Case Narrative
## Arcadis U.S., Inc.
### Lot Number: YD28005

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report. Where sampling is conducted by the client, results relate to the accuracy of the information provided, and as the samples are received.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved The NELAC Institute (TNI) standards, the Pace Analytical Services, LLC ("Pace") Laboratory Quality Manual, standard operating procedures (SOPs), and Pace policies. Additionally, the DoD QSM version 5.4 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the TNI standards, the Laboratory Quality Manual, SOPs, the DoD QSM, or policies are qualified on the results page or discussed below.

Pace is a DoD/DOE accredited laboratory; however, the following analyses are currently not listed on our DoD/DOE scope of accreditation: Drinking Water: pH EPA 150.1, Turbidity EPA 180.1, Metals EPA 200.7 & 200.8, Mercury EPA 245.1, Anions EPA 300.0, Cyanide EPA 335.4, Nitrates EPA 353.2, Orthophosphate & Phosphorus EPA 365.1, EDB/DBCP EPA 504.1, HPC SIMPLATE, Color SM 2120 B-2011, Alkalinity SM 2320 B-2011, Specific Conductance SM 2510 B-2011, Residue-filterable (TDS) SM 2540 C, Calcium Hardness (CaCO2) SM 3500-Ca B-2011, TRC SM 4500 Cl G-2011, pH SM 4500 H=B-2011, E.Coli, Total Coliform. Non-Potable Water: Metals EPA 200.7, Strontium EPA 200.8, Chlorate EPA 300.0, Cyanide EPA 335.4, Phenolics EPA 420.4, 2-Methyl-4,6-Dinitrophenol EPA 625.1, Propane RSK-175, Specific Conductance SM 2510 B-2011, Salinity SM2520 B, Residue- total SM 2540 B, Sulfite SM 4500 SO32- B-2011, Amenable Cyanide SM 4500-CN- G-2011, BOD & CBOD SM 5210 B, MBAS SM 5540 C-2011, Boron & Titanium SW-846 6010D, Boron, Molybdenum, & Titanium SW-846 6020B, Alcohols & Glycols SW-846 8015C, Pentachlorophenol SW-846 8151A, Ethyl Acetate, Hexane, & n-Hexane SW-846 8260D, SVOC 1,4-Dioxane, 4-Dimethyl aminoazobenzene, 1,4-Naphthoquinone, 3,5-Dinitroaniline, PETN SW-846 8270E, Amenable Cyanide SW-846 9012B. Solid and Chemical Materials: Boron & Titanium SW-846 6010D, Molybdenum SW-846 6020B, Ethylene Glycol SW-846 8015B, Pentachlorophenol SW-846 8151A, Chloroprene SW-846 8260B, SVOC 1,4-Dioxane, 1,3,5-Trinitrobenzene, 1,4- Naphthoquinone, 1,4-Phenylenediamine, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 3-Methylcholanthrene, 4-Aminobiphenyl, 4-Dimethyl aminoazobenzene, 4-Nitroquinoline-1-oxide, 7,12-Dimethylbenzo(a)anthracene, Chlorobenzilate, Diallate, Ethyl methanesulfonate, Isodrin, Isosafrole, Methyl methanesulfonate, n-Nitrosomethylethylamine, n-Nitrosomorpholine, n-Nitrosopiperidine, Piperonyl butoxide, Pronamide, Safrole, 3,5- Dinitroaniline, PETN SW-846 8270E, Oil & Grease SW-846 9071B.

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18.

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

**PFAS**

Surrogate recovery for the following sample was outside the upper control limit: YD28005-001. This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

Surrogate recovery for the following sample was outside control limits: YD28005-005. DUP was performed with concurring results. The original analysis has been reported.

Surrogate recovery for the following sample was outside control limits: YD28005-003. Re-extraction and/or re-analysis was performed with concurring results. The original analysis has been reported.

Surrogate recovery for the following samples was outside the upper control limit: YD28005-004, YD28005-006, YD28005-007. The samples did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

## Manual Integration Summary

## Arcadis U.S., Inc.

### Lot Number: YD28005

### Project Name: Racer PNC

### Project Number: 30171056.0370B

Where applicable, analytes for which manual integration occurred have been flagged with the following:

| Qualifier | Technical Justification | Qualifier | Technical Justification | Qualifier | Technical Justification |
|---|---|---|---|---|---|
| M-01 | Split peak | M-07 | Low fit | M-13 | Error |
| M-02 | Peak tailing | M-08 | Peak not found | M-14 | Baseline |
| M-03 | Incorrect auto integration | M-09 | Analyte not Identified by the Data System | M-15 | Other |
| M-04 | Poor chromatography | M-10 | Analyte misidentified by the Data System | M-16 | Retention time shift |
| M-05 | Manually assigned peak | M-11 | Invalid integration | M-17 | Shouldering |
| M-06 | Wrong isomer | M-12 | Wrong peak | | |

A summary of instances where manual integration occurred is included below:

| Method | Sample | Run Number | Parameter | Qualifier |
|---|---|---|---|---|
| PFAS by ID SOP | YD28005-001 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YD28005-001 | 1 | Perfluoro-1-pentanesulfonic acid | M-03 |
| PFAS by ID SOP | YD28005-001 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD28005-001 | 1 | Perfluoro-n-heptanoic acid (PFHpA) | M-03 |
| PFAS by ID SOP | YD28005-001 | 1 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YD28005-001 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD28005-001 | 1 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YD28005-002 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD28005-002 | 1 | d3-MeFOSAA | M-03 |
| PFAS by ID SOP | YD28005-003 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YD28005-003 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD28005-003 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD28005-003 | 1 | Perfluoro-n-heptanoic acid (PFHpA) | M-03 |
| PFAS by ID SOP | YD28005-003 | 1 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YD28005-003 | 1 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YD28005-004 | 2 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD28005-004 | 2 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YD28005-004 | 2 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD28005-004 | 2 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YD28005-004 | 2 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD28005-005 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YD28005-005 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD28005-005 | 1 | Perfluoro-n-heptanoic acid (PFHpA) | M-03 |
| PFAS by ID SOP | YD28005-005 | 1 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YD28005-005 | 1 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YD28005-005 | 1 | d5-EtFOSAA | M-03 |
| PFAS by ID SOP | YD28005-006 | 2 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YD28005-006 | 2 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD28005-006 | 2 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD28005-006 | 2 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD28005-007 | 2 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD28005-007 | 2 | Perfluoro-n-heptanoic acid (PFHpA) | M-03 |
| PFAS by ID SOP | YD28005-008 | 1 | 13C8_PFOA | M-03 |
| PFAS by ID SOP | YD28005-008 | 1 | d3-MeFOSAA | M-03 |
| PFAS by ID SOP | YQ75586-002 | 1 | 11-chloroeicosafluoro-3-oxaundecane- | M-03 |
| PFAS by ID SOP | YQ75586-002 | 1 | 1H, 1H, 2H, 2H-perfluorodecane | M-03 |
| PFAS by ID SOP | YD28005-001MS | 1 | 1H, 1H, 2H, 2H-perfluorodecane | M-03 |

## Manual Integration Summary

## Arcadis U.S., Inc.

### Lot Number: YD28005

### Project Name: Racer PNC

### Project Number: 30171056.0370B

Where applicable, analytes for which manual integration occurred have been flagged with the following:

| Qualifier | Technical Justification | Qualifier | Technical Justification | Qualifier | Technical Justification |
|---|---|---|---|---|---|
| M-01 | Split peak | M-07 | Low fit | M-13 | Error |
| M-02 | Peak tailing | M-08 | Peak not found | M-14 | Baseline |
| M-03 | Incorrect auto integration | M-09 | Analyte not Identified by the Data System | M-15 | Other |
| M-04 | Poor chromatography | M-10 | Analyte misidentified by the Data System | M-16 | Retention time shift |
| M-05 | Manually assigned peak | M-11 | Invalid integration | M-17 | Shouldering |
| M-06 | Wrong isomer | M-12 | Wrong peak | | |

A summary of instances where manual integration occurred is included below:

| Method | Sample | Run Number | Parameter | Qualifier |
|---|---|---|---|---|
| PFAS by ID SOP | YQ75586-002 | 1 | 1H, 1H, 2H, 2H-perfluorooctane sulfonic | M-03 |
| PFAS by ID SOP | YD28005-001MS | 1 | 1H, 1H, 2H, 2H-perfluorooctane sulfonic | M-03 |
| PFAS by ID SOP | YQ75586-002 | 1 | N-ethylperfluoro-1- | M-03 |
| PFAS by ID SOP | YD28005-001MS | 1 | N-ethylperfluoro-1- | M-03 |
| PFAS by ID SOP | YQ75586-002 | 1 | N-methylperfluoro-1- | M-03 |
| PFAS by ID SOP | YD28005-001MS | 1 | Perfluoro-1-nonanesulfonic acid (PFNS) | M-03 |
| PFAS by ID SOP | YD28005-001MS | 1 | Perfluoro-1-octanesulfonamide (PFOSA) | M-03 |
| PFAS by ID SOP | YD28005-001MS | 1 | Perfluoro-1-pentanesulfonic acid | M-03 |
| PFAS by ID SOP | YD28005-001MS | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD28005-005DU | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD28005-001MS | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YQ75586-002 | 1 | Perfluoro-n-dodecanoic acid (PFDoA) | M-03 |
| PFAS by ID SOP | YD28005-001MS | 1 | Perfluoro-n-heptanoic acid (PFHpA) | M-03 |
| PFAS by ID SOP | YD28005-005DU | 1 | Perfluoro-n-heptanoic acid (PFHpA) | M-03 |
| PFAS by ID SOP | YD28005-005DU | 1 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YD28005-001MS | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD28005-001MS | 1 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YD28005-005DU | 1 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YD28005-001MS | 1 | Perfluoro-n-tridecanoic acid (PFTrDA) | M-03 |
| PFAS by ID SOP | YD28005-001MS | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD28005-005DU | 1 | 13C2_8:2FTS | M-03 |
| PFAS by ID SOP | YD28005-005DU | 1 | 13C7_PFUdA | M-03 |
| PFAS by ID SOP | YQ75586-001 | 1 | d5-EtFOSAA | M-03 |
| PFAS by ID SOP | YQ75963-002 | 1 | 13C8_PFOSA | M-03 |
| PFAS by ID SOP | YQ75963-002 | 1 | 1H, 1H, 2H, 2H-perfluorodecane | M-03 |
| PFAS by ID SOP | YQ75963-002 | 1 | 1H, 1H, 2H, 2H-perfluorooctane sulfonic | M-03 |
| PFAS by ID SOP | YQ75963-002 | 1 | N-ethylperfluoro-1- | M-03 |
| PFAS by ID SOP | YQ75963-002 | 1 | N-methylperfluoro-1- | M-03 |
| PFAS by ID SOP | YQ75963-002 | 1 | Perfluoro-1-heptanesulfonic acid | M-03 |
| PFAS by ID SOP | YQ75963-002 | 1 | Perfluoro-1-octanesulfonamide (PFOSA) | M-03 |
| PFAS by ID SOP | YQ75963-002 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YQ75963-002 | 1 | Perfluoro-n-decanoic acid (PFDA) | M-03 |
| PFAS by ID SOP | YQ75963-002 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YQ75963-002 | 1 | Perfluoro-n-tetradecanoic acid | M-03 |
| PFAS by ID SOP | YQ75963-002 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |

## Manual Integration Summary

## Arcadis U.S., Inc.

**Lot Number: YD28005**

**Project Name: Racer PNC**

**Project Number: 30171056.0370B**

Where applicable, analytes for which manual integration occurred have been flagged with the following:

| Qualifier | Technical Justification | Qualifier | Technical Justification | Qualifier | Technical Justification |
|---|---|---|---|---|---|
| M-01 | Split peak | M-07 | Low fit | M-13 | Error |
| M-02 | Peak tailing | M-08 | Peak not found | M-14 | Baseline |
| M-03 | Incorrect auto integration | M-09 | Analyte not Identified by the Data System | M-15 | Other |
| M-04 | Poor chromatography | M-10 | Analyte misidentified by the Data System | M-16 | Retention time shift |
| M-05 | Manually assigned peak | M-11 | Invalid integration | M-17 | Shouldering |
| M-06 | Wrong isomer | M-12 | Wrong peak | | |

A summary of instances where manual integration occurred is included below:

| Method | Sample | Run Number | Parameter | Qualifier |
|---|---|---|---|---|

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

## Sample Summary

## Arcadis U.S., Inc.

**Lot Number: YD28005**

**Project Name: Racer PNC**

**Project Number: 30171056.0370B**

| Sample Number | Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| 001 | MWF16-05_GW-042723 | Aqueous | 04/27/2023 0940 | 04/28/2023 |
| 002 | MWF8-01_GW-042723 | Aqueous | 04/27/2023 1035 | 04/28/2023 |
| 003 | MWF16-18_GW-042723 | Aqueous | 04/27/2023 1125 | 04/28/2023 |
| 004 | MWF16-06_GW-042723 | Aqueous | 04/27/2023 1220 | 04/28/2023 |
| 005 | MWF12-01R_GW-042723 | Aqueous | 04/27/2023 1342 | 04/28/2023 |
| 006 | MW0S-05_GW-042723 | Aqueous | 04/27/2023 1453 | 04/28/2023 |
| 007 | DUP-01_GW-042723 | Aqueous | 04/27/2023 | 04/28/2023 |
| 008 | Trip Blank | Aqueous | 04/27/2023 1410 | 04/28/2023 |

(8 samples)

## Detection Summary

## Arcadis U.S., Inc.

**Lot Number: YD28005**

**Project Name: Racer PNC**

**Project Number: 30171056.0370B**

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 001 | MWF16-05_GW-042723 | Aqueous | PFBS | PFAS by ID | 3.3 | JM-03 | ng/L | 11 |
| 001 | MWF16-05_GW-042723 | Aqueous | PFPeS | PFAS by ID | 2.8 | JM-03 | ng/L | 11 |
| 001 | MWF16-05_GW-042723 | Aqueous | PFHxS | PFAS by ID | 6.8 | M-03 | ng/L | 11 |
| 001 | MWF16-05_GW-042723 | Aqueous | PFBA | PFAS by ID | 8.8 | | ng/L | 11 |
| 001 | MWF16-05_GW-042723 | Aqueous | PFHpA | PFAS by ID | 2.8 | JM-03 | ng/L | 11 |
| 001 | MWF16-05_GW-042723 | Aqueous | PFHxA | PFAS by ID | 8.6 | M-03 | ng/L | 11 |
| 001 | MWF16-05_GW-042723 | Aqueous | PFOA | PFAS by ID | 4.8 | M-03 | ng/L | 11 |
| 001 | MWF16-05_GW-042723 | Aqueous | PFPeA | PFAS by ID | 7.4 | M-03 | ng/L | 11 |
| 002 | MWF8-01_GW-042723 | Aqueous | PFBS | PFAS by ID | 3.6 | | ng/L | 13 |
| 002 | MWF8-01_GW-042723 | Aqueous | PFBA | PFAS by ID | 1.6 | JM-03 | ng/L | 13 |
| 003 | MWF16-18_GW-042723 | Aqueous | PFBS | PFAS by ID | 10 | M-03 | ng/L | 15 |
| 003 | MWF16-18_GW-042723 | Aqueous | PFHpS | PFAS by ID | 1.3 | J | ng/L | 15 |
| 003 | MWF16-18_GW-042723 | Aqueous | PFPeS | PFAS by ID | 13 | | ng/L | 15 |
| 003 | MWF16-18_GW-042723 | Aqueous | PFHxS | PFAS by ID | 33 | M-03 | ng/L | 15 |
| 003 | MWF16-18_GW-042723 | Aqueous | PFBA | PFAS by ID | 14 | QM-03 | ng/L | 15 |
| 003 | MWF16-18_GW-042723 | Aqueous | PFHpA | PFAS by ID | 20 | M-03 | ng/L | 15 |
| 003 | MWF16-18_GW-042723 | Aqueous | PFHxA | PFAS by ID | 21 | M-03 | ng/L | 15 |
| 003 | MWF16-18_GW-042723 | Aqueous | PFOA | PFAS by ID | 41 | | ng/L | 15 |
| 003 | MWF16-18_GW-042723 | Aqueous | PFPeA | PFAS by ID | 16 | M-03 | ng/L | 15 |
| 004 | MWF16-06_GW-042723 | Aqueous | PFBS | PFAS by ID | 3.4 | J | ng/L | 17 |
| 004 | MWF16-06_GW-042723 | Aqueous | PFHpS | PFAS by ID | 5.7 | | ng/L | 17 |
| 004 | MWF16-06_GW-042723 | Aqueous | PFPeS | PFAS by ID | 5.1 | | ng/L | 17 |
| 004 | MWF16-06_GW-042723 | Aqueous | PFHxS | PFAS by ID | 18 | M-03 | ng/L | 17 |
| 004 | MWF16-06_GW-042723 | Aqueous | PFBA | PFAS by ID | 9.1 | | ng/L | 17 |
| 004 | MWF16-06_GW-042723 | Aqueous | PFHpA | PFAS by ID | 7.5 | | ng/L | 17 |
| 004 | MWF16-06_GW-042723 | Aqueous | PFHxA | PFAS by ID | 8.8 | M-03 | ng/L | 17 |
| 004 | MWF16-06_GW-042723 | Aqueous | PFOA | PFAS by ID | 42 | M-03 | ng/L | 17 |
| 004 | MWF16-06_GW-042723 | Aqueous | PFPeA | PFAS by ID | 10 | M-03 | ng/L | 17 |
| 004 | MWF16-06_GW-042723 | Aqueous | PFOS | PFAS by ID | 38 | M-03 | ng/L | 17 |
| 005 | MWF12-01R_GW-042723 | Aqueous | PFBS | PFAS by ID | 1.8 | JQM-03 | ng/L | 19 |
| 005 | MWF12-01R_GW-042723 | Aqueous | PFHxS | PFAS by ID | 1.8 | JQM-03 | ng/L | 19 |
| 005 | MWF12-01R_GW-042723 | Aqueous | PFBA | PFAS by ID | 4.3 | | ng/L | 19 |
| 005 | MWF12-01R_GW-042723 | Aqueous | PFHpA | PFAS by ID | 0.90 | JQM-03 | ng/L | 19 |
| 005 | MWF12-01R_GW-042723 | Aqueous | PFHxA | PFAS by ID | 1.8 | JQM-03 | ng/L | 19 |
| 005 | MWF12-01R_GW-042723 | Aqueous | PFOA | PFAS by ID | 3.2 | JQ | ng/L | 19 |
| 005 | MWF12-01R_GW-042723 | Aqueous | PFPeA | PFAS by ID | 1.9 | JQM-03 | ng/L | 19 |
| 006 | MW0S-05_GW-042723 | Aqueous | PFBS | PFAS by ID | 2.9 | JM-03 | ng/L | 21 |
| 006 | MW0S-05_GW-042723 | Aqueous | PFHxS | PFAS by ID | 2.3 | JM-03 | ng/L | 21 |
| 006 | MW0S-05_GW-042723 | Aqueous | PFBA | PFAS by ID | 12 | | ng/L | 21 |
| 006 | MW0S-05_GW-042723 | Aqueous | PFOA | PFAS by ID | 2.1 | JM-03 | ng/L | 21 |
| 006 | MW0S-05_GW-042723 | Aqueous | PFPeA | PFAS by ID | 2.5 | J | ng/L | 21 |
| 006 | MW0S-05_GW-042723 | Aqueous | PFOS | PFAS by ID | 2.7 | JM-03 | ng/L | 21 |
| 007 | DUP-01_GW-042723 | Aqueous | PFBS | PFAS by ID | 3.5 | J | ng/L | 23 |

# Detection Summary (Continued)

## Lot Number: YD28005

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 007 | DUP-01_GW-042723 | Aqueous | PFHxS | PFAS by ID | 4.0 | M-03 | ng/L | 23 |
| 007 | DUP-01_GW-042723 | Aqueous | PFBA | PFAS by ID | 9.0 | | ng/L | 23 |
| 007 | DUP-01_GW-042723 | Aqueous | PFHpA | PFAS by ID | 1.6 | JM-03 | ng/L | 23 |
| 007 | DUP-01_GW-042723 | Aqueous | PFHxA | PFAS by ID | 2.6 | J | ng/L | 23 |
| 007 | DUP-01_GW-042723 | Aqueous | PFOA | PFAS by ID | 6.7 | | ng/L | 23 |
| 007 | DUP-01_GW-042723 | Aqueous | PFPeA | PFAS by ID | 2.7 | J | ng/L | 23 |
| 007 | DUP-01_GW-042723 | Aqueous | PFOS | PFAS by ID | 0.90 | J | ng/L | 23 |

(50 detections)

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-001**

Description: **MWF16-05_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 0940** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/18/2023 1856 | ALM | 05/17/2023 1903 | 75586 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.4 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.4 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.3** | **JM-03** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **2.8** | **JM-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **6.8** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **8.8** | | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **2.8** | **JM-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **8.6** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **4.8** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **7.4** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 243 | 50-150 |
| 13C2_6:2FTS | N | 151 | 50-150 |
| 13C2_8:2FTS | | 104 | 50-150 |
| 13C2_PFDoA | | 89 | 50-150 |
| 13C2_PFTeDA | | 84 | 50-150 |
| 13C3_PFBS | | 100 | 50-150 |
| 13C3_PFHxS | | 103 | 50-150 |
| 13C3-HFPO-DA | | 82 | 50-150 |
| 13C4_PFBA | | 63 | 50-150 |
| 13C4_PFHpA | | 90 | 50-150 |
| 13C5_PFHxA | | 98 | 50-150 |
| 13C5_PFPeA | | 82 | 50-150 |
| 13C6_PFDA | | 96 | 50-150 |
| 13C7_PFUdA | | 86 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-001**

Description: **MWF16-05_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 0940** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 110 | 50-150 |
| 13C8_PFOS | | 95 | 50-150 |
| 13C8_PFOSA | | 97 | 50-150 |
| 13C9_PFNA | | 97 | 50-150 |
| d5-EtFOSAA | | 94 | 50-150 |
| d3-MeFOSAA | | 85 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-002**

Description: **MWF8-01_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1035** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/18/2023 1917 | ALM | 05/17/2023 1903 | 75586 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.6** | | **3.6** | **0.89** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **1.6** | **JM-03** | **3.6** | **0.89** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 111 | 50-150 |
| 13C2_6:2FTS | | 98 | 50-150 |
| 13C2_8:2FTS | | 89 | 50-150 |
| 13C2_PFDoA | | 81 | 50-150 |
| 13C2_PFTeDA | | 81 | 50-150 |
| 13C3_PFBS | | 105 | 50-150 |
| 13C3_PFHxS | | 91 | 50-150 |
| 13C3-HFPO-DA | | 86 | 50-150 |
| 13C4_PFBA | | 86 | 50-150 |
| 13C4_PFHpA | | 95 | 50-150 |
| 13C5_PFHxA | | 87 | 50-150 |
| 13C5_PFPeA | | 94 | 50-150 |
| 13C6_PFDA | | 86 | 50-150 |
| 13C7_PFUdA | | 86 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-002**

Description: **MWF8-01_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1035** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 104 | 50-150 |
| 13C8_PFOS | | 88 | 50-150 |
| 13C8_PFOSA | | 95 | 50-150 |
| 13C9_PFNA | | 94 | 50-150 |
| d5-EtFOSAA | | 92 | 50-150 |
| d3-MeFOSAA | M-03 | 84 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-003**

Description: **MWF16-18_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1125** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/18/2023 1928 | ALM | 05/17/2023 1903 | 75586 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.1 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.1 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **10** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **1.3** | **J** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **13** | | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **33** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **14** | **QM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **20** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **21** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **41** | | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **16** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 249 | 50-150 |
| 13C2_6:2FTS | N | 294 | 50-150 |
| 13C2_8:2FTS | | 128 | 50-150 |
| 13C2_PFDoA | | 85 | 50-150 |
| 13C2_PFTeDA | | 86 | 50-150 |
| 13C3_PFBS | | 88 | 50-150 |
| 13C3_PFHxS | | 88 | 50-150 |
| 13C3-HFPO-DA | | 65 | 50-150 |
| 13C4_PFBA | N | 40 | 50-150 |
| 13C4_PFHpA | | 64 | 50-150 |
| 13C5_PFHxA | | 72 | 50-150 |
| 13C5_PFPeA | | 58 | 50-150 |
| 13C6_PFDA | | 99 | 50-150 |
| 13C7_PFUdA | | 87 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-003**

Description: **MWF16-18_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1125** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 109 | 50-150 |
| 13C8_PFOS | | 97 | 50-150 |
| 13C8_PFOSA | | 93 | 50-150 |
| 13C9_PFNA | | 105 | 50-150 |
| d5-EtFOSAA | | 90 | 50-150 |
| d3-MeFOSAA | | 95 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-004**

Description: **MWF16-06_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1220** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 2 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 1510 | ALM | 05/23/2023 1402 | 75963 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.0 | 1.7 | ng/L | 2 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.4** | **J** | **3.5** | **0.87** | **ng/L** | **2** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **5.7** | | **3.5** | **0.87** | **ng/L** | **2** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **5.1** | | **3.5** | **0.87** | **ng/L** | **2** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **18** | **M-03** | **3.5** | **0.87** | **ng/L** | **2** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **9.1** | | **3.5** | **0.87** | **ng/L** | **2** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **7.5** | | **3.5** | **0.87** | **ng/L** | **2** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **8.8** | **M-03** | **3.5** | **0.87** | **ng/L** | **2** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **42** | **M-03** | **3.5** | **0.87** | **ng/L** | **2** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **10** | **M-03** | **3.5** | **0.87** | **ng/L** | **2** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **38** | **M-03** | **3.5** | **0.87** | **ng/L** | **2** |

| Surrogate | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 207 | 50-150 |
| 13C2_6:2FTS | | 132 | 50-150 |
| 13C2_8:2FTS | | 89 | 50-150 |
| 13C2_PFDoA | | 93 | 50-150 |
| 13C2_PFTeDA | | 90 | 50-150 |
| 13C3_PFBS | | 97 | 50-150 |
| 13C3_PFHxS | | 93 | 50-150 |
| 13C3-HFPO-DA | | 93 | 50-150 |
| 13C4_PFBA | | 70 | 50-150 |
| 13C4_PFHpA | | 93 | 50-150 |
| 13C5_PFHxA | | 108 | 50-150 |
| 13C5_PFPeA | | 96 | 50-150 |
| 13C6_PFDA | | 98 | 50-150 |
| 13C7_PFUdA | | 91 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-004**

Description: **MWF16-06_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1220** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 119 | 50-150 |
| 13C8_PFOS | | 97 | 50-150 |
| 13C8_PFOSA | | 92 | 50-150 |
| 13C9_PFNA | | 104 | 50-150 |
| d5-EtFOSAA | | 93 | 50-150 |
| d3-MeFOSAA | | 89 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-005**

Description: **MWF12-01R_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1342** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/18/2023 1949 | ALM | 05/17/2023 1903 | 75586 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **1.8** | **JQM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **1.8** | **JQM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **4.3** | | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **0.90** | **JQM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **1.8** | **JQM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **3.2** | **JQ** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **1.9** | **JQM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 397 | 50-150 |
| 13C2_6:2FTS | N | 222 | 50-150 |
| 13C2_8:2FTS | N | 182 | 50-150 |
| 13C2_PFDoA | N | 157 | 50-150 |
| 13C2_PFTeDA | N | 161 | 50-150 |
| 13C3_PFBS | N | 192 | 50-150 |
| 13C3_PFHxS | N | 178 | 50-150 |
| 13C3-HFPO-DA | N | 162 | 50-150 |
| 13C4_PFBA | | 120 | 50-150 |
| 13C4_PFHpA | N | 179 | 50-150 |
| 13C5_PFHxA | N | 181 | 50-150 |
| 13C5_PFPeA | N | 159 | 50-150 |
| 13C6_PFDA | N | 180 | 50-150 |
| 13C7_PFUdA | N | 159 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-005**

Description: **MWF12-01R_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1342** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | N | 212 | 50-150 |
| 13C8_PFOS | N | 173 | 50-150 |
| 13C8_PFOSA | N | 174 | 50-150 |
| 13C9_PFNA | N | 186 | 50-150 |
| d5-EtFOSAA | M-03N | 165 | 50-150 |
| d3-MeFOSAA | N | 171 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-006**

Description: **MW0S-05_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1453** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 2 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 1521 | ALM | 05/23/2023 1402 | 75963 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.9 | 1.7 | ng/L | 2 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **2.9** | **JM-03** | **3.5** | **0.86** | **ng/L** | **2** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **2.3** | **JM-03** | **3.5** | **0.86** | **ng/L** | **2** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **12** | | **3.5** | **0.86** | **ng/L** | **2** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **2.1** | **JM-03** | **3.5** | **0.86** | **ng/L** | **2** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **2.5** | **J** | **3.5** | **0.86** | **ng/L** | **2** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **2.7** | **JM-03** | **3.5** | **0.86** | **ng/L** | **2** |

| Surrogate | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 207 | 50-150 |
| 13C2_6:2FTS | | 150 | 50-150 |
| 13C2_8:2FTS | | 84 | 50-150 |
| 13C2_PFDoA | | 89 | 50-150 |
| 13C2_PFTeDA | | 85 | 50-150 |
| 13C3_PFBS | | 91 | 50-150 |
| 13C3_PFHxS | | 93 | 50-150 |
| 13C3-HFPO-DA | | 85 | 50-150 |
| 13C4_PFBA | | 54 | 50-150 |
| 13C4_PFHpA | | 93 | 50-150 |
| 13C5_PFHxA | | 99 | 50-150 |
| 13C5_PFPeA | | 91 | 50-150 |
| 13C6_PFDA | | 98 | 50-150 |
| 13C7_PFUdA | | 93 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-006**

Description: **MW0S-05_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1453** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 115 | 50-150 |
| 13C8_PFOS | | 95 | 50-150 |
| 13C8_PFOSA | | 85 | 50-150 |
| 13C9_PFNA | | 105 | 50-150 |
| d5-EtFOSAA | | 101 | 50-150 |
| d3-MeFOSAA | | 89 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-007**

Description: **DUP-01_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 2 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 1531 | ALM | 05/23/2023 1402 | 75963 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.2 | 1.8 | ng/L | 2 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.5** | **J** | **3.6** | **0.90** | **ng/L** | **2** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **4.0** | **M-03** | **3.6** | **0.90** | **ng/L** | **2** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **9.0** | | **3.6** | **0.90** | **ng/L** | **2** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **1.6** | **JM-03** | **3.6** | **0.90** | **ng/L** | **2** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **2.6** | **J** | **3.6** | **0.90** | **ng/L** | **2** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **6.7** | | **3.6** | **0.90** | **ng/L** | **2** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **2.7** | **J** | **3.6** | **0.90** | **ng/L** | **2** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **0.90** | **J** | **3.6** | **0.90** | **ng/L** | **2** |

| Surrogate | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 191 | 50-150 |
| 13C2_6:2FTS | | 111 | 50-150 |
| 13C2_8:2FTS | | 85 | 50-150 |
| 13C2_PFDoA | | 90 | 50-150 |
| 13C2_PFTeDA | | 93 | 50-150 |
| 13C3_PFBS | | 95 | 50-150 |
| 13C3_PFHxS | | 93 | 50-150 |
| 13C3-HFPO-DA | | 82 | 50-150 |
| 13C4_PFBA | | 57 | 50-150 |
| 13C4_PFHpA | | 99 | 50-150 |
| 13C5_PFHxA | | 93 | 50-150 |
| 13C5_PFPeA | | 89 | 50-150 |
| 13C6_PFDA | | 91 | 50-150 |
| 13C7_PFUdA | | 86 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-007**

Description: **DUP-01_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 103 | 50-150 |
| 13C8_PFOS | | 90 | 50-150 |
| 13C8_PFOSA | | 88 | 50-150 |
| 13C9_PFNA | | 94 | 50-150 |
| d5-EtFOSAA | | 93 | 50-150 |
| d3-MeFOSAA | | 85 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-008**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1410** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/18/2023 2032 | ALM | 05/17/2023 1903 | 75586 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 80 | 50-150 |
| 13C2_6:2FTS | | 75 | 50-150 |
| 13C2_8:2FTS | | 78 | 50-150 |
| 13C2_PFDoA | | 76 | 50-150 |
| 13C2_PFTeDA | | 60 | 50-150 |
| 13C3_PFBS | | 94 | 50-150 |
| 13C3_PFHxS | | 87 | 50-150 |
| 13C3-HFPO-DA | | 86 | 50-150 |
| 13C4_PFBA | | 86 | 50-150 |
| 13C4_PFHpA | | 84 | 50-150 |
| 13C5_PFHxA | | 86 | 50-150 |
| 13C5_PFPeA | | 80 | 50-150 |
| 13C6_PFDA | | 78 | 50-150 |
| 13C7_PFUdA | | 74 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-008**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1410** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | M-03 | 93 | 50-150 |
| 13C8_PFOS | | 79 | 50-150 |
| 13C8_PFOSA | | 83 | 50-150 |
| 13C9_PFNA | | 87 | 50-150 |
| d5-EtFOSAA | | 83 | 50-150 |
| d3-MeFOSAA | M-03 | 82 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# QC Summary

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ75586-001
**Batch:** 75586
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/17/2023 1903

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/19/2023 2020 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/19/2023 2020 |
| 8:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/19/2023 2020 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/19/2023 2020 |
| 4:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/19/2023 2020 |
| GenX | ND | | 1 | 8.0 | 2.0 | ng/L | 05/19/2023 2020 |
| ADONA | ND | | 1 | 8.0 | 2.0 | ng/L | 05/19/2023 2020 |
| EtFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 05/19/2023 2020 |
| MeFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 05/19/2023 2020 |
| PFBS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFDS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFHpS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFNS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFOSA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFPeS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFHxS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFBA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFDA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFDoA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFHpA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFHxA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFNA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFOA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFPeA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFTeDA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFTrDA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFUdA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |
| PFOS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/19/2023 2020 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 84 | 50-150 |
| 13C2_6:2FTS | | 90 | 50-150 |
| 13C2_8:2FTS | | 79 | 50-150 |
| 13C2_PFDoA | | 89 | 50-150 |
| 13C2_PFTeDA | | 74 | 50-150 |
| 13C3_PFBS | | 93 | 50-150 |
| 13C3_PFHxS | | 92 | 50-150 |
| 13C3-HFPO-DA | | 89 | 50-150 |
| 13C4_PFBA | | 92 | 50-150 |
| 13C4_PFHpA | | 90 | 50-150 |
| 13C5_PFHxA | | 89 | 50-150 |
| 13C5_PFPeA | | 98 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ75586-001
**Batch:** 75586
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/17/2023 1903

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 83 | 50-150 |
| 13C7_PFUdA | | 76 | 50-150 |
| 13C8_PFOA | | 95 | 50-150 |
| 13C8_PFOS | | 101 | 50-150 |
| 13C8_PFOSA | | 83 | 50-150 |
| 13C9_PFNA | | 87 | 50-150 |
| d5-EtFOSAA | M-03 | 90 | 50-150 |
| d3-MeFOSAA | | 98 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ75586-002
**Batch:** 75586
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/17/2023 1903

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 12 | | 1 | 84 | 50-150 | 05/19/2023 2031 |
| 11Cl-PF3OUdS | 15 | 13 | M-03 | 1 | 88 | 50-150 | 05/19/2023 2031 |
| 8:2 FTS | 15 | 14 | M-03 | 1 | 88 | 67-138 | 05/19/2023 2031 |
| 6:2 FTS | 15 | 14 | M-03 | 1 | 95 | 64-140 | 05/19/2023 2031 |
| 4:2 FTS | 15 | 15 | | 1 | 100 | 63-143 | 05/19/2023 2031 |
| GenX | 32 | 29 | | 1 | 91 | 50-150 | 05/19/2023 2031 |
| ADONA | 15 | 14 | | 1 | 94 | 50-150 | 05/19/2023 2031 |
| EtFOSAA | 16 | 16 | M-03 | 1 | 98 | 61-135 | 05/19/2023 2031 |
| MeFOSAA | 16 | 15 | M-03 | 1 | 93 | 65-136 | 05/19/2023 2031 |
| PFBS | 14 | 14 | | 1 | 98 | 72-130 | 05/19/2023 2031 |
| PFDS | 15 | 13 | | 1 | 84 | 53-142 | 05/19/2023 2031 |
| PFHpS | 15 | 14 | | 1 | 91 | 69-134 | 05/19/2023 2031 |
| PFNS | 15 | 13 | | 1 | 84 | 69-127 | 05/19/2023 2031 |
| PFOSA | 16 | 16 | | 1 | 98 | 67-137 | 05/19/2023 2031 |
| PFPeS | 15 | 14 | | 1 | 91 | 71-127 | 05/19/2023 2031 |
| PFHxS | 15 | 14 | | 1 | 94 | 68-131 | 05/19/2023 2031 |
| PFBA | 16 | 15 | | 1 | 93 | 73-129 | 05/19/2023 2031 |
| PFDA | 16 | 15 | | 1 | 95 | 71-129 | 05/19/2023 2031 |
| PFDoA | 16 | 14 | M-03 | 1 | 89 | 72-134 | 05/19/2023 2031 |
| PFHpA | 16 | 17 | | 1 | 103 | 72-130 | 05/19/2023 2031 |
| PFHxA | 16 | 15 | | 1 | 95 | 72-129 | 05/19/2023 2031 |
| PFNA | 16 | 14 | | 1 | 90 | 69-130 | 05/19/2023 2031 |
| PFOA | 16 | 15 | | 1 | 92 | 71-133 | 05/19/2023 2031 |
| PFPeA | 16 | 15 | | 1 | 96 | 72-129 | 05/19/2023 2031 |
| PFTeDA | 16 | 16 | | 1 | 97 | 71-132 | 05/19/2023 2031 |
| PFTrDA | 16 | 14 | | 1 | 87 | 65-144 | 05/19/2023 2031 |
| PFUdA | 16 | 16 | | 1 | 99 | 69-133 | 05/19/2023 2031 |
| PFOS | 15 | 12 | | 1 | 81 | 65-140 | 05/19/2023 2031 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 91 | 50-150 |
| 13C2_6:2FTS | | 87 | 50-150 |
| 13C2_8:2FTS | | 96 | 50-150 |
| 13C2_PFDoA | | 91 | 50-150 |
| 13C2_PFTeDA | | 85 | 50-150 |
| 13C3_PFBS | | 94 | 50-150 |
| 13C3_PFHxS | | 97 | 50-150 |
| 13C3-HFPO-DA | | 98 | 50-150 |
| 13C4_PFBA | | 95 | 50-150 |
| 13C4_PFHpA | | 94 | 50-150 |
| 13C5_PFHxA | | 86 | 50-150 |
| 13C5_PFPeA | | 94 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ75586-002
**Batch:** 75586
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/17/2023 1903

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 98 | 50-150 |
| 13C7_PFUdA | | 84 | 50-150 |
| 13C8_PFOA | | 100 | 50-150 |
| 13C8_PFOS | | 109 | 50-150 |
| 13C8_PFOSA | | 84 | 50-150 |
| 13C9_PFNA | | 87 | 50-150 |
| d5-EtFOSAA | | 101 | 50-150 |
| d3-MeFOSAA | | 96 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MS

**Sample ID:** YD28005-001MS
**Batch:** 75586
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/17/2023 1903

| Parameter | Sample Amount (ng/L) | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | 14 | 12 | | 1 | 88 | 50-150 | 05/18/2023 1907 |
| 11Cl-PF3OUdS | ND | 14 | 12 | | 1 | 86 | 50-150 | 05/18/2023 1907 |
| 8:2 FTS | ND | 15 | 18 | M-03 | 1 | 121 | 67-138 | 05/18/2023 1907 |
| 6:2 FTS | ND | 14 | 15 | M-03 | 1 | 107 | 64-140 | 05/18/2023 1907 |
| 4:2 FTS | ND | 14 | 16 | | 1 | 110 | 63-143 | 05/18/2023 1907 |
| GenX | ND | 30 | 31 | | 1 | 101 | 50-150 | 05/18/2023 1907 |
| ADONA | ND | 14 | 15 | | 1 | 103 | 50-150 | 05/18/2023 1907 |
| EtFOSAA | ND | 15 | 15 | M-03 | 1 | 99 | 61-135 | 05/18/2023 1907 |
| MeFOSAA | ND | 15 | 14 | | 1 | 89 | 65-136 | 05/18/2023 1907 |
| PFBS | 3.3 | 13 | 15 | | 1 | 88 | 72-130 | 05/18/2023 1907 |
| PFDS | ND | 15 | 12 | | 1 | 80 | 53-142 | 05/18/2023 1907 |
| PFHpS | ND | 14 | 16 | | 1 | 110 | 69-134 | 05/18/2023 1907 |
| PFNS | ND | 15 | 14 | M-03 | 1 | 95 | 69-127 | 05/18/2023 1907 |
| PFOSA | ND | 15 | 15 | M-03 | 1 | 100 | 67-137 | 05/18/2023 1907 |
| PFPeS | 2.8 | 14 | 16 | M-03 | 1 | 96 | 71-127 | 05/18/2023 1907 |
| PFHxS | 6.8 | 14 | 21 | M-03 | 1 | 101 | 68-131 | 05/18/2023 1907 |
| PFBA | 8.8 | 15 | 25 | M-03 | 1 | 104 | 73-129 | 05/18/2023 1907 |
| PFDA | ND | 15 | 17 | | 1 | 109 | 71-129 | 05/18/2023 1907 |
| PFDoA | ND | 15 | 15 | | 1 | 99 | 72-134 | 05/18/2023 1907 |
| PFHpA | 2.8 | 15 | 19 | M-03 | 1 | 109 | 72-130 | 05/18/2023 1907 |
| PFHxA | 8.6 | 15 | 23 | | 1 | 94 | 72-129 | 05/18/2023 1907 |
| PFNA | ND | 15 | 16 | | 1 | 105 | 69-130 | 05/18/2023 1907 |
| PFOA | 4.8 | 15 | 21 | M-03 | 1 | 109 | 71-133 | 05/18/2023 1907 |
| PFPeA | 7.4 | 15 | 21 | M-03 | 1 | 90 | 72-129 | 05/18/2023 1907 |
| PFTeDA | ND | 15 | 15 | | 1 | 99 | 71-132 | 05/18/2023 1907 |
| PFTrDA | ND | 15 | 13 | M-03 | 1 | 87 | 65-144 | 05/18/2023 1907 |
| PFUdA | ND | 15 | 15 | | 1 | 101 | 69-133 | 05/18/2023 1907 |
| PFOS | ND | 14 | 15 | M-03 | 1 | 104 | 65-140 | 05/18/2023 1907 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | N | 227 | 50-150 |
| 13C2_6:2FTS | | 129 | 50-150 |
| 13C2_8:2FTS | | 97 | 50-150 |
| 13C2_PFDoA | | 85 | 50-150 |
| 13C2_PFTeDA | | 84 | 50-150 |
| 13C3_PFBS | | 99 | 50-150 |
| 13C3_PFHxS | | 89 | 50-150 |
| 13C3-HFPO-DA | | 80 | 50-150 |
| 13C4_PFBA | | 61 | 50-150 |
| 13C4_PFHpA | | 88 | 50-150 |
| 13C5_PFHxA | | 95 | 50-150 |
| 13C5_PFPeA | | 82 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MS

**Sample ID:** YD28005-001MS
**Batch:** 75586
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/17/2023 1903

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 89 | 50-150 |
| 13C7_PFUdA | | 79 | 50-150 |
| 13C8_PFOA | | 110 | 50-150 |
| 13C8_PFOS | | 93 | 50-150 |
| 13C8_PFOSA | | 96 | 50-150 |
| 13C9_PFNA | | 93 | 50-150 |
| d5-EtFOSAA | | 86 | 50-150 |
| d3-MeFOSAA | | 91 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - Duplicate

**Sample ID:** YD28005-005DU
**Batch:** 75586
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/17/2023 1903

| Parameter | Sample Amount (ng/L) | Result (ng/L) | Q | Dil | % RPD | %RPD Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| 11Cl-PF3OUdS | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| 8:2 FTS | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| 6:2 FTS | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| 4:2 FTS | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| GenX | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| ADONA | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| EtFOSAA | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| MeFOSAA | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| PFBS | 1.8 | 1.9 | J | 1 | 3.7 | 20 | 05/18/2023 2000 |
| PFDS | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| PFHpS | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| PFNS | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| PFOSA | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| PFPeS | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| PFHxS | 1.8 | 1.7 | JM-03 | 1 | 5.6 | 20 | 05/18/2023 2000 |
| PFBA | 4.3 | 4.3 | | 1 | 0.72 | 20 | 05/18/2023 2000 |
| PFDA | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| PFDoA | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| PFHpA | 0.90 | 1.1 | JM-03 | 1 | 19 | 20 | 05/18/2023 2000 |
| PFHxA | 1.8 | 1.4 | JM-03,+ | 1 | 28 | 20 | 05/18/2023 2000 |
| PFNA | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| PFOA | 3.2 | 2.7 | J | 1 | 17 | 20 | 05/18/2023 2000 |
| PFPeA | 1.9 | 1.5 | JM-03,+ | 1 | 23 | 20 | 05/18/2023 2000 |
| PFTeDA | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| PFTrDA | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| PFUdA | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |
| PFOS | ND | ND | | 1 | 0.00 | 20 | 05/18/2023 2000 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | N | 352 | 50-150 |
| 13C2_6:2FTS | N | 205 | 50-150 |
| 13C2_8:2FTS | M-03N | 174 | 50-150 |
| 13C2_PFDoA | N | 161 | 50-150 |
| 13C2_PFTeDA | N | 171 | 50-150 |
| 13C3_PFBS | N | 188 | 50-150 |
| 13C3_PFHxS | N | 179 | 50-150 |
| 13C3-HFPO-DA | N | 167 | 50-150 |
| 13C4_PFBA | | 121 | 50-150 |
| 13C4_PFHpA | N | 177 | 50-150 |
| 13C5_PFHxA | N | 184 | 50-150 |
| 13C5_PFPeA | N | 160 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - Duplicate

**Sample ID:** YD28005-005DU
**Batch:** 75586
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/17/2023 1903

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | N | 171 | 50-150 |
| 13C7_PFUdA | M-03N | 155 | 50-150 |
| 13C8_PFOA | N | 215 | 50-150 |
| 13C8_PFOS | N | 172 | 50-150 |
| 13C8_PFOSA | N | 186 | 50-150 |
| 13C9_PFNA | N | 190 | 50-150 |
| d5-EtFOSAA | N | 166 | 50-150 |
| d3-MeFOSAA | N | 180 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ75963-001
**Batch:** 75963
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/23/2023 1402

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 1356 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 1356 |
| 8:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 1356 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 1356 |
| 4:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 1356 |
| GenX | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 1356 |
| ADONA | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 1356 |
| EtFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 1356 |
| MeFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 1356 |
| PFBS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFDS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFHpS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFNS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFOSA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFPeS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFHxS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFBA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFDA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFDoA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFHpA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFHxA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFNA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFOA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFPeA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFTeDA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFTrDA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFUdA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |
| PFOS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 1356 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 98 | 50-150 |
| 13C2_6:2FTS | | 117 | 50-150 |
| 13C2_8:2FTS | | 88 | 50-150 |
| 13C2_PFDoA | | 95 | 50-150 |
| 13C2_PFTeDA | | 95 | 50-150 |
| 13C3_PFBS | | 101 | 50-150 |
| 13C3_PFHxS | | 97 | 50-150 |
| 13C3-HFPO-DA | | 103 | 50-150 |
| 13C4_PFBA | | 91 | 50-150 |
| 13C4_PFHpA | | 103 | 50-150 |
| 13C5_PFHxA | | 101 | 50-150 |
| 13C5_PFPeA | | 100 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ75963-001
**Batch:** 75963
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/23/2023 1402

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 96 | 50-150 |
| 13C7_PFUdA | | 91 | 50-150 |
| 13C8_PFOA | | 111 | 50-150 |
| 13C8_PFOS | | 90 | 50-150 |
| 13C8_PFOSA | | 83 | 50-150 |
| 13C9_PFNA | | 98 | 50-150 |
| d5-EtFOSAA | | 93 | 50-150 |
| d3-MeFOSAA | | 91 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ75963-002
**Batch:** 75963
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/23/2023 1402

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 15 | | 1 | 98 | 50-150 | 05/25/2023 1208 |
| 11Cl-PF3OUdS | 15 | 13 | | 1 | 89 | 50-150 | 05/25/2023 1208 |
| 8:2 FTS | 15 | 15 | M-03 | 1 | 100 | 67-138 | 05/25/2023 1208 |
| 6:2 FTS | 15 | 13 | M-03 | 1 | 87 | 64-140 | 05/25/2023 1208 |
| 4:2 FTS | 15 | 16 | | 1 | 106 | 63-143 | 05/25/2023 1208 |
| GenX | 32 | 35 | | 1 | 108 | 50-150 | 05/25/2023 1208 |
| ADONA | 15 | 16 | | 1 | 104 | 50-150 | 05/25/2023 1208 |
| EtFOSAA | 16 | 18 | M-03 | 1 | 111 | 61-135 | 05/25/2023 1208 |
| MeFOSAA | 16 | 17 | M-03 | 1 | 105 | 65-136 | 05/25/2023 1208 |
| PFBS | 14 | 13 | | 1 | 94 | 72-130 | 05/25/2023 1208 |
| PFDS | 15 | 14 | | 1 | 88 | 53-142 | 05/25/2023 1208 |
| PFHpS | 15 | 17 | M-03 | 1 | 114 | 69-134 | 05/25/2023 1208 |
| PFNS | 15 | 13 | | 1 | 86 | 69-127 | 05/25/2023 1208 |
| PFOSA | 16 | 16 | M-03 | 1 | 100 | 67-137 | 05/25/2023 1208 |
| PFPeS | 15 | 14 | | 1 | 96 | 71-127 | 05/25/2023 1208 |
| PFHxS | 15 | 15 | M-03 | 1 | 101 | 68-131 | 05/25/2023 1208 |
| PFBA | 16 | 17 | | 1 | 108 | 73-129 | 05/25/2023 1208 |
| PFDA | 16 | 16 | M-03 | 1 | 98 | 71-129 | 05/25/2023 1208 |
| PFDoA | 16 | 16 | | 1 | 101 | 72-134 | 05/25/2023 1208 |
| PFHpA | 16 | 18 | | 1 | 110 | 72-130 | 05/25/2023 1208 |
| PFHxA | 16 | 16 | | 1 | 102 | 72-129 | 05/25/2023 1208 |
| PFNA | 16 | 16 | | 1 | 98 | 69-130 | 05/25/2023 1208 |
| PFOA | 16 | 16 | M-03 | 1 | 101 | 71-133 | 05/25/2023 1208 |
| PFPeA | 16 | 16 | | 1 | 102 | 72-129 | 05/25/2023 1208 |
| PFTeDA | 16 | 16 | M-03 | 1 | 101 | 71-132 | 05/25/2023 1208 |
| PFTrDA | 16 | 20 | | 1 | 123 | 65-144 | 05/25/2023 1208 |
| PFUdA | 16 | 17 | | 1 | 103 | 69-133 | 05/25/2023 1208 |
| PFOS | 15 | 15 | M-03 | 1 | 103 | 65-140 | 05/25/2023 1208 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 97 | 50-150 |
| 13C2_6:2FTS | | 108 | 50-150 |
| 13C2_8:2FTS | | 104 | 50-150 |
| 13C2_PFDoA | | 94 | 50-150 |
| 13C2_PFTeDA | | 97 | 50-150 |
| 13C3_PFBS | | 105 | 50-150 |
| 13C3_PFHxS | | 98 | 50-150 |
| 13C3-HFPO-DA | | 94 | 50-150 |
| 13C4_PFBA | | 98 | 50-150 |
| 13C4_PFHpA | | 93 | 50-150 |
| 13C5_PFHxA | | 96 | 50-150 |
| 13C5_PFPeA | | 95 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ75963-002
**Batch:** 75963
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/23/2023 1402

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 97 | 50-150 |
| 13C7_PFUdA | | 90 | 50-150 |
| 13C8_PFOA | | 101 | 50-150 |
| 13C8_PFOS | | 99 | 50-150 |
| 13C8_PFOSA | M-03 | 94 | 50-150 |
| 13C9_PFNA | | 101 | 50-150 |
| d5-EtFOSAA | | 86 | 50-150 |
| d3-MeFOSAA | | 88 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Chain of Custody
# and
# Miscellaneous Documents

Pace Analytical®

**PACE ANALYTICAL SERVICES, LLC**
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 146506

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Tiffany Linder, Alexis Crisp | Telephone No. / E-mail: tiffany.linder@arcadis.com, Alexis.Crisp@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: Jommel Guy | Analysis (Attach list if more space is needed): Repost EGLE 28 Compounds | Page 1 of 1 |
| City: NOVI | State: MI | Zip Code: 48377 | Printed Name: Jommel Guy |
| Project Name: Racer PNC | | | YD28005 |
| Project No.: 30167840.00030 | P.O. No.: | | KESZ |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | G=Grab C=Composite | Matrix: Aqueous | Soil | Air/Gas | No. of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | NaHSO4 | PFAS Method 537.1mod. with isotope dilution PZ (Y/N) | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWF16-05_GW-042723 | 4/27/23 | 0940 | G | 2 | | | 2 | | | | | | | X | |
| MWF18-01_GW-042723 | 4/27/23 | 1035 | G | 2 | | | 2 | | | | | | | X | |
| MWF16-18_GW-042723 | 4/27/23 | 1125 | G | 2 | | | 2 | | | | | | | X | |
| MWF16-06_GW-042723 | 4/27/23 | 1220 | G | 2 | | | 2 | | | | | | | X | |
| MWF12-01R_GW-042723 | 4/27/23 | 1342 | G | 2 | | | 2 | | | | | | | X | |
| MWOS-05_GW-042723 | 4/27/23 | 1453 | G | 2 | | | 2 | | | | | | | X | |
| DUP-01_GW-042723 | 4/27/23 | — | G | 2 | | | 2 | | | | | | | X | |
| tripblank | 4/27/23 | 1410 | G | 1 | | | 1 | | | | | | | X | tripblank |

**Turn Around Time Required (Prior lab approval required for expedited TAT.):** ☒ Standard ☐ Rush (Specify)

**Sample Disposal:** ☐ Return to Client ☒ Disposal by Lab

**Possible Hazard Identification:** ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

**QC Requirements (Specify)**

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Jommel Guy | 4/27/23 | 1550 | 1. Received by: FedEx | 4/27/23 | 1550 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: Fedex | 4-28-23 | 930 | 4. Laboratory received by: [signature] | 4-28-23 | 930 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on Ice (Circle): (Yes) No Ice Pack — Receipt Temp. 1.5 °C — Temp Blank: ☒ Y ☐ N

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: ME003N2-01



PACE ANALYTICAL SERVICES, LLC

DC#_Title: ENV-FRM-WCOL-0286 v02_Samples Receipt Checklist (SRC)
Effective Date: 8/2/2022

# Sample Receipt Checklist (SRC)

Client: ARCADIS  Cooler Inspected by/date: KDRW / 04/28/2023  Lot #: YD28005

Means of receipt: ☐ Pace ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | | 1. Were custody seals present on the cooler? |
| ☑ Yes | ☐ No | ☐ NA | 2. If custody seals were present, were they intact and unbroken? |

pH Strip ID: NA  Chlorine Strip ID: NA  Tested by: NA
Original temperature upon receipt / Derived (Corrected) temperature upon receipt  %Solid Snap-Cup ID: NA
1.5 / 1.5 °C  NA / NA °C  NA / NA °C  NA / NA °C
Method: ☑ Temperature Blank ☐ Against Bottles  IR Gun ID: 8  IR Gun Correction Factor: 0 °C
Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | ☐ NA | 3. Were all coolers received at or below 6.0°C? If no, was Project Manager notified? PM was Notified by: phone / email / face-to-face (circle one). |
| ☑ Yes | ☐ No | ☐ NA | 4. Is the commercial courier's packing slip attached to this form? |
| ☑ Yes | ☐ No | | 5. Were proper custody procedures (relinquished/received) followed? |
| ☑ Yes | ☐ No | | 6. Were sample IDs listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 7. Was collection date & time listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 8. Did all container label information (ID, date, time) agree with the COC? |
| ☑ Yes | ☐ No | | 9. Were tests to be performed listed on the COC? |
| ☑ Yes | ☐ No | | 10. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____ |
| ☑ Yes | ☐ No | | 11. Was adequate sample volume available? |
| ☑ Yes | ☐ No | | 12. Were all samples received within ½ the holding time or 48 hours, whichever comes first? |
| ☑ Yes | ☐ No | | 13. Were all samples containers accounted for? (No missing/excess) |
| ☐ Yes | ☐ No | ☑ NA | 14. Were VOA, 8015C and RSK-175 samples free of bubbles >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials? |
| ☐ Yes | ☐ No | ☑ NA | 15. Were all DRO/metals/nutrient samples received at a pH of < 2? |
| ☐ Yes | ☐ No | ☑ NA | 16. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9? |
| ☐ Yes | ☐ No | ☑ NA | 17. Were all applicable $NH_3$/TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine? |
| ☑ Yes | ☐ No | ☐ NA | 18. Was the quote number listed on the container label? If yes, Quote # 25015 |

**Sample Preservation** (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) _____ were received incorrectly preserved and were adjusted accordingly in sample receiving with _____ mL of circle one: $H_2SO_4$, $HNO_3$, HCl, NaOH using SR # _____. ☐
Time of preservation _____. If more than one preservative is needed, please note in the comments below.

Sample(s) _____ were received with bubbles >6 mm in diameter.

Samples(s) NA _____ were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Unique ID: NA _____.

Comments:

Qualtrax ID: 56360  Pace® Analytical Services, LLC  Page 1 of 1

# Report of Analysis

**Arcadis U.S., Inc.**
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Tiffany Linder

Project Name: Racer PNC

Project Number: 30167840.00030

Lot Number:**YE02015**

Date Completed:06/05/2023

Kathy Smith

06/05/2023 10:23 AM
Approved and released by:
Project Manager II: **Kathy E. Smith**

The electronic signature above is the equivalent of a handwritten signature.
This report shall not be reproduced, except in its entirety, without the written approval of Pace Analytical Services, LLC.

Pace Analytical Services, LLC (*formerly Shealy Environmental Services, Inc.*)
106 Vantage Point Drive West Columbia, SC 29172
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

## Case Narrative
## Arcadis U.S., Inc.
### Lot Number: YE02015

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.4 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples were compliant with DOD QSM 5.4 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). The CF is calculated as follows:

CF = DF * FV / Vo

FV is volume of extract (mL)
Vo is initial sample volume (mL)
DF is dilution factor. For undiluted analysis, DF = 1.

Sample concentration for aqueous samples:
Concentration (ng/L) = Cs*CF,

$$C_s = \frac{\left(\frac{(A_s x C_{is})}{A_{is}}\right) - B}{M1}$$

Where

$C_s$ is on column concentration of target analyte in the sample (ng/L)
$C_{is}$ is concentration of internal standard in the sample (ng/L)
$A_s$ is peak response of target analyte in the sample
$A_{is}$ is peak response of internal standard in the sample
M1 is the average RF from ICAL or the slope from linear regression ICAL
B is the y-intercept from the ICAL

Pace is a DoD/DOE accredited laboratory; however, the following analyses are currently not listed on our DoD/DOE scope of accreditation: Drinking Water: pH EPA 150.1, Turbidity EPA 180.1, Metals EPA 200.7 & 200.8, Mercury EPA 245.1, Anions EPA 300.0, Cyanide EPA 335.4, Nitrates EPA 353.2, Orthophosphate & Phosphorus EPA 365.1, EDB/DBCP EPA 504.1, HPC SIMPLATE, Color SM 2120 B-2011, Alkalinity SM 2320 B-2011, Specific Conductance SM 2510 B-2011, Residue-filterable (TDS) SM 2540 C, Calcium Hardness (CaCO2) SM 3500-Ca B-2011, TRC SM 4500 Cl G-2011, pH SM 4500 H=B-2011, E.Coli, Total Coliform. Non-Potable Water: Metals EPA 200.7, Strontium EPA 200.8, Chlorate EPA 300.0, Cyanide EPA 335.4, Phenolics EPA 420.4, 2-Methyl-4,6-Dinitrophenol EPA 625.1, Propane RSK-175, Specific Conductance SM 2510 B-2011, Salinity SM2520 B, Residue- total SM 2540 B, Sulfite SM 4500 SO32- B-2011, Amenable Cyanide SM 4500-CN- G-2011, BOD & CBOD SM 5210 B, MBAS SM 5540 C-2011, Boron & Titanium SW-846 6010D, Boron, Molybdenum, & Titanium SW-846 6020B, Alcohols & Glycols SW-846 8015C, Pentachlorophenol SW-846 8151A, Ethyl Acetate, Hexane, & n-Hexane SW-846 8260D, SVOC 1,4-Dioxane, 4-Dimethyl aminoazobenzene, 1,4-Naphthoquinone, 3,5-Dinitroaniline, PETN SW-846 8270E, Amenable Cyanide SW-846 9012B. Solid and Chemical Materials: Boron & Titanium SW-846 6010D, Molybdenum SW-846 6020B, Ethylene Glycol SW-846 8015B, Pentachlorophenol SW-846 8151A, Chloroprene SW-846 8260B, SVOC 1,4-Dioxane, 1,3,5-Trinitrobenzene, 1,4- Naphthoquinone, 1,4-Phenylenediamine, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 3-Methylcholanthrene, 4-Aminobiphenyl, 4-Dimethyl aminoazobenzene, 4-Nitroquinoline-1-oxide, 7,12-Dimethylbenzo(a)anthracene, Chlorobenzilate, Diallate, Ethyl methanesulfonate, Isodrin, Isosafrole, Methyl methanesulfonate, n-Nitrosomethylethylamine, n-Nitrosomorpholine, n-Nitrosopiperidine, Piperonyl butoxide, Pronamide, Safrole, 3,5- Dinitroaniline, PETN SW-846 8270E, Oil & Grease SW-846 9071B.

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18.

PFAS
Sample YE02015-004 required centrifugation prior to extraction, due to excessive solids present in the samples. Centrifugation was performed following the PFAS Aqueous Centrifuge Protocol; samples were spiked with Surrogate (SUR; Extracted Internal Standard/EIS) and shaken vigorously before being poured into a conical bottle and centrifuged. The centrifuged aqueous sample was decanted back into the original sample bottle, off of the condensed solids remaining in the centrifuge bottle. Original sample bottle was rinsed as normal and centrifuge bottle was rinsed with 4mL of MeOH. Centrifuge bottle rinsate was added to the elution. Samples concentrated to <5mL and reconstituted to 5mL using MeOH by transfer pipet.

The following samples were diluted due to the nature of the sample matrix: YE02015-003, YE02015-005. The LOQ has been elevated to reflect the dilution. Samples were dilued due to samples being foamy.

Surrogate recovery for the following samples was outside control limits: YE02015-001, YE02015-004, YE02015-006. Re-extraction and/or re-analysis was performed with concurring results. The original analysis has been reported.

Surrogate recovery for the following samples was outside the upper control limit: YE02015-002, YE02015-003, YE02015-005. These samples did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

## Manual Integration Summary

## Arcadis U.S., Inc.

### Lot Number: YE02015

### Project Name: Racer PNC

### Project Number: 30167840.00030

Where applicable, analytes for which manual integration occurred have been flagged with the following:

| Qualifier | Technical Justification | Qualifier | Technical Justification | Qualifier | Technical Justification |
|---|---|---|---|---|---|
| M-01 | Split peak | M-07 | Low fit | M-13 | Error |
| M-02 | Peak tailing | M-08 | Peak not found | M-14 | Baseline |
| M-03 | Incorrect auto integration | M-09 | Analyte not Identified by the Data System | M-15 | Other |
| M-04 | Poor chromatography | M-10 | Analyte misidentified by the Data System | M-16 | Retention time shift |
| M-05 | Manually assigned peak | M-11 | Invalid integration | M-17 | Shouldering |
| M-06 | Wrong isomer | M-12 | Wrong peak | | |

A summary of instances where manual integration occurred is included below:

| Method | Sample | Run Number | Parameter | Qualifier |
|---|---|---|---|---|
| PFAS by ID SOP | YE02015-001 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YE02015-001 | 1 | Perfluoro-1-pentanesulfonic acid | M-03 |
| PFAS by ID SOP | YE02015-001 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YE02015-001 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YE02015-001 | 1 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YE02015-001 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YE02015-001 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YE02015-001 | 2 | 13C8_PFOS | M-03 |
| PFAS by ID SOP | YE02015-002 | 1 | 1H, 1H, 2H, 2H-perfluorooctane sulfonic | M-03 |
| PFAS by ID SOP | YE02015-002 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YE02015-002 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YE02015-002 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YE02015-002 | 1 | Perfluoro-n-heptanoic acid (PFHpA) | M-03 |
| PFAS by ID SOP | YE02015-002 | 1 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YE02015-002 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YE02015-002 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YE02015-004 | 1 | 1H, 1H, 2H, 2H-perfluorodecane | M-03 |
| PFAS by ID SOP | YE02015-004 | 1 | 1H, 1H, 2H, 2H-perfluorooctane sulfonic | M-03 |
| PFAS by ID SOP | YE02015-004 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YE02015-004 | 1 | Perfluoro-1-heptanesulfonic acid | M-03 |
| PFAS by ID SOP | YE02015-004 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YE02015-004 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YE02015-004 | 1 | Perfluoro-n-decanoic acid (PFDA) | M-03 |
| PFAS by ID SOP | YE02015-004 | 1 | Perfluoro-n-heptanoic acid (PFHpA) | M-03 |
| PFAS by ID SOP | YE02015-004 | 1 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YE02015-004 | 1 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YE02015-004 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YE02015-004 | 2 | 13C2_8:2FTS | M-03 |
| PFAS by ID SOP | YE02015-004 | 2 | d3-MeFOSAA | M-03 |
| PFAS by ID SOP | YE02015-005 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YE02015-005 | 1 | Perfluoro-n-heptanoic acid (PFHpA) | M-03 |
| PFAS by ID SOP | YE02015-005 | 1 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YE02015-005 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YE02015-005 | 1 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YE02015-005 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YE02015-006 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YE02015-006 | 1 | Perfluoro-1-pentanesulfonic acid | M-03 |

## Manual Integration Summary

## Arcadis U.S., Inc.

### Lot Number: YE02015

### Project Name: Racer PNC

### Project Number: 30167840.00030

Where applicable, analytes for which manual integration occurred have been flagged with the following:

| Qualifier | Technical Justification | Qualifier | Technical Justification | Qualifier | Technical Justification |
|---|---|---|---|---|---|
| M-01 | Split peak | M-07 | Low fit | M-13 | Error |
| M-02 | Peak tailing | M-08 | Peak not found | M-14 | Baseline |
| M-03 | Incorrect auto integration | M-09 | Analyte not Identified by the Data System | M-15 | Other |
| M-04 | Poor chromatography | M-10 | Analyte misidentified by the Data System | M-16 | Retention time shift |
| M-05 | Manually assigned peak | M-11 | Invalid integration | M-17 | Shouldering |
| M-06 | Wrong isomer | M-12 | Wrong peak | | |

A summary of instances where manual integration occurred is included below:

| Method | Sample | Run Number | Parameter | Qualifier |
|---|---|---|---|---|
| PFAS by ID SOP | YE02015-006 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YE02015-006 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YE02015-006 | 1 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YE02015-006 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YE02015-006 | 2 | 13C2_4:2FTS | M-03 |
| PFAS by ID SOP | YE02015-006 | 2 | 13C2_8:2FTS | M-03 |
| PFAS by ID SOP | YE02015-006 | 2 | 13C3_PFBS | M-03 |
| PFAS by ID SOP | YE02015-006 | 2 | 13C6_PFDA | M-03 |
| PFAS by ID SOP | YE02015-006 | 2 | d5-EtFOSAA | M-03 |
| PFAS by ID SOP | YE02015-007 | 1 | 4,8-dioxa-3H-perfluorononanoic acid | M-03 |
| PFAS by ID SOP | YQ75726-002 | 1 | N-ethylperfluoro-1- | M-03 |
| PFAS by ID SOP | YQ75726-002 | 1 | N-methylperfluoro-1- | M-03 |
| PFAS by ID SOP | YQ75726-002 | 1 | Perfluoro-1-octanesulfonamide (PFOSA) | M-03 |
| PFAS by ID SOP | YQ75726-002 | 1 | Perfluoro-n-undecanoic acid (PFUdA) | M-03 |
| PFAS by ID SOP | YQ75750-002 | 1 | 1H, 1H, 2H, 2H-perfluorodecane | M-03 |
| PFAS by ID SOP | YQ75750-002 | 1 | N-methylperfluoro-1- | M-03 |
| PFAS by ID SOP | YQ75750-002 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

## Sample Summary

## Arcadis U.S., Inc.

**Lot Number: YE02015**

**Project Name: Racer PNC**

**Project Number: 30167840.00030**

| Sample Number | Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| 001 | MWM16-30_GW-050123 | Aqueous | 05/01/2023 0838 | 05/02/2023 |
| 002 | MWM4-05_GW-050123 | Aqueous | 05/01/2023 1132 | 05/02/2023 |
| 003 | MWM32-01_GW-050123 | Aqueous | 05/01/2023 1250 | 05/02/2023 |
| 004 | MWM2-28_GW-050123 | Aqueous | 05/01/2023 1413 | 05/02/2023 |
| 005 | MWM2-22_GW-050123 | Aqueous | 05/01/2023 1505 | 05/02/2023 |
| 006 | DUP-02_GW-050123 | Aqueous | 05/01/2023 | 05/02/2023 |
| 007 | Trip Blank | Aqueous | 05/01/2023 1540 | 05/02/2023 |

(7 samples)

## Detection Summary

## Arcadis U.S., Inc.

**Lot Number: YE02015**

**Project Name: Racer PNC**

**Project Number: 30167840.00030**

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 001 | MWM16-30_GW-050123 | Aqueous | PFBS | PFAS by ID | 3.0 | JM-03 | ng/L | 9 |
| 001 | MWM16-30_GW-050123 | Aqueous | PFPeS | PFAS by ID | 1.0 | JM-03 | ng/L | 9 |
| 001 | MWM16-30_GW-050123 | Aqueous | PFHxS | PFAS by ID | 4.7 | M-03 | ng/L | 9 |
| 001 | MWM16-30_GW-050123 | Aqueous | PFBA | PFAS by ID | 12 | QM-03 | ng/L | 9 |
| 001 | MWM16-30_GW-050123 | Aqueous | PFHpA | PFAS by ID | 6.7 | | ng/L | 9 |
| 001 | MWM16-30_GW-050123 | Aqueous | PFHxA | PFAS by ID | 7.7 | M-03 | ng/L | 9 |
| 001 | MWM16-30_GW-050123 | Aqueous | PFOA | PFAS by ID | 3.8 | JM-03 | ng/L | 9 |
| 001 | MWM16-30_GW-050123 | Aqueous | PFPeA | PFAS by ID | 11 | | ng/L | 9 |
| 001 | MWM16-30_GW-050123 | Aqueous | PFOS | PFAS by ID | 1.3 | JM-03 | ng/L | 9 |
| 002 | MWM4-05_GW-050123 | Aqueous | PFBS | PFAS by ID | 2.5 | JM-03 | ng/L | 11 |
| 002 | MWM4-05_GW-050123 | Aqueous | PFHxS | PFAS by ID | 2.2 | JM-03 | ng/L | 11 |
| 002 | MWM4-05_GW-050123 | Aqueous | PFBA | PFAS by ID | 8.5 | M-03 | ng/L | 11 |
| 002 | MWM4-05_GW-050123 | Aqueous | PFHpA | PFAS by ID | 2.6 | JM-03 | ng/L | 11 |
| 002 | MWM4-05_GW-050123 | Aqueous | PFHxA | PFAS by ID | 3.5 | JM-03 | ng/L | 11 |
| 002 | MWM4-05_GW-050123 | Aqueous | PFOA | PFAS by ID | 4.2 | M-03 | ng/L | 11 |
| 002 | MWM4-05_GW-050123 | Aqueous | PFPeA | PFAS by ID | 3.8 | | ng/L | 11 |
| 002 | MWM4-05_GW-050123 | Aqueous | PFOS | PFAS by ID | 2.2 | JM-03 | ng/L | 11 |
| 004 | MWM2-28_GW-050123 | Aqueous | 8:2 FTS | PFAS by ID | 2.3 | JQM-03 | ng/L | 15 |
| 004 | MWM2-28_GW-050123 | Aqueous | 6:2 FTS | PFAS by ID | 3.9 | JQM-03 | ng/L | 15 |
| 004 | MWM2-28_GW-050123 | Aqueous | PFBS | PFAS by ID | 3.7 | M-03 | ng/L | 15 |
| 004 | MWM2-28_GW-050123 | Aqueous | PFHpS | PFAS by ID | 1.1 | JM-03 | ng/L | 15 |
| 004 | MWM2-28_GW-050123 | Aqueous | PFHxS | PFAS by ID | 4.2 | M-03 | ng/L | 15 |
| 004 | MWM2-28_GW-050123 | Aqueous | PFBA | PFAS by ID | 14 | QM-03 | ng/L | 15 |
| 004 | MWM2-28_GW-050123 | Aqueous | PFDA | PFAS by ID | 2.2 | JM-03 | ng/L | 15 |
| 004 | MWM2-28_GW-050123 | Aqueous | PFHpA | PFAS by ID | 8.1 | M-03 | ng/L | 15 |
| 004 | MWM2-28_GW-050123 | Aqueous | PFHxA | PFAS by ID | 16 | M-03 | ng/L | 15 |
| 004 | MWM2-28_GW-050123 | Aqueous | PFNA | PFAS by ID | 5.0 | | ng/L | 15 |
| 004 | MWM2-28_GW-050123 | Aqueous | PFOA | PFAS by ID | 18 | | ng/L | 15 |
| 004 | MWM2-28_GW-050123 | Aqueous | PFPeA | PFAS by ID | 14 | M-03 | ng/L | 15 |
| 004 | MWM2-28_GW-050123 | Aqueous | PFOS | PFAS by ID | 56 | M-03 | ng/L | 15 |
| 005 | MWM2-22_GW-050123 | Aqueous | PFBA | PFAS by ID | 27 | JM-03 | ng/L | 17 |
| 005 | MWM2-22_GW-050123 | Aqueous | PFHpA | PFAS by ID | 15 | JM-03 | ng/L | 17 |
| 005 | MWM2-22_GW-050123 | Aqueous | PFHxA | PFAS by ID | 28 | JM-03 | ng/L | 17 |
| 005 | MWM2-22_GW-050123 | Aqueous | PFOA | PFAS by ID | 28 | JM-03 | ng/L | 17 |
| 005 | MWM2-22_GW-050123 | Aqueous | PFPeA | PFAS by ID | 26 | JM-03 | ng/L | 17 |
| 005 | MWM2-22_GW-050123 | Aqueous | PFOS | PFAS by ID | 77 | M-03 | ng/L | 17 |
| 006 | DUP-02_GW-050123 | Aqueous | PFBS | PFAS by ID | 3.0 | JM-03 | ng/L | 19 |
| 006 | DUP-02_GW-050123 | Aqueous | PFHxS | PFAS by ID | 4.6 | M-03 | ng/L | 19 |
| 006 | DUP-02_GW-050123 | Aqueous | PFBA | PFAS by ID | 11 | Q | ng/L | 19 |
| 006 | DUP-02_GW-050123 | Aqueous | PFHpA | PFAS by ID | 6.5 | | ng/L | 19 |
| 006 | DUP-02_GW-050123 | Aqueous | PFHxA | PFAS by ID | 7.0 | | ng/L | 19 |
| 006 | DUP-02_GW-050123 | Aqueous | PFOA | PFAS by ID | 4.1 | M-03 | ng/L | 19 |
| 006 | DUP-02_GW-050123 | Aqueous | PFPeA | PFAS by ID | 13 | M-03 | ng/L | 19 |

# Detection Summary (Continued)

## Lot Number: YE02015

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 006 | DUP-02_GW-050123 | Aqueous | PFOS | PFAS by ID | 1.2 | JM-03 | ng/L | 19 |

(44 detections)

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-001**

Description: **MWM16-30_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 0838** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 0211 | ARC2 | 05/19/2023 1219 | 75726 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.7 | 1.9 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.7 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.7 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.7 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.7 | 1.9 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.7 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.7 | 1.9 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.7 | 1.9 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.7 | 1.9 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.0** | **JM-03** | **3.9** | **0.96** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **1.0** | **JM-03** | **3.9** | **0.96** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **4.7** | **M-03** | **3.9** | **0.96** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **12** | **QM-03** | **3.9** | **0.96** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **6.7** | | **3.9** | **0.96** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **7.7** | **M-03** | **3.9** | **0.96** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **3.8** | **JM-03** | **3.9** | **0.96** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **11** | | **3.9** | **0.96** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **1.3** | **JM-03** | **3.9** | **0.96** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 295 | 50-150 |
| 13C2_6:2FTS | N | 166 | 50-150 |
| 13C2_8:2FTS | | 110 | 50-150 |
| 13C2_PFDoA | | 88 | 50-150 |
| 13C2_PFTeDA | | 92 | 50-150 |
| 13C3_PFBS | | 95 | 50-150 |
| 13C3_PFHxS | | 101 | 50-150 |
| 13C3-HFPO-DA | | 88 | 50-150 |
| 13C4_PFBA | N | 31 | 50-150 |
| 13C4_PFHpA | | 105 | 50-150 |
| 13C5_PFHxA | | 93 | 50-150 |
| 13C5_PFPeA | | 67 | 50-150 |
| 13C6_PFDA | | 99 | 50-150 |
| 13C7_PFUdA | | 93 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-001**

Description: **MWM16-30_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 0838** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 105 | 50-150 |
| 13C8_PFOS | | 97 | 50-150 |
| 13C8_PFOSA | | 98 | 50-150 |
| 13C9_PFNA | | 109 | 50-150 |
| d5-EtFOSAA | | 95 | 50-150 |
| d3-MeFOSAA | | 103 | 50-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-002**

Description: **MWM4-05_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1132** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 0223 | ARC2 | 05/19/2023 1219 | 75726 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | QM-03 | 7.4 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.4 | 1.9 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **2.5** | **JM-03** | **3.7** | **0.93** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **2.2** | **JM-03** | **3.7** | **0.93** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **8.5** | **M-03** | **3.7** | **0.93** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **2.6** | **JM-03** | **3.7** | **0.93** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **3.5** | **JM-03** | **3.7** | **0.93** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **4.2** | **M-03** | **3.7** | **0.93** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **3.8** | | **3.7** | **0.93** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **2.2** | **JM-03** | **3.7** | **0.93** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 251 | 50-150 |
| 13C2_6:2FTS | N | 169 | 50-150 |
| 13C2_8:2FTS | | 119 | 50-150 |
| 13C2_PFDoA | | 88 | 50-150 |
| 13C2_PFTeDA | | 93 | 50-150 |
| 13C3_PFBS | | 99 | 50-150 |
| 13C3_PFHxS | | 102 | 50-150 |
| 13C3-HFPO-DA | | 92 | 50-150 |
| 13C4_PFBA | | 55 | 50-150 |
| 13C4_PFHpA | | 105 | 50-150 |
| 13C5_PFHxA | | 102 | 50-150 |
| 13C5_PFPeA | | 85 | 50-150 |
| 13C6_PFDA | | 105 | 50-150 |
| 13C7_PFUdA | | 95 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-002**

Description: **MWM4-05_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1132** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 105 | 50-150 |
| 13C8_PFOS | | 95 | 50-150 |
| 13C8_PFOSA | | 99 | 50-150 |
| 13C9_PFNA | | 107 | 50-150 |
| d5-EtFOSAA | | 96 | 50-150 |
| d3-MeFOSAA | | 107 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-003**

Description: **MWM32-01_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1250** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 0236 | ARC2 | 05/19/2023 1219 | 75726 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 234 | 50-150 |
| 13C2_6:2FTS | N | 214 | 50-150 |
| 13C2_8:2FTS | N | 186 | 50-150 |
| 13C2_PFDoA | | 106 | 50-150 |
| 13C2_PFTeDA | | 103 | 50-150 |
| 13C3_PFBS | | 104 | 50-150 |
| 13C3_PFHxS | | 106 | 50-150 |
| 13C3-HFPO-DA | | 98 | 50-150 |
| 13C4_PFBA | | 86 | 50-150 |
| 13C4_PFHpA | | 110 | 50-150 |
| 13C5_PFHxA | | 110 | 50-150 |
| 13C5_PFPeA | | 97 | 50-150 |
| 13C6_PFDA | | 112 | 50-150 |
| 13C7_PFUdA | | 113 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-003**

Description: **MWM32-01_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1250** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 108 | 50-150 |
| 13C8_PFOS | | 99 | 50-150 |
| 13C8_PFOSA | | 105 | 50-150 |
| 13C9_PFNA | | 111 | 50-150 |
| d5-EtFOSAA | | 124 | 50-150 |
| d3-MeFOSAA | | 134 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-004**

Description: **MWM2-28_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1413** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 0249 | ARC2 | 05/19/2023 1219 | 75726 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)** | **39108-34-4** | **PFAS by ID SOP** | **2.3** | **JQM-03** | **7.0** | **1.8** | **ng/L** | **1** |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **3.9** | **JQM-03** | **7.0** | **1.8** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.7** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **1.1** | **JM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **4.2** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **14** | **QM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-decanoic acid (PFDA)** | **335-76-2** | **PFAS by ID SOP** | **2.2** | **JM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **8.1** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **16** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **5.0** | | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **18** | | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **14** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **56** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 331 | 50-150 |
| 13C2_6:2FTS | N | 312 | 50-150 |
| 13C2_8:2FTS | N | 359 | 50-150 |
| 13C2_PFDoA | | 103 | 50-150 |
| 13C2_PFTeDA | | 104 | 50-150 |
| 13C3_PFBS | | 89 | 50-150 |
| 13C3_PFHxS | | 92 | 50-150 |
| 13C3-HFPO-DA | | 74 | 50-150 |
| 13C4_PFBA | N | 29 | 50-150 |
| 13C4_PFHpA | | 82 | 50-150 |
| 13C5_PFHxA | | 77 | 50-150 |
| 13C5_PFPeA | | 57 | 50-150 |
| 13C6_PFDA | | 93 | 50-150 |
| 13C7_PFUdA | | 105 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-004**

Description: **MWM2-28_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1413** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 82 | 50-150 |
| 13C8_PFOS | | 93 | 50-150 |
| 13C8_PFOSA | | 80 | 50-150 |
| 13C9_PFNA | | 93 | 50-150 |
| d5-EtFOSAA | | 131 | 50-150 |
| d3-MeFOSAA | | 119 | 50-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-005**

Description: **MWM2-22_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1505** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 0302 | ARC2 | 05/19/2023 1219 | 75726 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **27** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **15** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **28** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **28** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **26** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **77** | **M-03** | **40** | **10** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 221 | 50-150 |
| 13C2_6:2FTS | N | 183 | 50-150 |
| 13C2_8:2FTS | N | 171 | 50-150 |
| 13C2_PFDoA | | 108 | 50-150 |
| 13C2_PFTeDA | | 105 | 50-150 |
| 13C3_PFBS | | 105 | 50-150 |
| 13C3_PFHxS | | 110 | 50-150 |
| 13C3-HFPO-DA | | 99 | 50-150 |
| 13C4_PFBA | | 81 | 50-150 |
| 13C4_PFHpA | | 111 | 50-150 |
| 13C5_PFHxA | | 109 | 50-150 |
| 13C5_PFPeA | | 95 | 50-150 |
| 13C6_PFDA | | 113 | 50-150 |
| 13C7_PFUdA | | 113 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
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L = LCS/LCSD failure
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-005**

Description: **MWM2-22_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1505** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 107 | 50-150 |
| 13C8_PFOS | | 102 | 50-150 |
| 13C8_PFOSA | | 108 | 50-150 |
| 13C9_PFNA | | 113 | 50-150 |
| d5-EtFOSAA | | 128 | 50-150 |
| d3-MeFOSAA | | 136 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-006**

Description: **DUP-02_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 0314 | ARC2 | 05/19/2023 1219 | 75726 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.4 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.4 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.0** | **JM-03** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | M-03 | 3.7 | 0.92 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **4.6** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **11** | **Q** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **6.5** | | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **7.0** | | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **4.1** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **13** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **1.2** | **JM-03** | **3.7** | **0.92** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 292 | 50-150 |
| 13C2_6:2FTS | N | 167 | 50-150 |
| 13C2_8:2FTS | | 110 | 50-150 |
| 13C2_PFDoA | | 88 | 50-150 |
| 13C2_PFTeDA | | 91 | 50-150 |
| 13C3_PFBS | | 97 | 50-150 |
| 13C3_PFHxS | | 102 | 50-150 |
| 13C3-HFPO-DA | | 86 | 50-150 |
| 13C4_PFBA | N | 31 | 50-150 |
| 13C4_PFHpA | | 105 | 50-150 |
| 13C5_PFHxA | | 92 | 50-150 |
| 13C5_PFPeA | | 66 | 50-150 |
| 13C6_PFDA | | 103 | 50-150 |
| 13C7_PFUdA | | 92 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-006**

Description: **DUP-02_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 105 | 50-150 |
| 13C8_PFOS | | 98 | 50-150 |
| 13C8_PFOSA | | 99 | 50-150 |
| 13C9_PFNA | | 109 | 50-150 |
| d5-EtFOSAA | | 93 | 50-150 |
| d3-MeFOSAA | | 106 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-007**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1540** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 2338 | ARC2 | 05/19/2023 1238 | 75750 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | M-03 | 6.9 | 1.7 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 92 | 50-150 |
| 13C2_6:2FTS | | 86 | 50-150 |
| 13C2_8:2FTS | | 96 | 50-150 |
| 13C2_PFDoA | | 93 | 50-150 |
| 13C2_PFTeDA | | 79 | 50-150 |
| 13C3_PFBS | | 95 | 50-150 |
| 13C3_PFHxS | | 91 | 50-150 |
| 13C3-HFPO-DA | | 95 | 50-150 |
| 13C4_PFBA | | 94 | 50-150 |
| 13C4_PFHpA | | 95 | 50-150 |
| 13C5_PFHxA | | 89 | 50-150 |
| 13C5_PFPeA | | 96 | 50-150 |
| 13C6_PFDA | | 94 | 50-150 |
| 13C7_PFUdA | | 95 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-007**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1540** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 95 | 50-150 |
| 13C8_PFOS | | 89 | 50-150 |
| 13C8_PFOSA | | 91 | 50-150 |
| 13C9_PFNA | | 87 | 50-150 |
| d5-EtFOSAA | | 83 | 50-150 |
| d3-MeFOSAA | | 89 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# QC Summary

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ75726-001
**Batch:** 75726
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/19/2023 1219

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 0054 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 0054 |
| 8:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 0054 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 0054 |
| 4:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 0054 |
| GenX | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 0054 |
| ADONA | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 0054 |
| EtFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 0054 |
| MeFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 05/24/2023 0054 |
| PFBS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFDS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFHpS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFNS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFOSA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFPeS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFHxS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFBA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFDA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFDoA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFHpA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFHxA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFNA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFOA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFPeA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFTeDA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFTrDA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFUdA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |
| PFOS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/24/2023 0054 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 99 | 50-150 |
| 13C2_6:2FTS | | 101 | 50-150 |
| 13C2_8:2FTS | | 100 | 50-150 |
| 13C2_PFDoA | | 90 | 50-150 |
| 13C2_PFTeDA | | 94 | 50-150 |
| 13C3_PFBS | | 103 | 50-150 |
| 13C3_PFHxS | | 101 | 50-150 |
| 13C3-HFPO-DA | | 100 | 50-150 |
| 13C4_PFBA | | 101 | 50-150 |
| 13C4_PFHpA | | 104 | 50-150 |
| 13C5_PFHxA | | 103 | 50-150 |
| 13C5_PFPeA | | 99 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ75726-001
**Batch:** 75726
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/19/2023 1219

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 97 | 50-150 |
| 13C7_PFUdA | | 98 | 50-150 |
| 13C8_PFOA | | 103 | 50-150 |
| 13C8_PFOS | | 95 | 50-150 |
| 13C8_PFOSA | | 97 | 50-150 |
| 13C9_PFNA | | 102 | 50-150 |
| d5-EtFOSAA | | 98 | 50-150 |
| d3-MeFOSAA | | 111 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit

ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria

N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ75726-002
**Batch:** 75726
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/19/2023 1219

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 15 | | 1 | 103 | 50-150 | 05/24/2023 0107 |
| 11Cl-PF3OUdS | 15 | 14 | | 1 | 95 | 50-150 | 05/24/2023 0107 |
| 8:2 FTS | 15 | 16 | | 1 | 104 | 67-138 | 05/24/2023 0107 |
| 6:2 FTS | 15 | 16 | | 1 | 103 | 64-140 | 05/24/2023 0107 |
| 4:2 FTS | 15 | 16 | | 1 | 104 | 63-143 | 05/24/2023 0107 |
| GenX | 32 | 33 | | 1 | 104 | 50-150 | 05/24/2023 0107 |
| ADONA | 15 | 15 | | 1 | 102 | 50-150 | 05/24/2023 0107 |
| EtFOSAA | 16 | 16 | M-03 | 1 | 100 | 61-135 | 05/24/2023 0107 |
| MeFOSAA | 16 | 16 | M-03 | 1 | 101 | 65-136 | 05/24/2023 0107 |
| PFBS | 14 | 14 | | 1 | 102 | 72-130 | 05/24/2023 0107 |
| PFDS | 15 | 15 | | 1 | 97 | 53-142 | 05/24/2023 0107 |
| PFHpS | 15 | 15 | | 1 | 97 | 69-134 | 05/24/2023 0107 |
| PFNS | 15 | 15 | | 1 | 99 | 69-127 | 05/24/2023 0107 |
| PFOSA | 16 | 16 | M-03 | 1 | 103 | 67-137 | 05/24/2023 0107 |
| PFPeS | 15 | 15 | | 1 | 101 | 71-127 | 05/24/2023 0107 |
| PFHxS | 15 | 14 | | 1 | 98 | 68-131 | 05/24/2023 0107 |
| PFBA | 16 | 16 | | 1 | 101 | 73-129 | 05/24/2023 0107 |
| PFDA | 16 | 17 | | 1 | 106 | 71-129 | 05/24/2023 0107 |
| PFDoA | 16 | 17 | | 1 | 108 | 72-134 | 05/24/2023 0107 |
| PFHpA | 16 | 17 | | 1 | 103 | 72-130 | 05/24/2023 0107 |
| PFHxA | 16 | 16 | | 1 | 101 | 72-129 | 05/24/2023 0107 |
| PFNA | 16 | 16 | | 1 | 100 | 69-130 | 05/24/2023 0107 |
| PFOA | 16 | 16 | | 1 | 102 | 71-133 | 05/24/2023 0107 |
| PFPeA | 16 | 16 | | 1 | 103 | 72-129 | 05/24/2023 0107 |
| PFTeDA | 16 | 16 | | 1 | 100 | 71-132 | 05/24/2023 0107 |
| PFTrDA | 16 | 15 | | 1 | 91 | 65-144 | 05/24/2023 0107 |
| PFUdA | 16 | 18 | M-03 | 1 | 110 | 69-133 | 05/24/2023 0107 |
| PFOS | 15 | 15 | | 1 | 98 | 65-140 | 05/24/2023 0107 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 96 | 50-150 |
| 13C2_6:2FTS | | 95 | 50-150 |
| 13C2_8:2FTS | | 94 | 50-150 |
| 13C2_PFDoA | | 85 | 50-150 |
| 13C2_PFTeDA | | 72 | 50-150 |
| 13C3_PFBS | | 96 | 50-150 |
| 13C3_PFHxS | | 97 | 50-150 |
| 13C3-HFPO-DA | | 94 | 50-150 |
| 13C4_PFBA | | 98 | 50-150 |
| 13C4_PFHpA | | 96 | 50-150 |
| 13C5_PFHxA | | 100 | 50-150 |
| 13C5_PFPeA | | 97 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ75726-002
**Batch:** 75726
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/19/2023 1219

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 94 | 50-150 |
| 13C7_PFUdA | | 88 | 50-150 |
| 13C8_PFOA | | 100 | 50-150 |
| 13C8_PFOS | | 92 | 50-150 |
| 13C8_PFOSA | | 94 | 50-150 |
| 13C9_PFNA | | 99 | 50-150 |
| d5-EtFOSAA | | 95 | 50-150 |
| d3-MeFOSAA | | 102 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ75750-001
**Batch:** 75750
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/19/2023 1238

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 2053 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 2053 |
| 8:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 2053 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 2053 |
| 4:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 2053 |
| GenX | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 2053 |
| ADONA | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 2053 |
| EtFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 2053 |
| MeFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 2053 |
| PFBS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFDS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFHpS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFNS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFOSA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFPeS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFHxS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFBA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFDA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFDoA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFHpA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFHxA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFNA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFOA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFPeA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFTeDA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFTrDA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFUdA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |
| PFOS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 2053 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 99 | 50-150 |
| 13C2_6:2FTS | | 100 | 50-150 |
| 13C2_8:2FTS | | 105 | 50-150 |
| 13C2_PFDoA | | 97 | 50-150 |
| 13C2_PFTeDA | | 69 | 50-150 |
| 13C3_PFBS | | 105 | 50-150 |
| 13C3_PFHxS | | 96 | 50-150 |
| 13C3-HFPO-DA | | 104 | 50-150 |
| 13C4_PFBA | | 103 | 50-150 |
| 13C4_PFHpA | | 104 | 50-150 |
| 13C5_PFHxA | | 97 | 50-150 |
| 13C5_PFPeA | | 103 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ75750-001
**Batch:** 75750
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/19/2023 1238

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 98 | 50-150 |
| 13C7_PFUdA | | 105 | 50-150 |
| 13C8_PFOA | | 103 | 50-150 |
| 13C8_PFOS | | 95 | 50-150 |
| 13C8_PFOSA | | 99 | 50-150 |
| 13C9_PFNA | | 92 | 50-150 |
| d5-EtFOSAA | | 98 | 50-150 |
| d3-MeFOSAA | | 98 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ75750-002
**Batch:** 75750
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/19/2023 1238

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 15 | | 1 | 102 | 50-150 | 06/01/2023 2106 |
| 11Cl-PF3OUdS | 15 | 14 | | 1 | 93 | 50-150 | 06/01/2023 2106 |
| 8:2 FTS | 15 | 16 | M-03 | 1 | 108 | 67-138 | 06/01/2023 2106 |
| 6:2 FTS | 15 | 15 | | 1 | 98 | 64-140 | 06/01/2023 2106 |
| 4:2 FTS | 15 | 16 | | 1 | 105 | 63-143 | 06/01/2023 2106 |
| GenX | 32 | 33 | | 1 | 102 | 50-150 | 06/01/2023 2106 |
| ADONA | 15 | 15 | | 1 | 102 | 50-150 | 06/01/2023 2106 |
| EtFOSAA | 16 | 17 | | 1 | 108 | 61-135 | 06/01/2023 2106 |
| MeFOSAA | 16 | 16 | M-03 | 1 | 99 | 65-136 | 06/01/2023 2106 |
| PFBS | 14 | 13 | | 1 | 95 | 72-130 | 06/01/2023 2106 |
| PFDS | 15 | 14 | | 1 | 93 | 53-142 | 06/01/2023 2106 |
| PFHpS | 15 | 15 | | 1 | 95 | 69-134 | 06/01/2023 2106 |
| PFNS | 15 | 16 | | 1 | 102 | 69-127 | 06/01/2023 2106 |
| PFOSA | 16 | 16 | | 1 | 103 | 67-137 | 06/01/2023 2106 |
| PFPeS | 15 | 15 | | 1 | 99 | 71-127 | 06/01/2023 2106 |
| PFHxS | 15 | 15 | | 1 | 102 | 68-131 | 06/01/2023 2106 |
| PFBA | 16 | 16 | | 1 | 103 | 73-129 | 06/01/2023 2106 |
| PFDA | 16 | 16 | | 1 | 99 | 71-129 | 06/01/2023 2106 |
| PFDoA | 16 | 17 | | 1 | 108 | 72-134 | 06/01/2023 2106 |
| PFHpA | 16 | 16 | | 1 | 98 | 72-130 | 06/01/2023 2106 |
| PFHxA | 16 | 17 | | 1 | 103 | 72-129 | 06/01/2023 2106 |
| PFNA | 16 | 16 | | 1 | 98 | 69-130 | 06/01/2023 2106 |
| PFOA | 16 | 16 | | 1 | 97 | 71-133 | 06/01/2023 2106 |
| PFPeA | 16 | 16 | | 1 | 99 | 72-129 | 06/01/2023 2106 |
| PFTeDA | 16 | 18 | | 1 | 111 | 71-132 | 06/01/2023 2106 |
| PFTrDA | 16 | 13 | | 1 | 80 | 65-144 | 06/01/2023 2106 |
| PFUdA | 16 | 15 | | 1 | 95 | 69-133 | 06/01/2023 2106 |
| PFOS | 15 | 16 | M-03 | 1 | 105 | 65-140 | 06/01/2023 2106 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 100 | 50-150 |
| 13C2_6:2FTS | | 94 | 50-150 |
| 13C2_8:2FTS | | 99 | 50-150 |
| 13C2_PFDoA | | 86 | 50-150 |
| 13C2_PFTeDA | | 51 | 50-150 |
| 13C3_PFBS | | 103 | 50-150 |
| 13C3_PFHxS | | 94 | 50-150 |
| 13C3-HFPO-DA | | 99 | 50-150 |
| 13C4_PFBA | | 97 | 50-150 |
| 13C4_PFHpA | | 107 | 50-150 |
| 13C5_PFHxA | | 97 | 50-150 |
| 13C5_PFPeA | | 98 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ75750-002
**Batch:** 75750
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/19/2023 1238

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 97 | 50-150 |
| 13C7_PFUdA | | 101 | 50-150 |
| 13C8_PFOA | | 101 | 50-150 |
| 13C8_PFOS | | 86 | 50-150 |
| 13C8_PFOSA | | 93 | 50-150 |
| 13C9_PFNA | | 97 | 50-150 |
| d5-EtFOSAA | | 88 | 50-150 |
| d3-MeFOSAA | | 94 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Chain of Custody
# and
# Miscellaneous Documents

Pace Analytical®

**PACE ANALYTICAL SERVICES, LLC**
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 146505

| | | | |
|---|---|---|---|
| Client: ArCadis | Report to Contact: Tiffany Linder, Alexis Crisp | Telephone No. / E-mail: Alexis.Crisp@arcadis.com, tiffany.linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Sommer Guy | Analysis (Attach list if more space is needed): Report EGLE 28 compounds | Page: of |
| City: Novi / State: MI / Zip Code: 48377 | Printed Name: Sommer Guy | | YE02015 |
| Project Name: River PNC | | | |
| Project No.: 30167840.00030 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line) | Collection Date(s) | Collection Time (Military) | Grab / C-Composite | Matrix: Aqueous | Matrix: Soil | Matrix: Non-Aqueous | No. of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | Other | Other Analysis | PFAS - Per/Poly Fluoroalkyl Substances by ASTM D7979-17 Modified | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWM16-30_GW-050123 | 5/1/23 | 0838 | G | 2 | | | 2 | | | | | | | X | |
| MWM4-05_GW-050123 | 5/1/23 | 1132 | G | 2 | | | 2 | | | | | | | X | |
| MWM32-01_GW-050123 | 5/1/23 | 1250 | G | 2 | | | 2 | | | | | | | X | |
| MWM2-28_GW-050123 | 5/1/23 | 1413 | G | 2 | | | 2 | | | | | | | X | |
| MWM2-22_GW-050123 | 5/1/23 | 1505 | G | 2 | | | 2 | | | | | | | X | |
| DUP-02_GW-050123 | 5/1/23 | — | G | 2 | | | 2 | | | | | | | X | |
| tripblank | 5/1/23 | 1540 | G | 1 | | | 1 | | | | | | | X | tripblank |

Turn Around Time Required (Prior lab approval required for expedited TAT.): X Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client X Disposal by Lab

Possible Hazard Identification: X Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Guy | 5/1/23 | 1625 | 1. Received by: FedEx | 5/1/23 | 1625 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: fedex | 5-2-23 | 950 | 4. Laboratory received by: Keyanna Williams | 5/2/23 | 950 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on Ice (Circle): Yes No Ice Pack — Receipt Temp: 3.6 °C — Temp Blank: ☐ Y ☐ N

DISTRIBUTION: WHITE & YELLOW-Return to Laboratory with Sample(s); PINK-Field/Client Copy

Document Number: ME009N2-01



PACE ANALYTICAL SERVICES, LLC

DC#_Title: ENV-FRM-WCOL-0286 v02_Samples Receipt Checklist (SRC)
Effective Date: 8/2/2022

# Sample Receipt Checklist (SRC)

Client: ARCADIS  Cooler Inspected by/date: KDRW / 05/02/2023  Lot #: YE02015

Means of receipt: ☐ Pace ☐ Client ☐ UPS ☑ FedEx ☐ Other:

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | | 1. Were custody seals present on the cooler? |
| ☑ Yes | ☐ No | ☐ NA | 2. If custody seals were present, were they intact and unbroken? |

pH Strip ID: NA  Chlorine Strip ID: NA  Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt  %Solid Snap-Cup ID: NA

3.6 / 3.6 °C  NA / NA °C  NA / NA °C  NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles  IR Gun ID: 8  IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | ☐ NA | 3. Were all coolers received at or below 6.0°C? If no, was Project Manager notified? PM was Notified by: phone / email / face-to-face (circle one). |
| ☐ Yes | ☐ No | ☑ NA | 4. Is the commercial courier's packing slip attached to this form? |
| ☑ Yes | ☐ No | | 5. Were proper custody procedures (relinquished/received) followed? |
| ☑ Yes | ☐ No | | 6. Were sample IDs listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 7. Was collection date & time listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 8. Did all container label information (ID, date, time) agree with the COC? |
| ☑ Yes | ☐ No | | 9. Were tests to be performed listed on the COC? |
| ☑ Yes | ☐ No | | 10. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? |
| ☑ Yes | ☐ No | | 11. Was adequate sample volume available? |
| ☑ Yes | ☐ No | | 12. Were all samples received within ½ the holding time or 48 hours, whichever comes first? |
| ☑ Yes | ☐ No | | 13. Were all samples containers accounted for? (No missing/excess) |
| ☐ Yes | ☐ No | ☑ NA | 14. Were VOA, 8015C and RSK-175 samples free of bubbles >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials? |
| ☐ Yes | ☐ No | ☑ NA | 15. Were all DRO/metals/nutrient samples received at a pH of < 2? |
| ☐ Yes | ☐ No | ☑ NA | 16. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9? |
| ☐ Yes | ☐ No | ☑ NA | 17. Were all applicable $NH_3$/TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine? |
| ☑ Yes | ☐ No | ☐ NA | 18. Was the quote number listed on the container label? If yes. Quote # 25015 |

**Sample Preservation** (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA. ☐
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Unique ID: NA.

Comments:

Qualtrax ID: 56360

# Report of Analysis

**Arcadis U.S., Inc.**
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Tiffany Linder

Project Name: Racer PNC

Project Number: 30167840.00030

Lot Number:**YE03032**

Date Completed:06/08/2023

06/08/2023 11:00 AM
Approved and released by:
Project Manager II: **Kathy E. Smith**

The electronic signature above is the equivalent of a handwritten signature.
This report shall not be reproduced, except in its entirety, without the written approval of Pace Analytical Services, LLC.

Pace Analytical Services, LLC (*formerly Shealy Environmental Services, Inc.*)
106 Vantage Point Drive West Columbia, SC 29172
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

## Case Narrative
## Arcadis U.S., Inc.
### Lot Number: YE03032

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.4 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples were compliant with DOD QSM 5.4 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). The CF is calculated as follows:

CF = DF * FV / Vo

FV is volume of extract (mL)
Vo is initial sample volume (mL)
DF is dilution factor. For undiluted analysis, DF = 1.

Sample concentration for aqueous samples:
Concentration (ng/L) = Cs*CF,

$$C_s = \frac{\left(\frac{(A_s x C_{is})}{A_{is}}\right) - B}{M1}$$

Where

$C_s$ is on column concentration of target analyte in the sample (ng/L)
$C_{is}$ is concentration of internal standard in the sample (ng/L)
$A_s$ is peak response of target analyte in the sample
$A_{is}$ is peak response of internal standard in the sample
M1 is the average RF from ICAL or the slope from linear regression ICAL
B is the y-intercept from the ICAL

Pace is a DoD/DOE accredited laboratory; however, the following analyses are currently not listed on our DoD/DOE scope of accreditation: Drinking Water: pH EPA 150.1, Turbidity EPA 180.1, Metals EPA 200.7 & 200.8, Mercury EPA 245.1, Anions EPA 300.0, Cyanide EPA 335.4, Nitrates EPA 353.2, Orthophosphate & Phosphorus EPA 365.1, EDB/DBCP EPA 504.1, HPC SIMPLATE, Color SM 2120 B-2011, Alkalinity SM 2320 B-2011, Specific Conductance SM 2510 B-2011, Residue-filterable (TDS) SM 2540 C, Calcium Hardness (CaCO2) SM 3500-Ca B-2011, TRC SM 4500 Cl G-2011, pH SM 4500 H=B-2011, E.Coli, Total Coliform. Non-Potable Water: Metals EPA 200.7, Strontium EPA 200.8, Chlorate EPA 300.0, Cyanide EPA 335.4, Phenolics EPA 420.4, 2-Methyl-4,6-Dinitrophenol EPA 625.1, Propane RSK-175, Specific Conductance SM 2510 B-2011, Salinity SM2520 B, Residue- total SM 2540 B, Sulfite SM 4500 SO32- B-2011, Amenable Cyanide SM 4500-CN- G-2011, BOD & CBOD SM 5210 B, MBAS SM 5540 C-2011, Boron & Titanium SW-846 6010D, Boron, Molybdenum, & Titanium SW-846 6020B, Alcohols & Glycols SW-846 8015C, Pentachlorophenol SW-846 8151A, Ethyl Acetate, Hexane, & n-Hexane SW-846 8260D, SVOC 1,4-Dioxane, 4-Dimethyl aminoazobenzene, 1,4-Naphthoquinone, 3,5-Dinitroaniline, PETN SW-846 8270E, Amenable Cyanide SW-846 9012B. Solid and Chemical Materials: Boron & Titanium SW-846 6010D, Molybdenum SW-846 6020B, Ethylene Glycol SW-846 8015B, Pentachlorophenol SW-846 8151A, Chloroprene SW-846 8260B, SVOC 1,4-Dioxane, 1,3,5-Trinitrobenzene, 1,4- Naphthoquinone, 1,4-Phenylenediamine, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 3-Methylcholanthrene, 4-Aminobiphenyl, 4-Dimethyl aminoazobenzene, 4-Nitroquinoline-1-oxide, 7,12-Dimethylbenzo(a)anthracene, Chlorobenzilate, Diallate, Ethyl methanesulfonate, Isodrin, Isosafrole, Methyl methanesulfonate, n-Nitrosomethylethylamine, n-Nitrosomorpholine, n-Nitrosopiperidine, Piperonyl butoxide, Pronamide, Safrole, 3,5- Dinitroaniline, PETN SW-846 8270E, Oil & Grease SW-846 9071B.

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18.

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

PFAS
Samples YE03032-001, YE03032-006 required centrifugation prior to extraction, due to excessive solids present in the samples. Centrifugation was performed following the PFAS Aqueous Centrifuge Protocol; samples were spiked with Surrogate (SUR; Extracted Internal Standard/EIS) and shaken vigorously before being poured into a conical bottle and centrifuged. The centrifuged aqueous sample was decanted back into the original sample bottle, off of the condensed solids remaining in the centrifuge bottle. Original sample bottle was rinsed as normal and centrifuge bottle was rinsed with 4mL of MeOH. Centrifuge bottle rinsate was added to the elution. Samples concentrated to <5mL and reconstituted to 5mL using MeOH by transfer pipet.

Surrogate recovery for the following samples was outside control limits: YE03032-001, YE03032-005, YE03032-006. Re-extraction and/or re-analysis was performed with concurring results. The original analysis has been reported.

## Manual Integration Summary

## Arcadis U.S., Inc.

### Lot Number: YE03032

### Project Name: Racer PNC

### Project Number: 30167840.00030

Where applicable, analytes for which manual integration occurred have been flagged with the following:

| Qualifier | Technical Justification | Qualifier | Technical Justification | Qualifier | Technical Justification |
|---|---|---|---|---|---|
| M-01 | Split peak | M-07 | Low fit | M-13 | Error |
| M-02 | Peak tailing | M-08 | Peak not found | M-14 | Baseline |
| M-03 | Incorrect auto integration | M-09 | Analyte not Identified by the Data System | M-15 | Other |
| M-04 | Poor chromatography | M-10 | Analyte misidentified by the Data System | M-16 | Retention time shift |
| M-05 | Manually assigned peak | M-11 | Invalid integration | M-17 | Shouldering |
| M-06 | Wrong isomer | M-12 | Wrong peak | | |

A summary of instances where manual integration occurred is included below:

| Method | Sample | Run Number | Parameter | Qualifier |
|---|---|---|---|---|
| PFAS by ID SOP | YE03032-001 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YE03032-001 | 1 | Perfluoro-1-pentanesulfonic acid | M-03 |
| PFAS by ID SOP | YE03032-001 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YE03032-001 | 1 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YE03032-001 | 1 | Perfluoro-n-nonanoic acid (PFNA) | M-03 |
| PFAS by ID SOP | YE03032-001 | 1 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YE03032-001 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YE03032-001 | 2 | 13C8_PFOSA | M-03 |
| PFAS by ID SOP | YE03032-004 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YE03032-004 | 1 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YE03032-005 | 1 | N-ethylperfluoro-1- | M-03 |
| PFAS by ID SOP | YE03032-005 | 1 | N-methylperfluoro-1- | M-03 |
| PFAS by ID SOP | YE03032-005 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YE03032-005 | 1 | Perfluoro-1-octanesulfonamide (PFOSA) | M-03 |
| PFAS by ID SOP | YE03032-005 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YE03032-005 | 1 | Perfluoro-n-nonanoic acid (PFNA) | M-03 |
| PFAS by ID SOP | YE03032-005 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YE03032-006 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YE03032-006 | 1 | Perfluoro-1-pentanesulfonic acid | M-03 |
| PFAS by ID SOP | YE03032-006 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YE03032-006 | 1 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YE03032-006 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YQ75967-002 | 1 | 1H, 1H, 2H, 2H-perfluorodecane | M-03 |
| PFAS by ID SOP | YQ75967-002 | 1 | N-ethylperfluoro-1- | M-03 |

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

## Sample Summary

## Arcadis U.S., Inc.

**Lot Number: YE03032**

**Project Name: Racer PNC**

**Project Number: 30167840.00030**

| Sample Number | Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| 001 | MW-03-17-GW-050223 | Aqueous | 05/02/2023 0918 | 05/03/2023 |
| 002 | MWM32-09-GW-050223 | Aqueous | 05/02/2023 1053 | 05/03/2023 |
| 003 | EB-01-050223 | Aqueous | 05/02/2023 1105 | 05/03/2023 |
| 004 | MWF16-26-GW-050223 | Aqueous | 05/02/2023 1155 | 05/03/2023 |
| 005 | MWW1-04-GW-050223 | Aqueous | 05/02/2023 1308 | 05/03/2023 |
| 006 | DUP-03-GW-050223 | Aqueous | 05/02/2023 | 05/03/2023 |
| 007 | TRIP BLANK | Aqueous | 05/02/2023 1320 | 05/03/2023 |

(7 samples)

## Detection Summary

## Arcadis U.S., Inc.

**Lot Number: YE03032**

**Project Name: Racer PNC**

**Project Number: 30167840.00030**

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 001 | MW-03-17-GW-050223 | Aqueous | 6:2 FTS | PFAS by ID | 8.8 | Q | ng/L | 7 |
| 001 | MW-03-17-GW-050223 | Aqueous | PFBS | PFAS by ID | 5.2 | M-03 | ng/L | 7 |
| 001 | MW-03-17-GW-050223 | Aqueous | PFHpS | PFAS by ID | 4.7 | | ng/L | 7 |
| 001 | MW-03-17-GW-050223 | Aqueous | PFPeS | PFAS by ID | 4.0 | M-03 | ng/L | 7 |
| 001 | MW-03-17-GW-050223 | Aqueous | PFHxS | PFAS by ID | 58 | | ng/L | 7 |
| 001 | MW-03-17-GW-050223 | Aqueous | PFBA | PFAS by ID | 18 | QM-03 | ng/L | 7 |
| 001 | MW-03-17-GW-050223 | Aqueous | PFHpA | PFAS by ID | 9.1 | | ng/L | 7 |
| 001 | MW-03-17-GW-050223 | Aqueous | PFHxA | PFAS by ID | 14 | M-03 | ng/L | 7 |
| 001 | MW-03-17-GW-050223 | Aqueous | PFNA | PFAS by ID | 2.4 | JM-03 | ng/L | 7 |
| 001 | MW-03-17-GW-050223 | Aqueous | PFOA | PFAS by ID | 27 | | ng/L | 7 |
| 001 | MW-03-17-GW-050223 | Aqueous | PFPeA | PFAS by ID | 16 | M-03 | ng/L | 7 |
| 001 | MW-03-17-GW-050223 | Aqueous | PFOS | PFAS by ID | 140 | M-03 | ng/L | 7 |
| 004 | MWF16-26-GW-050223 | Aqueous | PFBS | PFAS by ID | 15 | M-03 | ng/L | 13 |
| 004 | MWF16-26-GW-050223 | Aqueous | PFPeS | PFAS by ID | 14 | | ng/L | 13 |
| 004 | MWF16-26-GW-050223 | Aqueous | PFHxS | PFAS by ID | 24 | | ng/L | 13 |
| 004 | MWF16-26-GW-050223 | Aqueous | PFBA | PFAS by ID | 8.6 | | ng/L | 13 |
| 004 | MWF16-26-GW-050223 | Aqueous | PFHpA | PFAS by ID | 7.3 | | ng/L | 13 |
| 004 | MWF16-26-GW-050223 | Aqueous | PFHxA | PFAS by ID | 17 | M-03 | ng/L | 13 |
| 004 | MWF16-26-GW-050223 | Aqueous | PFOA | PFAS by ID | 34 | | ng/L | 13 |
| 004 | MWF16-26-GW-050223 | Aqueous | PFPeA | PFAS by ID | 12 | | ng/L | 13 |
| 005 | MWW1-04-GW-050223 | Aqueous | EtFOSAA | PFAS by ID | 8.9 | M-03 | ng/L | 15 |
| 005 | MWW1-04-GW-050223 | Aqueous | PFOSA | PFAS by ID | 1.2 | JM-03 | ng/L | 15 |
| 005 | MWW1-04-GW-050223 | Aqueous | PFHxS | PFAS by ID | 4.1 | M-03 | ng/L | 15 |
| 005 | MWW1-04-GW-050223 | Aqueous | PFOA | PFAS by ID | 2.8 | JM-03 | ng/L | 15 |
| 005 | MWW1-04-GW-050223 | Aqueous | PFOS | PFAS by ID | 98 | | ng/L | 15 |
| 006 | DUP-03-GW-050223 | Aqueous | 6:2 FTS | PFAS by ID | 9.6 | Q | ng/L | 17 |
| 006 | DUP-03-GW-050223 | Aqueous | PFBS | PFAS by ID | 4.0 | M-03 | ng/L | 17 |
| 006 | DUP-03-GW-050223 | Aqueous | PFHpS | PFAS by ID | 5.1 | | ng/L | 17 |
| 006 | DUP-03-GW-050223 | Aqueous | PFPeS | PFAS by ID | 3.8 | M-03 | ng/L | 17 |
| 006 | DUP-03-GW-050223 | Aqueous | PFHxS | PFAS by ID | 57 | | ng/L | 17 |
| 006 | DUP-03-GW-050223 | Aqueous | PFBA | PFAS by ID | 17 | QM-03 | ng/L | 17 |
| 006 | DUP-03-GW-050223 | Aqueous | PFHpA | PFAS by ID | 8.8 | | ng/L | 17 |
| 006 | DUP-03-GW-050223 | Aqueous | PFHxA | PFAS by ID | 15 | | ng/L | 17 |
| 006 | DUP-03-GW-050223 | Aqueous | PFNA | PFAS by ID | 2.2 | J | ng/L | 17 |
| 006 | DUP-03-GW-050223 | Aqueous | PFOA | PFAS by ID | 27 | | ng/L | 17 |
| 006 | DUP-03-GW-050223 | Aqueous | PFPeA | PFAS by ID | 16 | M-03 | ng/L | 17 |
| 006 | DUP-03-GW-050223 | Aqueous | PFOS | PFAS by ID | 140 | M-03 | ng/L | 17 |

(37 detections)

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-001**

Description: **MW-03-17-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 0918** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 1303 | ARC2 | 05/23/2023 1402 | 75967 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.8 | 2.0 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **8.8** | **Q** | **7.8** | **2.0** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.8 | 2.0 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **5.2** | **M-03** | **3.9** | **0.98** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **4.7** | | **3.9** | **0.98** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **4.0** | **M-03** | **3.9** | **0.98** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **58** | | **3.9** | **0.98** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **18** | **QM-03** | **3.9** | **0.98** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **9.1** | | **3.9** | **0.98** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **14** | **M-03** | **3.9** | **0.98** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **2.4** | **JM-03** | **3.9** | **0.98** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **27** | | **3.9** | **0.98** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **16** | **M-03** | **3.9** | **0.98** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **140** | **M-03** | **3.9** | **0.98** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 272 | 50-150 |
| 13C2_6:2FTS | N | 261 | 50-150 |
| 13C2_8:2FTS | N | 272 | 50-150 |
| 13C2_PFDoA | | 109 | 50-150 |
| 13C2_PFTeDA | | 90 | 50-150 |
| 13C3_PFBS | | 91 | 50-150 |
| 13C3_PFHxS | | 97 | 50-150 |
| 13C3-HFPO-DA | | 82 | 50-150 |
| 13C4_PFBA | N | 34 | 50-150 |
| 13C4_PFHpA | | 92 | 50-150 |
| 13C5_PFHxA | | 80 | 50-150 |
| 13C5_PFPeA | | 63 | 50-150 |
| 13C6_PFDA | | 112 | 50-150 |
| 13C7_PFUdA | | 120 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-001**

Description: **MW-03-17-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 0918** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 102 | 50-150 |
| 13C8_PFOS | | 95 | 50-150 |
| 13C8_PFOSA | | 99 | 50-150 |
| 13C9_PFNA | | 108 | 50-150 |
| d5-EtFOSAA | | 127 | 50-150 |
| d3-MeFOSAA | | 123 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-002**

Description: **MWM32-09-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1053** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 1316 | ARC2 | 05/23/2023 1402 | 75967 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 130 | 50-150 |
| 13C2_6:2FTS | | 103 | 50-150 |
| 13C2_8:2FTS | | 111 | 50-150 |
| 13C2_PFDoA | | 90 | 50-150 |
| 13C2_PFTeDA | | 92 | 50-150 |
| 13C3_PFBS | | 106 | 50-150 |
| 13C3_PFHxS | | 96 | 50-150 |
| 13C3-HFPO-DA | | 100 | 50-150 |
| 13C4_PFBA | | 69 | 50-150 |
| 13C4_PFHpA | | 99 | 50-150 |
| 13C5_PFHxA | | 94 | 50-150 |
| 13C5_PFPeA | | 89 | 50-150 |
| 13C6_PFDA | | 97 | 50-150 |
| 13C7_PFUdA | | 94 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-002**

Description: **MWM32-09-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1053** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 50-150 |
| 13C8_PFOS | | 90 | 50-150 |
| 13C8_PFOSA | | 91 | 50-150 |
| 13C9_PFNA | | 92 | 50-150 |
| d5-EtFOSAA | | 84 | 50-150 |
| d3-MeFOSAA | | 92 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-003**

Description: **EB-01-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1105** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 1329 | ARC2 | 05/23/2023 1402 | 75967 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 106 | 50-150 |
| 13C2_6:2FTS | | 101 | 50-150 |
| 13C2_8:2FTS | | 104 | 50-150 |
| 13C2_PFDoA | | 96 | 50-150 |
| 13C2_PFTeDA | | 92 | 50-150 |
| 13C3_PFBS | | 106 | 50-150 |
| 13C3_PFHxS | | 99 | 50-150 |
| 13C3-HFPO-DA | | 102 | 50-150 |
| 13C4_PFBA | | 96 | 50-150 |
| 13C4_PFHpA | | 101 | 50-150 |
| 13C5_PFHxA | | 98 | 50-150 |
| 13C5_PFPeA | | 96 | 50-150 |
| 13C6_PFDA | | 101 | 50-150 |
| 13C7_PFUdA | | 102 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

| | | | |
|---|---|---|---|
| Client: **Arcadis U.S., Inc.** | | Laboratory ID: **YE03032-003** |
| Description: **EB-01-050223** | | Matrix: **Aqueous** |
| Date Sampled: **05/02/2023 1105** | Project Name: **Racer PNC** | |
| Date Received: **05/03/2023** | Project Number: **30167840.00030** | |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 106 | 50-150 |
| 13C8_PFOS | | 99 | 50-150 |
| 13C8_PFOSA | | 92 | 50-150 |
| 13C9_PFNA | | 96 | 50-150 |
| d5-EtFOSAA | | 94 | 50-150 |
| d3-MeFOSAA | | 96 | 50-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-004**

Description: **MWF16-26-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1155** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 1341 | ARC2 | 05/23/2023 1402 | 75967 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **15** | **M-03** | **3.6** | **0.89** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **14** | | **3.6** | **0.89** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **24** | | **3.6** | **0.89** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **8.6** | | **3.6** | **0.89** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **7.3** | | **3.6** | **0.89** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **17** | **M-03** | **3.6** | **0.89** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **34** | | **3.6** | **0.89** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **12** | | **3.6** | **0.89** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 113 | 50-150 |
| 13C2_6:2FTS | | 96 | 50-150 |
| 13C2_8:2FTS | | 105 | 50-150 |
| 13C2_PFDoA | | 91 | 50-150 |
| 13C2_PFTeDA | | 96 | 50-150 |
| 13C3_PFBS | | 118 | 50-150 |
| 13C3_PFHxS | | 101 | 50-150 |
| 13C3-HFPO-DA | | 101 | 50-150 |
| 13C4_PFBA | | 79 | 50-150 |
| 13C4_PFHpA | | 101 | 50-150 |
| 13C5_PFHxA | | 97 | 50-150 |
| 13C5_PFPeA | | 95 | 50-150 |
| 13C6_PFDA | | 101 | 50-150 |
| 13C7_PFUdA | | 95 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-004**

Description: **MWF16-26-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1155** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 98 | 50-150 |
| 13C8_PFOS | | 98 | 50-150 |
| 13C8_PFOSA | | 99 | 50-150 |
| 13C9_PFNA | | 95 | 50-150 |
| d5-EtFOSAA | | 92 | 50-150 |
| d3-MeFOSAA | | 95 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-005**

Description: **MWW1-04-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1308** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 1354 | ARC2 | 05/23/2023 1402 | 75967 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.1 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.1 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| **N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)** | **2991-50-6** | **PFAS by ID SOP** | **8.9** | **M-03** | **7.1** | **1.8** | **ng/L** | **1** |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | M-03 | 7.1 | 1.8 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | M-03 | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-1-octanesulfonamide (PFOSA)** | **754-91-6** | **PFAS by ID SOP** | **1.2** | **JM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **4.1** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | M-03 | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **2.8** | **JM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **98** | | **3.5** | **0.88** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 267 | 50-150 |
| 13C2_6:2FTS | N | 277 | 50-150 |
| 13C2_8:2FTS | N | 281 | 50-150 |
| 13C2_PFDoA | | 104 | 50-150 |
| 13C2_PFTeDA | | 83 | 50-150 |
| 13C3_PFBS | | 91 | 50-150 |
| 13C3_PFHxS | | 93 | 50-150 |
| 13C3-HFPO-DA | | 80 | 50-150 |
| 13C4_PFBA | N | 13 | 50-150 |
| 13C4_PFHpA | | 91 | 50-150 |
| 13C5_PFHxA | | 78 | 50-150 |
| 13C5_PFPeA | | 65 | 50-150 |
| 13C6_PFDA | | 105 | 50-150 |
| 13C7_PFUdA | | 110 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-005**

Description: **MWW1-04-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1308** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 95 | 50-150 |
| 13C8_PFOS | | 93 | 50-150 |
| 13C8_PFOSA | | 93 | 50-150 |
| 13C9_PFNA | | 102 | 50-150 |
| d5-EtFOSAA | | 116 | 50-150 |
| d3-MeFOSAA | | 115 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-006**

Description: **DUP-03-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 1407 | ARC2 | 05/23/2023 1402 | 75967 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.2 | 1.8 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **9.6** | **Q** | **7.2** | **1.8** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.2 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **4.0** | **M-03** | **3.6** | **0.91** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **5.1** | | **3.6** | **0.91** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **3.8** | **M-03** | **3.6** | **0.91** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **57** | | **3.6** | **0.91** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **17** | **QM-03** | **3.6** | **0.91** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **8.8** | | **3.6** | **0.91** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **15** | | **3.6** | **0.91** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **2.2** | **J** | **3.6** | **0.91** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **27** | | **3.6** | **0.91** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **16** | **M-03** | **3.6** | **0.91** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **140** | **M-03** | **3.6** | **0.91** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 269 | 50-150 |
| 13C2_6:2FTS | N | 263 | 50-150 |
| 13C2_8:2FTS | N | 268 | 50-150 |
| 13C2_PFDoA | | 108 | 50-150 |
| 13C2_PFTeDA | | 87 | 50-150 |
| 13C3_PFBS | | 91 | 50-150 |
| 13C3_PFHxS | | 95 | 50-150 |
| 13C3-HFPO-DA | | 80 | 50-150 |
| 13C4_PFBA | N | 33 | 50-150 |
| 13C4_PFHpA | | 95 | 50-150 |
| 13C5_PFHxA | | 78 | 50-150 |
| 13C5_PFPeA | | 61 | 50-150 |
| 13C6_PFDA | | 115 | 50-150 |
| 13C7_PFUdA | | 118 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-006**

Description: **DUP-03-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 102 | 50-150 |
| 13C8_PFOS | | 97 | 50-150 |
| 13C8_PFOSA | | 97 | 50-150 |
| 13C9_PFNA | | 108 | 50-150 |
| d5-EtFOSAA | | 123 | 50-150 |
| d3-MeFOSAA | | 116 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-007**

Description: **TRIP BLANK** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1320** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 1419 | ARC2 | 05/23/2023 1402 | 75967 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 94 | 50-150 |
| 13C2_6:2FTS | | 93 | 50-150 |
| 13C2_8:2FTS | | 99 | 50-150 |
| 13C2_PFDoA | | 90 | 50-150 |
| 13C2_PFTeDA | | 89 | 50-150 |
| 13C3_PFBS | | 102 | 50-150 |
| 13C3_PFHxS | | 96 | 50-150 |
| 13C3-HFPO-DA | | 97 | 50-150 |
| 13C4_PFBA | | 92 | 50-150 |
| 13C4_PFHpA | | 100 | 50-150 |
| 13C5_PFHxA | | 92 | 50-150 |
| 13C5_PFPeA | | 92 | 50-150 |
| 13C6_PFDA | | 100 | 50-150 |
| 13C7_PFUdA | | 102 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-007**

Description: **TRIP BLANK** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1320** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 50-150 |
| 13C8_PFOS | | 91 | 50-150 |
| 13C8_PFOSA | | 93 | 50-150 |
| 13C9_PFNA | | 94 | 50-150 |
| d5-EtFOSAA | | 92 | 50-150 |
| d3-MeFOSAA | | 94 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# QC Summary

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ75967-001
**Batch:** 75967
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/23/2023 1402

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 1225 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 1225 |
| 8:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 1225 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 1225 |
| 4:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 1225 |
| GenX | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 1225 |
| ADONA | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 1225 |
| EtFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 1225 |
| MeFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 06/01/2023 1225 |
| PFBS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFDS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFHpS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFNS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFOSA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFPeS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFHxS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFBA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFDA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFDoA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFHpA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFHxA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFNA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFOA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFPeA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFTeDA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFTrDA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFUdA | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |
| PFOS | ND | | 1 | 4.0 | 1.0 | ng/L | 06/01/2023 1225 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 98 | 50-150 |
| 13C2_6:2FTS | | 98 | 50-150 |
| 13C2_8:2FTS | | 104 | 50-150 |
| 13C2_PFDoA | | 92 | 50-150 |
| 13C2_PFTeDA | | 85 | 50-150 |
| 13C3_PFBS | | 107 | 50-150 |
| 13C3_PFHxS | | 97 | 50-150 |
| 13C3-HFPO-DA | | 101 | 50-150 |
| 13C4_PFBA | | 97 | 50-150 |
| 13C4_PFHpA | | 102 | 50-150 |
| 13C5_PFHxA | | 94 | 50-150 |
| 13C5_PFPeA | | 99 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ75967-001
**Batch:** 75967
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/23/2023 1402

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 96 | 50-150 |
| 13C7_PFUdA | | 100 | 50-150 |
| 13C8_PFOA | | 103 | 50-150 |
| 13C8_PFOS | | 90 | 50-150 |
| 13C8_PFOSA | | 91 | 50-150 |
| 13C9_PFNA | | 94 | 50-150 |
| d5-EtFOSAA | | 93 | 50-150 |
| d3-MeFOSAA | | 100 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ75967-002
**Batch:** 75967
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/23/2023 1402

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 17 | | 1 | 112 | 50-150 | 06/01/2023 1238 |
| 11Cl-PF3OUdS | 15 | 17 | | 1 | 110 | 50-150 | 06/01/2023 1238 |
| 8:2 FTS | 15 | 18 | M-03 | 1 | 117 | 67-138 | 06/01/2023 1238 |
| 6:2 FTS | 15 | 18 | | 1 | 121 | 64-140 | 06/01/2023 1238 |
| 4:2 FTS | 15 | 17 | | 1 | 111 | 63-143 | 06/01/2023 1238 |
| GenX | 32 | 35 | | 1 | 110 | 50-150 | 06/01/2023 1238 |
| ADONA | 15 | 17 | | 1 | 111 | 50-150 | 06/01/2023 1238 |
| EtFOSAA | 16 | 19 | M-03 | 1 | 116 | 61-135 | 06/01/2023 1238 |
| MeFOSAA | 16 | 17 | | 1 | 108 | 65-136 | 06/01/2023 1238 |
| PFBS | 14 | 15 | | 1 | 105 | 72-130 | 06/01/2023 1238 |
| PFDS | 15 | 17 | | 1 | 112 | 53-142 | 06/01/2023 1238 |
| PFHpS | 15 | 16 | | 1 | 108 | 69-134 | 06/01/2023 1238 |
| PFNS | 15 | 17 | | 1 | 111 | 69-127 | 06/01/2023 1238 |
| PFOSA | 16 | 18 | | 1 | 112 | 67-137 | 06/01/2023 1238 |
| PFPeS | 15 | 16 | | 1 | 104 | 71-127 | 06/01/2023 1238 |
| PFHxS | 15 | 16 | | 1 | 108 | 68-131 | 06/01/2023 1238 |
| PFBA | 16 | 17 | | 1 | 105 | 73-129 | 06/01/2023 1238 |
| PFDA | 16 | 18 | | 1 | 110 | 71-129 | 06/01/2023 1238 |
| PFDoA | 16 | 20 | | 1 | 124 | 72-134 | 06/01/2023 1238 |
| PFHpA | 16 | 18 | | 1 | 115 | 72-130 | 06/01/2023 1238 |
| PFHxA | 16 | 17 | | 1 | 108 | 72-129 | 06/01/2023 1238 |
| PFNA | 16 | 19 | | 1 | 116 | 69-130 | 06/01/2023 1238 |
| PFOA | 16 | 18 | | 1 | 114 | 71-133 | 06/01/2023 1238 |
| PFPeA | 16 | 17 | | 1 | 107 | 72-129 | 06/01/2023 1238 |
| PFTeDA | 16 | 17 | | 1 | 108 | 71-132 | 06/01/2023 1238 |
| PFTrDA | 16 | 18 | | 1 | 115 | 65-144 | 06/01/2023 1238 |
| PFUdA | 16 | 17 | | 1 | 109 | 69-133 | 06/01/2023 1238 |
| PFOS | 15 | 16 | | 1 | 111 | 65-140 | 06/01/2023 1238 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 91 | 50-150 |
| 13C2_6:2FTS | | 87 | 50-150 |
| 13C2_8:2FTS | | 91 | 50-150 |
| 13C2_PFDoA | | 87 | 50-150 |
| 13C2_PFTeDA | | 82 | 50-150 |
| 13C3_PFBS | | 98 | 50-150 |
| 13C3_PFHxS | | 87 | 50-150 |
| 13C3-HFPO-DA | | 93 | 50-150 |
| 13C4_PFBA | | 92 | 50-150 |
| 13C4_PFHpA | | 92 | 50-150 |
| 13C5_PFHxA | | 93 | 50-150 |
| 13C5_PFPeA | | 93 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ75967-002
**Batch:** 75967
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/23/2023 1402

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 88 | 50-150 |
| 13C7_PFUdA | | 95 | 50-150 |
| 13C8_PFOA | | 93 | 50-150 |
| 13C8_PFOS | | 81 | 50-150 |
| 13C8_PFOSA | | 86 | 50-150 |
| 13C9_PFNA | | 85 | 50-150 |
| d5-EtFOSAA | | 85 | 50-150 |
| d3-MeFOSAA | | 85 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Chain of Custody
# and
# Miscellaneous Documents

Pace Analytical®

**PACE ANALYTICAL SERVICES, LLC**
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 146506

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Tiffany Linder, Alexis Cusp | Telephone No. / E-mail: Alexis.cusp@arcadis.com, tiffany.linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: Sommer Guy | Analysis (Attach list if more space is needed): Report EGLE 28 compounds | Page 1 of 1 |
| City: Novi; State: MI; Zip Code: 48377 | Printed Name: Sommer Guy | | Lot # Bar Code (lab use only): YE03032 |
| Project Name: Racer PNC | | | |
| Project No.: 30167840.00030 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Sample Type: G=Grab C=Composite | Matrix: Aqueous | Soil/Solid | Oil | Biota/Animal | No. of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Methanol | Other: Filtered (Y/N) | Analysis: Report EGLE 28 compounds per QSM 5.1 | Lab ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-03-17_GW-050223 | 5/2/23 | 0918 | G | 2 | | | | 2 | | | | | | | | X | |
| MWM32-09_GW-050223 | 5/2/23 | 1053 | G | 2 | | | | 2 | | | | | | | | X | |
| EB-01-050223 | 5/2/23 | 1105 | G | 2 | | | | 2 | | | | | | | | X | |
| MWF16-26_GW-050223 | 5/2/23 | 1155 | G | 2 | | | | 2 | | | | | | | | X | |
| MWW1-04_GW-050223 | 5/2/23 | 1308 | G | 2 | | | | 2 | | | | | | | | X | |
| Dup-03_GW-050223 | 5/2/23 | — | G | 2 | | | | 2 | | | | | | | | X | |
| tripblank | 5/2/23 | 1320 | G | 1 | | | | 1 | | | | | | | | X | tripblank |

Turn Around Time Required (Prior lab approval required for expedited TAT.): [X] Standard [ ] Rush (Specify)

Sample Disposal: [ ] Return to Client [X] Disposal by Lab

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison [ ] Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Guy | 5/2/23 | 1420 | 1. Received by: FedEx | 5/2/23 | 1420 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | 5/3/23 | 0945 | 4. Laboratory received by: Jennifer N Parker | 5/3/23 | 0945 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on ice (Circle): (Yes) No; Ice Pack:; Receipt Temp. 3.2 °C; Temp Blank: [ ] Y [X] N

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: ME003N2-01



PACE ANALYTICAL SERVICES, LLC

DC#_Title: ENV-FRM-WCOL-0286 v02_Samples Receipt Checklist (SRC)
Effective Date: 8/2/2022

# Sample Receipt Checklist (SRC)

Client: ARCADIS  Cooler Inspected by/date: KNR / 5/03/23  Lot #: YE03032

Means of receipt: ☐ Pace ☐ Client ☐ UPS ☑ FedEx ☐ Other: ____

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | | 1. Were custody seals present on the cooler? |
| ☑ Yes | ☐ No | ☐ NA | 2. If custody seals were present, were they intact and unbroken? |

pH Strip ID: NA  Chlorine Strip ID: NA  Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt  %Solid Snap-Cup ID: NA

3.2 / 3.2 °C  NA / NA °C  NA / NA °C  NA / NA °C

Method: ☐ Temperature Blank ☑ Against Bottles  IR Gun ID: 8  IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | ☐ NA | 3. Were all coolers received at or below 6.0°C? If no, was Project Manager notified? PM was Notified by: phone / email / face-to-face (circle one). |
| ☐ Yes | ☑ No | ☐ NA | 4. Is the commercial courier's packing slip attached to this form? |
| ☑ Yes | ☐ No | | 5. Were proper custody procedures (relinquished/received) followed? |
| ☑ Yes | ☐ No | | 6. Were sample IDs listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 7. Was collection date & time listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 8. Did all container label information (ID, date, time) agree with the COC? |
| ☑ Yes | ☐ No | | 9. Were tests to be performed listed on the COC? |
| ☑ Yes | ☐ No | | 10. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? ____ |
| ☑ Yes | ☐ No | | 11. Was adequate sample volume available? |
| ☑ Yes | ☐ No | | 12. Were all samples received within ½ the holding time or 48 hours, whichever comes first? |
| ☑ Yes | ☐ No | | 13. Were all samples containers accounted for? (No missing/excess) |
| ☐ Yes | ☐ No | ☑ NA | 14. Were VOA 8015C and RSK-175 samples free of bubbles >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials? |
| ☐ Yes | ☐ No | ☑ NA | 15. Were all DRO/metals/nutrient samples received at a pH of < 2? |
| ☐ Yes | ☐ No | ☑ NA | 16. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9? |
| ☐ Yes | ☐ No | ☑ NA | 17. Were all applicable $NH_3$/TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine? |
| ☐ Yes | ☑ No | ☐ NA | 18. Was the quote number listed on the container label? If yes, Quote # ____ |

**Sample Preservation** (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA ____ were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA. ☐
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA ____ were received with bubbles >6 mm in diameter.

Samples(s) NA ____ were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Unique ID: NA.

Comments: Packing slip was not on cooler, must have come off on the truck

Qualtrax ID: 56360

# Report of Analysis

**Arcadis U.S., Inc.**
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Tiffany Linder

Project Name: RACER PNC

Project Number: 30167840.00030

Lot Number:**YD26028**

Date Completed:05/12/2023

Kathy Smith

05/12/2023 5:23 PM
Approved and released by:
Project Manager II: **Kathy E. Smith**

The electronic signature above is the equivalent of a handwritten signature.
This report shall not be reproduced, except in its entirety, without the written approval of Pace Analytical Services, LLC.

Pace Analytical Services, LLC (*formerly Shealy Environmental Services, Inc.*)
106 Vantage Point Drive West Columbia, SC 29172
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

## Case Narrative
## Arcadis U.S., Inc.
### Lot Number: YD26028

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.4 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples were compliant with DOD QSM 5.4 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). The CF is calculated as follows:

CF = DF * FV / Vo

FV is volume of extract (mL)
Vo is initial sample volume (mL)
DF is dilution factor. For undiluted analysis, DF = 1.

Sample concentration for aqueous samples:
Concentration (ng/L) = Cs*CF,

$$C_s = \frac{\left(\frac{(A_s x C_{is})}{A_{is}}\right) - B}{M1}$$

Where

$C_s$ is on column concentration of target analyte in the sample (ng/L)
$C_{is}$ is concentration of internal standard in the sample (ng/L)
$A_s$ is peak response of target analyte in the sample
$A_{is}$ is peak response of internal standard in the sample
M1 is the average RF from ICAL or the slope from linear regression ICAL
B is the y-intercept from the ICAL

Pace is a DoD/DOE accredited laboratory; however, the following analyses are currently not listed on our DoD/DOE scope of accreditation: Drinking Water: pH EPA 150.1, Turbidity EPA 180.1, Metals EPA 200.7 & 200.8, Mercury EPA 245.1, Anions EPA 300.0, Cyanide EPA 335.4, Nitrates EPA 353.2, Orthophosphate & Phosphorus EPA 365.1, EDB/DBCP EPA 504.1, HPC SIMPLATE, Color SM 2120 B-2011, Alkalinity SM 2320 B-2011, Specific Conductance SM 2510 B-2011, Residue-filterable (TDS) SM 2540 C, Calcium Hardness (CaCO2) SM 3500-Ca B-2011, TRC SM 4500 Cl G-2011, pH SM 4500 H=B-2011, E.Coli, Total Coliform. Non-Potable Water: Metals EPA 200.7, Strontium EPA 200.8, Chlorate EPA 300.0, Cyanide EPA 335.4, Phenolics EPA 420.4, 2-Methyl-4,6-Dinitrophenol EPA 625.1, Propane RSK-175, Specific Conductance SM 2510 B-2011, Salinity SM2520 B, Residue- total SM 2540 B, Sulfite SM 4500 SO32- B-2011, Amenable Cyanide SM 4500-CN- G-2011, BOD & CBOD SM 5210 B, MBAS SM 5540 C-2011, Boron & Titanium SW-846 6010D, Boron, Molybdenum, & Titanium SW-846 6020B, Alcohols & Glycols SW-846 8015C, Pentachlorophenol SW-846 8151A, Ethyl Acetate, Hexane, & n-Hexane SW-846 8260D, SVOC 1,4-Dioxane, 4-Dimethyl aminoazobenzene, 1,4-Naphthoquinone, 3,5-Dinitroaniline, PETN SW-846 8270E, Amenable Cyanide SW-846 9012B. Solid and Chemical Materials: Boron & Titanium SW-846 6010D, Molybdenum SW-846 6020B, Ethylene Glycol SW-846 8015B, Pentachlorophenol SW-846 8151A, Chloroprene SW-846 8260B, SVOC 1,4-Dioxane, 1,3,5-Trinitrobenzene, 1,4- Naphthoquinone, 1,4-Phenylenediamine, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 3-Methylcholanthrene, 4-Aminobiphenyl, 4-Dimethyl aminoazobenzene, 4-Nitroquinoline-1-oxide, 7,12-Dimethylbenzo(a)anthracene, Chlorobenzilate, Diallate, Ethyl methanesulfonate, Isodrin, Isosafrole, Methyl methanesulfonate, n-Nitrosomethylethylamine, n-Nitrosomorpholine, n-Nitrosopiperidine, Piperonyl butoxide, Pronamide, Safrole, 3,5- Dinitroaniline, PETN SW-846 8270E, Oil & Grease SW-846 9071B.

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18.

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

PFAS
Samples YD26028-001, YD26028-003, YD26028-005 had surrogates recovered above the acceptance limits. There were no detections for these compounds in the sample; therefore, there is no impact on data quality and no corrective action is required.

Sample YD26028-002 had surrogates recovered outside of the acceptance limits due to confirmed matrix interference.

## Manual Integration Summary

## Arcadis U.S., Inc.

### Lot Number: YD26028

### Project Name: RACER PNC

### Project Number: 30167840.00030

Where applicable, analytes for which manual integration occurred have been flagged with the following:

| Qualifier | Technical Justification | Qualifier | Technical Justification | Qualifier | Technical Justification |
|---|---|---|---|---|---|
| M-01 | Split peak | M-07 | Low fit | M-13 | Error |
| M-02 | Peak tailing | M-08 | Peak not found | M-14 | Baseline |
| M-03 | Incorrect auto integration | M-09 | Analyte not Identified by the Data System | M-15 | Other |
| M-04 | Poor chromatography | M-10 | Analyte misidentified by the Data System | M-16 | Retention time shift |
| M-05 | Manually assigned peak | M-11 | Invalid integration | M-17 | Shouldering |
| M-06 | Wrong isomer | M-12 | Wrong peak | | |

A summary of instances where manual integration occurred is included below:

| Method | Sample | Run Number | Parameter | Qualifier |
|---|---|---|---|---|
| PFAS by ID SOP | YD26028-001 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YD26028-001 | 1 | Perfluoro-1-pentanesulfonic acid | M-03 |
| PFAS by ID SOP | YD26028-001 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD26028-001 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD26028-001 | 1 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YD26028-001 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD26028-001 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD26028-002 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YD26028-002 | 1 | Perfluoro-1-pentanesulfonic acid | M-03 |
| PFAS by ID SOP | YD26028-002 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD26028-002 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD26028-002 | 1 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YD26028-002 | 1 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YD26028-003 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YD26028-003 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD26028-003 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD26028-003 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD26028-004 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YD26028-004 | 1 | Perfluoro-1-heptanesulfonic acid | M-03 |
| PFAS by ID SOP | YD26028-004 | 1 | Perfluoro-1-pentanesulfonic acid | M-03 |
| PFAS by ID SOP | YD26028-004 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD26028-004 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD26028-005 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YD26028-005 | 1 | Perfluoro-1-pentanesulfonic acid | M-03 |
| PFAS by ID SOP | YD26028-005 | 1 | Perfluorohexanesulfonic acid (PFHxS) | M-03 |
| PFAS by ID SOP | YD26028-005 | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD26028-005 | 1 | Perfluoro-n-heptanoic acid (PFHpA) | M-03 |
| PFAS by ID SOP | YD26028-005 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD26028-005 | 1 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YD26028-005 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD26028-006 | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YD26028-006 | 1 | Perfluoro-1-pentanesulfonic acid | M-03 |
| PFAS by ID SOP | YD26028-006 | 1 | Perfluoro-n-heptanoic acid (PFHpA) | M-03 |
| PFAS by ID SOP | YD26028-006 | 1 | Perfluoro-n-hexanoic acid (PFHxA) | M-03 |
| PFAS by ID SOP | YD26028-006 | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD26028-005MS | 1 | 1H, 1H, 2H, 2H-perfluorodecane | M-03 |
| PFAS by ID SOP | YD26028-001MS | 1 | 1H,1H,2H,2H-perfluorohexane sulfonic | M-03 |

## Manual Integration Summary

## Arcadis U.S., Inc.

### Lot Number: YD26028

### Project Name: RACER PNC

### Project Number: 30167840.00030

Where applicable, analytes for which manual integration occurred have been flagged with the following:

| Qualifier | Technical Justification | Qualifier | Technical Justification | Qualifier | Technical Justification |
|---|---|---|---|---|---|
| M-01 | Split peak | M-07 | Low fit | M-13 | Error |
| M-02 | Peak tailing | M-08 | Peak not found | M-14 | Baseline |
| M-03 | Incorrect auto integration | M-09 | Analyte not Identified by the Data System | M-15 | Other |
| M-04 | Poor chromatography | M-10 | Analyte misidentified by the Data System | M-16 | Retention time shift |
| M-05 | Manually assigned peak | M-11 | Invalid integration | M-17 | Shouldering |
| M-06 | Wrong isomer | M-12 | Wrong peak | | |

A summary of instances where manual integration occurred is included below:

| Method | Sample | Run Number | Parameter | Qualifier |
|---|---|---|---|---|
| PFAS by ID SOP | YD26028-001MD | 1 | 1H,1H,2H,2H-perfluorohexane sulfonic | M-03 |
| PFAS by ID SOP | YD26028-005MS | 1 | 1H,1H,2H,2H-perfluorohexane sulfonic | M-03 |
| PFAS by ID SOP | YD26028-005MD | 1 | 1H,1H,2H,2H-perfluorohexane sulfonic | M-03 |
| PFAS by ID SOP | YQ74943-002 | 1 | N-ethylperfluoro-1- | M-03 |
| PFAS by ID SOP | YD26028-001MS | 1 | N-ethylperfluoro-1- | M-03 |
| PFAS by ID SOP | YD26028-001MS | 1 | N-methylperfluoro-1- | M-03 |
| PFAS by ID SOP | YD26028-001MD | 1 | N-methylperfluoro-1- | M-03 |
| PFAS by ID SOP | YD26028-005MS | 1 | N-methylperfluoro-1- | M-03 |
| PFAS by ID SOP | YD26028-005MD | 1 | N-methylperfluoro-1- | M-03 |
| PFAS by ID SOP | YD26028-005MD | 1 | Perfluoro-1-butanesulfonic acid (PFBS) | M-03 |
| PFAS by ID SOP | YD26028-001MS | 1 | Perfluoro-1-octanesulfonamide (PFOSA) | M-03 |
| PFAS by ID SOP | YD26028-001MS | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD26028-001MD | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD26028-005MS | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD26028-005MD | 1 | Perfluoro-n-butanoic acid (PFBA) | M-03 |
| PFAS by ID SOP | YD26028-005MD | 1 | Perfluoro-n-decanoic acid (PFDA) | M-03 |
| PFAS by ID SOP | YD26028-001MS | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD26028-001MD | 1 | Perfluoro-n-octanoic acid (PFOA) | M-03 |
| PFAS by ID SOP | YD26028-005MD | 1 | Perfluoro-n-pentanoic acid (PFPeA) | M-03 |
| PFAS by ID SOP | YQ74943-002 | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD26028-001MS | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD26028-001MD | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD26028-005MS | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YD26028-005MD | 1 | Perfluorooctanesulfonic acid (PFOS) | M-03 |
| PFAS by ID SOP | YQ74943-001 | 1 | 13C2_8:2FTS | M-03 |

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

## Sample Summary

## Arcadis U.S., Inc.

**Lot Number: YD26028**

**Project Name: RACER PNC**

**Project Number: 30167840.00030**

| Sample Number | Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| 001 | MWM16-37_GW-042523 | Aqueous | 04/25/2023 1028 | 04/26/2023 |
| 002 | MWM30-01_GW-042523 | Aqueous | 04/25/2023 1040 | 04/26/2023 |
| 003 | MWM5-02_GW-042523 | Aqueous | 04/25/2023 1210 | 04/26/2023 |
| 004 | MWF16-23_GW-042523 | Aqueous | 04/25/2023 1307 | 04/26/2023 |
| 005 | MWF12-02R_GW-042523 | Aqueous | 04/25/2023 1425 | 04/26/2023 |
| 006 | MW-02-17_GW-042523 | Aqueous | 04/25/2023 1420 | 04/26/2023 |
| 007 | Trip Blank | Aqueous | 04/25/2023 1730 | 04/26/2023 |

(7 samples)

## Detection Summary

## Arcadis U.S., Inc.

**Lot Number: YD26028**

**Project Name: RACER PNC**

**Project Number: 30167840.00030**

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 001 | MWM16-37_GW-042523 | Aqueous | PFBS | PFAS by ID | 1.4 | JM-03 | ng/L | 8 |
| 001 | MWM16-37_GW-042523 | Aqueous | PFPeS | PFAS by ID | 0.93 | JM-03 | ng/L | 8 |
| 001 | MWM16-37_GW-042523 | Aqueous | PFHxS | PFAS by ID | 5.8 | M-03 | ng/L | 8 |
| 001 | MWM16-37_GW-042523 | Aqueous | PFBA | PFAS by ID | 6.4 | M-03 | ng/L | 8 |
| 001 | MWM16-37_GW-042523 | Aqueous | PFHpA | PFAS by ID | 1.5 | J | ng/L | 8 |
| 001 | MWM16-37_GW-042523 | Aqueous | PFHxA | PFAS by ID | 1.9 | JM-03 | ng/L | 8 |
| 001 | MWM16-37_GW-042523 | Aqueous | PFOA | PFAS by ID | 2.5 | JM-03 | ng/L | 8 |
| 001 | MWM16-37_GW-042523 | Aqueous | PFPeA | PFAS by ID | 2.0 | J | ng/L | 8 |
| 001 | MWM16-37_GW-042523 | Aqueous | PFOS | PFAS by ID | 4.4 | M-03 | ng/L | 8 |
| 002 | MWM30-01_GW-042523 | Aqueous | 6:2 FTS | PFAS by ID | 34 | Q | ng/L | 10 |
| 002 | MWM30-01_GW-042523 | Aqueous | PFBS | PFAS by ID | 4.6 | M-03 | ng/L | 10 |
| 002 | MWM30-01_GW-042523 | Aqueous | PFPeS | PFAS by ID | 2.4 | JM-03 | ng/L | 10 |
| 002 | MWM30-01_GW-042523 | Aqueous | PFHxS | PFAS by ID | 8.3 | M-03 | ng/L | 10 |
| 002 | MWM30-01_GW-042523 | Aqueous | PFBA | PFAS by ID | 24 | QM-03 | ng/L | 10 |
| 002 | MWM30-01_GW-042523 | Aqueous | PFHpA | PFAS by ID | 15 | | ng/L | 10 |
| 002 | MWM30-01_GW-042523 | Aqueous | PFHxA | PFAS by ID | 20 | M-03 | ng/L | 10 |
| 002 | MWM30-01_GW-042523 | Aqueous | PFOA | PFAS by ID | 45 | | ng/L | 10 |
| 002 | MWM30-01_GW-042523 | Aqueous | PFPeA | PFAS by ID | 18 | M-03 | ng/L | 10 |
| 003 | MWM5-02_GW-042523 | Aqueous | PFBS | PFAS by ID | 0.95 | JM-03 | ng/L | 12 |
| 003 | MWM5-02_GW-042523 | Aqueous | PFBA | PFAS by ID | 2.5 | J | ng/L | 12 |
| 003 | MWM5-02_GW-042523 | Aqueous | PFOA | PFAS by ID | 1.0 | JM-03 | ng/L | 12 |
| 003 | MWM5-02_GW-042523 | Aqueous | PFOS | PFAS by ID | 1.3 | JM-03 | ng/L | 12 |
| 004 | MWF16-23_GW-042523 | Aqueous | PFBS | PFAS by ID | 6.7 | M-03 | ng/L | 14 |
| 004 | MWF16-23_GW-042523 | Aqueous | PFHpS | PFAS by ID | 1.3 | JM-03 | ng/L | 14 |
| 004 | MWF16-23_GW-042523 | Aqueous | PFPeS | PFAS by ID | 6.1 | M-03 | ng/L | 14 |
| 004 | MWF16-23_GW-042523 | Aqueous | PFHxS | PFAS by ID | 26 | | ng/L | 14 |
| 004 | MWF16-23_GW-042523 | Aqueous | PFBA | PFAS by ID | 9.8 | M-03 | ng/L | 14 |
| 004 | MWF16-23_GW-042523 | Aqueous | PFHpA | PFAS by ID | 23 | | ng/L | 14 |
| 004 | MWF16-23_GW-042523 | Aqueous | PFHxA | PFAS by ID | 12 | | ng/L | 14 |
| 004 | MWF16-23_GW-042523 | Aqueous | PFOA | PFAS by ID | 63 | M-03 | ng/L | 14 |
| 004 | MWF16-23_GW-042523 | Aqueous | PFPeA | PFAS by ID | 14 | | ng/L | 14 |
| 005 | MWF12-02R_GW-042523 | Aqueous | PFBS | PFAS by ID | 3.7 | JM-03 | ng/L | 16 |
| 005 | MWF12-02R_GW-042523 | Aqueous | PFPeS | PFAS by ID | 1.6 | JM-03 | ng/L | 16 |
| 005 | MWF12-02R_GW-042523 | Aqueous | PFHxS | PFAS by ID | 5.9 | M-03 | ng/L | 16 |
| 005 | MWF12-02R_GW-042523 | Aqueous | PFBA | PFAS by ID | 22 | M-03 | ng/L | 16 |
| 005 | MWF12-02R_GW-042523 | Aqueous | PFHpA | PFAS by ID | 4.4 | M-03 | ng/L | 16 |
| 005 | MWF12-02R_GW-042523 | Aqueous | PFHxA | PFAS by ID | 12 | | ng/L | 16 |
| 005 | MWF12-02R_GW-042523 | Aqueous | PFOA | PFAS by ID | 11 | M-03 | ng/L | 16 |
| 005 | MWF12-02R_GW-042523 | Aqueous | PFPeA | PFAS by ID | 14 | M-03 | ng/L | 16 |
| 005 | MWF12-02R_GW-042523 | Aqueous | PFOS | PFAS by ID | 4.0 | M-03 | ng/L | 16 |
| 006 | MW-02-17_GW-042523 | Aqueous | PFBS | PFAS by ID | 9.3 | M-03 | ng/L | 18 |
| 006 | MW-02-17_GW-042523 | Aqueous | PFPeS | PFAS by ID | 5.8 | M-03 | ng/L | 18 |
| 006 | MW-02-17_GW-042523 | Aqueous | PFHxS | PFAS by ID | 10 | | ng/L | 18 |

# Detection Summary (Continued)

## Lot Number: YD26028

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 006 | MW-02-17_GW-042523 | Aqueous | PFBA | PFAS by ID | 12 | | ng/L | 18 |
| 006 | MW-02-17_GW-042523 | Aqueous | PFHpA | PFAS by ID | 6.4 | M-03 | ng/L | 18 |
| 006 | MW-02-17_GW-042523 | Aqueous | PFHxA | PFAS by ID | 11 | M-03 | ng/L | 18 |
| 006 | MW-02-17_GW-042523 | Aqueous | PFOA | PFAS by ID | 7.7 | M-03 | ng/L | 18 |
| 006 | MW-02-17_GW-042523 | Aqueous | PFPeA | PFAS by ID | 7.2 | | ng/L | 18 |

(48 detections)

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-001**

Description: **MWM16-37_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1028** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/12/2023 0448 | OMNS | 05/10/2023 1430 | 74943 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.9 | 1.7 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **1.4** | **JM-03** | **3.5** | **0.86** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **0.93** | **JM-03** | **3.5** | **0.86** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **5.8** | **M-03** | **3.5** | **0.86** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **6.4** | **M-03** | **3.5** | **0.86** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **1.5** | **J** | **3.5** | **0.86** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **1.9** | **JM-03** | **3.5** | **0.86** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **2.5** | **JM-03** | **3.5** | **0.86** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **2.0** | **J** | **3.5** | **0.86** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **4.4** | **M-03** | **3.5** | **0.86** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 174 | 50-150 |
| 13C2_6:2FTS | | 128 | 50-150 |
| 13C2_8:2FTS | | 108 | 50-150 |
| 13C2_PFDoA | | 81 | 50-150 |
| 13C2_PFTeDA | | 93 | 50-150 |
| 13C3_PFBS | | 111 | 50-150 |
| 13C3_PFHxS | | 116 | 50-150 |
| 13C3-HFPO-DA | | 101 | 50-150 |
| 13C4_PFBA | | 84 | 50-150 |
| 13C4_PFHpA | | 116 | 50-150 |
| 13C5_PFHxA | | 106 | 50-150 |
| 13C5_PFPeA | | 99 | 50-150 |
| 13C6_PFDA | | 101 | 50-150 |
| 13C7_PFUdA | | 92 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-001**

Description: **MWM16-37_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1028** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 111 | 50-150 |
| 13C8_PFOS | | 106 | 50-150 |
| 13C8_PFOSA | | 90 | 50-150 |
| 13C9_PFNA | | 115 | 50-150 |
| d5-EtFOSAA | | 96 | 50-150 |
| d3-MeFOSAA | | 100 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-002**

Description: **MWM30-01_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1040** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/12/2023 0319 | ARC2 | 05/10/2023 1430 | 74943 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.1 | 2.0 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.1 | 2.0 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 8.1 | 2.0 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **34** | **Q** | **8.1** | **2.0** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 8.1 | 2.0 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.1 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.1 | 2.0 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.1 | 2.0 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.1 | 2.0 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **4.6** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **2.4** | **JM-03** | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **8.3** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **24** | **QM-03** | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **15** | | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **20** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **45** | | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **18** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 223 | 50-150 |
| 13C2_6:2FTS | N | 243 | 50-150 |
| 13C2_8:2FTS | N | 193 | 50-150 |
| 13C2_PFDoA | | 90 | 50-150 |
| 13C2_PFTeDA | | 95 | 50-150 |
| 13C3_PFBS | | 77 | 50-150 |
| 13C3_PFHxS | | 99 | 50-150 |
| 13C3-HFPO-DA | | 74 | 50-150 |
| 13C4_PFBA | N | 26 | 50-150 |
| 13C4_PFHpA | | 90 | 50-150 |
| 13C5_PFHxA | | 74 | 50-150 |
| 13C5_PFPeA | | 55 | 50-150 |
| 13C6_PFDA | | 108 | 50-150 |
| 13C7_PFUdA | | 101 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-002**

Description: **MWM30-01_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1040** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 98 | 50-150 |
| 13C8_PFOS | | 106 | 50-150 |
| 13C8_PFOSA | | 103 | 50-150 |
| 13C9_PFNA | | 113 | 50-150 |
| d5-EtFOSAA | | 118 | 50-150 |
| d3-MeFOSAA | | 114 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-003**

Description: **MWM5-02_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1210** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/12/2023 0332 | ARC2 | 05/10/2023 1430 | 74943 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.9 | 1.7 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **0.95** | **JM-03** | **3.5** | **0.86** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | M-03 | 3.5 | 0.86 | ng/L | 1 |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **2.5** | **J** | **3.5** | **0.86** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **1.0** | **JM-03** | **3.5** | **0.86** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **1.3** | **JM-03** | **3.5** | **0.86** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 196 | 50-150 |
| 13C2_6:2FTS | N | 158 | 50-150 |
| 13C2_8:2FTS | | 125 | 50-150 |
| 13C2_PFDoA | | 105 | 50-150 |
| 13C2_PFTeDA | | 104 | 50-150 |
| 13C3_PFBS | | 117 | 50-150 |
| 13C3_PFHxS | | 116 | 50-150 |
| 13C3-HFPO-DA | | 111 | 50-150 |
| 13C4_PFBA | | 83 | 50-150 |
| 13C4_PFHpA | | 117 | 50-150 |
| 13C5_PFHxA | | 118 | 50-150 |
| 13C5_PFPeA | | 110 | 50-150 |
| 13C6_PFDA | | 109 | 50-150 |
| 13C7_PFUdA | | 99 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-003**

Description: **MWM5-02_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1210** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 119 | 50-150 |
| 13C8_PFOS | | 114 | 50-150 |
| 13C8_PFOSA | | 102 | 50-150 |
| 13C9_PFNA | | 119 | 50-150 |
| d5-EtFOSAA | | 112 | 50-150 |
| d3-MeFOSAA | | 112 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-004**

Description: **MWF16-23_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1307** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/12/2023 0526 | OMNS | 05/10/2023 1430 | 74943 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **6.7** | **M-03** | **3.5** | **0.87** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **1.3** | **JM-03** | **3.5** | **0.87** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **6.1** | **M-03** | **3.5** | **0.87** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **26** | | **3.5** | **0.87** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **9.8** | **M-03** | **3.5** | **0.87** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **23** | | **3.5** | **0.87** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **12** | | **3.5** | **0.87** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **63** | **M-03** | **3.5** | **0.87** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **14** | | **3.5** | **0.87** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 145 | 50-150 |
| 13C2_6:2FTS | | 97 | 50-150 |
| 13C2_8:2FTS | | 87 | 50-150 |
| 13C2_PFDoA | | 65 | 50-150 |
| 13C2_PFTeDA | | 71 | 50-150 |
| 13C3_PFBS | | 97 | 50-150 |
| 13C3_PFHxS | | 98 | 50-150 |
| 13C3-HFPO-DA | | 90 | 50-150 |
| 13C4_PFBA | | 65 | 50-150 |
| 13C4_PFHpA | | 96 | 50-150 |
| 13C5_PFHxA | | 95 | 50-150 |
| 13C5_PFPeA | | 93 | 50-150 |
| 13C6_PFDA | | 92 | 50-150 |
| 13C7_PFUdA | | 80 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-004**

Description: **MWF16-23_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1307** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 101 | 50-150 |
| 13C8_PFOS | | 89 | 50-150 |
| 13C8_PFOSA | | 85 | 50-150 |
| 13C9_PFNA | | 97 | 50-150 |
| d5-EtFOSAA | | 73 | 50-150 |
| d3-MeFOSAA | | 80 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-005**

Description: **MWF12-02R_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1425** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/12/2023 0539 | OMNS | 05/10/2023 1430 | 74943 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.6 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.6 | 1.9 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.7** | **JM-03** | **3.8** | **0.95** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **1.6** | **JM-03** | **3.8** | **0.95** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **5.9** | **M-03** | **3.8** | **0.95** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **22** | **M-03** | **3.8** | **0.95** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **4.4** | **M-03** | **3.8** | **0.95** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **12** | | **3.8** | **0.95** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **11** | **M-03** | **3.8** | **0.95** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **14** | **M-03** | **3.8** | **0.95** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **4.0** | **M-03** | **3.8** | **0.95** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 239 | 50-150 |
| 13C2_6:2FTS | N | 155 | 50-150 |
| 13C2_8:2FTS | | 112 | 50-150 |
| 13C2_PFDoA | | 83 | 50-150 |
| 13C2_PFTeDA | | 94 | 50-150 |
| 13C3_PFBS | | 103 | 50-150 |
| 13C3_PFHxS | | 108 | 50-150 |
| 13C3-HFPO-DA | | 97 | 50-150 |
| 13C4_PFBA | | 56 | 50-150 |
| 13C4_PFHpA | | 102 | 50-150 |
| 13C5_PFHxA | | 100 | 50-150 |
| 13C5_PFPeA | | 88 | 50-150 |
| 13C6_PFDA | | 101 | 50-150 |
| 13C7_PFUdA | | 97 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-005**

Description: **MWF12-02R_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1425** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 114 | 50-150 |
| 13C8_PFOS | | 105 | 50-150 |
| 13C8_PFOSA | | 94 | 50-150 |
| 13C9_PFNA | | 115 | 50-150 |
| d5-EtFOSAA | | 94 | 50-150 |
| d3-MeFOSAA | | 103 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-006**

Description: **MW-02-17_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1420** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/12/2023 0617 | OMNS | 05/10/2023 1430 | 74943 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **9.3** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **5.8** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **10** | | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **12** | | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **6.4** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **11** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **7.7** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **7.2** | | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 111 | 50-150 |
| 13C2_6:2FTS | | 87 | 50-150 |
| 13C2_8:2FTS | | 89 | 50-150 |
| 13C2_PFDoA | | 75 | 50-150 |
| 13C2_PFTeDA | | 83 | 50-150 |
| 13C3_PFBS | | 94 | 50-150 |
| 13C3_PFHxS | | 94 | 50-150 |
| 13C3-HFPO-DA | | 88 | 50-150 |
| 13C4_PFBA | | 70 | 50-150 |
| 13C4_PFHpA | | 90 | 50-150 |
| 13C5_PFHxA | | 90 | 50-150 |
| 13C5_PFPeA | | 90 | 50-150 |
| 13C6_PFDA | | 84 | 50-150 |
| 13C7_PFUdA | | 84 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-006**

Description: **MW-02-17_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1420** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 92 | 50-150 |
| 13C8_PFOS | | 89 | 50-150 |
| 13C8_PFOSA | | 78 | 50-150 |
| 13C9_PFNA | | 94 | 50-150 |
| d5-EtFOSAA | | 77 | 50-150 |
| d3-MeFOSAA | | 84 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-007**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1730** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/12/2023 0630 | OMNS | 05/10/2023 1430 | 74943 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 100 | 50-150 |
| 13C2_6:2FTS | | 92 | 50-150 |
| 13C2_8:2FTS | | 99 | 50-150 |
| 13C2_PFDoA | | 86 | 50-150 |
| 13C2_PFTeDA | | 98 | 50-150 |
| 13C3_PFBS | | 97 | 50-150 |
| 13C3_PFHxS | | 105 | 50-150 |
| 13C3-HFPO-DA | | 98 | 50-150 |
| 13C4_PFBA | | 101 | 50-150 |
| 13C4_PFHpA | | 102 | 50-150 |
| 13C5_PFHxA | | 101 | 50-150 |
| 13C5_PFPeA | | 103 | 50-150 |
| 13C6_PFDA | | 99 | 50-150 |
| 13C7_PFUdA | | 96 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-007**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1730** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 50-150 |
| 13C8_PFOS | | 97 | 50-150 |
| 13C8_PFOSA | | 88 | 50-150 |
| 13C9_PFNA | | 106 | 50-150 |
| d5-EtFOSAA | | 92 | 50-150 |
| d3-MeFOSAA | | 98 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# QC Summary

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ74943-001
**Batch:** 74943
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/10/2023 1430

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/12/2023 0125 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/12/2023 0125 |
| 8:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/12/2023 0125 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/12/2023 0125 |
| 4:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 05/12/2023 0125 |
| GenX | ND | | 1 | 8.0 | 2.0 | ng/L | 05/12/2023 0125 |
| ADONA | ND | | 1 | 8.0 | 2.0 | ng/L | 05/12/2023 0125 |
| EtFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 05/12/2023 0125 |
| MeFOSAA | ND | | 1 | 8.0 | 2.0 | ng/L | 05/12/2023 0125 |
| PFBS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFDS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFHpS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFNS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFOSA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFPeS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFHxS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFBA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFDA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFDoA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFHpA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFHxA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFNA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFOA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFPeA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFTeDA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFTrDA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFUdA | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |
| PFOS | ND | | 1 | 4.0 | 1.0 | ng/L | 05/12/2023 0125 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 114 | 50-150 |
| 13C2_6:2FTS | | 106 | 50-150 |
| 13C2_8:2FTS | M-03 | 121 | 50-150 |
| 13C2_PFDoA | | 112 | 50-150 |
| 13C2_PFTeDA | | 108 | 50-150 |
| 13C3_PFBS | | 112 | 50-150 |
| 13C3_PFHxS | | 114 | 50-150 |
| 13C3-HFPO-DA | | 114 | 50-150 |
| 13C4_PFBA | | 115 | 50-150 |
| 13C4_PFHpA | | 110 | 50-150 |
| 13C5_PFHxA | | 117 | 50-150 |
| 13C5_PFPeA | | 121 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ74943-001
**Batch:** 74943
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/10/2023 1430

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 109 | 50-150 |
| 13C7_PFUdA | | 108 | 50-150 |
| 13C8_PFOA | | 112 | 50-150 |
| 13C8_PFOS | | 123 | 50-150 |
| 13C8_PFOSA | | 104 | 50-150 |
| 13C9_PFNA | | 114 | 50-150 |
| d5-EtFOSAA | | 113 | 50-150 |
| d3-MeFOSAA | | 112 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ74943-002
**Batch:** 74943
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/10/2023 1430

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 14 | | 1 | 95 | 50-150 | 05/12/2023 0138 |
| 11Cl-PF3OUdS | 15 | 15 | | 1 | 97 | 50-150 | 05/12/2023 0138 |
| 8:2 FTS | 15 | 15 | | 1 | 101 | 67-138 | 05/12/2023 0138 |
| 6:2 FTS | 15 | 15 | | 1 | 102 | 64-140 | 05/12/2023 0138 |
| 4:2 FTS | 15 | 15 | | 1 | 98 | 63-143 | 05/12/2023 0138 |
| GenX | 32 | 32 | | 1 | 99 | 50-150 | 05/12/2023 0138 |
| ADONA | 15 | 15 | | 1 | 101 | 50-150 | 05/12/2023 0138 |
| EtFOSAA | 16 | 16 | M-03 | 1 | 98 | 61-135 | 05/12/2023 0138 |
| MeFOSAA | 16 | 16 | | 1 | 101 | 65-136 | 05/12/2023 0138 |
| PFBS | 14 | 13 | | 1 | 94 | 72-130 | 05/12/2023 0138 |
| PFDS | 15 | 15 | | 1 | 100 | 53-142 | 05/12/2023 0138 |
| PFHpS | 15 | 15 | | 1 | 96 | 69-134 | 05/12/2023 0138 |
| PFNS | 15 | 15 | | 1 | 97 | 69-127 | 05/12/2023 0138 |
| PFOSA | 16 | 15 | | 1 | 94 | 67-137 | 05/12/2023 0138 |
| PFPeS | 15 | 14 | | 1 | 95 | 71-127 | 05/12/2023 0138 |
| PFHxS | 15 | 14 | | 1 | 99 | 68-131 | 05/12/2023 0138 |
| PFBA | 16 | 15 | | 1 | 95 | 73-129 | 05/12/2023 0138 |
| PFDA | 16 | 15 | | 1 | 97 | 71-129 | 05/12/2023 0138 |
| PFDoA | 16 | 17 | | 1 | 105 | 72-134 | 05/12/2023 0138 |
| PFHpA | 16 | 16 | | 1 | 101 | 72-130 | 05/12/2023 0138 |
| PFHxA | 16 | 16 | | 1 | 102 | 72-129 | 05/12/2023 0138 |
| PFNA | 16 | 16 | | 1 | 101 | 69-130 | 05/12/2023 0138 |
| PFOA | 16 | 16 | | 1 | 98 | 71-133 | 05/12/2023 0138 |
| PFPeA | 16 | 15 | | 1 | 94 | 72-129 | 05/12/2023 0138 |
| PFTeDA | 16 | 14 | | 1 | 91 | 71-132 | 05/12/2023 0138 |
| PFTrDA | 16 | 17 | | 1 | 106 | 65-144 | 05/12/2023 0138 |
| PFUdA | 16 | 16 | | 1 | 100 | 69-133 | 05/12/2023 0138 |
| PFOS | 15 | 14 | M-03 | 1 | 94 | 65-140 | 05/12/2023 0138 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 108 | 50-150 |
| 13C2_6:2FTS | | 101 | 50-150 |
| 13C2_8:2FTS | | 110 | 50-150 |
| 13C2_PFDoA | | 109 | 50-150 |
| 13C2_PFTeDA | | 109 | 50-150 |
| 13C3_PFBS | | 113 | 50-150 |
| 13C3_PFHxS | | 112 | 50-150 |
| 13C3-HFPO-DA | | 112 | 50-150 |
| 13C4_PFBA | | 113 | 50-150 |
| 13C4_PFHpA | | 113 | 50-150 |
| 13C5_PFHxA | | 114 | 50-150 |
| 13C5_PFPeA | | 118 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ74943-002
**Batch:** 74943
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/10/2023 1430

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 107 | 50-150 |
| 13C7_PFUdA | | 103 | 50-150 |
| 13C8_PFOA | | 116 | 50-150 |
| 13C8_PFOS | | 115 | 50-150 |
| 13C8_PFOSA | | 109 | 50-150 |
| 13C9_PFNA | | 114 | 50-150 |
| d5-EtFOSAA | | 113 | 50-150 |
| d3-MeFOSAA | | 113 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MS

**Sample ID:** YD26028-001MS
**Batch:** 74943
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/10/2023 1430

| Parameter | Sample Amount (ng/L) | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | 13 | 13 | | 1 | 98 | 50-150 | 05/12/2023 0501 |
| 11Cl-PF3OUdS | ND | 13 | 12 | | 1 | 95 | 50-150 | 05/12/2023 0501 |
| 8:2 FTS | ND | 13 | 15 | | 1 | 117 | 67-138 | 05/12/2023 0501 |
| 6:2 FTS | ND | 13 | 14 | | 1 | 109 | 64-140 | 05/12/2023 0501 |
| 4:2 FTS | ND | 13 | 13 | M-03 | 1 | 104 | 63-143 | 05/12/2023 0501 |
| GenX | ND | 28 | 28 | | 1 | 103 | 50-150 | 05/12/2023 0501 |
| ADONA | ND | 13 | 13 | | 1 | 100 | 50-150 | 05/12/2023 0501 |
| EtFOSAA | ND | 14 | 15 | M-03 | 1 | 110 | 61-135 | 05/12/2023 0501 |
| MeFOSAA | ND | 14 | 15 | M-03 | 1 | 106 | 65-136 | 05/12/2023 0501 |
| PFBS | 1.4 | 12 | 14 | | 1 | 102 | 72-130 | 05/12/2023 0501 |
| PFDS | ND | 13 | 13 | | 1 | 94 | 53-142 | 05/12/2023 0501 |
| PFHpS | ND | 13 | 14 | | 1 | 104 | 69-134 | 05/12/2023 0501 |
| PFNS | ND | 13 | 13 | | 1 | 96 | 69-127 | 05/12/2023 0501 |
| PFOSA | ND | 14 | 17 | M-03 | 1 | 120 | 67-137 | 05/12/2023 0501 |
| PFPeS | 0.93 | 13 | 15 | | 1 | 116 | 71-127 | 05/12/2023 0501 |
| PFHxS | 5.8 | 13 | 19 | | 1 | 104 | 68-131 | 05/12/2023 0501 |
| PFBA | 6.4 | 14 | 22 | M-03 | 1 | 109 | 73-129 | 05/12/2023 0501 |
| PFDA | ND | 14 | 14 | | 1 | 105 | 71-129 | 05/12/2023 0501 |
| PFDoA | ND | 14 | 15 | | 1 | 111 | 72-134 | 05/12/2023 0501 |
| PFHpA | 1.5 | 14 | 15 | | 1 | 100 | 72-130 | 05/12/2023 0501 |
| PFHxA | 1.9 | 14 | 17 | | 1 | 106 | 72-129 | 05/12/2023 0501 |
| PFNA | ND | 14 | 15 | | 1 | 111 | 69-130 | 05/12/2023 0501 |
| PFOA | 2.5 | 14 | 17 | M-03 | 1 | 108 | 71-133 | 05/12/2023 0501 |
| PFPeA | 2.0 | 14 | 15 | | 1 | 95 | 72-129 | 05/12/2023 0501 |
| PFTeDA | ND | 14 | 14 | | 1 | 101 | 71-132 | 05/12/2023 0501 |
| PFTrDA | ND | 14 | 15 | | 1 | 111 | 65-144 | 05/12/2023 0501 |
| PFUdA | ND | 14 | 15 | | 1 | 108 | 69-133 | 05/12/2023 0501 |
| PFOS | 4.4 | 13 | 17 | M-03 | 1 | 102 | 65-140 | 05/12/2023 0501 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | N | 163 | 50-150 |
| 13C2_6:2FTS | | 132 | 50-150 |
| 13C2_8:2FTS | | 104 | 50-150 |
| 13C2_PFDoA | | 86 | 50-150 |
| 13C2_PFTeDA | | 88 | 50-150 |
| 13C3_PFBS | | 100 | 50-150 |
| 13C3_PFHxS | | 109 | 50-150 |
| 13C3-HFPO-DA | | 101 | 50-150 |
| 13C4_PFBA | | 78 | 50-150 |
| 13C4_PFHpA | | 104 | 50-150 |
| 13C5_PFHxA | | 102 | 50-150 |
| 13C5_PFPeA | | 102 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MS

**Sample ID:** YD26028-001MS
**Batch:** 74943
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/10/2023 1430

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 98 | 50-150 |
| 13C7_PFUdA | | 92 | 50-150 |
| 13C8_PFOA | | 105 | 50-150 |
| 13C8_PFOS | | 99 | 50-150 |
| 13C8_PFOSA | | 87 | 50-150 |
| 13C9_PFNA | | 108 | 50-150 |
| d5-EtFOSAA | | 87 | 50-150 |
| d3-MeFOSAA | | 98 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MSD

**Sample ID:** YD26028-001MD
**Batch:** 74943
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/10/2023 1430

| Parameter | Sample Amount (ng/L) | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | % RPD | %Rec Limit | % RPD Limit | Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | 13 | 12 | | 1 | 96 | 3.1 | 50-150 | 30 | 05/12/2023 0514 |
| 11Cl-PF3OUdS | ND | 13 | 12 | | 1 | 96 | 0.67 | 50-150 | 30 | 05/12/2023 0514 |
| 8:2 FTS | ND | 13 | 14 | | 1 | 104 | 12 | 67-138 | 30 | 05/12/2023 0514 |
| 6:2 FTS | ND | 13 | 14 | | 1 | 111 | 1.5 | 64-140 | 30 | 05/12/2023 0514 |
| 4:2 FTS | ND | 13 | 14 | M-03 | 1 | 107 | 2.2 | 63-143 | 30 | 05/12/2023 0514 |
| GenX | ND | 28 | 28 | | 1 | 103 | 0.035 | 50-150 | 30 | 05/12/2023 0514 |
| ADONA | ND | 13 | 13 | | 1 | 100 | 0.83 | 50-150 | 30 | 05/12/2023 0514 |
| EtFOSAA | ND | 14 | 15 | | 1 | 109 | 1.4 | 61-135 | 30 | 05/12/2023 0514 |
| MeFOSAA | ND | 14 | 16 | M-03 | 1 | 114 | 6.3 | 65-136 | 30 | 05/12/2023 0514 |
| PFBS | 1.4 | 12 | 14 | | 1 | 100 | 1.7 | 72-130 | 30 | 05/12/2023 0514 |
| PFDS | ND | 13 | 12 | | 1 | 93 | 2.0 | 53-142 | 30 | 05/12/2023 0514 |
| PFHpS | ND | 13 | 13 | | 1 | 102 | 1.9 | 69-134 | 30 | 05/12/2023 0514 |
| PFNS | ND | 13 | 12 | | 1 | 93 | 3.9 | 69-127 | 30 | 05/12/2023 0514 |
| PFOSA | ND | 14 | 16 | | 1 | 118 | 2.7 | 67-137 | 30 | 05/12/2023 0514 |
| PFPeS | 0.93 | 13 | 14 | | 1 | 106 | 8.8 | 71-127 | 30 | 05/12/2023 0514 |
| PFHxS | 5.8 | 13 | 19 | | 1 | 105 | 0.17 | 68-131 | 30 | 05/12/2023 0514 |
| PFBA | 6.4 | 14 | 22 | M-03 | 1 | 110 | 0.048 | 73-129 | 30 | 05/12/2023 0514 |
| PFDA | ND | 14 | 14 | | 1 | 100 | 4.5 | 71-129 | 30 | 05/12/2023 0514 |
| PFDoA | ND | 14 | 15 | | 1 | 110 | 1.0 | 72-134 | 30 | 05/12/2023 0514 |
| PFHpA | 1.5 | 14 | 15 | | 1 | 97 | 4.0 | 72-130 | 30 | 05/12/2023 0514 |
| PFHxA | 1.9 | 14 | 16 | | 1 | 101 | 5.3 | 72-129 | 30 | 05/12/2023 0514 |
| PFNA | ND | 14 | 15 | | 1 | 105 | 5.7 | 69-130 | 30 | 05/12/2023 0514 |
| PFOA | 2.5 | 14 | 17 | M-03 | 1 | 103 | 5.0 | 71-133 | 30 | 05/12/2023 0514 |
| PFPeA | 2.0 | 14 | 15 | | 1 | 97 | 0.75 | 72-129 | 30 | 05/12/2023 0514 |
| PFTeDA | ND | 14 | 13 | | 1 | 98 | 3.8 | 71-132 | 30 | 05/12/2023 0514 |
| PFTrDA | ND | 14 | 15 | | 1 | 109 | 2.1 | 65-144 | 30 | 05/12/2023 0514 |
| PFUdA | ND | 14 | 14 | | 1 | 101 | 7.2 | 69-133 | 30 | 05/12/2023 0514 |
| PFOS | 4.4 | 13 | 16 | M-03 | 1 | 92 | 7.8 | 65-140 | 30 | 05/12/2023 0514 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | N | 170 | 50-150 |
| 13C2_6:2FTS | | 125 | 50-150 |
| 13C2_8:2FTS | | 108 | 50-150 |
| 13C2_PFDoA | | 88 | 50-150 |
| 13C2_PFTeDA | | 94 | 50-150 |
| 13C3_PFBS | | 108 | 50-150 |
| 13C3_PFHxS | | 108 | 50-150 |
| 13C3-HFPO-DA | | 100 | 50-150 |
| 13C4_PFBA | | 80 | 50-150 |
| 13C4_PFHpA | | 112 | 50-150 |
| 13C5_PFHxA | | 108 | 50-150 |
| 13C5_PFPeA | | 101 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MSD

**Sample ID:** YD26028-001MD
**Batch:** 74943
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/10/2023 1430

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 104 | 50-150 |
| 13C7_PFUdA | | 103 | 50-150 |
| 13C8_PFOA | | 112 | 50-150 |
| 13C8_PFOS | | 103 | 50-150 |
| 13C8_PFOSA | | 90 | 50-150 |
| 13C9_PFNA | | 114 | 50-150 |
| d5-EtFOSAA | | 95 | 50-150 |
| d3-MeFOSAA | | 100 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MS

**Sample ID:** YD26028-005MS
**Batch:** 74943
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/10/2023 1430

| Parameter | Sample Amount (ng/L) | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | 14 | 12 | | 1 | 90 | 50-150 | 05/12/2023 0552 |
| 11Cl-PF3OUdS | ND | 14 | 12 | | 1 | 85 | 50-150 | 05/12/2023 0552 |
| 8:2 FTS | ND | 14 | 13 | M-03 | 1 | 91 | 67-138 | 05/12/2023 0552 |
| 6:2 FTS | ND | 14 | 14 | | 1 | 100 | 64-140 | 05/12/2023 0552 |
| 4:2 FTS | ND | 14 | 12 | M-03 | 1 | 90 | 63-143 | 05/12/2023 0552 |
| GenX | ND | 29 | 28 | | 1 | 98 | 50-150 | 05/12/2023 0552 |
| ADONA | ND | 14 | 13 | | 1 | 95 | 50-150 | 05/12/2023 0552 |
| EtFOSAA | ND | 15 | 15 | | 1 | 104 | 61-135 | 05/12/2023 0552 |
| MeFOSAA | ND | 15 | 15 | M-03 | 1 | 101 | 65-136 | 05/12/2023 0552 |
| PFBS | 3.7 | 13 | 15 | | 1 | 91 | 72-130 | 05/12/2023 0552 |
| PFDS | ND | 14 | 12 | | 1 | 89 | 53-142 | 05/12/2023 0552 |
| PFHpS | ND | 14 | 14 | | 1 | 105 | 69-134 | 05/12/2023 0552 |
| PFNS | ND | 14 | 12 | | 1 | 88 | 69-127 | 05/12/2023 0552 |
| PFOSA | ND | 15 | 15 | | 1 | 102 | 67-137 | 05/12/2023 0552 |
| PFPeS | 1.6 | 14 | 15 | | 1 | 96 | 71-127 | 05/12/2023 0552 |
| PFHxS | 5.9 | 13 | 18 | | 1 | 93 | 68-131 | 05/12/2023 0552 |
| PFBA | 22 | 15 | 37 | M-03 | 1 | 102 | 73-129 | 05/12/2023 0552 |
| PFDA | ND | 15 | 16 | | 1 | 108 | 71-129 | 05/12/2023 0552 |
| PFDoA | ND | 15 | 15 | | 1 | 102 | 72-134 | 05/12/2023 0552 |
| PFHpA | 4.4 | 15 | 18 | | 1 | 97 | 72-130 | 05/12/2023 0552 |
| PFHxA | 12 | 15 | 24 | | 1 | 88 | 72-129 | 05/12/2023 0552 |
| PFNA | ND | 15 | 15 | | 1 | 103 | 69-130 | 05/12/2023 0552 |
| PFOA | 11 | 15 | 25 | | 1 | 103 | 71-133 | 05/12/2023 0552 |
| PFPeA | 14 | 15 | 30 | | 1 | 106 | 72-129 | 05/12/2023 0552 |
| PFTeDA | ND | 15 | 15 | | 1 | 100 | 71-132 | 05/12/2023 0552 |
| PFTrDA | ND | 15 | 16 | | 1 | 111 | 65-144 | 05/12/2023 0552 |
| PFUdA | ND | 15 | 15 | | 1 | 105 | 69-133 | 05/12/2023 0552 |
| PFOS | 4.0 | 13 | 17 | M-03 | 1 | 98 | 65-140 | 05/12/2023 0552 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | N | 250 | 50-150 |
| 13C2_6:2FTS | N | 170 | 50-150 |
| 13C2_8:2FTS | | 125 | 50-150 |
| 13C2_PFDoA | | 83 | 50-150 |
| 13C2_PFTeDA | | 94 | 50-150 |
| 13C3_PFBS | | 104 | 50-150 |
| 13C3_PFHxS | | 111 | 50-150 |
| 13C3-HFPO-DA | | 98 | 50-150 |
| 13C4_PFBA | | 55 | 50-150 |
| 13C4_PFHpA | | 107 | 50-150 |
| 13C5_PFHxA | | 103 | 50-150 |
| 13C5_PFPeA | | 88 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MS

**Sample ID:** YD26028-005MS
**Batch:** 74943
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/10/2023 1430

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 97 | 50-150 |
| 13C7_PFUdA | | 96 | 50-150 |
| 13C8_PFOA | | 110 | 50-150 |
| 13C8_PFOS | | 107 | 50-150 |
| 13C8_PFOSA | | 95 | 50-150 |
| 13C9_PFNA | | 108 | 50-150 |
| d5-EtFOSAA | | 95 | 50-150 |
| d3-MeFOSAA | | 104 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MSD

**Sample ID:** YD26028-005MD
**Batch:** 74943
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/10/2023 1430

| Parameter | Sample Amount (ng/L) | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | % RPD | %Rec Limit | % RPD Limit | Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | 13 | 13 | | 1 | 97 | 5.1 | 50-150 | 30 | 05/12/2023 0604 |
| 11Cl-PF3OUdS | ND | 13 | 12 | | 1 | 90 | 2.9 | 50-150 | 30 | 05/12/2023 0604 |
| 8:2 FTS | ND | 14 | 14 | | 1 | 102 | 8.0 | 67-138 | 30 | 05/12/2023 0604 |
| 6:2 FTS | ND | 13 | 14 | | 1 | 107 | 3.3 | 64-140 | 30 | 05/12/2023 0604 |
| 4:2 FTS | ND | 13 | 14 | M-03 | 1 | 104 | 12 | 63-143 | 30 | 05/12/2023 0604 |
| GenX | ND | 28 | 29 | | 1 | 103 | 2.4 | 50-150 | 30 | 05/12/2023 0604 |
| ADONA | ND | 13 | 13 | | 1 | 100 | 2.9 | 50-150 | 30 | 05/12/2023 0604 |
| EtFOSAA | ND | 14 | 15 | | 1 | 107 | 0.26 | 61-135 | 30 | 05/12/2023 0604 |
| MeFOSAA | ND | 14 | 15 | M-03 | 1 | 108 | 3.3 | 65-136 | 30 | 05/12/2023 0604 |
| PFBS | 3.7 | 12 | 15 | M-03 | 1 | 91 | 2.1 | 72-130 | 30 | 05/12/2023 0604 |
| PFDS | ND | 14 | 13 | | 1 | 93 | 1.9 | 53-142 | 30 | 05/12/2023 0604 |
| PFHpS | ND | 13 | 14 | | 1 | 105 | 2.6 | 69-134 | 30 | 05/12/2023 0604 |
| PFNS | ND | 14 | 12 | | 1 | 89 | 0.98 | 69-127 | 30 | 05/12/2023 0604 |
| PFOSA | ND | 14 | 15 | | 1 | 107 | 1.8 | 67-137 | 30 | 05/12/2023 0604 |
| PFPeS | 1.6 | 13 | 16 | | 1 | 109 | 8.5 | 71-127 | 30 | 05/12/2023 0604 |
| PFHxS | 5.9 | 13 | 19 | | 1 | 105 | 6.2 | 68-131 | 30 | 05/12/2023 0604 |
| PFBA | 22 | 14 | 36 | M-03 | 1 | 102 | 1.4 | 73-129 | 30 | 05/12/2023 0604 |
| PFDA | ND | 14 | 14 | M-03 | 1 | 101 | 8.9 | 71-129 | 30 | 05/12/2023 0604 |
| PFDoA | ND | 14 | 15 | | 1 | 108 | 3.0 | 72-134 | 30 | 05/12/2023 0604 |
| PFHpA | 4.4 | 14 | 18 | | 1 | 98 | 1.2 | 72-130 | 30 | 05/12/2023 0604 |
| PFHxA | 12 | 14 | 26 | | 1 | 98 | 4.6 | 72-129 | 30 | 05/12/2023 0604 |
| PFNA | ND | 14 | 14 | | 1 | 97 | 8.7 | 69-130 | 30 | 05/12/2023 0604 |
| PFOA | 11 | 14 | 25 | | 1 | 103 | 1.3 | 71-133 | 30 | 05/12/2023 0604 |
| PFPeA | 14 | 14 | 29 | M-03 | 1 | 108 | 0.37 | 72-129 | 30 | 05/12/2023 0604 |
| PFTeDA | ND | 14 | 14 | | 1 | 98 | 4.5 | 71-132 | 30 | 05/12/2023 0604 |
| PFTrDA | ND | 14 | 16 | | 1 | 114 | 0.44 | 65-144 | 30 | 05/12/2023 0604 |
| PFUdA | ND | 14 | 14 | | 1 | 97 | 10 | 69-133 | 30 | 05/12/2023 0604 |
| PFOS | 4.0 | 13 | 17 | M-03 | 1 | 98 | 1.6 | 65-140 | 30 | 05/12/2023 0604 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | N | 242 | 50-150 |
| 13C2_6:2FTS | N | 164 | 50-150 |
| 13C2_8:2FTS | | 115 | 50-150 |
| 13C2_PFDoA | | 86 | 50-150 |
| 13C2_PFTeDA | | 99 | 50-150 |
| 13C3_PFBS | | 97 | 50-150 |
| 13C3_PFHxS | | 107 | 50-150 |
| 13C3-HFPO-DA | | 95 | 50-150 |
| 13C4_PFBA | | 53 | 50-150 |
| 13C4_PFHpA | | 109 | 50-150 |
| 13C5_PFHxA | | 97 | 50-150 |
| 13C5_PFPeA | | 84 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MSD

**Sample ID:** YD26028-005MD
**Batch:** 74943
**Analytical Method:** PFAS by ID SOP QSM B-15

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 05/10/2023 1430

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 103 | 50-150 |
| 13C7_PFUdA | | 99 | 50-150 |
| 13C8_PFOA | | 108 | 50-150 |
| 13C8_PFOS | | 103 | 50-150 |
| 13C8_PFOSA | | 93 | 50-150 |
| 13C9_PFNA | | 118 | 50-150 |
| d5-EtFOSAA | | 94 | 50-150 |
| d3-MeFOSAA | | 95 | 50-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Chain of Custody
# and
# Miscellaneous Documents

Pace Analytical

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**Number** 146507

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Tiffany Linder, Alexis Crisp | Telephone No. / E-mail: Tiffany.Linder@arcadis.com, Alexis.Crisp@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Sommer Guy | Analysis (Attach list if more space is needed): Report EGLE 24 Compounds | Page 1 of 1 |
| City: Novi / State: MI / Zip Code: 48377 | Printed Name: Sommer Guy Lotte Jay | | YD26028 |
| Project Name: RacerPNC | | | KES2 |
| Project No.: 30167840.00030 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab (G) / Composite (C) | Matrix: Aqueous | Soil | Non-Aqueous | No of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | NaS2O3 | Methanol | Filtered (Y/N) | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWM16-37_GW-042523 | 4/25/23 | 1028 | G | 6 | | | 6 | | | | | | | X | Run MS/MSD |
| MWM30-01_GW-042523 | 4/25/23 | 1040 | G | 2 | | | 2 | | | | | | | X | |
| MWM5-02_GW-042523 | 4/25/23 | 1210 | G | 2 | | | 2 | | | | | | | X | |
| MWF16-23_GW-042523 | 4/25/23 | 1307 | G | 2 | | | 2 | | | | | | | X | |
| MWF12-02R_GW-042523 | 4/25/23 | 1425 | G | 6 | | | 6 | | | | | | | X | Run MS/MSD |
| MW-02-17_GW-042523 | 4/25/23 | 1420 | G | 2 | | | 2 | | | | | | | X | |
| trip blank | 4/25/23 | 1730 | G | 1 | | | 1 | | | | | | | X | |

Turn Around Time Required (Prior lab approval required for expedited TAT.): X Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client X Dispose by Lab

Possible Hazard Identification: X Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Guy | 4/25/23 | 1750 | 1. Received by: FedEx | 4/25/23 | 1750 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | 4/26/23 | 1025 | 4. Laboratory received by | 4/26/23 | 1025 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY: Received on ice (Circle) (Yes) No Ice Pack; Receipt Temp. 1.7 °C; Temp Blank ☐ Y ☐ N

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: (illegible)



PACE ANALYTICAL SERVICES, LLC

DC#_Title: ENV-FRM-WCOL-0286 v02_Samples Receipt Checklist (SRC)
Effective Date: 8/2/2022

# Sample Receipt Checklist (SRC)

Client: ARCADIS  Cooler Inspected by/date: CDR / 04/26/2023  Lot #: YD26028

Means of receipt: ☐ Pace ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | | 1. Were custody seals present on the cooler? |
| ☑ Yes | ☐ No | ☐ NA | 2. If custody seals were present, were they intact and unbroken? |

pH Strip ID: NA  Chlorine Strip ID: NA  Tested by: NA
Original temperature upon receipt / Derived (Corrected) temperature upon receipt  %Solid Snap-Cup ID: NA
1.6 / 1.6 °C  NA / NA °C  NA / NA °C  NA / NA °C
Method: ☑ Temperature Blank ☐ Against Bottles  IR Gun ID: 8  IR Gun Correction Factor: 0 °C
Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | ☐ NA | 3. Were all coolers received at or below 6.0°C? If no, was Project Manager notified? PM was Notified by: phone / email / face-to-face (circle one). |
| ☑ Yes | ☐ No | ☐ NA | 4. Is the commercial courier's packing slip attached to this form? |
| ☑ Yes | ☐ No | | 5. Were proper custody procedures (relinquished/received) followed? |
| ☑ Yes | ☐ No | | 6. Were sample IDs listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 7. Was collection date & time listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 8. Did all container label information (ID, date, time) agree with the COC? |
| ☑ Yes | ☐ No | | 9. Were tests to be performed listed on the COC? |
| ☑ Yes | ☐ No | | 10. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____ |
| ☑ Yes | ☐ No | | 11. Was adequate sample volume available? |
| ☑ Yes | ☐ No | | 12. Were all samples received within ½ the holding time or 48 hours, whichever comes first? |
| ☑ Yes | ☐ No | | 13. Were all samples containers accounted for? (No missing/excess) |
| ☐ Yes | ☐ No | ☑ NA | 14. Were VOA, 8015C and RSK-175 samples free of bubbles >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials? |
| ☐ Yes | ☐ No | ☑ NA | 15. Were all DRO/metals/nutrient samples received at a pH of < 2? |
| ☐ Yes | ☐ No | ☑ NA | 16. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9? |
| ☐ Yes | ☐ No | ☑ NA | 17. Were all applicable $NH_3$/TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine? |
| ☑ Yes | ☐ No | ☐ NA | 18. Was the quote number listed on the container label? If yes, Quote # 25015 |

**Sample Preservation** (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: $H_2SO_4$, $HNO_3$, HCl, NaOH using SR # NA. ☐
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Unique ID: NA.

Comments:

# Report of Analysis

**Arcadis U.S., Inc.**
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Tiffany Linder

Project Name: RACER PNC

Project Number: 30167840.00031

Lot Number:**YI26004**

Date Completed:10/20/2023

Project Manager:**Kathy E. Smith**

10/20/2023 12:46 PM
Approved and released by:
Account Executive: **Teresa A. Brailsford**

The electronic signature above is the equivalent of a handwritten signature.
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## Case Narrative
## Arcadis U.S., Inc.
### Lot Number: YI26004

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report. Where sampling is conducted by the client, results relate to the accuracy of the information provided, and as the samples are received.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved The NELAC Institute (TNI) standards, the Pace Analytical Services, LLC ("Pace") Laboratory Quality Manual, standard operating procedures (SOPs), and Pace policies. Any exceptions to the TNI standards, the Laboratory Quality Manual, SOPs or policies are qualified on the results page or discussed below.

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18, PFAS by Isotope Dilution SOP.

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

**PFAS - MI 28**

Sample YI26004-005 (MW-43-14R_GW-092523) required centrifugation prior to extraction, due to excessive solids present in the samples. Centrifugation was performed following the PFAS Aqueous Centrifuge Protocol; samples were spiked with Surrogate (SUR; Extracted Internal Standard/EIS) and shaken vigorously before being poured into a conical bottle and centrifuged. The centrifuged aqueous sample was decanted back into the original sample bottle, off of the condensed solids remaining in the centrifuge bottle. The original sample bottle was rinsed as normal and centrifuge bottle was rinsed with 4mL of MeOH. Centrifuge bottle rinsate was added to the elution. Samples concentrated to <5mL and reconstituted to 5mL using MeOH by transfer pipet.

The continuing calibration verification (CCV) associated with sample YI26004-001 (MWM2-28_GW-092523) was outside of criteria for the following EIS: PFOSA. The data has been reported. EIS failed high, target analyte passed. Data will be reported.

Surrogate recovery for sample YI26004-001 (MWM2-28_GW-092523) was outside the upper control limit. This sample did not contain any target analytes > 1/2 LOQ; therefore, re-extraction and/or re-analysis was not performed. Data has been flagged with a “Q” qualifier.

Surrogate recovery for sample YI26004-005 (MW-43-14R_GW-092523) was outside control limits. Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed. Data has been flagged with a “Q” qualifier.

Surrogate recovery for the sample YI26004-004 (MWM2-22_GW-092523) was outside the upper control limit. This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed. Data has been flagged with a “Q” qualifier.

Sample (YI26004-004 (MWM2-22_GW-092523) was diluted due to the nature of the sample matrix (samples were foamy). The LOQ has been elevated to reflect the dilution.

## Sample Summary

## Arcadis U.S., Inc.

**Lot Number: YI26004**

**Project Name: RACER PNC**

**Project Number: 30167840.00031**

| Sample Number | Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| 001 | MWM2-28_GW-092523 | Aqueous | 09/25/2023 1020 | 09/26/2023 |
| 002 | EB-08_092523 | Aqueous | 09/25/2023 1025 | 09/26/2023 |
| 003 | Trip Blank | Aqueous | 09/25/2023 0925 | 09/26/2023 |
| 004 | MWM2-22_GW-092523 | Aqueous | 09/25/2023 1115 | 09/26/2023 |
| 005 | MW-43-14R_GW-092523 | Aqueous | 09/25/2023 1220 | 09/26/2023 |

(5 samples)

## Detection Summary

## Arcadis U.S., Inc.

**Lot Number: YI26004**

**Project Name: RACER PNC**

**Project Number: 30167840.00031**

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 001 | MWM2-28_GW-092523 | Aqueous | 8:2 FTS | PFAS by ID | 2.0 | JQ | ng/L | 6 |
| 001 | MWM2-28_GW-092523 | Aqueous | 6:2 FTS | PFAS by ID | 3.4 | JQ | ng/L | 6 |
| 001 | MWM2-28_GW-092523 | Aqueous | PFHxS | PFAS by ID | 7.0 | | ng/L | 6 |
| 001 | MWM2-28_GW-092523 | Aqueous | PFBA | PFAS by ID | 16 | | ng/L | 6 |
| 001 | MWM2-28_GW-092523 | Aqueous | PFDA | PFAS by ID | 2.2 | J | ng/L | 6 |
| 001 | MWM2-28_GW-092523 | Aqueous | PFHpA | PFAS by ID | 8.3 | | ng/L | 6 |
| 001 | MWM2-28_GW-092523 | Aqueous | PFHxA | PFAS by ID | 18 | | ng/L | 6 |
| 001 | MWM2-28_GW-092523 | Aqueous | PFNA | PFAS by ID | 4.0 | | ng/L | 6 |
| 001 | MWM2-28_GW-092523 | Aqueous | PFOA | PFAS by ID | 16 | | ng/L | 6 |
| 001 | MWM2-28_GW-092523 | Aqueous | PFPeA | PFAS by ID | 17 | | ng/L | 6 |
| 001 | MWM2-28_GW-092523 | Aqueous | PFOS | PFAS by ID | 65 | | ng/L | 6 |
| 004 | MWM2-22_GW-092523 | Aqueous | EtFOSAA | PFAS by ID | 2.0 | J | ng/L | 12 |
| 004 | MWM2-22_GW-092523 | Aqueous | PFBS | PFAS by ID | 7.4 | | ng/L | 12 |
| 004 | MWM2-22_GW-092523 | Aqueous | PFHxS | PFAS by ID | 8.7 | | ng/L | 12 |
| 004 | MWM2-22_GW-092523 | Aqueous | PFBA | PFAS by ID | 28 | | ng/L | 12 |
| 004 | MWM2-22_GW-092523 | Aqueous | PFDA | PFAS by ID | 1.9 | J | ng/L | 12 |
| 004 | MWM2-22_GW-092523 | Aqueous | PFHpA | PFAS by ID | 14 | | ng/L | 12 |
| 004 | MWM2-22_GW-092523 | Aqueous | PFHxA | PFAS by ID | 28 | | ng/L | 12 |
| 004 | MWM2-22_GW-092523 | Aqueous | PFNA | PFAS by ID | 5.4 | | ng/L | 12 |
| 004 | MWM2-22_GW-092523 | Aqueous | PFOA | PFAS by ID | 26 | | ng/L | 12 |
| 004 | MWM2-22_GW-092523 | Aqueous | PFPeA | PFAS by ID | 27 | | ng/L | 12 |
| 004 | MWM2-22_GW-092523 | Aqueous | PFOS | PFAS by ID | 95 | | ng/L | 12 |
| 005 | MW-43-14R_GW-092523 | Aqueous | PFHxS | PFAS by ID | 16 | | ng/L | 14 |
| 005 | MW-43-14R_GW-092523 | Aqueous | PFHpA | PFAS by ID | 4.9 | | ng/L | 14 |
| 005 | MW-43-14R_GW-092523 | Aqueous | PFNA | PFAS by ID | 1.0 | J | ng/L | 14 |
| 005 | MW-43-14R_GW-092523 | Aqueous | PFOA | PFAS by ID | 12 | | ng/L | 14 |
| 005 | MW-43-14R_GW-092523 | Aqueous | PFOS | PFAS by ID | 99 | | ng/L | 14 |

(27 detections)

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-001**

Description: **MWM2-28_GW-092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1020** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/12/2023 0137 | ELC2 | 10/10/2023 2002 | 87060 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 0.60 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)** | **39108-34-4** | **PFAS by ID SOP** | **2.0** | **JQ** | **7.3** | **1.5** | **ng/L** | **1** |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **3.4** | **JQ** | **7.3** | **1.8** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.3 | 0.80 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 0.68 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 0.85 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.38 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.71 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.45 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.65 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **7.0** | | **3.6** | **0.50** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **16** | | **3.6** | **0.55** | **ng/L** | **1** |
| **Perfluoro-n-decanoic acid (PFDA)** | **335-76-2** | **PFAS by ID SOP** | **2.2** | **J** | **3.6** | **0.48** | **ng/L** | **1** |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.43 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **8.3** | | **3.6** | **0.41** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **18** | | **3.6** | **0.63** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **4.0** | | **3.6** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **16** | | **3.6** | **0.76** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **17** | | **3.6** | **0.50** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.57 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **65** | | **3.6** | **1.8** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 308 | 25-150 |
| 13C2_6:2FTS | N | 341 | 25-150 |
| 13C2_8:2FTS | N | 361 | 25-150 |
| 13C2_PFDoA | | 110 | 25-150 |
| 13C2_PFTeDA | | 111 | 25-150 |
| 13C3_PFBS | | 89 | 25-150 |
| 13C3_PFHxS | | 96 | 25-150 |
| 13C3-HFPO-DA | | 69 | 25-150 |
| 13C4_PFBA | | 37 | 25-150 |
| 13C4_PFHpA | | 77 | 25-150 |
| 13C5_PFHxA | | 72 | 25-150 |
| 13C5_PFPeA | | 56 | 25-150 |
| 13C6_PFDA | | 107 | 25-150 |
| 13C7_PFUdA | | 110 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-001**

Description: **MWM2-28_GW-092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1020** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 25-150 |
| 13C8_PFOS | | 108 | 25-150 |
| 13C8_PFOSA | | 93 | 10-150 |
| 13C9_PFNA | | 104 | 25-150 |
| d5-EtFOSAA | | 118 | 25-150 |
| d3-MeFOSAA | | 128 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-002**

Description: **EB-08_092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1025** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/12/2023 1517 | ELC2 | 10/10/2023 2002 | 87060 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 0.60 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.3 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.3 | 0.79 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 0.68 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 0.85 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.38 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.71 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.45 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.65 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.6 | 0.50 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.43 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.41 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.63 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.6 | 0.75 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.49 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.57 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.6 | 1.8 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 115 | 25-150 |
| 13C2_6:2FTS | | 122 | 25-150 |
| 13C2_8:2FTS | | 100 | 25-150 |
| 13C2_PFDoA | | 101 | 25-150 |
| 13C2_PFTeDA | | 103 | 25-150 |
| 13C3_PFBS | | 107 | 25-150 |
| 13C3_PFHxS | | 110 | 25-150 |
| 13C3-HFPO-DA | | 96 | 25-150 |
| 13C4_PFBA | | 107 | 25-150 |
| 13C4_PFHpA | | 100 | 25-150 |
| 13C5_PFHxA | | 102 | 25-150 |
| 13C5_PFPeA | | 105 | 25-150 |
| 13C6_PFDA | | 108 | 25-150 |
| 13C7_PFUdA | | 105 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-002**

Description: **EB-08_092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1025** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 113 | 25-150 |
| 13C8_PFOS | | 105 | 25-150 |
| 13C8_PFOSA | | 101 | 10-150 |
| 13C9_PFNA | | 102 | 25-150 |
| d5-EtFOSAA | | 100 | 25-150 |
| d3-MeFOSAA | | 97 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-003**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/25/2023 0925** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/12/2023 1528 | ELC2 | 10/10/2023 2002 | 87060 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 0.57 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 6.9 | 0.76 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 0.65 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 0.81 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.5 | 0.36 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.67 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.43 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.62 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.53 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.5 | 0.48 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.5 | 0.39 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.5 | 0.60 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.40 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.5 | 0.72 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.5 | 0.47 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.5 | 1.7 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 114 | 25-150 |
| 13C2_6:2FTS | | 118 | 25-150 |
| 13C2_8:2FTS | | 88 | 25-150 |
| 13C2_PFDoA | | 92 | 25-150 |
| 13C2_PFTeDA | | 88 | 25-150 |
| 13C3_PFBS | | 101 | 25-150 |
| 13C3_PFHxS | | 104 | 25-150 |
| 13C3-HFPO-DA | | 94 | 25-150 |
| 13C4_PFBA | | 105 | 25-150 |
| 13C4_PFHpA | | 96 | 25-150 |
| 13C5_PFHxA | | 102 | 25-150 |
| 13C5_PFPeA | | 104 | 25-150 |
| 13C6_PFDA | | 98 | 25-150 |
| 13C7_PFUdA | | 95 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-003**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/25/2023 0925** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 25-150 |
| 13C8_PFOS | | 99 | 25-150 |
| 13C8_PFOSA | | 94 | 10-150 |
| 13C9_PFNA | | 93 | 25-150 |
| d5-EtFOSAA | | 93 | 25-150 |
| d3-MeFOSAA | | 98 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-004**

Description: **MWM2-22_GW-092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1115** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/12/2023 1539 | ELC2 | 10/10/2023 2002 | 87060 |
| 2 | SOP SPE | PFAS by ID SOP | 1 | 10/18/2023 1905 | BWS | 10/17/2023 1806 | 87673 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.2 | 0.43 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.2 | 0.59 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 80 | 16 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 2 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.2 | 0.78 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.2 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.2 | 0.43 | ng/L | 1 |
| **N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)** | **2991-50-6** | **PFAS by ID SOP** | **2.0** | **J** | **7.2** | **0.67** | **ng/L** | **1** |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.2 | 0.83 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **7.4** | | **3.6** | **0.37** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.70 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.45 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.64 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.53 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **8.7** | | **3.6** | **0.49** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **28** | | **3.6** | **0.54** | **ng/L** | **1** |
| **Perfluoro-n-decanoic acid (PFDA)** | **335-76-2** | **PFAS by ID SOP** | **1.9** | **J** | **3.6** | **0.47** | **ng/L** | **1** |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **14** | | **3.6** | **0.40** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **28** | | **3.6** | **0.62** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **5.4** | | **3.6** | **0.41** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **26** | | **3.6** | **0.74** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **27** | | **3.6** | **0.49** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **95** | | **3.6** | **1.8** | **ng/L** | **1** |

| Surrogate | Run 1 Q | Run 1 % Recovery | Run 1 Acceptance Limits | Run 2 Q | Run 2 % Recovery | Run 2 Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C2_4:2FTS | N | 273 | 25-150 | N | 194 | 25-150 |
| 13C2_6:2FTS | N | 253 | 25-150 | | 145 | 25-150 |
| 13C2_8:2FTS | N | 274 | 25-150 | | 95 | 25-150 |
| 13C2_PFDoA | | 104 | 25-150 | | 108 | 25-150 |
| 13C2_PFTeDA | | 96 | 25-150 | | 106 | 25-150 |
| 13C3_PFBS | | 78 | 25-150 | | 100 | 25-150 |
| 13C3_PFHxS | | 93 | 25-150 | | 103 | 25-150 |
| 13C3-HFPO-DA | | 56 | 25-150 | | 92 | 25-150 |
| 13C4_PFBA | | 29 | 25-150 | | 79 | 25-150 |
| 13C4_PFHpA | | 60 | 25-150 | | 106 | 25-150 |
| 13C5_PFHxA | | 59 | 25-150 | | 111 | 25-150 |
| 13C5_PFPeA | | 42 | 25-150 | | 93 | 25-150 |
| 13C6_PFDA | | 97 | 25-150 | | 98 | 25-150 |

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-004**

Description: **MWM2-22_GW-092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1115** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C7_PFUdA | | 109 | 25-150 | | 110 | 25-150 |
| 13C8_PFOA | | 74 | 25-150 | | 101 | 25-150 |
| 13C8_PFOS | | 99 | 25-150 | | 104 | 25-150 |
| 13C8_PFOSA | | 77 | 10-150 | | 97 | 10-150 |
| 13C9_PFNA | | 85 | 25-150 | | 104 | 25-150 |
| d5-EtFOSAA | | 117 | 25-150 | | 116 | 25-150 |
| d3-MeFOSAA | | 113 | 25-150 | | 111 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-005**

Description: **MW-43-14R_GW-092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1220** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/12/2023 1550 | ELC2 | 10/10/2023 2002 | 87060 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.1 | 0.43 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.1 | 0.59 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.1 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.1 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.1 | 0.78 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.1 | 0.43 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.1 | 0.67 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.1 | 0.83 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.37 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.69 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.44 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.63 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.53 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **16** | | **3.6** | **0.49** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | Q | 3.6 | 0.53 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **4.9** | | **3.6** | **0.40** | **ng/L** | **1** |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.61 | ng/L | 1 |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **1.0** | **J** | **3.6** | **0.41** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **12** | | **3.6** | **0.74** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.53 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **99** | | **3.6** | **1.8** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 308 | 25-150 |
| 13C2_6:2FTS | N | 229 | 25-150 |
| 13C2_8:2FTS | N | 287 | 25-150 |
| 13C2_PFDoA | | 96 | 25-150 |
| 13C2_PFTeDA | | 72 | 25-150 |
| 13C3_PFBS | | 77 | 25-150 |
| 13C3_PFHxS | | 85 | 25-150 |
| 13C3-HFPO-DA | | 49 | 25-150 |
| 13C4_PFBA | N | 20 | 25-150 |
| 13C4_PFHpA | | 54 | 25-150 |
| 13C5_PFHxA | | 54 | 25-150 |
| 13C5_PFPeA | | 35 | 25-150 |
| 13C6_PFDA | | 99 | 25-150 |
| 13C7_PFUdA | | 100 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-005**

Description: **MW-43-14R_GW-092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1220** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 69 | 25-150 |
| 13C8_PFOS | | 98 | 25-150 |
| 13C8_PFOSA | | 80 | 10-150 |
| 13C9_PFNA | | 88 | 25-150 |
| d5-EtFOSAA | | 115 | 25-150 |
| d3-MeFOSAA | | 110 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# QC Summary

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ87060-001
**Batch:** 87060
**Analytical Method:** PFAS by ID SOP
**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 10/10/2023 2002

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 0.48 | ng/L | 10/11/2023 2314 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 0.66 | ng/L | 10/11/2023 2314 |
| 8:2 FTS | ND | | 1 | 8.0 | 1.6 | ng/L | 10/11/2023 2314 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 10/11/2023 2314 |
| 4:2 FTS | ND | | 1 | 8.0 | 0.87 | ng/L | 10/11/2023 2314 |
| GenX | ND | | 1 | 8.0 | 2.1 | ng/L | 10/11/2023 2314 |
| ADONA | ND | | 1 | 8.0 | 0.48 | ng/L | 10/11/2023 2314 |
| EtFOSAA | ND | | 1 | 8.0 | 0.75 | ng/L | 10/11/2023 2314 |
| MeFOSAA | ND | | 1 | 8.0 | 0.93 | ng/L | 10/11/2023 2314 |
| PFBS | ND | | 1 | 4.0 | 0.41 | ng/L | 10/11/2023 2314 |
| PFDS | ND | | 1 | 4.0 | 0.78 | ng/L | 10/11/2023 2314 |
| PFHpS | ND | | 1 | 4.0 | 0.50 | ng/L | 10/11/2023 2314 |
| PFNS | ND | | 1 | 4.0 | 0.71 | ng/L | 10/11/2023 2314 |
| PFOSA | ND | | 1 | 4.0 | 0.61 | ng/L | 10/11/2023 2314 |
| PFPeS | ND | | 1 | 4.0 | 0.59 | ng/L | 10/11/2023 2314 |
| PFHxS | ND | | 1 | 4.0 | 0.55 | ng/L | 10/11/2023 2314 |
| PFBA | ND | | 1 | 4.0 | 0.60 | ng/L | 10/11/2023 2314 |
| PFDA | ND | | 1 | 4.0 | 0.52 | ng/L | 10/11/2023 2314 |
| PFDoA | ND | | 1 | 4.0 | 0.47 | ng/L | 10/11/2023 2314 |
| PFHpA | ND | | 1 | 4.0 | 0.45 | ng/L | 10/11/2023 2314 |
| PFHxA | ND | | 1 | 4.0 | 0.69 | ng/L | 10/11/2023 2314 |
| PFNA | ND | | 1 | 4.0 | 0.46 | ng/L | 10/11/2023 2314 |
| PFOA | ND | | 1 | 4.0 | 0.83 | ng/L | 10/11/2023 2314 |
| PFPeA | ND | | 1 | 4.0 | 0.54 | ng/L | 10/11/2023 2314 |
| PFTeDA | ND | | 1 | 4.0 | 0.60 | ng/L | 10/11/2023 2314 |
| PFTrDA | ND | | 1 | 4.0 | 0.53 | ng/L | 10/11/2023 2314 |
| PFUdA | ND | | 1 | 4.0 | 0.63 | ng/L | 10/11/2023 2314 |
| PFOS | ND | | 1 | 4.0 | 2.0 | ng/L | 10/11/2023 2314 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 97 | 25-150 |
| 13C2_6:2FTS | | 115 | 25-150 |
| 13C2_8:2FTS | | 92 | 25-150 |
| 13C2_PFDoA | | 107 | 25-150 |
| 13C2_PFTeDA | | 103 | 25-150 |
| 13C3_PFBS | | 108 | 25-150 |
| 13C3_PFHxS | | 112 | 25-150 |
| 13C3-HFPO-DA | | 114 | 25-150 |
| 13C4_PFBA | | 108 | 25-150 |
| 13C4_PFHpA | | 110 | 25-150 |
| 13C5_PFHxA | | 103 | 25-150 |
| 13C5_PFPeA | | 106 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ87060-001
**Batch:** 87060
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 10/10/2023 2002

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 106 | 25-150 |
| 13C7_PFUdA | | 100 | 25-150 |
| 13C8_PFOA | | 119 | 25-150 |
| 13C8_PFOS | | 111 | 25-150 |
| 13C8_PFOSA | | 118 | 10-150 |
| 13C9_PFNA | | 111 | 25-150 |
| d5-EtFOSAA | | 94 | 25-150 |
| d3-MeFOSAA | | 112 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit

ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria

N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ87060-002
**Batch:** 87060
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 10/10/2023 2002

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 13 | | 1 | 90 | 50-150 | 10/11/2023 2325 |
| 11Cl-PF3OUdS | 15 | 15 | | 1 | 98 | 50-150 | 10/11/2023 2325 |
| 8:2 FTS | 15 | 17 | | 1 | 112 | 50-150 | 10/11/2023 2325 |
| 6:2 FTS | 15 | 18 | | 1 | 116 | 50-150 | 10/11/2023 2325 |
| 4:2 FTS | 15 | 14 | | 1 | 93 | 50-150 | 10/11/2023 2325 |
| GenX | 32 | 33 | | 1 | 104 | 50-150 | 10/11/2023 2325 |
| ADONA | 15 | 16 | | 1 | 106 | 50-150 | 10/11/2023 2325 |
| EtFOSAA | 16 | 16 | | 1 | 101 | 50-150 | 10/11/2023 2325 |
| MeFOSAA | 16 | 15 | | 1 | 91 | 50-150 | 10/11/2023 2325 |
| PFBS | 14 | 14 | | 1 | 97 | 50-150 | 10/11/2023 2325 |
| PFDS | 15 | 14 | | 1 | 93 | 50-150 | 10/11/2023 2325 |
| PFHpS | 15 | 15 | | 1 | 96 | 50-150 | 10/11/2023 2325 |
| PFNS | 15 | 16 | | 1 | 103 | 50-150 | 10/11/2023 2325 |
| PFOSA | 16 | 16 | | 1 | 97 | 50-150 | 10/11/2023 2325 |
| PFPeS | 15 | 15 | | 1 | 97 | 50-150 | 10/11/2023 2325 |
| PFHxS | 15 | 14 | | 1 | 97 | 50-150 | 10/11/2023 2325 |
| PFBA | 16 | 15 | | 1 | 94 | 50-150 | 10/11/2023 2325 |
| PFDA | 16 | 16 | | 1 | 97 | 50-150 | 10/11/2023 2325 |
| PFDoA | 16 | 15 | | 1 | 95 | 50-150 | 10/11/2023 2325 |
| PFHpA | 16 | 15 | | 1 | 96 | 50-150 | 10/11/2023 2325 |
| PFHxA | 16 | 16 | | 1 | 99 | 50-150 | 10/11/2023 2325 |
| PFNA | 16 | 16 | | 1 | 99 | 50-150 | 10/11/2023 2325 |
| PFOA | 16 | 15 | | 1 | 95 | 50-150 | 10/11/2023 2325 |
| PFPeA | 16 | 16 | | 1 | 103 | 50-150 | 10/11/2023 2325 |
| PFTeDA | 16 | 17 | | 1 | 106 | 50-150 | 10/11/2023 2325 |
| PFTrDA | 16 | 15 | | 1 | 92 | 50-150 | 10/11/2023 2325 |
| PFUdA | 16 | 16 | | 1 | 100 | 50-150 | 10/11/2023 2325 |
| PFOS | 15 | 15 | | 1 | 99 | 50-150 | 10/11/2023 2325 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 95 | 25-150 |
| 13C2_6:2FTS | | 121 | 25-150 |
| 13C2_8:2FTS | | 99 | 25-150 |
| 13C2_PFDoA | | 101 | 25-150 |
| 13C2_PFTeDA | | 101 | 25-150 |
| 13C3_PFBS | | 106 | 25-150 |
| 13C3_PFHxS | | 105 | 25-150 |
| 13C3-HFPO-DA | | 105 | 25-150 |
| 13C4_PFBA | | 105 | 25-150 |
| 13C4_PFHpA | | 107 | 25-150 |
| 13C5_PFHxA | | 104 | 25-150 |
| 13C5_PFPeA | | 101 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ87060-002
**Batch:** 87060
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 10/10/2023 2002

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 105 | 25-150 |
| 13C7_PFUdA | | 94 | 25-150 |
| 13C8_PFOA | | 116 | 25-150 |
| 13C8_PFOS | | 105 | 25-150 |
| 13C8_PFOSA | | 111 | 10-150 |
| 13C9_PFNA | | 103 | 25-150 |
| d5-EtFOSAA | | 96 | 25-150 |
| d3-MeFOSAA | | 107 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ87673-001
**Batch:** 87673
**Analytical Method:** PFAS by ID SOP
**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 10/17/2023 1806

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 8:2 FTS | ND | | 1 | 8.0 | 1.6 | ng/L | 10/18/2023 1827 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 10/18/2023 1827 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 91 | 25-150 |
| 13C2_6:2FTS | | 109 | 25-150 |
| 13C2_8:2FTS | | 65 | 25-150 |
| 13C2_PFDoA | | 104 | 25-150 |
| 13C2_PFTeDA | | 104 | 25-150 |
| 13C3_PFBS | | 102 | 25-150 |
| 13C3_PFHxS | | 104 | 25-150 |
| 13C3-HFPO-DA | | 96 | 25-150 |
| 13C4_PFBA | | 108 | 25-150 |
| 13C4_PFHpA | | 106 | 25-150 |
| 13C5_PFHxA | | 111 | 25-150 |
| 13C5_PFPeA | | 106 | 25-150 |
| 13C6_PFDA | | 95 | 25-150 |
| 13C7_PFUdA | | 102 | 25-150 |
| 13C8_PFOA | | 104 | 25-150 |
| 13C8_PFOS | | 104 | 25-150 |
| 13C8_PFOSA | | 94 | 10-150 |
| 13C9_PFNA | | 106 | 25-150 |
| d5-EtFOSAA | | 97 | 25-150 |
| d3-MeFOSAA | | 94 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ87673-002
**Batch:** 87673
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 10/17/2023 1806

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 8:2 FTS | 15 | 17 | | 1 | 111 | 50-150 | 10/18/2023 1839 |
| 6:2 FTS | 15 | 14 | | 1 | 94 | 50-150 | 10/18/2023 1839 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 91 | 25-150 |
| 13C2_6:2FTS | | 102 | 25-150 |
| 13C2_8:2FTS | | 61 | 25-150 |
| 13C2_PFDoA | | 99 | 25-150 |
| 13C2_PFTeDA | | 94 | 25-150 |
| 13C3_PFBS | | 98 | 25-150 |
| 13C3_PFHxS | | 97 | 25-150 |
| 13C3-HFPO-DA | | 92 | 25-150 |
| 13C4_PFBA | | 103 | 25-150 |
| 13C4_PFHpA | | 100 | 25-150 |
| 13C5_PFHxA | | 103 | 25-150 |
| 13C5_PFPeA | | 100 | 25-150 |
| 13C6_PFDA | | 91 | 25-150 |
| 13C7_PFUdA | | 99 | 25-150 |
| 13C8_PFOA | | 97 | 25-150 |
| 13C8_PFOS | | 98 | 25-150 |
| 13C8_PFOSA | | 89 | 10-150 |
| 13C9_PFNA | | 105 | 25-150 |
| d5-EtFOSAA | | 92 | 25-150 |
| d3-MeFOSAA | | 91 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Chain of Custody
# and
# Miscellaneous Documents

Pace Analytical

**PACE ANALYTICAL SERVICES, LLC**
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Alexis Crisp, Tiffany Linder | Telephone No. / E-mail: Alexis.Crisp@arcadis.com, sTiffany.linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Sommer Guy | Analysis (Attach list if more space is needed): Report EbiE 28 compounds | Page 1 of 1 |
| City: Novi | State: MI | Zip Code: 48377 | Lot # Bar Code: YI26004 |
| Project Name: Racer PNC | Printed Name: Sommer Guy | | |
| Project No.: 30167840.00031 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | G=Grab C=Composite | Matrix: Aqueous | Solid | Wipe/Swab | No of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Methanol | Other | Volatiles (EPA 624, plus 1,4-Dioxane, 1,2,3-TCP, Naphthalene, MTBE, TBA, DIPE, ETBE, TAME) | Lot # Bar Code / Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWM2-28_GW-092523 | 9/25/23 | 1020 | G | X | | | 2 | | | | | | | | X | |
| EB-08_092523 | 9/25/23 | 1025 | G | X | | | 1 | | | | | | | | X | equipment blank |
| triplank | 9/25/23 | 0925 | G | X | | | 1 | | | | | | | | X | triplank |
| MWM2-22_GW-092523 | 9/25/23 | 1115 | G | X | | | 2 | | | | | | | | X | |
| MW-43-14R_GW-092523 | 9/25/23 | 1220 | G | X | | | 2 | | | | | | | | X | |

Turn Around Time Required (Prior lab approval required for expedited TAT.): ☒ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Guy | 9/25/23 | 1630 | 1. Received by: FedEx | 9/25/23 | 1630 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | 9/26/23 | 1030 | 4. Laboratory received by | 9/26/23 | 1036 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on ice (Circle): (Yes) No Ice Pack: Receipt Temp: 4.5 °C — Temp Blank: PRESENT

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: ME003NA-01

PACE ANALYTICAL SERVICES, LLC

DC#_Title: ENV-FRM-WCOL-0286 v02_Samples Receipt Checklist (SRC)
Effective Date: 8/2/2022

# Sample Receipt Checklist (SRC)

Client: ARCADIS  Cooler Inspected by/date: CJH / 9/26/23  Lot #: YI26004

Means of receipt: ☐ Pace ☐ Client ☐ UPS ☑ FedEx ☐ Other: NA

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | | 1. Were custody seals present on the cooler? |
| ☑ Yes | ☐ No | ☐ NA | 2. If custody seals were present, were they intact and unbroken? |

pH Strip ID: NA  Chlorine Strip ID: NA  Tested by: NA
Original temperature upon receipt / Derived (Corrected) temperature upon receipt  %Solid Snap-Cup ID: NA
4.5 / 4.5 °C  NA / NA °C  NA / NA °C  NA / NA °C
Method: ☑ Temperature Blank ☐ Against Bottles  IR Gun ID: 8  IR Gun Correction Factor: 0 °C
Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | ☐ NA | 3. Were all coolers received at or below 6.0°C? If no, was Project Manager notified? PM was Notified by: phone / email / face-to-face (circle one). |
| ☑ Yes | ☐ No | ☐ NA | 4. Is the commercial courier's packing slip attached to this form? |
| ☑ Yes | ☐ No | | 5. Were proper custody procedures (relinquished/received) followed? |
| ☑ Yes | ☐ No | | 6. Were sample IDs listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 7. Was collection date & time listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 8. Did all container label information (ID, date, time) agree with the COC? |
| ☑ Yes | ☐ No | | 9. Were tests to be performed listed on the COC? |
| ☑ Yes | ☐ No | | 10. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? NA |
| ☑ Yes | ☐ No | | 11. Was adequate sample volume available? |
| ☑ Yes | ☐ No | | 12. Were all samples received within ½ the holding time or 48 hours, whichever comes first? |
| ☑ Yes | ☐ No | | 13. Were all samples containers accounted for? (No missing/excess) |
| ☐ Yes | ☐ No | ☑ NA | 14. Were VOA, 8015C and RSK-175 samples free of bubbles >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials? |
| ☐ Yes | ☐ No | ☑ NA | 15. Were all DRO/metals/nutrient samples received at a pH of < 2? |
| ☐ Yes | ☐ No | ☑ NA | 16. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9? |
| ☐ Yes | ☐ No | ☑ NA | 17. Were all applicable $NH_3$/TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine? |
| ☐ Yes | ☑ No | ☐ NA | 18. Was the quote number listed on the container label? If yes, Quote # NA |

**Sample Preservation** (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA. ☐
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Unique ID: NA.

Comments:

Qualtrax ID: 56360  Pace® Analytical Services, LLC  Page 1 of 1

# Report of Analysis

**Arcadis U.S., Inc.**
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Tiffany Linder

Project Name: RACER PNC

Project Number: 30167840.00031

Lot Number:**YI13047**

Date Completed:09/29/2023

09/29/2023 5:19 PM
Approved and released by:
Project Manager II: **Kathy E. Smith**

The electronic signature above is the equivalent of a handwritten signature.
This report shall not be reproduced, except in its entirety, without the written approval of Pace Analytical Services, LLC.

Pace Analytical Services, LLC (*formerly Shealy Environmental Services, Inc.*)
106 Vantage Point Drive West Columbia, SC 29172
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

## Case Narrative
## Arcadis U.S., Inc.
### Lot Number: YI13047

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.4 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples were compliant with DOD QSM 5.4 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). The CF is calculated as follows:

CF = DF * FV / Vo

FV is volume of extract (mL)
Vo is initial sample volume (mL)
DF is dilution factor. For undiluted analysis, DF = 1.

Sample concentration for aqueous samples:
Concentration (ng/L) = Cs*CF,

$$C_s = \frac{\left(\frac{(A_s x C_{is})}{A_{is}}\right) - B}{M1}$$

Where

$C_s$ is on column concentration of target analyte in the sample (ng/L)
$C_{is}$ is concentration of internal standard in the sample (ng/L)
$A_s$ is peak response of target analyte in the sample
$A_{is}$ is peak response of internal standard in the sample
M1 is the average RF from ICAL or the slope from linear regression ICAL
B is the y-intercept from the ICAL

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18, PFAS by Isotope Dilution SOP.

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

PFAS
Samples YI13047-001, YI13047-003, YI13047-004, YI13047-005, YI13047-006, YI13047-008, YI13047-009 required centrifugation prior to extraction, due to excessive solids present in the samples. Centrifugation was performed following the PFAS Aqueous Centrifuge Protocol; samples were spiked with Surrogate (SUR; Extracted Internal Standard/EIS) and shaken vigorously before being poured into a conical bottle and centrifuged. The centrifuged aqueous sample was decanted back into the original sample bottle, off of the condensed solids remaining in the centrifuge bottle. Original sample bottle was rinsed as normal and centrifuge bottle was rinsed with 4mL of MeOH. Centrifuge bottle rinsate was added to the elution. Samples concentrated to <5mL and reconstituted to 5mL using MeOH by transfer pipet.

Surrogate recovery for the following samples was outside the upper control limit: YI13047-001, YI13047-004, YI13047-005, YI13047-006, YI13047-007, YI13047-010, YI13047-011. This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

Surrogate recovery for the following sample was outside control limits: YI13047-008, YI13047-009. Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

## Sample Summary

## Arcadis U.S., Inc.

**Lot Number: YI13047**

**Project Name: RACER PNC**

**Project Number: 30167840.00031**

| Sample Number | Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| 001 | MWF16-25_GW-091223 | Aqueous | 09/12/2023 1417 | 09/13/2023 |
| 002 | Trip Blank | Aqueous | 09/12/2023 1400 | 09/13/2023 |
| 003 | MWF16-26_GW-091223 | Aqueous | 09/12/2023 1525 | 09/13/2023 |
| 004 | MW-05-18_GW-091223 | Aqueous | 09/12/2023 1642 | 09/13/2023 |
| 005 | MW-02-17_GW-091223 | Aqueous | 09/12/2023 1110 | 09/13/2023 |
| 006 | MWF12-02R_GW-091223 | Aqueous | 09/12/2023 1435 | 09/13/2023 |
| 007 | MWOS-09R_GW-091223 | Aqueous | 09/12/2023 1635 | 09/13/2023 |
| 008 | MWF7-02_GW-091223 | Aqueous | 09/12/2023 1125 | 09/13/2023 |
| 009 | MWF15-01_GW-091223 | Aqueous | 09/12/2023 1330 | 09/13/2023 |
| 010 | MWF16-23_GW-091223 | Aqueous | 09/12/2023 1505 | 09/13/2023 |
| 011 | MWOS-10_GW-091223 | Aqueous | 09/12/2023 1700 | 09/13/2023 |
| 012 | EB-03_091223 | Aqueous | 09/12/2023 1129 | 09/13/2023 |

(12 samples)

## Detection Summary

## Arcadis U.S., Inc.

**Lot Number: YI13047**

**Project Name: RACER PNC**

**Project Number: 30167840.00031**

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 001 | MWF16-25_GW-091223 | Aqueous | PFBS | PFAS by ID | 12 | | ng/L | 9 |
| 001 | MWF16-25_GW-091223 | Aqueous | PFPeS | PFAS by ID | 10 | | ng/L | 9 |
| 001 | MWF16-25_GW-091223 | Aqueous | PFHxS | PFAS by ID | 22 | | ng/L | 9 |
| 001 | MWF16-25_GW-091223 | Aqueous | PFBA | PFAS by ID | 13 | | ng/L | 9 |
| 001 | MWF16-25_GW-091223 | Aqueous | PFHpA | PFAS by ID | 8.0 | | ng/L | 9 |
| 001 | MWF16-25_GW-091223 | Aqueous | PFHxA | PFAS by ID | 13 | | ng/L | 9 |
| 001 | MWF16-25_GW-091223 | Aqueous | PFOA | PFAS by ID | 20 | | ng/L | 9 |
| 001 | MWF16-25_GW-091223 | Aqueous | PFPeA | PFAS by ID | 9.2 | | ng/L | 9 |
| 003 | MWF16-26_GW-091223 | Aqueous | 6:2 FTS | PFAS by ID | 8.4 | | ng/L | 13 |
| 003 | MWF16-26_GW-091223 | Aqueous | PFBS | PFAS by ID | 17 | | ng/L | 13 |
| 003 | MWF16-26_GW-091223 | Aqueous | PFHpS | PFAS by ID | 0.98 | J | ng/L | 13 |
| 003 | MWF16-26_GW-091223 | Aqueous | PFPeS | PFAS by ID | 11 | | ng/L | 13 |
| 003 | MWF16-26_GW-091223 | Aqueous | PFHxS | PFAS by ID | 21 | | ng/L | 13 |
| 003 | MWF16-26_GW-091223 | Aqueous | PFBA | PFAS by ID | 11 | | ng/L | 13 |
| 003 | MWF16-26_GW-091223 | Aqueous | PFHpA | PFAS by ID | 5.8 | | ng/L | 13 |
| 003 | MWF16-26_GW-091223 | Aqueous | PFHxA | PFAS by ID | 22 | | ng/L | 13 |
| 003 | MWF16-26_GW-091223 | Aqueous | PFOA | PFAS by ID | 34 | | ng/L | 13 |
| 003 | MWF16-26_GW-091223 | Aqueous | PFPeA | PFAS by ID | 24 | | ng/L | 13 |
| 003 | MWF16-26_GW-091223 | Aqueous | PFOS | PFAS by ID | 2.0 | J | ng/L | 13 |
| 004 | MW-05-18_GW-091223 | Aqueous | PFBS | PFAS by ID | 7.4 | | ng/L | 15 |
| 004 | MW-05-18_GW-091223 | Aqueous | PFPeS | PFAS by ID | 5.2 | | ng/L | 15 |
| 004 | MW-05-18_GW-091223 | Aqueous | PFHxS | PFAS by ID | 7.0 | | ng/L | 15 |
| 004 | MW-05-18_GW-091223 | Aqueous | PFBA | PFAS by ID | 15 | | ng/L | 15 |
| 004 | MW-05-18_GW-091223 | Aqueous | PFHpA | PFAS by ID | 5.7 | | ng/L | 15 |
| 004 | MW-05-18_GW-091223 | Aqueous | PFHxA | PFAS by ID | 11 | | ng/L | 15 |
| 004 | MW-05-18_GW-091223 | Aqueous | PFOA | PFAS by ID | 5.3 | | ng/L | 15 |
| 004 | MW-05-18_GW-091223 | Aqueous | PFPeA | PFAS by ID | 9.3 | | ng/L | 15 |
| 005 | MW-02-17_GW-091223 | Aqueous | PFBS | PFAS by ID | 7.4 | | ng/L | 17 |
| 005 | MW-02-17_GW-091223 | Aqueous | PFPeS | PFAS by ID | 5.5 | | ng/L | 17 |
| 005 | MW-02-17_GW-091223 | Aqueous | PFHxS | PFAS by ID | 9.3 | | ng/L | 17 |
| 005 | MW-02-17_GW-091223 | Aqueous | PFBA | PFAS by ID | 16 | | ng/L | 17 |
| 005 | MW-02-17_GW-091223 | Aqueous | PFHpA | PFAS by ID | 4.9 | | ng/L | 17 |
| 005 | MW-02-17_GW-091223 | Aqueous | PFHxA | PFAS by ID | 8.3 | | ng/L | 17 |
| 005 | MW-02-17_GW-091223 | Aqueous | PFOA | PFAS by ID | 5.9 | | ng/L | 17 |
| 005 | MW-02-17_GW-091223 | Aqueous | PFPeA | PFAS by ID | 7.7 | | ng/L | 17 |
| 006 | MWF12-02R_GW-091223 | Aqueous | PFBS | PFAS by ID | 3.9 | | ng/L | 19 |
| 006 | MWF12-02R_GW-091223 | Aqueous | PFHxS | PFAS by ID | 4.6 | | ng/L | 19 |
| 006 | MWF12-02R_GW-091223 | Aqueous | PFBA | PFAS by ID | 20 | | ng/L | 19 |
| 006 | MWF12-02R_GW-091223 | Aqueous | PFHpA | PFAS by ID | 3.5 | | ng/L | 19 |
| 006 | MWF12-02R_GW-091223 | Aqueous | PFHxA | PFAS by ID | 8.9 | | ng/L | 19 |
| 006 | MWF12-02R_GW-091223 | Aqueous | PFOA | PFAS by ID | 9.6 | | ng/L | 19 |
| 006 | MWF12-02R_GW-091223 | Aqueous | PFPeA | PFAS by ID | 11 | | ng/L | 19 |
| 006 | MWF12-02R_GW-091223 | Aqueous | PFOS | PFAS by ID | 9.0 | | ng/L | 19 |

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 007 | MWOS-09R_GW-091223 | Aqueous | 6:2 FTS | PFAS by ID | 3.5 | J | ng/L | 21 |
| 007 | MWOS-09R_GW-091223 | Aqueous | PFBS | PFAS by ID | 6.3 | | ng/L | 21 |
| 007 | MWOS-09R_GW-091223 | Aqueous | PFPeS | PFAS by ID | 5.0 | | ng/L | 21 |
| 007 | MWOS-09R_GW-091223 | Aqueous | PFHxS | PFAS by ID | 10 | | ng/L | 21 |
| 007 | MWOS-09R_GW-091223 | Aqueous | PFBA | PFAS by ID | 9.8 | | ng/L | 21 |
| 007 | MWOS-09R_GW-091223 | Aqueous | PFHpA | PFAS by ID | 10 | | ng/L | 21 |
| 007 | MWOS-09R_GW-091223 | Aqueous | PFHxA | PFAS by ID | 11 | | ng/L | 21 |
| 007 | MWOS-09R_GW-091223 | Aqueous | PFOA | PFAS by ID | 19 | | ng/L | 21 |
| 007 | MWOS-09R_GW-091223 | Aqueous | PFPeA | PFAS by ID | 11 | | ng/L | 21 |
| 008 | MWF7-02_GW-091223 | Aqueous | 6:2 FTS | PFAS by ID | 4.9 | JQ | ng/L | 23 |
| 008 | MWF7-02_GW-091223 | Aqueous | PFBS | PFAS by ID | 7.0 | | ng/L | 23 |
| 008 | MWF7-02_GW-091223 | Aqueous | PFHpS | PFAS by ID | 1.6 | J | ng/L | 23 |
| 008 | MWF7-02_GW-091223 | Aqueous | PFPeS | PFAS by ID | 6.0 | | ng/L | 23 |
| 008 | MWF7-02_GW-091223 | Aqueous | PFHxS | PFAS by ID | 16 | | ng/L | 23 |
| 008 | MWF7-02_GW-091223 | Aqueous | PFBA | PFAS by ID | 15 | | ng/L | 23 |
| 008 | MWF7-02_GW-091223 | Aqueous | PFHpA | PFAS by ID | 8.9 | | ng/L | 23 |
| 008 | MWF7-02_GW-091223 | Aqueous | PFHxA | PFAS by ID | 16 | | ng/L | 23 |
| 008 | MWF7-02_GW-091223 | Aqueous | PFOA | PFAS by ID | 50 | | ng/L | 23 |
| 008 | MWF7-02_GW-091223 | Aqueous | PFPeA | PFAS by ID | 9.6 | | ng/L | 23 |
| 008 | MWF7-02_GW-091223 | Aqueous | PFOS | PFAS by ID | 12 | | ng/L | 23 |
| 009 | MWF15-01_GW-091223 | Aqueous | 6:2 FTS | PFAS by ID | 4.7 | JQ | ng/L | 25 |
| 009 | MWF15-01_GW-091223 | Aqueous | PFBS | PFAS by ID | 5.9 | | ng/L | 25 |
| 009 | MWF15-01_GW-091223 | Aqueous | PFHpS | PFAS by ID | 0.96 | J | ng/L | 25 |
| 009 | MWF15-01_GW-091223 | Aqueous | PFPeS | PFAS by ID | 5.8 | | ng/L | 25 |
| 009 | MWF15-01_GW-091223 | Aqueous | PFHxS | PFAS by ID | 13 | | ng/L | 25 |
| 009 | MWF15-01_GW-091223 | Aqueous | PFBA | PFAS by ID | 10 | | ng/L | 25 |
| 009 | MWF15-01_GW-091223 | Aqueous | PFHpA | PFAS by ID | 5.2 | | ng/L | 25 |
| 009 | MWF15-01_GW-091223 | Aqueous | PFHxA | PFAS by ID | 7.8 | | ng/L | 25 |
| 009 | MWF15-01_GW-091223 | Aqueous | PFOA | PFAS by ID | 11 | | ng/L | 25 |
| 009 | MWF15-01_GW-091223 | Aqueous | PFPeA | PFAS by ID | 7.3 | | ng/L | 25 |
| 009 | MWF15-01_GW-091223 | Aqueous | PFOS | PFAS by ID | 17 | | ng/L | 25 |
| 010 | MWF16-23_GW-091223 | Aqueous | 6:2 FTS | PFAS by ID | 7.8 | J | ng/L | 27 |
| 010 | MWF16-23_GW-091223 | Aqueous | PFBS | PFAS by ID | 4.8 | | ng/L | 27 |
| 010 | MWF16-23_GW-091223 | Aqueous | PFPeS | PFAS by ID | 2.5 | J | ng/L | 27 |
| 010 | MWF16-23_GW-091223 | Aqueous | PFHxS | PFAS by ID | 8.0 | | ng/L | 27 |
| 010 | MWF16-23_GW-091223 | Aqueous | PFBA | PFAS by ID | 13 | | ng/L | 27 |
| 010 | MWF16-23_GW-091223 | Aqueous | PFHpA | PFAS by ID | 5.5 | | ng/L | 27 |
| 010 | MWF16-23_GW-091223 | Aqueous | PFHxA | PFAS by ID | 9.3 | | ng/L | 27 |
| 010 | MWF16-23_GW-091223 | Aqueous | PFOA | PFAS by ID | 19 | | ng/L | 27 |
| 010 | MWF16-23_GW-091223 | Aqueous | PFPeA | PFAS by ID | 7.1 | | ng/L | 27 |
| 011 | MWOS-10_GW-091223 | Aqueous | 6:2 FTS | PFAS by ID | 3.0 | J | ng/L | 29 |
| 011 | MWOS-10_GW-091223 | Aqueous | PFBS | PFAS by ID | 7.5 | | ng/L | 29 |
| 011 | MWOS-10_GW-091223 | Aqueous | PFPeS | PFAS by ID | 5.0 | | ng/L | 29 |
| 011 | MWOS-10_GW-091223 | Aqueous | PFHxS | PFAS by ID | 13 | | ng/L | 29 |
| 011 | MWOS-10_GW-091223 | Aqueous | PFBA | PFAS by ID | 14 | | ng/L | 29 |
| 011 | MWOS-10_GW-091223 | Aqueous | PFHpA | PFAS by ID | 11 | | ng/L | 29 |
| 011 | MWOS-10_GW-091223 | Aqueous | PFHxA | PFAS by ID | 15 | | ng/L | 29 |
| 011 | MWOS-10_GW-091223 | Aqueous | PFOA | PFAS by ID | 10 | | ng/L | 29 |

# Detection Summary (Continued)

## Lot Number: YI13047

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 011 | MWOS-10_GW-091223 | Aqueous | PFPeA | PFAS by ID | 14 | | ng/L | 29 |

(92 detections)

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-001**

Description: **MWF16-25_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1417** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/28/2023 1643 | ARC2 | 09/19/2023 1753 | 85183 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.0 | 0.48 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.0 | 0.66 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.0 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 8.0 | 2.0 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 8.0 | 0.87 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.0 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.0 | 0.48 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.0 | 0.75 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.0 | 0.93 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **12** | | **4.0** | **0.41** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.0 | 0.78 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.0 | 0.50 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.0 | 0.71 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.0 | 0.61 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **10** | | **4.0** | **0.59** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **22** | | **4.0** | **0.55** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **13** | | **4.0** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.0 | 0.52 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.0 | 0.47 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **8.0** | | **4.0** | **0.45** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **13** | | **4.0** | **0.69** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.0 | 0.46 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **20** | | **4.0** | **0.83** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **9.2** | | **4.0** | **0.54** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.0 | 0.60 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.53 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.63 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.0 | 2.0 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 203 | 25-150 |
| 13C2_6:2FTS | N | 151 | 25-150 |
| 13C2_8:2FTS | | 98 | 25-150 |
| 13C2_PFDoA | | 88 | 25-150 |
| 13C2_PFTeDA | | 81 | 25-150 |
| 13C3_PFBS | | 115 | 25-150 |
| 13C3_PFHxS | | 112 | 25-150 |
| 13C3-HFPO-DA | | 105 | 25-150 |
| 13C4_PFBA | | 95 | 25-150 |
| 13C4_PFHpA | | 112 | 25-150 |
| 13C5_PFHxA | | 118 | 25-150 |
| 13C5_PFPeA | | 117 | 25-150 |
| 13C6_PFDA | | 111 | 25-150 |
| 13C7_PFUdA | | 100 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-001**

Description: **MWF16-25_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1417** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 136 | 25-150 |
| 13C8_PFOS | | 114 | 25-150 |
| 13C8_PFOSA | | 100 | 10-150 |
| 13C9_PFNA | | 106 | 25-150 |
| d5-EtFOSAA | | 105 | 25-150 |
| d3-MeFOSAA | | 109 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-002**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1400** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/28/2023 1654 | ARC2 | 09/19/2023 1753 | 85183 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 0.61 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.4 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.4 | 0.81 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 0.70 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.7 | 0.38 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.72 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.46 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.66 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.57 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.7 | 0.51 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.44 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.7 | 0.41 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.7 | 0.64 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.43 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.7 | 0.77 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.50 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.58 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.7 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 98 | 25-150 |
| 13C2_6:2FTS | | 99 | 25-150 |
| 13C2_8:2FTS | | 85 | 25-150 |
| 13C2_PFDoA | | 85 | 25-150 |
| 13C2_PFTeDA | | 81 | 25-150 |
| 13C3_PFBS | | 92 | 25-150 |
| 13C3_PFHxS | | 95 | 25-150 |
| 13C3-HFPO-DA | | 91 | 25-150 |
| 13C4_PFBA | | 100 | 25-150 |
| 13C4_PFHpA | | 96 | 25-150 |
| 13C5_PFHxA | | 97 | 25-150 |
| 13C5_PFPeA | | 97 | 25-150 |
| 13C6_PFDA | | 84 | 25-150 |
| 13C7_PFUdA | | 81 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-002**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1400** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 105 | 25-150 |
| 13C8_PFOS | | 90 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 |
| 13C9_PFNA | | 88 | 25-150 |
| d5-EtFOSAA | | 88 | 25-150 |
| d3-MeFOSAA | | 96 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-003**

Description: **MWF16-26_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1525** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1700 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.0 | 0.48 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.0 | 0.67 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.0 | 1.6 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **8.4** | | **8.0** | **2.0** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 8.0 | 0.88 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.0 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.0 | 0.49 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.0 | 0.75 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.0 | 0.94 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **17** | | **4.0** | **0.42** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.0 | 0.78 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **0.98** | **J** | **4.0** | **0.50** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.0 | 0.71 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.0 | 0.62 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **11** | | **4.0** | **0.60** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **21** | | **4.0** | **0.55** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **11** | | **4.0** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.0 | 0.53 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.0 | 0.47 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **5.8** | | **4.0** | **0.45** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **22** | | **4.0** | **0.69** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.0 | 0.46 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **34** | | **4.0** | **0.83** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **24** | | **4.0** | **0.55** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.0 | 0.60 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.53 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.63 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **2.0** | **J** | **4.0** | **2.0** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 149 | 25-150 |
| 13C2_6:2FTS | | 110 | 25-150 |
| 13C2_8:2FTS | | 92 | 25-150 |
| 13C2_PFDoA | | 76 | 25-150 |
| 13C2_PFTeDA | | 87 | 25-150 |
| 13C3_PFBS | | 97 | 25-150 |
| 13C3_PFHxS | | 88 | 25-150 |
| 13C3-HFPO-DA | | 87 | 25-150 |
| 13C4_PFBA | | 76 | 25-150 |
| 13C4_PFHpA | | 89 | 25-150 |
| 13C5_PFHxA | | 98 | 25-150 |
| 13C5_PFPeA | | 100 | 25-150 |
| 13C6_PFDA | | 93 | 25-150 |
| 13C7_PFUdA | | 85 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-003**

Description: **MWF16-26_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1525** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 91 | 25-150 |
| 13C8_PFOS | | 83 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 |
| d5-EtFOSAA | | 85 | 25-150 |
| d3-MeFOSAA | | 83 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-004**

Description: **MW-05-18_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1642** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/28/2023 1715 | ARC2 | 09/19/2023 1753 | 85183 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.5 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.5 | 0.62 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.5 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.5 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.5 | 0.82 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.5 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.5 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.5 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.5 | 0.88 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **7.4** | | **3.8** | **0.39** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.73 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.47 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.67 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **5.2** | | **3.8** | **0.56** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **7.0** | | **3.8** | **0.52** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **15** | | **3.8** | **0.57** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **5.7** | | **3.8** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **11** | | **3.8** | **0.65** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **5.3** | | **3.8** | **0.78** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **9.3** | | **3.8** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 219 | 25-150 |
| 13C2_6:2FTS | | 124 | 25-150 |
| 13C2_8:2FTS | | 83 | 25-150 |
| 13C2_PFDoA | | 87 | 25-150 |
| 13C2_PFTeDA | | 74 | 25-150 |
| 13C3_PFBS | | 87 | 25-150 |
| 13C3_PFHxS | | 94 | 25-150 |
| 13C3-HFPO-DA | | 75 | 25-150 |
| 13C4_PFBA | | 74 | 25-150 |
| 13C4_PFHpA | | 91 | 25-150 |
| 13C5_PFHxA | | 93 | 25-150 |
| 13C5_PFPeA | | 84 | 25-150 |
| 13C6_PFDA | | 79 | 25-150 |
| 13C7_PFUdA | | 82 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-004**

Description: **MW-05-18_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1642** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 95 | 25-150 |
| 13C8_PFOS | | 94 | 25-150 |
| 13C8_PFOSA | | 94 | 10-150 |
| 13C9_PFNA | | 98 | 25-150 |
| d5-EtFOSAA | | 87 | 25-150 |
| d3-MeFOSAA | | 87 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-005**

Description: **MW-02-17_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1110** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/28/2023 1726 | ARC2 | 09/19/2023 1753 | 85183 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.7 | 0.40 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.7 | 0.56 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.7 | 1.3 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 6.7 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.7 | 0.73 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.7 | 1.7 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.7 | 0.41 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.7 | 0.63 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.7 | 0.78 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **7.4** | | **3.4** | **0.35** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.4 | 0.65 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.4 | 0.42 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.4 | 0.60 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.4 | 0.51 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **5.5** | | **3.4** | **0.50** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **9.3** | | **3.4** | **0.46** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **16** | | **3.4** | **0.50** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.4 | 0.44 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.4 | 0.40 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **4.9** | | **3.4** | **0.37** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **8.3** | | **3.4** | **0.58** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.4 | 0.39 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **5.9** | | **3.4** | **0.69** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **7.7** | | **3.4** | **0.46** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.4 | 0.50 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.44 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.52 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.4 | 1.7 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 262 | 25-150 |
| 13C2_6:2FTS | N | 176 | 25-150 |
| 13C2_8:2FTS | | 99 | 25-150 |
| 13C2_PFDoA | | 82 | 25-150 |
| 13C2_PFTeDA | | 73 | 25-150 |
| 13C3_PFBS | | 96 | 25-150 |
| 13C3_PFHxS | | 98 | 25-150 |
| 13C3-HFPO-DA | | 82 | 25-150 |
| 13C4_PFBA | | 69 | 25-150 |
| 13C4_PFHpA | | 99 | 25-150 |
| 13C5_PFHxA | | 100 | 25-150 |
| 13C5_PFPeA | | 88 | 25-150 |
| 13C6_PFDA | | 97 | 25-150 |
| 13C7_PFUdA | | 81 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-005**

Description: **MW-02-17_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1110** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 113 | 25-150 |
| 13C8_PFOS | | 99 | 25-150 |
| 13C8_PFOSA | | 96 | 10-150 |
| 13C9_PFNA | | 108 | 25-150 |
| d5-EtFOSAA | | 92 | 25-150 |
| d3-MeFOSAA | | 91 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-006**

Description: **MWF12-02R_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1435** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/28/2023 1736 | ARC2 | 09/19/2023 1753 | 85183 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 0.57 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.9 | 0.75 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 0.65 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 0.80 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.9** | | **3.4** | **0.36** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.4 | 0.67 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.4 | 0.43 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.4 | 0.61 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.4 | 0.53 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.4 | 0.51 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **4.6** | | **3.4** | **0.48** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **20** | | **3.4** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.4 | 0.45 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.4 | 0.41 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **3.5** | | **3.4** | **0.39** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **8.9** | | **3.4** | **0.59** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.4 | 0.40 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **9.6** | | **3.4** | **0.71** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **11** | | **3.4** | **0.47** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.4 | 0.52 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.54 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **9.0** | | **3.4** | **1.7** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 241 | 25-150 |
| 13C2_6:2FTS | N | 194 | 25-150 |
| 13C2_8:2FTS | | 86 | 25-150 |
| 13C2_PFDoA | | 71 | 25-150 |
| 13C2_PFTeDA | | 61 | 25-150 |
| 13C3_PFBS | | 63 | 25-150 |
| 13C3_PFHxS | | 69 | 25-150 |
| 13C3-HFPO-DA | | 49 | 25-150 |
| 13C4_PFBA | | 35 | 25-150 |
| 13C4_PFHpA | | 57 | 25-150 |
| 13C5_PFHxA | | 62 | 25-150 |
| 13C5_PFPeA | | 51 | 25-150 |
| 13C6_PFDA | | 70 | 25-150 |
| 13C7_PFUdA | | 65 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-006**

Description: **MWF12-02R_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1435** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 73 | 25-150 |
| 13C8_PFOS | | 66 | 25-150 |
| 13C8_PFOSA | | 62 | 10-150 |
| 13C9_PFNA | | 79 | 25-150 |
| d5-EtFOSAA | | 73 | 25-150 |
| d3-MeFOSAA | | 75 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-007**

Description: **MWOS-09R_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1635** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1711 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.0 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.0 | 0.58 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.0 | 1.4 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **3.5** | **J** | **7.0** | **1.7** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.0 | 0.76 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.0 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.0 | 0.65 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.0 | 0.81 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **6.3** | | **3.5** | **0.36** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.68 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.43 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.62 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.53 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **5.0** | | **3.5** | **0.52** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **10** | | **3.5** | **0.48** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **9.8** | | **3.5** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **10** | | **3.5** | **0.39** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **11** | | **3.5** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.40 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **19** | | **3.5** | **0.72** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **11** | | **3.5** | **0.47** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.5 | 1.7 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 214 | 25-150 |
| 13C2_6:2FTS | | 130 | 25-150 |
| 13C2_8:2FTS | | 97 | 25-150 |
| 13C2_PFDoA | | 76 | 25-150 |
| 13C2_PFTeDA | | 83 | 25-150 |
| 13C3_PFBS | | 97 | 25-150 |
| 13C3_PFHxS | | 89 | 25-150 |
| 13C3-HFPO-DA | | 88 | 25-150 |
| 13C4_PFBA | | 63 | 25-150 |
| 13C4_PFHpA | | 82 | 25-150 |
| 13C5_PFHxA | | 97 | 25-150 |
| 13C5_PFPeA | | 91 | 25-150 |
| 13C6_PFDA | | 87 | 25-150 |
| 13C7_PFUdA | | 79 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-007**

Description: **MWOS-09R_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1635** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 98 | 25-150 |
| 13C8_PFOS | | 88 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 |
| 13C9_PFNA | | 93 | 25-150 |
| d5-EtFOSAA | | 85 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-008**

Description: **MWF7-02_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1125** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1721 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.4 | 0.51 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.4 | 0.70 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.4 | 1.7 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **4.9** | **JQ** | **8.4** | **2.1** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 8.4 | 0.92 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.4 | 2.2 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.4 | 0.51 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.4 | 0.79 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.4 | 0.98 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **7.0** | | **4.2** | **0.44** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.2 | 0.82 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **1.6** | **J** | **4.2** | **0.53** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.2 | 0.75 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.2 | 0.65 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **6.0** | | **4.2** | **0.63** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **16** | | **4.2** | **0.58** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **15** | | **4.2** | **0.63** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.2 | 0.55 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.2 | 0.50 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **8.9** | | **4.2** | **0.47** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **16** | | **4.2** | **0.73** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.2 | 0.49 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **50** | | **4.2** | **0.87** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **9.6** | | **4.2** | **0.57** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.2 | 0.63 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.2 | 0.56 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.2 | 0.66 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **12** | | **4.2** | **2.1** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 261 | 25-150 |
| 13C2_6:2FTS | N | 159 | 25-150 |
| 13C2_8:2FTS | | 101 | 25-150 |
| 13C2_PFDoA | | 77 | 25-150 |
| 13C2_PFTeDA | | 87 | 25-150 |
| 13C3_PFBS | | 89 | 25-150 |
| 13C3_PFHxS | | 87 | 25-150 |
| 13C3-HFPO-DA | | 71 | 25-150 |
| 13C4_PFBA | | 51 | 25-150 |
| 13C4_PFHpA | | 78 | 25-150 |
| 13C5_PFHxA | | 97 | 25-150 |
| 13C5_PFPeA | | 75 | 25-150 |
| 13C6_PFDA | | 91 | 25-150 |
| 13C7_PFUdA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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H = Out of holding time
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-008**

Description: **MWF7-02_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1125** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 25-150 |
| 13C8_PFOS | | 88 | 25-150 |
| 13C8_PFOSA | | 90 | 10-150 |
| 13C9_PFNA | | 95 | 25-150 |
| d5-EtFOSAA | | 88 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-009**

Description: **MWF15-01_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1330** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1732 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.9 | 0.48 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.9 | 0.66 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.9 | 1.6 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **4.7** | **JQ** | **7.9** | **2.0** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.9 | 0.86 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.9 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.9 | 0.48 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.9 | 0.74 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.9 | 0.92 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **5.9** | | **4.0** | **0.41** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.0 | 0.77 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **0.96** | **J** | **4.0** | **0.49** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.0 | 0.70 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.0 | 0.61 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **5.8** | | **4.0** | **0.59** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **13** | | **4.0** | **0.55** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **10** | | **4.0** | **0.59** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.0 | 0.52 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.0 | 0.47 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **5.2** | | **4.0** | **0.44** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **7.8** | | **4.0** | **0.68** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.0 | 0.46 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **11** | | **4.0** | **0.82** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **7.3** | | **4.0** | **0.54** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.0 | 0.59 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.52 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.62 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **17** | | **4.0** | **2.0** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 269 | 25-150 |
| 13C2_6:2FTS | N | 177 | 25-150 |
| 13C2_8:2FTS | | 93 | 25-150 |
| 13C2_PFDoA | | 73 | 25-150 |
| 13C2_PFTeDA | | 75 | 25-150 |
| 13C3_PFBS | | 94 | 25-150 |
| 13C3_PFHxS | | 93 | 25-150 |
| 13C3-HFPO-DA | | 77 | 25-150 |
| 13C4_PFBA | | 65 | 25-150 |
| 13C4_PFHpA | | 82 | 25-150 |
| 13C5_PFHxA | | 100 | 25-150 |
| 13C5_PFPeA | | 87 | 25-150 |
| 13C6_PFDA | | 91 | 25-150 |
| 13C7_PFUdA | | 86 | 25-150 |

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-009**

Description: **MWF15-01_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1330** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 103 | 25-150 |
| 13C8_PFOS | | 90 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 |
| 13C9_PFNA | | 100 | 25-150 |
| d5-EtFOSAA | | 86 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-010**

Description: **MWF16-23_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1505** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/28/2023 1705 | ARC2 | 09/19/2023 1753 | 85183 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 9.1 | 0.55 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 9.1 | 0.76 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 9.1 | 1.8 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **7.8** | **J** | **9.1** | **2.3** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 9.1 | 1.0 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 9.1 | 2.4 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 9.1 | 0.55 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 9.1 | 0.86 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 9.1 | 1.1 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **4.8** | | **4.6** | **0.47** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.6 | 0.57 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.6 | 0.81 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.6 | 0.70 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **2.5** | **J** | **4.6** | **0.68** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **8.0** | | **4.6** | **0.63** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **13** | | **4.6** | **0.68** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.6 | 0.60 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.6 | 0.54 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **5.5** | | **4.6** | **0.51** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **9.3** | | **4.6** | **0.79** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.6 | 0.53 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **19** | | **4.6** | **0.95** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **7.1** | | **4.6** | **0.62** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.6 | 0.68 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.6 | 0.60 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.6 | 0.71 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.6 | 2.3 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 247 | 25-150 |
| 13C2_6:2FTS | | 129 | 25-150 |
| 13C2_8:2FTS | | 89 | 25-150 |
| 13C2_PFDoA | | 84 | 25-150 |
| 13C2_PFTeDA | | 72 | 25-150 |
| 13C3_PFBS | | 85 | 25-150 |
| 13C3_PFHxS | | 93 | 25-150 |
| 13C3-HFPO-DA | | 77 | 25-150 |
| 13C4_PFBA | | 54 | 25-150 |
| 13C4_PFHpA | | 94 | 25-150 |
| 13C5_PFHxA | | 89 | 25-150 |
| 13C5_PFPeA | | 79 | 25-150 |
| 13C6_PFDA | | 86 | 25-150 |
| 13C7_PFUdA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-010**

Description: **MWF16-23_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1505** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 100 | 25-150 |
| 13C8_PFOS | | 93 | 25-150 |
| 13C8_PFOSA | | 85 | 10-150 |
| 13C9_PFNA | | 92 | 25-150 |
| d5-EtFOSAA | | 94 | 25-150 |
| d3-MeFOSAA | | 93 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-011**

Description: **MWOS-10_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1700** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1742 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.8 | 0.53 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.8 | 0.73 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.8 | 1.8 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **3.0** | **J** | **8.8** | **2.2** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 8.8 | 0.97 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.8 | 2.3 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.8 | 0.53 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.8 | 0.83 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.8 | 1.0 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **7.5** | | **4.4** | **0.46** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.4 | 0.55 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.4 | 0.79 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.4 | 0.68 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **5.0** | | **4.4** | **0.66** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **13** | | **4.4** | **0.61** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **14** | | **4.4** | **0.66** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.4 | 0.58 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.4 | 0.52 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **11** | | **4.4** | **0.49** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **15** | | **4.4** | **0.76** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.4 | 0.51 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **10** | | **4.4** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **14** | | **4.4** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.4 | 0.66 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.4 | 0.58 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.4 | 0.69 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.4 | 2.2 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 162 | 25-150 |
| 13C2_6:2FTS | | 113 | 25-150 |
| 13C2_8:2FTS | | 90 | 25-150 |
| 13C2_PFDoA | | 74 | 25-150 |
| 13C2_PFTeDA | | 86 | 25-150 |
| 13C3_PFBS | | 101 | 25-150 |
| 13C3_PFHxS | | 90 | 25-150 |
| 13C3-HFPO-DA | | 89 | 25-150 |
| 13C4_PFBA | | 68 | 25-150 |
| 13C4_PFHpA | | 83 | 25-150 |
| 13C5_PFHxA | | 96 | 25-150 |
| 13C5_PFPeA | | 97 | 25-150 |
| 13C6_PFDA | | 84 | 25-150 |
| 13C7_PFUdA | | 82 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-011**

Description: **MWOS-10_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1700** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 92 | 25-150 |
| 13C8_PFOS | | 88 | 25-150 |
| 13C8_PFOSA | | 86 | 10-150 |
| 13C9_PFNA | | 90 | 25-150 |
| d5-EtFOSAA | | 81 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-012**

Description: **EB-03_091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1129** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1753 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.1 | 0.49 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.1 | 0.67 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.1 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 8.1 | 2.0 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 8.1 | 0.89 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.1 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.1 | 0.49 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.1 | 0.76 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.1 | 0.95 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 4.1 | 0.42 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.1 | 0.79 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.1 | 0.51 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.1 | 0.72 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.1 | 0.62 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 4.1 | 0.60 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 4.1 | 0.56 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 4.1 | 0.61 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.1 | 0.53 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.1 | 0.48 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 4.1 | 0.45 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 4.1 | 0.70 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.1 | 0.47 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 4.1 | 0.84 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 4.1 | 0.55 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.1 | 0.61 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.1 | 0.54 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.1 | 0.64 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.1 | 2.0 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 93 | 25-150 |
| 13C2_6:2FTS | | 92 | 25-150 |
| 13C2_8:2FTS | | 81 | 25-150 |
| 13C2_PFDoA | | 72 | 25-150 |
| 13C2_PFTeDA | | 83 | 25-150 |
| 13C3_PFBS | | 88 | 25-150 |
| 13C3_PFHxS | | 84 | 25-150 |
| 13C3-HFPO-DA | | 79 | 25-150 |
| 13C4_PFBA | | 92 | 25-150 |
| 13C4_PFHpA | | 85 | 25-150 |
| 13C5_PFHxA | | 89 | 25-150 |
| 13C5_PFPeA | | 86 | 25-150 |
| 13C6_PFDA | | 87 | 25-150 |
| 13C7_PFUdA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
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W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

| | | | |
|---|---|---|---|
| Client: **Arcadis U.S., Inc.** | | Laboratory ID: **YI13047-012** |
| Description: **EB-03_091223** | | Matrix: **Aqueous** |
| Date Sampled: **09/12/2023 1129** | Project Name: **RACER PNC** | |
| Date Received: **09/13/2023** | Project Number: **30167840.00031** | |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 88 | 25-150 |
| 13C8_PFOS | | 83 | 25-150 |
| 13C8_PFOSA | | 79 | 10-150 |
| 13C9_PFNA | | 82 | 25-150 |
| d5-EtFOSAA | | 84 | 25-150 |
| d3-MeFOSAA | | 80 | 25-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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# QC Summary

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ85183-001
**Batch:** 85183
**Analytical Method:** PFAS by ID SOP
**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/19/2023 1753

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 0.48 | ng/L | 09/28/2023 1540 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 0.66 | ng/L | 09/28/2023 1540 |
| 8:2 FTS | ND | | 1 | 8.0 | 1.6 | ng/L | 09/28/2023 1540 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 09/28/2023 1540 |
| 4:2 FTS | ND | | 1 | 8.0 | 0.87 | ng/L | 09/28/2023 1540 |
| GenX | ND | | 1 | 8.0 | 2.1 | ng/L | 09/28/2023 1540 |
| ADONA | ND | | 1 | 8.0 | 0.48 | ng/L | 09/28/2023 1540 |
| EtFOSAA | ND | | 1 | 8.0 | 0.75 | ng/L | 09/28/2023 1540 |
| MeFOSAA | ND | | 1 | 8.0 | 0.93 | ng/L | 09/28/2023 1540 |
| PFBS | ND | | 1 | 4.0 | 0.41 | ng/L | 09/28/2023 1540 |
| PFDS | ND | | 1 | 4.0 | 0.78 | ng/L | 09/28/2023 1540 |
| PFHpS | ND | | 1 | 4.0 | 0.50 | ng/L | 09/28/2023 1540 |
| PFNS | ND | | 1 | 4.0 | 0.71 | ng/L | 09/28/2023 1540 |
| PFOSA | ND | | 1 | 4.0 | 0.61 | ng/L | 09/28/2023 1540 |
| PFPeS | ND | | 1 | 4.0 | 0.59 | ng/L | 09/28/2023 1540 |
| PFHxS | ND | | 1 | 4.0 | 0.55 | ng/L | 09/28/2023 1540 |
| PFBA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/28/2023 1540 |
| PFDA | ND | | 1 | 4.0 | 0.52 | ng/L | 09/28/2023 1540 |
| PFDoA | ND | | 1 | 4.0 | 0.47 | ng/L | 09/28/2023 1540 |
| PFHpA | ND | | 1 | 4.0 | 0.45 | ng/L | 09/28/2023 1540 |
| PFHxA | ND | | 1 | 4.0 | 0.69 | ng/L | 09/28/2023 1540 |
| PFNA | ND | | 1 | 4.0 | 0.46 | ng/L | 09/28/2023 1540 |
| PFOA | ND | | 1 | 4.0 | 0.83 | ng/L | 09/28/2023 1540 |
| PFPeA | ND | | 1 | 4.0 | 0.54 | ng/L | 09/28/2023 1540 |
| PFTeDA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/28/2023 1540 |
| PFTrDA | ND | | 1 | 4.0 | 0.53 | ng/L | 09/28/2023 1540 |
| PFUdA | ND | | 1 | 4.0 | 0.63 | ng/L | 09/28/2023 1540 |
| PFOS | ND | | 1 | 4.0 | 2.0 | ng/L | 09/28/2023 1540 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 102 | 25-150 |
| 13C2_6:2FTS | | 103 | 25-150 |
| 13C2_8:2FTS | | 88 | 25-150 |
| 13C2_PFDoA | | 94 | 25-150 |
| 13C2_PFTeDA | | 85 | 25-150 |
| 13C3_PFBS | | 96 | 25-150 |
| 13C3_PFHxS | | 101 | 25-150 |
| 13C3-HFPO-DA | | 102 | 25-150 |
| 13C4_PFBA | | 105 | 25-150 |
| 13C4_PFHpA | | 102 | 25-150 |
| 13C5_PFHxA | | 89 | 25-150 |
| 13C5_PFPeA | | 99 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ85183-001
**Batch:** 85183
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/19/2023 1753

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 92 | 25-150 |
| 13C7_PFUdA | | 87 | 25-150 |
| 13C8_PFOA | | 102 | 25-150 |
| 13C8_PFOS | | 93 | 25-150 |
| 13C8_PFOSA | | 94 | 10-150 |
| 13C9_PFNA | | 92 | 25-150 |
| d5-EtFOSAA | | 101 | 25-150 |
| d3-MeFOSAA | | 107 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ85183-002
**Batch:** 85183
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/19/2023 1753

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 13 | | 1 | 88 | 50-150 | 09/28/2023 1550 |
| 11Cl-PF3OUdS | 15 | 14 | | 1 | 93 | 50-150 | 09/28/2023 1550 |
| 8:2 FTS | 15 | 19 | | 1 | 122 | 50-150 | 09/28/2023 1550 |
| 6:2 FTS | 15 | 17 | | 1 | 111 | 50-150 | 09/28/2023 1550 |
| 4:2 FTS | 15 | 14 | | 1 | 91 | 50-150 | 09/28/2023 1550 |
| GenX | 32 | 30 | | 1 | 93 | 50-150 | 09/28/2023 1550 |
| ADONA | 15 | 15 | | 1 | 103 | 50-150 | 09/28/2023 1550 |
| EtFOSAA | 16 | 17 | | 1 | 106 | 50-150 | 09/28/2023 1550 |
| MeFOSAA | 16 | 17 | | 1 | 104 | 50-150 | 09/28/2023 1550 |
| PFBS | 14 | 15 | | 1 | 104 | 50-150 | 09/28/2023 1550 |
| PFDS | 15 | 14 | | 1 | 94 | 50-150 | 09/28/2023 1550 |
| PFHpS | 15 | 17 | | 1 | 114 | 50-150 | 09/28/2023 1550 |
| PFNS | 15 | 15 | | 1 | 97 | 50-150 | 09/28/2023 1550 |
| PFOSA | 16 | 16 | | 1 | 100 | 50-150 | 09/28/2023 1550 |
| PFPeS | 15 | 14 | | 1 | 95 | 50-150 | 09/28/2023 1550 |
| PFHxS | 15 | 14 | | 1 | 93 | 50-150 | 09/28/2023 1550 |
| PFBA | 16 | 15 | | 1 | 91 | 50-150 | 09/28/2023 1550 |
| PFDA | 16 | 16 | | 1 | 102 | 50-150 | 09/28/2023 1550 |
| PFDoA | 16 | 16 | | 1 | 101 | 50-150 | 09/28/2023 1550 |
| PFHpA | 16 | 15 | | 1 | 93 | 50-150 | 09/28/2023 1550 |
| PFHxA | 16 | 17 | | 1 | 106 | 50-150 | 09/28/2023 1550 |
| PFNA | 16 | 16 | | 1 | 97 | 50-150 | 09/28/2023 1550 |
| PFOA | 16 | 16 | | 1 | 100 | 50-150 | 09/28/2023 1550 |
| PFPeA | 16 | 15 | | 1 | 96 | 50-150 | 09/28/2023 1550 |
| PFTeDA | 16 | 16 | | 1 | 102 | 50-150 | 09/28/2023 1550 |
| PFTrDA | 16 | 15 | | 1 | 93 | 50-150 | 09/28/2023 1550 |
| PFUdA | 16 | 15 | | 1 | 95 | 50-150 | 09/28/2023 1550 |
| PFOS | 15 | 14 | | 1 | 93 | 50-150 | 09/28/2023 1550 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 101 | 25-150 |
| 13C2_6:2FTS | | 93 | 25-150 |
| 13C2_8:2FTS | | 84 | 25-150 |
| 13C2_PFDoA | | 98 | 25-150 |
| 13C2_PFTeDA | | 90 | 25-150 |
| 13C3_PFBS | | 94 | 25-150 |
| 13C3_PFHxS | | 94 | 25-150 |
| 13C3-HFPO-DA | | 100 | 25-150 |
| 13C4_PFBA | | 105 | 25-150 |
| 13C4_PFHpA | | 100 | 25-150 |
| 13C5_PFHxA | | 88 | 25-150 |
| 13C5_PFPeA | | 107 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ85183-002
**Batch:** 85183
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/19/2023 1753

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 91 | 25-150 |
| 13C7_PFUdA | | 91 | 25-150 |
| 13C8_PFOA | | 104 | 25-150 |
| 13C8_PFOS | | 102 | 25-150 |
| 13C8_PFOSA | | 89 | 10-150 |
| 13C9_PFNA | | 96 | 25-150 |
| d5-EtFOSAA | | 97 | 25-150 |
| d3-MeFOSAA | | 97 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MS

**Sample ID:** YI13047-006MS
**Batch:** 85183
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/19/2023 1753

| Parameter | Sample Amount (ng/L) | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | 13 | 11 | | 1 | 88 | 50-150 | 09/28/2023 1747 |
| 11Cl-PF3OUdS | ND | 13 | 11 | | 1 | 82 | 50-150 | 09/28/2023 1747 |
| 8:2 FTS | ND | 13 | 12 | | 1 | 91 | 50-150 | 09/28/2023 1747 |
| 6:2 FTS | ND | 13 | 15 | | 1 | 112 | 50-150 | 09/28/2023 1747 |
| 4:2 FTS | ND | 13 | 13 | | 1 | 98 | 50-150 | 09/28/2023 1747 |
| GenX | ND | 28 | 29 | | 1 | 103 | 50-150 | 09/28/2023 1747 |
| ADONA | ND | 13 | 11 | | 1 | 81 | 50-150 | 09/28/2023 1747 |
| EtFOSAA | ND | 14 | 13 | | 1 | 95 | 50-150 | 09/28/2023 1747 |
| MeFOSAA | ND | 14 | 13 | | 1 | 95 | 50-150 | 09/28/2023 1747 |
| PFBS | 3.9 | 12 | 14 | | 1 | 83 | 50-150 | 09/28/2023 1747 |
| PFDS | ND | 13 | 13 | | 1 | 98 | 50-150 | 09/28/2023 1747 |
| PFHpS | ND | 13 | 13 | | 1 | 100 | 50-150 | 09/28/2023 1747 |
| PFNS | ND | 13 | 11 | | 1 | 85 | 50-150 | 09/28/2023 1747 |
| PFOSA | ND | 14 | 13 | | 1 | 97 | 50-150 | 09/28/2023 1747 |
| PFPeS | ND | 13 | 13 | | 1 | 97 | 50-150 | 09/28/2023 1747 |
| PFHxS | 4.6 | 13 | 14 | | 1 | 78 | 50-150 | 09/28/2023 1747 |
| PFBA | 20 | 14 | 32 | | 1 | 90 | 50-150 | 09/28/2023 1747 |
| PFDA | ND | 14 | 13 | | 1 | 94 | 50-150 | 09/28/2023 1747 |
| PFDoA | ND | 14 | 13 | | 1 | 93 | 50-150 | 09/28/2023 1747 |
| PFHpA | 3.5 | 14 | 17 | | 1 | 93 | 50-150 | 09/28/2023 1747 |
| PFHxA | 8.9 | 14 | 21 | | 1 | 91 | 50-150 | 09/28/2023 1747 |
| PFNA | ND | 14 | 13 | | 1 | 90 | 50-150 | 09/28/2023 1747 |
| PFOA | 9.6 | 14 | 21 | | 1 | 86 | 50-150 | 09/28/2023 1747 |
| PFPeA | 11 | 14 | 24 | | 1 | 94 | 50-150 | 09/28/2023 1747 |
| PFTeDA | ND | 14 | 13 | | 1 | 95 | 50-150 | 09/28/2023 1747 |
| PFTrDA | ND | 14 | 13 | | 1 | 91 | 50-150 | 09/28/2023 1747 |
| PFUdA | ND | 14 | 13 | | 1 | 93 | 50-150 | 09/28/2023 1747 |
| PFOS | 9.0 | 13 | 18 | | 1 | 74 | 50-150 | 09/28/2023 1747 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | N | 283 | 25-150 |
| 13C2_6:2FTS | N | 233 | 25-150 |
| 13C2_8:2FTS | | 122 | 25-150 |
| 13C2_PFDoA | | 77 | 25-150 |
| 13C2_PFTeDA | | 68 | 25-150 |
| 13C3_PFBS | | 79 | 25-150 |
| 13C3_PFHxS | | 87 | 25-150 |
| 13C3-HFPO-DA | | 62 | 25-150 |
| 13C4_PFBA | | 40 | 25-150 |
| 13C4_PFHpA | | 73 | 25-150 |
| 13C5_PFHxA | | 73 | 25-150 |
| 13C5_PFPeA | | 58 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MS

**Sample ID:** YI13047-006MS
**Batch:** 85183
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/19/2023 1753

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 85 | 25-150 |
| 13C7_PFUdA | | 80 | 25-150 |
| 13C8_PFOA | | 94 | 25-150 |
| 13C8_PFOS | | 91 | 25-150 |
| 13C8_PFOSA | | 86 | 10-150 |
| 13C9_PFNA | | 97 | 25-150 |
| d5-EtFOSAA | | 89 | 25-150 |
| d3-MeFOSAA | | 100 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MSD

**Sample ID:** YI13047-006MD
**Batch:** 85183
**Analytical Method:** PFAS by ID SOP
**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/19/2023 1753

| Parameter | Sample Amount (ng/L) | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | % RPD | %Rec Limit | % RPD Limit | Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | 13 | 11 | | 1 | 90 | 1.3 | 50-150 | 30 | 09/28/2023 1757 |
| 11Cl-PF3OUdS | ND | 13 | 11 | | 1 | 85 | 2.8 | 50-150 | 30 | 09/28/2023 1757 |
| 8:2 FTS | ND | 13 | 13 | | 1 | 97 | 5.9 | 50-150 | 30 | 09/28/2023 1757 |
| 6:2 FTS | ND | 13 | 17 | | 1 | 133 | 16 | 50-150 | 30 | 09/28/2023 1757 |
| 4:2 FTS | ND | 13 | 15 | | 1 | 117 | 17 | 50-150 | 30 | 09/28/2023 1757 |
| GenX | ND | 27 | 29 | | 1 | 107 | 2.7 | 50-150 | 30 | 09/28/2023 1757 |
| ADONA | ND | 13 | 12 | | 1 | 90 | 9.8 | 50-150 | 30 | 09/28/2023 1757 |
| EtFOSAA | ND | 14 | 15 | | 1 | 107 | 11 | 50-150 | 30 | 09/28/2023 1757 |
| MeFOSAA | ND | 14 | 14 | | 1 | 99 | 3.2 | 50-150 | 30 | 09/28/2023 1757 |
| PFBS | 3.9 | 12 | 16 | | 1 | 97 | 10 | 50-150 | 30 | 09/28/2023 1757 |
| PFDS | ND | 13 | 12 | | 1 | 88 | 11 | 50-150 | 30 | 09/28/2023 1757 |
| PFHpS | ND | 13 | 16 | | 1 | 119 | 16 | 50-150 | 30 | 09/28/2023 1757 |
| PFNS | ND | 13 | 12 | | 1 | 88 | 2.6 | 50-150 | 30 | 09/28/2023 1757 |
| PFOSA | ND | 14 | 14 | | 1 | 104 | 6.3 | 50-150 | 30 | 09/28/2023 1757 |
| PFPeS | ND | 13 | 15 | | 1 | 114 | 16 | 50-150 | 30 | 09/28/2023 1757 |
| PFHxS | 4.6 | 12 | 17 | | 1 | 96 | 14 | 50-150 | 30 | 09/28/2023 1757 |
| PFBA | 20 | 14 | 38 | | 1 | 130 | 16 | 50-150 | 30 | 09/28/2023 1757 |
| PFDA | ND | 14 | 14 | | 1 | 105 | 9.6 | 50-150 | 30 | 09/28/2023 1757 |
| PFDoA | ND | 14 | 15 | | 1 | 106 | 12 | 50-150 | 30 | 09/28/2023 1757 |
| PFHpA | 3.5 | 14 | 18 | | 1 | 105 | 8.1 | 50-150 | 30 | 09/28/2023 1757 |
| PFHxA | 8.9 | 14 | 23 | | 1 | 101 | 5.8 | 50-150 | 30 | 09/28/2023 1757 |
| PFNA | ND | 14 | 14 | | 1 | 102 | 11 | 50-150 | 30 | 09/28/2023 1757 |
| PFOA | 9.6 | 14 | 20 | | 1 | 77 | 5.9 | 50-150 | 30 | 09/28/2023 1757 |
| PFPeA | 11 | 14 | 24 | | 1 | 101 | 3.3 | 50-150 | 30 | 09/28/2023 1757 |
| PFTeDA | ND | 14 | 14 | | 1 | 103 | 6.8 | 50-150 | 30 | 09/28/2023 1757 |
| PFTrDA | ND | 14 | 14 | | 1 | 100 | 8.4 | 50-150 | 30 | 09/28/2023 1757 |
| PFUdA | ND | 14 | 14 | | 1 | 98 | 5.2 | 50-150 | 30 | 09/28/2023 1757 |
| PFOS | 9.0 | 13 | 20 | | 1 | 87 | 8.5 | 50-150 | 30 | 09/28/2023 1757 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | N | 245 | 25-150 |
| 13C2_6:2FTS | N | 222 | 25-150 |
| 13C2_8:2FTS | | 109 | 25-150 |
| 13C2_PFDoA | | 78 | 25-150 |
| 13C2_PFTeDA | | 66 | 25-150 |
| 13C3_PFBS | | 73 | 25-150 |
| 13C3_PFHxS | | 80 | 25-150 |
| 13C3-HFPO-DA | | 60 | 25-150 |
| 13C4_PFBA | | 35 | 25-150 |
| 13C4_PFHpA | | 67 | 25-150 |
| 13C5_PFHxA | | 66 | 25-150 |
| 13C5_PFPeA | | 55 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MSD

**Sample ID:** YI13047-006MD
**Batch:** 85183
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/19/2023 1753

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 85 | 25-150 |
| 13C7_PFUdA | | 79 | 25-150 |
| 13C8_PFOA | | 94 | 25-150 |
| 13C8_PFOS | | 90 | 25-150 |
| 13C8_PFOSA | | 79 | 10-150 |
| 13C9_PFNA | | 92 | 25-150 |
| d5-EtFOSAA | | 85 | 25-150 |
| d3-MeFOSAA | | 92 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ85388-001
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP
**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 0.48 | ng/L | 09/22/2023 1546 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 0.66 | ng/L | 09/22/2023 1546 |
| 8:2 FTS | ND | | 1 | 8.0 | 1.6 | ng/L | 09/22/2023 1546 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 09/22/2023 1546 |
| 4:2 FTS | ND | | 1 | 8.0 | 0.87 | ng/L | 09/22/2023 1546 |
| GenX | ND | | 1 | 8.0 | 2.1 | ng/L | 09/22/2023 1546 |
| ADONA | ND | | 1 | 8.0 | 0.48 | ng/L | 09/22/2023 1546 |
| EtFOSAA | ND | | 1 | 8.0 | 0.75 | ng/L | 09/22/2023 1546 |
| MeFOSAA | ND | | 1 | 8.0 | 0.93 | ng/L | 09/22/2023 1546 |
| PFBS | ND | | 1 | 4.0 | 0.41 | ng/L | 09/22/2023 1546 |
| PFDS | ND | | 1 | 4.0 | 0.78 | ng/L | 09/22/2023 1546 |
| PFHpS | ND | | 1 | 4.0 | 0.50 | ng/L | 09/22/2023 1546 |
| PFNS | ND | | 1 | 4.0 | 0.71 | ng/L | 09/22/2023 1546 |
| PFOSA | ND | | 1 | 4.0 | 0.61 | ng/L | 09/22/2023 1546 |
| PFPeS | ND | | 1 | 4.0 | 0.59 | ng/L | 09/22/2023 1546 |
| PFHxS | ND | | 1 | 4.0 | 0.55 | ng/L | 09/22/2023 1546 |
| PFBA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/22/2023 1546 |
| PFDA | ND | | 1 | 4.0 | 0.52 | ng/L | 09/22/2023 1546 |
| PFDoA | ND | | 1 | 4.0 | 0.47 | ng/L | 09/22/2023 1546 |
| PFHpA | ND | | 1 | 4.0 | 0.45 | ng/L | 09/22/2023 1546 |
| PFHxA | ND | | 1 | 4.0 | 0.69 | ng/L | 09/22/2023 1546 |
| PFNA | ND | | 1 | 4.0 | 0.46 | ng/L | 09/22/2023 1546 |
| PFOA | ND | | 1 | 4.0 | 0.83 | ng/L | 09/22/2023 1546 |
| PFPeA | ND | | 1 | 4.0 | 0.54 | ng/L | 09/22/2023 1546 |
| PFTeDA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/22/2023 1546 |
| PFTrDA | ND | | 1 | 4.0 | 0.53 | ng/L | 09/22/2023 1546 |
| PFUdA | ND | | 1 | 4.0 | 0.63 | ng/L | 09/22/2023 1546 |
| PFOS | ND | | 1 | 4.0 | 2.0 | ng/L | 09/22/2023 1546 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 100 | 25-150 |
| 13C2_6:2FTS | | 108 | 25-150 |
| 13C2_8:2FTS | | 93 | 25-150 |
| 13C2_PFDoA | | 90 | 25-150 |
| 13C2_PFTeDA | | 98 | 25-150 |
| 13C3_PFBS | | 92 | 25-150 |
| 13C3_PFHxS | | 83 | 25-150 |
| 13C3-HFPO-DA | | 90 | 25-150 |
| 13C4_PFBA | | 94 | 25-150 |
| 13C4_PFHpA | | 86 | 25-150 |
| 13C5_PFHxA | | 89 | 25-150 |
| 13C5_PFPeA | | 89 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ85388-001
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 91 | 25-150 |
| 13C7_PFUdA | | 86 | 25-150 |
| 13C8_PFOA | | 88 | 25-150 |
| 13C8_PFOS | | 84 | 25-150 |
| 13C8_PFOSA | | 86 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 |
| d5-EtFOSAA | | 94 | 25-150 |
| d3-MeFOSAA | | 87 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ85388-002
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 16 | | 1 | 106 | 50-150 | 09/22/2023 1556 |
| 11Cl-PF3OUdS | 15 | 15 | | 1 | 102 | 50-150 | 09/22/2023 1556 |
| 8:2 FTS | 15 | 16 | | 1 | 105 | 50-150 | 09/22/2023 1556 |
| 6:2 FTS | 15 | 16 | | 1 | 103 | 50-150 | 09/22/2023 1556 |
| 4:2 FTS | 15 | 16 | | 1 | 107 | 50-150 | 09/22/2023 1556 |
| GenX | 32 | 32 | | 1 | 101 | 50-150 | 09/22/2023 1556 |
| ADONA | 15 | 18 | | 1 | 118 | 50-150 | 09/22/2023 1556 |
| EtFOSAA | 16 | 17 | | 1 | 105 | 50-150 | 09/22/2023 1556 |
| MeFOSAA | 16 | 16 | | 1 | 101 | 50-150 | 09/22/2023 1556 |
| PFBS | 14 | 15 | | 1 | 108 | 50-150 | 09/22/2023 1556 |
| PFDS | 15 | 16 | | 1 | 101 | 50-150 | 09/22/2023 1556 |
| PFHpS | 15 | 17 | | 1 | 109 | 50-150 | 09/22/2023 1556 |
| PFNS | 15 | 16 | | 1 | 107 | 50-150 | 09/22/2023 1556 |
| PFOSA | 16 | 14 | | 1 | 89 | 50-150 | 09/22/2023 1556 |
| PFPeS | 15 | 16 | | 1 | 108 | 50-150 | 09/22/2023 1556 |
| PFHxS | 15 | 16 | | 1 | 112 | 50-150 | 09/22/2023 1556 |
| PFBA | 16 | 16 | | 1 | 100 | 50-150 | 09/22/2023 1556 |
| PFDA | 16 | 17 | | 1 | 107 | 50-150 | 09/22/2023 1556 |
| PFDoA | 16 | 16 | | 1 | 100 | 50-150 | 09/22/2023 1556 |
| PFHpA | 16 | 17 | | 1 | 108 | 50-150 | 09/22/2023 1556 |
| PFHxA | 16 | 17 | | 1 | 108 | 50-150 | 09/22/2023 1556 |
| PFNA | 16 | 19 | | 1 | 118 | 50-150 | 09/22/2023 1556 |
| PFOA | 16 | 20 | | 1 | 123 | 50-150 | 09/22/2023 1556 |
| PFPeA | 16 | 16 | | 1 | 102 | 50-150 | 09/22/2023 1556 |
| PFTeDA | 16 | 17 | | 1 | 108 | 50-150 | 09/22/2023 1556 |
| PFTrDA | 16 | 18 | | 1 | 113 | 50-150 | 09/22/2023 1556 |
| PFUdA | 16 | 18 | | 1 | 113 | 50-150 | 09/22/2023 1556 |
| PFOS | 15 | 16 | | 1 | 109 | 50-150 | 09/22/2023 1556 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 101 | 25-150 |
| 13C2_6:2FTS | | 102 | 25-150 |
| 13C2_8:2FTS | | 86 | 25-150 |
| 13C2_PFDoA | | 81 | 25-150 |
| 13C2_PFTeDA | | 92 | 25-150 |
| 13C3_PFBS | | 99 | 25-150 |
| 13C3_PFHxS | | 89 | 25-150 |
| 13C3-HFPO-DA | | 95 | 25-150 |
| 13C4_PFBA | | 93 | 25-150 |
| 13C4_PFHpA | | 85 | 25-150 |
| 13C5_PFHxA | | 95 | 25-150 |
| 13C5_PFPeA | | 99 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ85388-002
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 89 | 25-150 |
| 13C7_PFUdA | | 82 | 25-150 |
| 13C8_PFOA | | 92 | 25-150 |
| 13C8_PFOS | | 81 | 25-150 |
| 13C8_PFOSA | | 86 | 10-150 |
| 13C9_PFNA | | 83 | 25-150 |
| d5-EtFOSAA | | 86 | 25-150 |
| d3-MeFOSAA | | 81 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Chain of Custody
# and
# Miscellaneous Documents

Pace Analytical®

**PACE ANALYTICAL SERVICES, LLC**
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 149979

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Alexis.crisp@arcadis.com, tiffany.linder@arcadis.com | Telephone No. / E-mail: tiffany linder, Alexis Crisp | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Sommer Guy | Analysis (Attach list if more space is needed): Report EGLE 26 compounds | Page 1 of 3 |
| City: Novi; State: MI; Zip Code: 48377 | Printed Name: Sommer Guy | | Lot # Bar Code: YI13047 |
| Project Name: Racer PNC | | | |

| Project No. 30167840.00031 | P.O. No. | | Grab/Composite | Matrix: Aqueous, Solid, Non-Aqueous | No of Containers by Preservative Type: Unpres, H2SO4, HNO3, HCl, NaOH, ZnAc/NaOH, Other | Analysis: Method 537.1 mod. with isotope dilution per QSM 5.1 | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|
| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | | | | | |
| MWF16-25_GW-091223 | 9/12/23 | 1417 | G | X | 2 | X | |
| triplblank | 9/12/23 | 1400 | G | X | 1 | X | triplblank |
| MWF16-26_GW-091223 | 9/12/23 | 1525 | G | X | 2 | X | |
| MW-05-18_GW-091223 | 9/12/23 | 1642 | G | X | 2 | X | |

| Turn Around Time Required (Prior lab approval required for expedited TAT.) | Sample Disposal | Possible Hazard Identification | QC Requirements (Specify) |
|---|---|---|---|
| ☒ Standard ☐ Rush (Specify) | ☐ Return to Client ☒ Disposal by Lab | ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown | |

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Guy | 9/12/23 | 1800 | 1. Received by: FedEx | 9/12/23 | 1806 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | Date 9/13/23 | Time 0650 | 4. Laboratory received by: CJH | Date 9/12/23 | Time 0650 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack — Receipt Temp 1.3 °C — Temp Blank ☐ Y ☐N

FedEx CJH

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: MEG03N2-01



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www.pacelabs.com

**Number** 149978

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Tiffany Linder Mundt CHSP | Telephone No. / E-mail: tiffany.linder@arcadis.us Alexis.Crisp@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Garrett Link | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds | Page 2 of 3 |
| City: Novi / State: MI / Zip Code: 48377 | Printed Name: | | |
| Project Name: Racer PNC | | | |

| Project No. | P.O. No. | | Grab/Composite | Matrix | | | | No of Containers by Preservative Type | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | | Aqueous | Solid | Wipe / Assay | Other | Unpres. | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Field Filtered | 537 Mod. w/ Isotope dilution for PFOA & PFOS | | Remarks / Cooler I.D. |
| 30167840.00031 | | | | | | | | | | | | | | | | | YI13047 |
| MW-02-17_GW-091223 | 9/12/23 | 11:40 | G | X | | | | X | | | | | | | X | | |
| MWP12-02R_GW-091223 | 9/12/23 | 14:35 | G | X | | | | X | | | | | | | X | | EGLE MS/MSD |
| MW05-09R_GW-091223 | 9/12/23 | 16:35 | G | X | | | | X | | | | | | | X | | |

Turn Around Time Required (Prior lab approval required for expedited TAT.): ☒ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify):

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Jennifer Hay | 9/12/23 | 1800 | 1. Received by: FedEx | 9/12/23 | 1800 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FEDEX | Date: 9/13/23 | Time: 0850 | 4. Laboratory received by: Ch Hy | Date: 9/14/23 | Time: 0850 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle): (Yes) No Ice Pack
Receipt Temp: 1.3 °C
Temp Blank: ☐ Y ☐ N

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: MECC3N2-01



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www.pacelabs.com

**Number** 149976

ARCADIS

| | | | |
|---|---|---|---|
| Client: 28550 Cabot Dr #500 | Report to Contact: Tiffany Linder, Alexis Crisp | Telephone No. / E-mail: Alexis.crisp@arcadis.com, tiffany.linder@arcadis.com | Quote No. |
| Address: Arcadis | Sampler's Signature: x Lottie Jay | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds | Page 3 of 3 |
| City: Novi; State: MI; Zip Code: 48377 | Printed Name: | | |
| Project Name: Racer PNC | | | YI13047 |
| Project No.: 30167840.00031 | P.O. No. | | KES2 |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Matrix: Grab/Composite | Aqueous | Solid | Non-Aqueous | No of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Methanol | Method 537 mod. with isotope dilution per DSHS | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWF7-02_GW-091223 | 9/12/23 | 1125 | G | 2 | | | 2 | | | | | | | X | |
| MWF15-01_GW-091223 | | 1330 | G | 2 | | | 2 | | | | | | | X | |
| MWF16-23_GW-091223 | | 1505 | G | 2 | | | 2 | | | | | | | X | |
| MW05-10-GW-091223 | | 1700 | G | 2 | | | 2 | | | | | | | X | |
| EB-03-GW-091223 | | 1129 | G | 1 | | | 1 | | | | | | | X | |

Turn Around Time Required (Prior lab approval required for expedited TAT): ☒ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Lottie Jay | 9/12/23 | 1800 | 1. Received by: FedEx | 9/12/23 | 1800 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | Date 9/13/23 | Time 0850 | 4. Laboratory received by | Date 9/13/23 | Time 0850 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on Ice (Circle) (Yes) No — Ice Pack — Receipt Temp. 1.3 °C — Temp Blank ☐ Yes ☐ No

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: MF002N2-01



PACE ANALYTICAL SERVICES, LLC

DC#_Title: ENV-FRM-WCOL-0286 v02_Samples Receipt Checklist (SRC)
Effective Date: 8/2/2022

# Sample Receipt Checklist (SRC)

Client: ARCADIS  Cooler Inspected by/date: CJH / 09/13/23  Lot #: YI13047

Means of receipt: ☐ Pace ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

| | | | |
|---|---|---|---|
| ☐ Yes | ☑ No | | 1. Were custody seals present on the cooler? |
| ☐ Yes | ☐ No | ☑ NA | 2. If custody seals were present, were they intact and unbroken? |

pH Strip ID: NA  Chlorine Strip ID: NA  Tested by: NA
Original temperature upon receipt / Derived (Corrected) temperature upon receipt  %Solid Snap-Cup ID: NA
1.3 / 1.3 °C  NA / NA °C  NA / NA °C  NA / NA °C
Method: ☐ Temperature Blank ☑ Against Bottles  IR Gun ID: 8  IR Gun Correction Factor: 0 °C
Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | ☐ NA | 3. Were all coolers received at or below 6.0°C? If no, was Project Manager notified? PM was Notified by: phone / email / face-to-face (circle one). |
| ☑ Yes | ☐ No | ☐ NA | 4. Is the commercial courier's packing slip attached to this form? |
| ☑ Yes | ☐ No | | 5. Were proper custody procedures (relinquished/received) followed? |
| ☑ Yes | ☐ No | | 6. Were sample IDs listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 7. Was collection date & time listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 8. Did all container label information (ID, date, time) agree with the COC? |
| ☑ Yes | ☐ No | | 9. Were tests to be performed listed on the COC? |
| ☑ Yes | ☐ No | | 10. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____ |
| ☑ Yes | ☐ No | | 11. Was adequate sample volume available? |
| ☑ Yes | ☐ No | | 12. Were all samples received within ½ the holding time or 48 hours, whichever comes first? |
| ☑ Yes | ☐ No | | 13. Were all samples containers accounted for? (No missing/excess) |
| ☐ Yes | ☐ No | ☑ NA | 14. Were VOA, 8015C and RSK-175 samples free of bubbles >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials? |
| ☐ Yes | ☐ No | ☑ NA | 15. Were all DRO/metals/nutrient samples received at a pH of < 2? |
| ☐ Yes | ☐ No | ☑ NA | 16. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9? |
| ☐ Yes | ☐ No | ☑ NA | 17. Were all applicable $NH_3$/TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine? |
| ☐ Yes | ☑ No | ☐ NA | 18. Was the quote number listed on the container label? If yes, Quote # _____ |

**Sample Preservation** (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA . ☐
Time of preservation NA . If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Unique ID: NA

Comments:

Qualtrax ID: 56360  Pace® Analytical Services, LLC  Page 1 of 1

# Report of Analysis

**Arcadis U.S., Inc.**
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Tiffany Linder

Project Name: RACER PNC

Project Number: 30167840.00031

Lot Number:**YI14025**

Date Completed:09/26/2023

09/26/2023 1:31 PM
Approved and released by:
Project Manager II: **Kathy E. Smith**

The electronic signature above is the equivalent of a handwritten signature.
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Pace Analytical Services, LLC (*formerly Shealy Environmental Services, Inc.*)
106 Vantage Point Drive West Columbia, SC 29172
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

## Case Narrative
## Arcadis U.S., Inc.
### Lot Number: YI14025

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.4 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples were compliant with DOD QSM 5.4 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). The CF is calculated as follows:

CF = DF * FV / Vo

FV is volume of extract (mL)
Vo is initial sample volume (mL)
DF is dilution factor. For undiluted analysis, DF = 1.

Sample concentration for aqueous samples:
Concentration (ng/L) = Cs*CF,

$$C_s = \frac{\left(\frac{(A_s x C_{is})}{A_{is}}\right) - B}{M1}$$

Where

$C_s$ is on column concentration of target analyte in the sample (ng/L)
$C_{is}$ is concentration of internal standard in the sample (ng/L)
$A_s$ is peak response of target analyte in the sample
$A_{is}$ is peak response of internal standard in the sample
M1 is the average RF from ICAL or the slope from linear regression ICAL
B is the y-intercept from the ICAL

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18, PFAS by Isotope Dilution SOP.

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

PFAS
Samples YI14025-001, YI14025-004, YI14025-006, YI14025-007, YI14025-008 required centrifugation prior to extraction, due to excessive solids present in the samples. Centrifugation was performed following the PFAS Aqueous Centrifuge Protocol; samples were spiked with Surrogate (SUR; Extracted Internal Standard/EIS) and shaken vigorously before being poured into a conical bottle and centrifuged. The centrifuged aqueous sample was decanted back into the original sample bottle, off of the condensed solids remaining in the centrifuge bottle. Original sample bottle was rinsed as normal and centrifuge bottle was rinsed with 4mL of MeOH. Centrifuge bottle rinsate was added to the elution. Samples concentrated to <5mL and reconstituted to 5mL using MeOH by transfer pipet.

Surrogate recovery for the following samples was outside control limits: YI14025-001, YI14025-004, YI14025-006, YI14025-007. Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Surrogate recovery for the following samples was outside the upper control limit: YI14025-005, YI14025-008, YI14025-009. These samples did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

## Sample Summary

## Arcadis U.S., Inc.

**Lot Number: YI14025**

**Project Name: RACER PNC**

**Project Number: 30167840.00031**

| Sample Number | Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| 001 | MWOS-03_GW-091323 | Aqueous | 09/13/2023 1043 | 09/14/2023 |
| 002 | EB-01-091323 | Aqueous | 09/13/2023 1100 | 09/14/2023 |
| 003 | trip blank | Aqueous | 09/13/2023 1105 | 09/14/2023 |
| 004 | MWOS-04_GW-091323 | Aqueous | 09/13/2023 1310 | 09/14/2023 |
| 005 | MWOS-01_GW-091323 | Aqueous | 09/13/2023 1045 | 09/14/2023 |
| 006 | MWOS-02_GW-091323 | Aqueous | 09/13/2023 1135 | 09/14/2023 |
| 007 | TW-ROW-03_GW-091323 | Aqueous | 09/13/2023 1215 | 09/14/2023 |
| 008 | TW-ROW-01_GW-091323 | Aqueous | 09/13/2023 1330 | 09/14/2023 |
| 009 | MWW1-06_GW-091323 | Aqueous | 09/13/2023 1350 | 09/14/2023 |

(9 samples)

## Detection Summary

## Arcadis U.S., Inc.

**Lot Number: YI14025**

**Project Name: RACER PNC**

**Project Number: 30167840.00031**

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 005 | MWOS-01_GW-091323 | Aqueous | PFBS | PFAS by ID | 18 | | ng/L | 15 |
| 005 | MWOS-01_GW-091323 | Aqueous | PFHxS | PFAS by ID | 2.2 | J | ng/L | 15 |
| 005 | MWOS-01_GW-091323 | Aqueous | PFBA | PFAS by ID | 14 | | ng/L | 15 |
| 005 | MWOS-01_GW-091323 | Aqueous | PFHpA | PFAS by ID | 1.8 | J | ng/L | 15 |
| 005 | MWOS-01_GW-091323 | Aqueous | PFHxA | PFAS by ID | 3.3 | J | ng/L | 15 |
| 005 | MWOS-01_GW-091323 | Aqueous | PFOA | PFAS by ID | 3.8 | | ng/L | 15 |
| 005 | MWOS-01_GW-091323 | Aqueous | PFPeA | PFAS by ID | 5.7 | | ng/L | 15 |
| 005 | MWOS-01_GW-091323 | Aqueous | PFOS | PFAS by ID | 7.8 | | ng/L | 15 |
| 006 | MWOS-02_GW-091323 | Aqueous | PFBS | PFAS by ID | 4.3 | | ng/L | 17 |
| 006 | MWOS-02_GW-091323 | Aqueous | PFPeS | PFAS by ID | 1.6 | J | ng/L | 17 |
| 006 | MWOS-02_GW-091323 | Aqueous | PFHxS | PFAS by ID | 6.8 | | ng/L | 17 |
| 006 | MWOS-02_GW-091323 | Aqueous | PFBA | PFAS by ID | 7.9 | | ng/L | 17 |
| 006 | MWOS-02_GW-091323 | Aqueous | PFHpA | PFAS by ID | 1.5 | J | ng/L | 17 |
| 006 | MWOS-02_GW-091323 | Aqueous | PFHxA | PFAS by ID | 2.9 | J | ng/L | 17 |
| 006 | MWOS-02_GW-091323 | Aqueous | PFOA | PFAS by ID | 7.0 | | ng/L | 17 |
| 006 | MWOS-02_GW-091323 | Aqueous | PFPeA | PFAS by ID | 2.5 | J | ng/L | 17 |
| 006 | MWOS-02_GW-091323 | Aqueous | PFOS | PFAS by ID | 9.5 | | ng/L | 17 |
| 007 | TW-ROW-03_GW-091323 | Aqueous | 6:2 FTS | PFAS by ID | 2.1 | JQ | ng/L | 19 |
| 007 | TW-ROW-03_GW-091323 | Aqueous | PFBS | PFAS by ID | 4.8 | | ng/L | 19 |
| 007 | TW-ROW-03_GW-091323 | Aqueous | PFHpS | PFAS by ID | 0.95 | J | ng/L | 19 |
| 007 | TW-ROW-03_GW-091323 | Aqueous | PFPeS | PFAS by ID | 1.3 | J | ng/L | 19 |
| 007 | TW-ROW-03_GW-091323 | Aqueous | PFHxS | PFAS by ID | 6.3 | | ng/L | 19 |
| 007 | TW-ROW-03_GW-091323 | Aqueous | PFBA | PFAS by ID | 12 | | ng/L | 19 |
| 007 | TW-ROW-03_GW-091323 | Aqueous | PFHpA | PFAS by ID | 1.7 | J | ng/L | 19 |
| 007 | TW-ROW-03_GW-091323 | Aqueous | PFHxA | PFAS by ID | 4.1 | | ng/L | 19 |
| 007 | TW-ROW-03_GW-091323 | Aqueous | PFNA | PFAS by ID | 0.74 | J | ng/L | 19 |
| 007 | TW-ROW-03_GW-091323 | Aqueous | PFOA | PFAS by ID | 5.8 | | ng/L | 19 |
| 007 | TW-ROW-03_GW-091323 | Aqueous | PFPeA | PFAS by ID | 4.5 | | ng/L | 19 |
| 007 | TW-ROW-03_GW-091323 | Aqueous | PFOS | PFAS by ID | 36 | | ng/L | 19 |
| 008 | TW-ROW-01_GW-091323 | Aqueous | PFHpS | PFAS by ID | 0.88 | J | ng/L | 21 |
| 008 | TW-ROW-01_GW-091323 | Aqueous | PFHxS | PFAS by ID | 3.5 | | ng/L | 21 |
| 008 | TW-ROW-01_GW-091323 | Aqueous | PFBA | PFAS by ID | 8.6 | | ng/L | 21 |
| 008 | TW-ROW-01_GW-091323 | Aqueous | PFHpA | PFAS by ID | 2.1 | J | ng/L | 21 |
| 008 | TW-ROW-01_GW-091323 | Aqueous | PFHxA | PFAS by ID | 4.2 | | ng/L | 21 |
| 008 | TW-ROW-01_GW-091323 | Aqueous | PFOA | PFAS by ID | 5.5 | | ng/L | 21 |
| 008 | TW-ROW-01_GW-091323 | Aqueous | PFOS | PFAS by ID | 12 | | ng/L | 21 |
| 009 | MWW1-06_GW-091323 | Aqueous | 6:2 FTS | PFAS by ID | 16 | | ng/L | 23 |
| 009 | MWW1-06_GW-091323 | Aqueous | PFBS | PFAS by ID | 2.7 | J | ng/L | 23 |
| 009 | MWW1-06_GW-091323 | Aqueous | PFHxS | PFAS by ID | 0.96 | J | ng/L | 23 |
| 009 | MWW1-06_GW-091323 | Aqueous | PFBA | PFAS by ID | 6.1 | | ng/L | 23 |
| 009 | MWW1-06_GW-091323 | Aqueous | PFHpA | PFAS by ID | 1.3 | J | ng/L | 23 |
| 009 | MWW1-06_GW-091323 | Aqueous | PFHxA | PFAS by ID | 1.3 | J | ng/L | 23 |
| 009 | MWW1-06_GW-091323 | Aqueous | PFOA | PFAS by ID | 6.8 | | ng/L | 23 |

# Detection Summary (Continued)

## Lot Number: YI14025

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 009 | MWW1-06_GW-091323 | Aqueous | PFPeA | PFAS by ID | 0.92 | J | ng/L | 23 |
| 009 | MWW1-06_GW-091323 | Aqueous | PFOS | PFAS by ID | 22 | | ng/L | 23 |

(45 detections)

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-001**

Description: **MWOS-03_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1043** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1804 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.7 | 0.47 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.7 | 0.64 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.7 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.7 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.7 | 0.84 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.7 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.7 | 0.47 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.7 | 0.72 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.7 | 0.90 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.9 | 0.40 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.75 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.48 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.69 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.59 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.57 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.9 | 0.53 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.46 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.9 | 0.43 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.9 | 0.66 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.9 | 0.45 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.9 | 0.80 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.9 | 0.53 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.61 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.9 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 283 | 25-150 |
| 13C2_6:2FTS | N | 217 | 25-150 |
| 13C2_8:2FTS | | 98 | 25-150 |
| 13C2_PFDoA | | 74 | 25-150 |
| 13C2_PFTeDA | | 73 | 25-150 |
| 13C3_PFBS | | 76 | 25-150 |
| 13C3_PFHxS | | 85 | 25-150 |
| 13C3-HFPO-DA | | 64 | 25-150 |
| 13C4_PFBA | | 26 | 25-150 |
| 13C4_PFHpA | | 80 | 25-150 |
| 13C5_PFHxA | | 74 | 25-150 |
| 13C5_PFPeA | | 54 | 25-150 |
| 13C6_PFDA | | 91 | 25-150 |
| 13C7_PFUdA | | 90 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-001**

Description: **MWOS-03_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1043** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 104 | 25-150 |
| 13C8_PFOS | | 90 | 25-150 |
| 13C8_PFOSA | | 92 | 10-150 |
| 13C9_PFNA | | 101 | 25-150 |
| d5-EtFOSAA | | 86 | 25-150 |
| d3-MeFOSAA | | 85 | 25-150 |

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
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ND = Not detected at or above the DL
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-002**

Description: **EB-01-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1100** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1814 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.2 | 0.43 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.2 | 0.60 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.2 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.2 | 0.79 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.2 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.2 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.2 | 0.68 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.2 | 0.84 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.37 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.70 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.45 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.64 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.53 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.6 | 0.50 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.40 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.62 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.6 | 0.75 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.49 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.6 | 1.8 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 105 | 25-150 |
| 13C2_6:2FTS | | 98 | 25-150 |
| 13C2_8:2FTS | | 88 | 25-150 |
| 13C2_PFDoA | | 72 | 25-150 |
| 13C2_PFTeDA | | 85 | 25-150 |
| 13C3_PFBS | | 94 | 25-150 |
| 13C3_PFHxS | | 87 | 25-150 |
| 13C3-HFPO-DA | | 82 | 25-150 |
| 13C4_PFBA | | 94 | 25-150 |
| 13C4_PFHpA | | 84 | 25-150 |
| 13C5_PFHxA | | 95 | 25-150 |
| 13C5_PFPeA | | 95 | 25-150 |
| 13C6_PFDA | | 86 | 25-150 |
| 13C7_PFUdA | | 85 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-002**

Description: **EB-01-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1100** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 97 | 25-150 |
| 13C8_PFOS | | 81 | 25-150 |
| 13C8_PFOSA | | 81 | 10-150 |
| 13C9_PFNA | | 85 | 25-150 |
| d5-EtFOSAA | | 87 | 25-150 |
| d3-MeFOSAA | | 80 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-003**

Description: **trip blank** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1105** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1825 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.8 | 0.65 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.8 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.8 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.8 | 0.85 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.8 | 0.73 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.8 | 0.91 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.9 | 0.40 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.76 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.49 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.69 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.60 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.9 | 0.54 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.46 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.9 | 0.44 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.9 | 0.67 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.9 | 0.45 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.9 | 0.81 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.9 | 0.53 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.52 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.61 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.9 | 2.0 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 94 | 25-150 |
| 13C2_6:2FTS | | 102 | 25-150 |
| 13C2_8:2FTS | | 82 | 25-150 |
| 13C2_PFDoA | | 75 | 25-150 |
| 13C2_PFTeDA | | 85 | 25-150 |
| 13C3_PFBS | | 93 | 25-150 |
| 13C3_PFHxS | | 90 | 25-150 |
| 13C3-HFPO-DA | | 90 | 25-150 |
| 13C4_PFBA | | 92 | 25-150 |
| 13C4_PFHpA | | 84 | 25-150 |
| 13C5_PFHxA | | 92 | 25-150 |
| 13C5_PFPeA | | 97 | 25-150 |
| 13C6_PFDA | | 90 | 25-150 |
| 13C7_PFUdA | | 87 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-003**

Description: **trip blank** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1105** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 95 | 25-150 |
| 13C8_PFOS | | 86 | 25-150 |
| 13C8_PFOSA | | 91 | 10-150 |
| 13C9_PFNA | | 93 | 25-150 |
| d5-EtFOSAA | | 94 | 25-150 |
| d3-MeFOSAA | | 82 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-004**

Description: **MWOS-04_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1310** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1857 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 0.61 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.4 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.4 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.4 | 0.81 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 0.70 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.7 | 0.38 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.72 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.46 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.66 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.57 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.7 | 0.51 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | Q | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.44 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.7 | 0.41 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.7 | 0.64 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.43 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.7 | 0.77 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.50 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.58 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.7 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 231 | 25-150 |
| 13C2_6:2FTS | N | 224 | 25-150 |
| 13C2_8:2FTS | | 108 | 25-150 |
| 13C2_PFDoA | | 67 | 25-150 |
| 13C2_PFTeDA | | 73 | 25-150 |
| 13C3_PFBS | | 80 | 25-150 |
| 13C3_PFHxS | | 83 | 25-150 |
| 13C3-HFPO-DA | | 56 | 25-150 |
| 13C4_PFBA | N | 21 | 25-150 |
| 13C4_PFHpA | | 60 | 25-150 |
| 13C5_PFHxA | | 55 | 25-150 |
| 13C5_PFPeA | | 40 | 25-150 |
| 13C6_PFDA | | 93 | 25-150 |
| 13C7_PFUdA | | 81 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-004**

Description: **MWOS-04_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1310** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 95 | 25-150 |
| 13C8_PFOS | | 80 | 25-150 |
| 13C8_PFOSA | | 84 | 10-150 |
| 13C9_PFNA | | 98 | 25-150 |
| d5-EtFOSAA | | 80 | 25-150 |
| d3-MeFOSAA | | 87 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-005**

Description: **MWOS-01_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1045** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1907 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.0 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.0 | 0.58 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.0 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.0 | 0.76 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.0 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.0 | 0.66 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.0 | 0.81 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **18** | | **3.5** | **0.36** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.68 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.44 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.62 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **2.2** | **J** | **3.5** | **0.48** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **14** | | **3.5** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **1.8** | **J** | **3.5** | **0.39** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **3.3** | **J** | **3.5** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.40 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **3.8** | | **3.5** | **0.72** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **5.7** | | **3.5** | **0.48** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.55 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **7.8** | | **3.5** | **1.7** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 224 | 25-150 |
| 13C2_6:2FTS | | 135 | 25-150 |
| 13C2_8:2FTS | | 91 | 25-150 |
| 13C2_PFDoA | | 75 | 25-150 |
| 13C2_PFTeDA | | 84 | 25-150 |
| 13C3_PFBS | | 87 | 25-150 |
| 13C3_PFHxS | | 81 | 25-150 |
| 13C3-HFPO-DA | | 75 | 25-150 |
| 13C4_PFBA | | 52 | 25-150 |
| 13C4_PFHpA | | 88 | 25-150 |
| 13C5_PFHxA | | 66 | 25-150 |
| 13C5_PFPeA | | 83 | 25-150 |
| 13C6_PFDA | | 88 | 25-150 |
| 13C7_PFUdA | | 88 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-005**

Description: **MWOS-01_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1045** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 91 | 25-150 |
| 13C8_PFOS | | 74 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 |
| d5-EtFOSAA | | 85 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-006**

Description: **MWOS-02_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1135** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1918 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.0 | 0.48 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.0 | 0.66 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.0 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 8.0 | 2.0 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 8.0 | 0.88 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.0 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.0 | 0.48 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.0 | 0.75 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.0 | 0.93 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **4.3** | | **4.0** | **0.42** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.0 | 0.78 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.0 | 0.50 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.0 | 0.71 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.0 | 0.61 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **1.6** | **J** | **4.0** | **0.60** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **6.8** | | **4.0** | **0.55** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **7.9** | | **4.0** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.0 | 0.53 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.0 | 0.47 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **1.5** | **J** | **4.0** | **0.45** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **2.9** | **J** | **4.0** | **0.69** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.0 | 0.46 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **7.0** | | **4.0** | **0.83** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **2.5** | **J** | **4.0** | **0.55** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.0 | 0.60 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.53 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.63 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **9.5** | | **4.0** | **2.0** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 276 | 25-150 |
| 13C2_6:2FTS | N | 157 | 25-150 |
| 13C2_8:2FTS | | 92 | 25-150 |
| 13C2_PFDoA | | 69 | 25-150 |
| 13C2_PFTeDA | | 73 | 25-150 |
| 13C3_PFBS | | 94 | 25-150 |
| 13C3_PFHxS | | 85 | 25-150 |
| 13C3-HFPO-DA | | 69 | 25-150 |
| 13C4_PFBA | | 56 | 25-150 |
| 13C4_PFHpA | | 79 | 25-150 |
| 13C5_PFHxA | | 88 | 25-150 |
| 13C5_PFPeA | | 78 | 25-150 |
| 13C6_PFDA | | 89 | 25-150 |
| 13C7_PFUdA | | 83 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-006**

Description: **MWOS-02_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1135** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 96 | 25-150 |
| 13C8_PFOS | | 83 | 25-150 |
| 13C8_PFOSA | | 88 | 10-150 |
| 13C9_PFNA | | 97 | 25-150 |
| d5-EtFOSAA | | 83 | 25-150 |
| d3-MeFOSAA | | 80 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-007**

Description: **TW-ROW-03_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1215** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1928 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 0.57 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.4 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **2.1** | **JQ** | **6.9** | **1.7** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.9 | 0.76 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 0.65 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 0.81 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **4.8** | | **3.5** | **0.36** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.67 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **0.95** | **J** | **3.5** | **0.43** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.62 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.53 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **1.3** | **J** | **3.5** | **0.51** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **6.3** | | **3.5** | **0.48** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **12** | | **3.5** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **1.7** | **J** | **3.5** | **0.39** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **4.1** | | **3.5** | **0.60** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **0.74** | **J** | **3.5** | **0.40** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **5.8** | | **3.5** | **0.72** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **4.5** | | **3.5** | **0.47** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **36** | | **3.5** | **1.7** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 266 | 25-150 |
| 13C2_6:2FTS | N | 219 | 25-150 |
| 13C2_8:2FTS | | 130 | 25-150 |
| 13C2_PFDoA | | 72 | 25-150 |
| 13C2_PFTeDA | | 66 | 25-150 |
| 13C3_PFBS | | 84 | 25-150 |
| 13C3_PFHxS | | 82 | 25-150 |
| 13C3-HFPO-DA | | 58 | 25-150 |
| 13C4_PFBA | | 32 | 25-150 |
| 13C4_PFHpA | | 72 | 25-150 |
| 13C5_PFHxA | | 84 | 25-150 |
| 13C5_PFPeA | | 61 | 25-150 |
| 13C6_PFDA | | 93 | 25-150 |
| 13C7_PFUdA | | 85 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-007**

Description: **TW-ROW-03_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1215** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 94 | 25-150 |
| 13C8_PFOS | | 80 | 25-150 |
| 13C8_PFOSA | | 82 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 |
| d5-EtFOSAA | | 91 | 25-150 |
| d3-MeFOSAA | | 88 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-008**

Description: **TW-ROW-01_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1330** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1939 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 0.41 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 0.57 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.9 | 0.75 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 0.41 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 0.64 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 0.80 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.4 | 0.36 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.4 | 0.67 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **0.88** | **J** | **3.4** | **0.43** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.4 | 0.61 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.4 | 0.53 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.4 | 0.51 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **3.5** | | **3.4** | **0.47** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **8.6** | | **3.4** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.4 | 0.45 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.4 | 0.40 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **2.1** | **J** | **3.4** | **0.38** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **4.2** | | **3.4** | **0.59** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.4 | 0.40 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **5.5** | | **3.4** | **0.71** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.4 | 0.47 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.4 | 0.51 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.45 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.54 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **12** | | **3.4** | **1.7** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 328 | 25-150 |
| 13C2_6:2FTS | N | 215 | 25-150 |
| 13C2_8:2FTS | | 105 | 25-150 |
| 13C2_PFDoA | | 65 | 25-150 |
| 13C2_PFTeDA | | 63 | 25-150 |
| 13C3_PFBS | | 81 | 25-150 |
| 13C3_PFHxS | | 80 | 25-150 |
| 13C3-HFPO-DA | | 57 | 25-150 |
| 13C4_PFBA | | 31 | 25-150 |
| 13C4_PFHpA | | 66 | 25-150 |
| 13C5_PFHxA | | 72 | 25-150 |
| 13C5_PFPeA | | 60 | 25-150 |
| 13C6_PFDA | | 83 | 25-150 |
| 13C7_PFUdA | | 77 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-008**

Description: **TW-ROW-01_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1330** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 93 | 25-150 |
| 13C8_PFOS | | 72 | 25-150 |
| 13C8_PFOSA | | 80 | 10-150 |
| 13C9_PFNA | | 84 | 25-150 |
| d5-EtFOSAA | | 74 | 25-150 |
| d3-MeFOSAA | | 77 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-009**

Description: **MWW1-06_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1350** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1950 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.2 | 0.50 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.2 | 0.68 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.2 | 1.7 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **16** | | **8.2** | **2.1** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 8.2 | 0.90 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.2 | 0.50 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.2 | 0.77 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.2 | 0.96 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **2.7** | **J** | **4.1** | **0.43** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.1 | 0.80 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.1 | 0.51 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.1 | 0.73 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.1 | 0.63 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 4.1 | 0.61 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **0.96** | **J** | **4.1** | **0.57** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **6.1** | | **4.1** | **0.62** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.1 | 0.54 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.1 | 0.49 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **1.3** | **J** | **4.1** | **0.46** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **1.3** | **J** | **4.1** | **0.71** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.1 | 0.48 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **6.8** | | **4.1** | **0.85** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **0.92** | **J** | **4.1** | **0.56** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.1 | 0.62 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.1 | 0.54 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.1 | 0.64 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **22** | | **4.1** | **2.1** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 205 | 25-150 |
| 13C2_6:2FTS | | 140 | 25-150 |
| 13C2_8:2FTS | | 104 | 25-150 |
| 13C2_PFDoA | | 70 | 25-150 |
| 13C2_PFTeDA | | 71 | 25-150 |
| 13C3_PFBS | | 101 | 25-150 |
| 13C3_PFHxS | | 89 | 25-150 |
| 13C3-HFPO-DA | | 79 | 25-150 |
| 13C4_PFBA | | 68 | 25-150 |
| 13C4_PFHpA | | 87 | 25-150 |
| 13C5_PFHxA | | 100 | 25-150 |
| 13C5_PFPeA | | 89 | 25-150 |
| 13C6_PFDA | | 89 | 25-150 |
| 13C7_PFUdA | | 85 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-009**

Description: **MWW1-06_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1350** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 98 | 25-150 |
| 13C8_PFOS | | 84 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 |
| 13C9_PFNA | | 97 | 25-150 |
| d5-EtFOSAA | | 82 | 25-150 |
| d3-MeFOSAA | | 87 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# QC Summary

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ85388-001
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP
**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 0.48 | ng/L | 09/22/2023 1546 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 0.66 | ng/L | 09/22/2023 1546 |
| 8:2 FTS | ND | | 1 | 8.0 | 1.6 | ng/L | 09/22/2023 1546 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 09/22/2023 1546 |
| 4:2 FTS | ND | | 1 | 8.0 | 0.87 | ng/L | 09/22/2023 1546 |
| GenX | ND | | 1 | 8.0 | 2.1 | ng/L | 09/22/2023 1546 |
| ADONA | ND | | 1 | 8.0 | 0.48 | ng/L | 09/22/2023 1546 |
| EtFOSAA | ND | | 1 | 8.0 | 0.75 | ng/L | 09/22/2023 1546 |
| MeFOSAA | ND | | 1 | 8.0 | 0.93 | ng/L | 09/22/2023 1546 |
| PFBS | ND | | 1 | 4.0 | 0.41 | ng/L | 09/22/2023 1546 |
| PFDS | ND | | 1 | 4.0 | 0.78 | ng/L | 09/22/2023 1546 |
| PFHpS | ND | | 1 | 4.0 | 0.50 | ng/L | 09/22/2023 1546 |
| PFNS | ND | | 1 | 4.0 | 0.71 | ng/L | 09/22/2023 1546 |
| PFOSA | ND | | 1 | 4.0 | 0.61 | ng/L | 09/22/2023 1546 |
| PFPeS | ND | | 1 | 4.0 | 0.59 | ng/L | 09/22/2023 1546 |
| PFHxS | ND | | 1 | 4.0 | 0.55 | ng/L | 09/22/2023 1546 |
| PFBA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/22/2023 1546 |
| PFDA | ND | | 1 | 4.0 | 0.52 | ng/L | 09/22/2023 1546 |
| PFDoA | ND | | 1 | 4.0 | 0.47 | ng/L | 09/22/2023 1546 |
| PFHpA | ND | | 1 | 4.0 | 0.45 | ng/L | 09/22/2023 1546 |
| PFHxA | ND | | 1 | 4.0 | 0.69 | ng/L | 09/22/2023 1546 |
| PFNA | ND | | 1 | 4.0 | 0.46 | ng/L | 09/22/2023 1546 |
| PFOA | ND | | 1 | 4.0 | 0.83 | ng/L | 09/22/2023 1546 |
| PFPeA | ND | | 1 | 4.0 | 0.54 | ng/L | 09/22/2023 1546 |
| PFTeDA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/22/2023 1546 |
| PFTrDA | ND | | 1 | 4.0 | 0.53 | ng/L | 09/22/2023 1546 |
| PFUdA | ND | | 1 | 4.0 | 0.63 | ng/L | 09/22/2023 1546 |
| PFOS | ND | | 1 | 4.0 | 2.0 | ng/L | 09/22/2023 1546 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 100 | 25-150 |
| 13C2_6:2FTS | | 108 | 25-150 |
| 13C2_8:2FTS | | 93 | 25-150 |
| 13C2_PFDoA | | 90 | 25-150 |
| 13C2_PFTeDA | | 98 | 25-150 |
| 13C3_PFBS | | 92 | 25-150 |
| 13C3_PFHxS | | 83 | 25-150 |
| 13C3-HFPO-DA | | 90 | 25-150 |
| 13C4_PFBA | | 94 | 25-150 |
| 13C4_PFHpA | | 86 | 25-150 |
| 13C5_PFHxA | | 89 | 25-150 |
| 13C5_PFPeA | | 89 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ85388-001
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 91 | 25-150 |
| 13C7_PFUdA | | 86 | 25-150 |
| 13C8_PFOA | | 88 | 25-150 |
| 13C8_PFOS | | 84 | 25-150 |
| 13C8_PFOSA | | 86 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 |
| d5-EtFOSAA | | 94 | 25-150 |
| d3-MeFOSAA | | 87 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ85388-002
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 16 | | 1 | 106 | 50-150 | 09/22/2023 1556 |
| 11Cl-PF3OUdS | 15 | 15 | | 1 | 102 | 50-150 | 09/22/2023 1556 |
| 8:2 FTS | 15 | 16 | | 1 | 105 | 50-150 | 09/22/2023 1556 |
| 6:2 FTS | 15 | 16 | | 1 | 103 | 50-150 | 09/22/2023 1556 |
| 4:2 FTS | 15 | 16 | | 1 | 107 | 50-150 | 09/22/2023 1556 |
| GenX | 32 | 32 | | 1 | 101 | 50-150 | 09/22/2023 1556 |
| ADONA | 15 | 18 | | 1 | 118 | 50-150 | 09/22/2023 1556 |
| EtFOSAA | 16 | 17 | | 1 | 105 | 50-150 | 09/22/2023 1556 |
| MeFOSAA | 16 | 16 | | 1 | 101 | 50-150 | 09/22/2023 1556 |
| PFBS | 14 | 15 | | 1 | 108 | 50-150 | 09/22/2023 1556 |
| PFDS | 15 | 16 | | 1 | 101 | 50-150 | 09/22/2023 1556 |
| PFHpS | 15 | 17 | | 1 | 109 | 50-150 | 09/22/2023 1556 |
| PFNS | 15 | 16 | | 1 | 107 | 50-150 | 09/22/2023 1556 |
| PFOSA | 16 | 14 | | 1 | 89 | 50-150 | 09/22/2023 1556 |
| PFPeS | 15 | 16 | | 1 | 108 | 50-150 | 09/22/2023 1556 |
| PFHxS | 15 | 16 | | 1 | 112 | 50-150 | 09/22/2023 1556 |
| PFBA | 16 | 16 | | 1 | 100 | 50-150 | 09/22/2023 1556 |
| PFDA | 16 | 17 | | 1 | 107 | 50-150 | 09/22/2023 1556 |
| PFDoA | 16 | 16 | | 1 | 100 | 50-150 | 09/22/2023 1556 |
| PFHpA | 16 | 17 | | 1 | 108 | 50-150 | 09/22/2023 1556 |
| PFHxA | 16 | 17 | | 1 | 108 | 50-150 | 09/22/2023 1556 |
| PFNA | 16 | 19 | | 1 | 118 | 50-150 | 09/22/2023 1556 |
| PFOA | 16 | 20 | | 1 | 123 | 50-150 | 09/22/2023 1556 |
| PFPeA | 16 | 16 | | 1 | 102 | 50-150 | 09/22/2023 1556 |
| PFTeDA | 16 | 17 | | 1 | 108 | 50-150 | 09/22/2023 1556 |
| PFTrDA | 16 | 18 | | 1 | 113 | 50-150 | 09/22/2023 1556 |
| PFUdA | 16 | 18 | | 1 | 113 | 50-150 | 09/22/2023 1556 |
| PFOS | 15 | 16 | | 1 | 109 | 50-150 | 09/22/2023 1556 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 101 | 25-150 |
| 13C2_6:2FTS | | 102 | 25-150 |
| 13C2_8:2FTS | | 86 | 25-150 |
| 13C2_PFDoA | | 81 | 25-150 |
| 13C2_PFTeDA | | 92 | 25-150 |
| 13C3_PFBS | | 99 | 25-150 |
| 13C3_PFHxS | | 89 | 25-150 |
| 13C3-HFPO-DA | | 95 | 25-150 |
| 13C4_PFBA | | 93 | 25-150 |
| 13C4_PFHpA | | 85 | 25-150 |
| 13C5_PFHxA | | 95 | 25-150 |
| 13C5_PFPeA | | 99 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ85388-002
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 89 | 25-150 |
| 13C7_PFUdA | | 82 | 25-150 |
| 13C8_PFOA | | 92 | 25-150 |
| 13C8_PFOS | | 81 | 25-150 |
| 13C8_PFOSA | | 86 | 10-150 |
| 13C9_PFNA | | 83 | 25-150 |
| d5-EtFOSAA | | 86 | 25-150 |
| d3-MeFOSAA | | 81 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Chain of Custody
# and
# Miscellaneous Documents

Pace Analytical®

**PACE ANALYTICAL SERVICES, LLC**
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number 149977**

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Tiffany Linder, Alexis Crisp | Telephone No. / E-mail: Alexis.crisp@arcadis.com, Tiffany.linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Sommer Gray | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds | Page 1 of 1 |
| City: Novi | State: MI | Zip Code: 48377 | Printed Name: Sommer Gray, Lothe Jay Garrett Link | Lot # Bar Code: YI14025 |
| Project Name: Racer PNC | | | | |
| Project No.: 30167840.00031 | P.O. No. | | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab/Composite | Matrix: Aqueous | Solid | Non-Aqueous | No of Containers by Preservative Type: Unpres. | HNO3 | H2SO4 | HCl | NaOH | Na2S2O3 | Field Filtered | Methanol MS with Tentative Compounds OSM 9.1 | Remarks / Locker I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWOS-03_GW-091323 | 9/13/23 | 1043 | G | X | | | 2 | | | | | | | X | |
| EB-01_091323 | 9/13/23 | 1100 | G | X | | | 1 | | | | | | | X | equipment blank |
| tripblank | 9/13/23 | 1105 | G | X | | | 1 | | | | | | | X | tripblank |
| MWOS-04_GW-091323 | 9/13/23 | 1310 | G | X | | | 2 | | | | | | | X | |
| MWOS-01_GW-091323 | 9/13/23 | 1045 | G | X | | | 2 | | | | | | | X | |
| MWOS-02_GW-091323 | 9/13/23 | 1135 | G | X | | | 2 | | | | | | | X | |
| TW-ROW-03_GW-091323 | 9/13/23 | 1215 | G | X | | | 2 | | | | | | | X | |
| TW-ROW-01_GW-091323 | 9/13/23 | 1330 | G | X | | | 2 | | | | | | | X | |
| MWW1-06_GW-091323 | 9/13/23 | 1350 | G | X | | | 2 | | | | | | | X | |

**Turn Around Time Required** (Prior lab approval required for expedited TAT.): ☒ Standard ☐ Rush (Specify)

**Sample Disposal**: ☐ Return to Client ☒ Dispose by Lab

**Possible Hazard Identification**: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

**QC Requirements (Specify)**

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Gray | 9/13/23 | 1715 | 1. Received by: FedEx | 9/13/23 | 1715 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | 9/14/23 | 1250 | 4. Laboratory Received by | 9/14/23 | 1250 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on ice (Circle): (Yes) No Ice Pack — Receipt Temp: 1.0 °C — Temp Blank ☐ Y ☐ N

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: ME00SIN2-01



PACE ANALYTICAL SERVICES, LLC

DC#_Title: ENV-FRM-WCOL-0286 v02_Samples Receipt Checklist (SRC)
Effective Date: 8/2/2022

# Sample Receipt Checklist (SRC)

Client: ARCADIS  Cooler Inspected by/date: CDR / 9/14/23  Lot #: YI14025

Means of receipt: ☐ Pace ☐ Client ☐ UPS ☑ FedEx ☐ Other: NA

| | | | |
|---|---|---|---|
| ☐ Yes | ☑ No | | 1. Were custody seals present on the cooler? |
| ☐ Yes | ☐ No | ☑ NA | 2. If custody seals were present, were they intact and unbroken? |

pH Strip ID: NA  Chlorine Strip ID: NA  Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt  %Solid Snap-Cup ID: NA

1.0 / 1.0 °C  NA / NA °C  NA / NA °C  NA / NA °C

Method: ☐ Temperature Blank ☑ Against Bottles  IR Gun ID: 8  IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | ☐ NA | 3. Were all coolers received at or below 6.0°C? If no, was Project Manager notified? PM was Notified by: phone / email / face-to-face (circle one). |
| ☑ Yes | ☐ No | ☐ NA | 4. Is the commercial courier's packing slip attached to this form? |
| ☑ Yes | ☐ No | | 5. Were proper custody procedures (relinquished/received) followed? |
| ☑ Yes | ☐ No | | 6. Were sample IDs listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 7. Was collection date & time listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 8. Did all container label information (ID, date, time) agree with the COC? |
| ☑ Yes | ☐ No | | 9. Were tests to be performed listed on the COC? |
| ☑ Yes | ☐ No | | 10. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? NA |
| ☑ Yes | ☐ No | | 11. Was adequate sample volume available? |
| ☑ Yes | ☐ No | | 12. Were all samples received within ½ the holding time or 48 hours, whichever comes first? |
| ☑ Yes | ☐ No | | 13. Were all samples containers accounted for? (No missing/excess) |
| ☐ Yes | ☐ No | ☑ NA | 14. Were VOA, 8015C and RSK-175 samples free of bubbles >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials? |
| ☐ Yes | ☐ No | ☑ NA | 15. Were all DRO/metals/nutrient samples received at a pH of < 2? |
| ☐ Yes | ☐ No | ☑ NA | 16. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9? |
| ☐ Yes | ☐ No | ☑ NA | 17. Were all applicable $NH_3$/TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine? |
| ☐ Yes | ☑ No | ☐ NA | 18. Was the quote number listed on the container label? If yes, Quote # NA |

**Sample Preservation** (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA. Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Unique ID: NA.

Comments:

Qualtrax ID: 56360  Pace® Analytical Services, LLC  Page 1 of 1

# Report of Analysis

**Arcadis U.S., Inc.**
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Tiffany Linder

Project Name: RACER PNC

Project Number: 30167840.00031

Lot Number:**YI15017**

Date Completed:09/29/2023

09/29/2023 4:37 PM
Approved and released by:
Project Manager II: **Kathy E. Smith**

The electronic signature above is the equivalent of a handwritten signature.
This report shall not be reproduced, except in its entirety, without the written approval of Pace Analytical Services, LLC.

Pace Analytical Services, LLC (*formerly Shealy Environmental Services, Inc.*)
106 Vantage Point Drive West Columbia, SC 29172
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

## Case Narrative
## Arcadis U.S., Inc.
### Lot Number: YI15017

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.4 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples were compliant with DOD QSM 5.4 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). The CF is calculated as follows:

CF = DF * FV / Vo

FV is volume of extract (mL)
Vo is initial sample volume (mL)
DF is dilution factor. For undiluted analysis, DF = 1.

Sample concentration for aqueous samples:
Concentration (ng/L) = Cs*CF,

$$C_s = \frac{\left(\frac{(A_s x C_{is})}{A_{is}}\right) - B}{M1}$$

Where

$C_s$ is on column concentration of target analyte in the sample (ng/L)
$C_{is}$ is concentration of internal standard in the sample (ng/L)
$A_s$ is peak response of target analyte in the sample
$A_{is}$ is peak response of internal standard in the sample
M1 is the average RF from ICAL or the slope from linear regression ICAL
B is the y-intercept from the ICAL

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18, PFAS by Isotope Dilution SOP.

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

PFAS
Samples YI15017-004, YI15017-005 required centrifugation prior to extraction, due to excessive solids present in the samples. Centrifugation was performed following the PFAS Aqueous Centrifuge Protocol; samples were spiked with Surrogate (SUR; Extracted Internal Standard/EIS) and shaken vigorously before being poured into a conical bottle and centrifuged. The centrifuged aqueous sample was decanted back into the original sample bottle, off of the condensed solids remaining in the centrifuge bottle. Original sample bottle was rinsed as normal and centrifuge bottle was rinsed with 4mL of MeOH. Centrifuge bottle rinsate was added to the elution. Samples concentrated to <5mL and reconstituted to 5mL using MeOH by transfer pipet.

Surrogate recovery for the following sample was outside control limits: YI15017-001. Re-extraction and/or re-analysis was performed with concurring results. The original analysis has been reported.

Surrogate recovery for the following samples was outside the upper control limit: YI15017-004, YI15017-005. These samples did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

## Sample Summary

## Arcadis U.S., Inc.

**Lot Number: YI15017**

**Project Name: RACER PNC**

**Project Number: 30167840.00031**

| Sample Number | Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| 001 | MWM30-01_GW-091423 | Aqueous | 09/14/2023 1425 | 09/15/2023 |
| 002 | EB-04_091423 | Aqueous | 09/14/2023 1450 | 09/15/2023 |
| 003 | trip blank | Aqueous | 09/14/2023 1455 | 09/15/2023 |
| 004 | MWM5-03_GW-091423 | Aqueous | 09/14/2023 1435 | 09/15/2023 |
| 005 | DUP-02_GW-091423 | Aqueous | 09/14/2023 | 09/15/2023 |

(5 samples)

## Detection Summary

## Arcadis U.S., Inc.

**Lot Number: YI15017**

**Project Name: RACER PNC**

**Project Number: 30167840.00031**

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 001 | MWM30-01_GW-091423 | Aqueous | 6:2 FTS | PFAS by ID | 37 | Q | ng/L | 6 |
| 001 | MWM30-01_GW-091423 | Aqueous | PFPeS | PFAS by ID | 2.6 | J | ng/L | 6 |
| 001 | MWM30-01_GW-091423 | Aqueous | PFHxS | PFAS by ID | 12 | | ng/L | 6 |
| 001 | MWM30-01_GW-091423 | Aqueous | PFHpA | PFAS by ID | 16 | | ng/L | 6 |
| 001 | MWM30-01_GW-091423 | Aqueous | PFHxA | PFAS by ID | 23 | | ng/L | 6 |
| 001 | MWM30-01_GW-091423 | Aqueous | PFOA | PFAS by ID | 54 | | ng/L | 6 |
| 001 | MWM30-01_GW-091423 | Aqueous | PFPeA | PFAS by ID | 21 | | ng/L | 6 |
| 004 | MWM5-03_GW-091423 | Aqueous | PFHxS | PFAS by ID | 1.8 | J | ng/L | 12 |
| 004 | MWM5-03_GW-091423 | Aqueous | PFBA | PFAS by ID | 2.5 | J | ng/L | 12 |
| 004 | MWM5-03_GW-091423 | Aqueous | PFHpA | PFAS by ID | 0.57 | J | ng/L | 12 |
| 005 | DUP-02_GW-091423 | Aqueous | PFBS | PFAS by ID | 2.8 | J | ng/L | 14 |
| 005 | DUP-02_GW-091423 | Aqueous | PFHxS | PFAS by ID | 1.5 | J | ng/L | 14 |
| 005 | DUP-02_GW-091423 | Aqueous | PFBA | PFAS by ID | 3.4 | J | ng/L | 14 |
| 005 | DUP-02_GW-091423 | Aqueous | PFHpA | PFAS by ID | 0.70 | J | ng/L | 14 |
| 005 | DUP-02_GW-091423 | Aqueous | PFOA | PFAS by ID | 1.3 | J | ng/L | 14 |

(15 detections)

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-001**

Description: **MWM30-01_GW-091423** Matrix: **Aqueous**

Date Sampled: **09/14/2023 1425** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/21/2023 1842 | ARC2 | 09/20/2023 2104 | 85336 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.1 | 0.43 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.1 | 0.59 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.1 | 1.4 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **37** | **Q** | **7.1** | **1.8** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.1 | 0.77 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.1 | 0.43 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.1 | 0.66 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.1 | 0.82 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.5 | 0.37 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.69 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.44 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.63 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **2.6** | **J** | **3.5** | **0.53** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **12** | | **3.5** | **0.49** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | Q | 3.5 | 0.53 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.42 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **16** | | **3.5** | **0.40** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **23** | | **3.5** | **0.61** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **54** | | **3.5** | **0.73** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **21** | | **3.5** | **0.48** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.53 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.47 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.55 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.5 | 1.8 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 177 | 25-150 |
| 13C2_6:2FTS | N | 300 | 25-150 |
| 13C2_8:2FTS | N | 213 | 25-150 |
| 13C2_PFDoA | | 95 | 25-150 |
| 13C2_PFTeDA | | 92 | 25-150 |
| 13C3_PFBS | | 71 | 25-150 |
| 13C3_PFHxS | | 87 | 25-150 |
| 13C3-HFPO-DA | | 44 | 25-150 |
| 13C4_PFBA | N | 19 | 25-150 |
| 13C4_PFHpA | | 55 | 25-150 |
| 13C5_PFHxA | | 43 | 25-150 |
| 13C5_PFPeA | | 32 | 25-150 |
| 13C6_PFDA | | 105 | 25-150 |
| 13C7_PFUdA | | 94 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-001**

Description: **MWM30-01_GW-091423** Matrix: **Aqueous**

Date Sampled: **09/14/2023 1425** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 82 | 25-150 |
| 13C8_PFOS | | 88 | 25-150 |
| 13C8_PFOSA | | 83 | 10-150 |
| 13C9_PFNA | | 89 | 25-150 |
| d5-EtFOSAA | | 111 | 25-150 |
| d3-MeFOSAA | | 107 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-002**

Description: **EB-04_091423** Matrix: **Aqueous**

Date Sampled: **09/14/2023 1450** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/21/2023 1853 | ARC2 | 09/20/2023 2104 | 85336 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.8 | 0.65 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.8 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.8 | 0.85 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.8 | 0.73 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.8 | 0.91 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.9 | 0.41 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.76 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.49 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.70 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.60 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.9 | 0.54 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.9 | 0.59 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.46 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.9 | 0.44 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.9 | 0.67 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.9 | 0.45 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.9 | 0.81 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.9 | 0.53 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.59 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.52 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.61 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.9 | 2.0 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 99 | 25-150 |
| 13C2_6:2FTS | | 139 | 25-150 |
| 13C2_8:2FTS | | 94 | 25-150 |
| 13C2_PFDoA | | 99 | 25-150 |
| 13C2_PFTeDA | | 91 | 25-150 |
| 13C3_PFBS | | 111 | 25-150 |
| 13C3_PFHxS | | 100 | 25-150 |
| 13C3-HFPO-DA | | 101 | 25-150 |
| 13C4_PFBA | | 103 | 25-150 |
| 13C4_PFHpA | | 101 | 25-150 |
| 13C5_PFHxA | | 98 | 25-150 |
| 13C5_PFPeA | | 96 | 25-150 |
| 13C6_PFDA | | 99 | 25-150 |
| 13C7_PFUdA | | 91 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
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# PFAS by LC/MS/MS

| | | | |
|---|---|---|---|
| Client: **Arcadis U.S., Inc.** | | Laboratory ID: **YI15017-002** |
| Description: **EB-04_091423** | | Matrix: **Aqueous** |
| Date Sampled: **09/14/2023 1450** | Project Name: **RACER PNC** | |
| Date Received: **09/15/2023** | Project Number: **30167840.00031** | |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 106 | 25-150 |
| 13C8_PFOS | | 96 | 25-150 |
| 13C8_PFOSA | | 90 | 10-150 |
| 13C9_PFNA | | 98 | 25-150 |
| d5-EtFOSAA | | 90 | 25-150 |
| d3-MeFOSAA | | 88 | 25-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-003**

Description: **trip blank** Matrix: **Aqueous**

Date Sampled: **09/14/2023 1455** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/21/2023 1903 | ARC2 | 09/20/2023 2104 | 85336 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.6 | 0.63 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.6 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.6 | 0.83 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.6 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.6 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.6 | 0.88 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.8 | 0.39 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.74 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.47 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.67 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.45 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.8 | 0.42 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.8 | 0.65 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.8 | 0.79 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 96 | 25-150 |
| 13C2_6:2FTS | | 121 | 25-150 |
| 13C2_8:2FTS | | 93 | 25-150 |
| 13C2_PFDoA | | 97 | 25-150 |
| 13C2_PFTeDA | | 95 | 25-150 |
| 13C3_PFBS | | 104 | 25-150 |
| 13C3_PFHxS | | 102 | 25-150 |
| 13C3-HFPO-DA | | 94 | 25-150 |
| 13C4_PFBA | | 105 | 25-150 |
| 13C4_PFHpA | | 105 | 25-150 |
| 13C5_PFHxA | | 96 | 25-150 |
| 13C5_PFPeA | | 99 | 25-150 |
| 13C6_PFDA | | 99 | 25-150 |
| 13C7_PFUdA | | 102 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-003**

Description: **trip blank** Matrix: **Aqueous**

Date Sampled: **09/14/2023 1455** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 109 | 25-150 |
| 13C8_PFOS | | 101 | 25-150 |
| 13C8_PFOSA | | 90 | 10-150 |
| 13C9_PFNA | | 104 | 25-150 |
| d5-EtFOSAA | | 100 | 25-150 |
| d3-MeFOSAA | | 95 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-004**

Description: **MWM5-03_GW-091423** Matrix: **Aqueous**

Date Sampled: **09/14/2023 1435** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/21/2023 1935 | ARC2 | 09/20/2023 2104 | 85336 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 0.62 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.4 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.4 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.4 | 0.81 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 0.70 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 0.87 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.7 | 0.39 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.72 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.46 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.66 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.57 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **1.8** | **J** | **3.7** | **0.51** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **2.5** | **J** | **3.7** | **0.56** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.44 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **0.57** | **J** | **3.7** | **0.42** | **ng/L** | **1** |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.7 | 0.64 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.43 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.7 | 0.77 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.51 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.58 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.7 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 291 | 25-150 |
| 13C2_6:2FTS | N | 193 | 25-150 |
| 13C2_8:2FTS | | 91 | 25-150 |
| 13C2_PFDoA | | 81 | 25-150 |
| 13C2_PFTeDA | | 73 | 25-150 |
| 13C3_PFBS | | 93 | 25-150 |
| 13C3_PFHxS | | 94 | 25-150 |
| 13C3-HFPO-DA | | 63 | 25-150 |
| 13C4_PFBA | | 39 | 25-150 |
| 13C4_PFHpA | | 90 | 25-150 |
| 13C5_PFHxA | | 87 | 25-150 |
| 13C5_PFPeA | | 66 | 25-150 |
| 13C6_PFDA | | 97 | 25-150 |
| 13C7_PFUdA | | 90 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

| | | | |
|---|---|---|---|
| Client: **Arcadis U.S., Inc.** | | Laboratory ID: **YI15017-004** |
| Description: **MWM5-03_GW-091423** | | Matrix: **Aqueous** |
| Date Sampled: **09/14/2023 1435** | Project Name: **RACER PNC** | |
| Date Received: **09/15/2023** | Project Number: **30167840.00031** | |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 114 | 25-150 |
| 13C8_PFOS | | 93 | 25-150 |
| 13C8_PFOSA | | 90 | 10-150 |
| 13C9_PFNA | | 100 | 25-150 |
| d5-EtFOSAA | | 85 | 25-150 |
| d3-MeFOSAA | | 85 | 25-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-005**

Description: **DUP-02_GW-091423** Matrix: **Aqueous**

Date Sampled: **09/14/2023** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/21/2023 1946 | ARC2 | 09/20/2023 2104 | 85336 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.6 | 0.63 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.6 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.6 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.6 | 0.83 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.6 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.6 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.6 | 0.89 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **2.8** | **J** | **3.8** | **0.39** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.74 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.47 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.68 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **1.5** | **J** | **3.8** | **0.52** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **3.4** | **J** | **3.8** | **0.57** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.45 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **0.70** | **J** | **3.8** | **0.43** | **ng/L** | **1** |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.8 | 0.65 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **1.3** | **J** | **3.8** | **0.79** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.60 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 280 | 25-150 |
| 13C2_6:2FTS | N | 191 | 25-150 |
| 13C2_8:2FTS | | 96 | 25-150 |
| 13C2_PFDoA | | 79 | 25-150 |
| 13C2_PFTeDA | | 71 | 25-150 |
| 13C3_PFBS | | 96 | 25-150 |
| 13C3_PFHxS | | 101 | 25-150 |
| 13C3-HFPO-DA | | 68 | 25-150 |
| 13C4_PFBA | | 41 | 25-150 |
| 13C4_PFHpA | | 88 | 25-150 |
| 13C5_PFHxA | | 85 | 25-150 |
| 13C5_PFPeA | | 64 | 25-150 |
| 13C6_PFDA | | 92 | 25-150 |
| 13C7_PFUdA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-005**

Description: **DUP-02_GW-091423** Matrix: **Aqueous**

Date Sampled: **09/14/2023** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 114 | 25-150 |
| 13C8_PFOS | | 93 | 25-150 |
| 13C8_PFOSA | | 85 | 10-150 |
| 13C9_PFNA | | 100 | 25-150 |
| d5-EtFOSAA | | 81 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# QC Summary

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ85336-001
**Batch:** 85336
**Analytical Method:** PFAS by ID SOP
**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/20/2023 2104

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 0.48 | ng/L | 09/21/2023 1656 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 0.66 | ng/L | 09/21/2023 1656 |
| 8:2 FTS | ND | | 1 | 8.0 | 1.6 | ng/L | 09/21/2023 1656 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 09/21/2023 1656 |
| 4:2 FTS | ND | | 1 | 8.0 | 0.87 | ng/L | 09/21/2023 1656 |
| GenX | ND | | 1 | 8.0 | 2.1 | ng/L | 09/21/2023 1656 |
| ADONA | ND | | 1 | 8.0 | 0.48 | ng/L | 09/21/2023 1656 |
| EtFOSAA | ND | | 1 | 8.0 | 0.75 | ng/L | 09/21/2023 1656 |
| MeFOSAA | ND | | 1 | 8.0 | 0.93 | ng/L | 09/21/2023 1656 |
| PFBS | ND | | 1 | 4.0 | 0.41 | ng/L | 09/21/2023 1656 |
| PFDS | ND | | 1 | 4.0 | 0.78 | ng/L | 09/21/2023 1656 |
| PFHpS | ND | | 1 | 4.0 | 0.50 | ng/L | 09/21/2023 1656 |
| PFNS | ND | | 1 | 4.0 | 0.71 | ng/L | 09/21/2023 1656 |
| PFOSA | ND | | 1 | 4.0 | 0.61 | ng/L | 09/21/2023 1656 |
| PFPeS | ND | | 1 | 4.0 | 0.59 | ng/L | 09/21/2023 1656 |
| PFHxS | ND | | 1 | 4.0 | 0.55 | ng/L | 09/21/2023 1656 |
| PFBA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/21/2023 1656 |
| PFDA | ND | | 1 | 4.0 | 0.52 | ng/L | 09/21/2023 1656 |
| PFDoA | ND | | 1 | 4.0 | 0.47 | ng/L | 09/21/2023 1656 |
| PFHpA | ND | | 1 | 4.0 | 0.45 | ng/L | 09/21/2023 1656 |
| PFHxA | ND | | 1 | 4.0 | 0.69 | ng/L | 09/21/2023 1656 |
| PFNA | ND | | 1 | 4.0 | 0.46 | ng/L | 09/21/2023 1656 |
| PFOA | ND | | 1 | 4.0 | 0.83 | ng/L | 09/21/2023 1656 |
| PFPeA | ND | | 1 | 4.0 | 0.54 | ng/L | 09/21/2023 1656 |
| PFTeDA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/21/2023 1656 |
| PFTrDA | ND | | 1 | 4.0 | 0.53 | ng/L | 09/21/2023 1656 |
| PFUdA | ND | | 1 | 4.0 | 0.63 | ng/L | 09/21/2023 1656 |
| PFOS | ND | | 1 | 4.0 | 2.0 | ng/L | 09/21/2023 1656 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 100 | 25-150 |
| 13C2_6:2FTS | | 130 | 25-150 |
| 13C2_8:2FTS | | 102 | 25-150 |
| 13C2_PFDoA | | 94 | 25-150 |
| 13C2_PFTeDA | | 95 | 25-150 |
| 13C3_PFBS | | 106 | 25-150 |
| 13C3_PFHxS | | 109 | 25-150 |
| 13C3-HFPO-DA | | 90 | 25-150 |
| 13C4_PFBA | | 105 | 25-150 |
| 13C4_PFHpA | | 104 | 25-150 |
| 13C5_PFHxA | | 97 | 25-150 |
| 13C5_PFPeA | | 96 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ85336-001
**Batch:** 85336
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/20/2023 2104

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 100 | 25-150 |
| 13C7_PFUdA | | 98 | 25-150 |
| 13C8_PFOA | | 113 | 25-150 |
| 13C8_PFOS | | 99 | 25-150 |
| 13C8_PFOSA | | 88 | 10-150 |
| 13C9_PFNA | | 102 | 25-150 |
| d5-EtFOSAA | | 105 | 25-150 |
| d3-MeFOSAA | | 95 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ85336-002
**Batch:** 85336
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/20/2023 2104

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 15 | | 1 | 104 | 50-150 | 09/21/2023 1707 |
| 11Cl-PF3OUdS | 15 | 15 | | 1 | 97 | 50-150 | 09/21/2023 1707 |
| 8:2 FTS | 15 | 13 | | 1 | 85 | 50-150 | 09/21/2023 1707 |
| 6:2 FTS | 15 | 15 | | 1 | 100 | 50-150 | 09/21/2023 1707 |
| 4:2 FTS | 15 | 14 | | 1 | 97 | 50-150 | 09/21/2023 1707 |
| GenX | 32 | 30 | | 1 | 93 | 50-150 | 09/21/2023 1707 |
| ADONA | 15 | 15 | | 1 | 102 | 50-150 | 09/21/2023 1707 |
| EtFOSAA | 16 | 16 | | 1 | 101 | 50-150 | 09/21/2023 1707 |
| MeFOSAA | 16 | 14 | | 1 | 87 | 50-150 | 09/21/2023 1707 |
| PFBS | 14 | 14 | | 1 | 96 | 50-150 | 09/21/2023 1707 |
| PFDS | 15 | 16 | | 1 | 102 | 50-150 | 09/21/2023 1707 |
| PFHpS | 15 | 14 | | 1 | 94 | 50-150 | 09/21/2023 1707 |
| PFNS | 15 | 15 | | 1 | 99 | 50-150 | 09/21/2023 1707 |
| PFOSA | 16 | 15 | | 1 | 93 | 50-150 | 09/21/2023 1707 |
| PFPeS | 15 | 15 | | 1 | 98 | 50-150 | 09/21/2023 1707 |
| PFHxS | 15 | 15 | | 1 | 101 | 50-150 | 09/21/2023 1707 |
| PFBA | 16 | 15 | | 1 | 94 | 50-150 | 09/21/2023 1707 |
| PFDA | 16 | 15 | | 1 | 91 | 50-150 | 09/21/2023 1707 |
| PFDoA | 16 | 15 | | 1 | 94 | 50-150 | 09/21/2023 1707 |
| PFHpA | 16 | 16 | | 1 | 100 | 50-150 | 09/21/2023 1707 |
| PFHxA | 16 | 15 | | 1 | 92 | 50-150 | 09/21/2023 1707 |
| PFNA | 16 | 15 | | 1 | 94 | 50-150 | 09/21/2023 1707 |
| PFOA | 16 | 16 | | 1 | 101 | 50-150 | 09/21/2023 1707 |
| PFPeA | 16 | 16 | | 1 | 101 | 50-150 | 09/21/2023 1707 |
| PFTeDA | 16 | 16 | | 1 | 101 | 50-150 | 09/21/2023 1707 |
| PFTrDA | 16 | 15 | | 1 | 93 | 50-150 | 09/21/2023 1707 |
| PFUdA | 16 | 15 | | 1 | 95 | 50-150 | 09/21/2023 1707 |
| PFOS | 15 | 15 | | 1 | 104 | 50-150 | 09/21/2023 1707 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 104 | 25-150 |
| 13C2_6:2FTS | | 137 | 25-150 |
| 13C2_8:2FTS | | 102 | 25-150 |
| 13C2_PFDoA | | 98 | 25-150 |
| 13C2_PFTeDA | | 104 | 25-150 |
| 13C3_PFBS | | 109 | 25-150 |
| 13C3_PFHxS | | 114 | 25-150 |
| 13C3-HFPO-DA | | 108 | 25-150 |
| 13C4_PFBA | | 105 | 25-150 |
| 13C4_PFHpA | | 107 | 25-150 |
| 13C5_PFHxA | | 104 | 25-150 |
| 13C5_PFPeA | | 102 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ85336-002
**Batch:** 85336
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/20/2023 2104

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 107 | 25-150 |
| 13C7_PFUdA | | 103 | 25-150 |
| 13C8_PFOA | | 110 | 25-150 |
| 13C8_PFOS | | 100 | 25-150 |
| 13C8_PFOSA | | 102 | 10-150 |
| 13C9_PFNA | | 103 | 25-150 |
| d5-EtFOSAA | | 105 | 25-150 |
| d3-MeFOSAA | | 105 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Chain of Custody
# and
# Miscellaneous Documents

Pace Analytical®

**PACE ANALYTICAL SERVICES, LLC**
108 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Tiffany Linder, Alexis Crisp | Telephone No. / E-mail: Alexis.crisp@arcadis.com, tiffany.linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Sommer Guy | Analysis (Attach list if more space is needed): Report CoLE 28 Compounds | Page 1 of 2 |
| City: Novi | State: MI Zip Code: 48377 | Printed Name: Sommer Guy | |
| Project Name: Racer PNC | | | YI15017 |
| Project No.: 30167840.00031 | P.O. No. | | KES2 |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab (G) C-Composite | Matrix: Aqueous | Matrix: Solid | Matrix: Non-Aqueous | No. of Containers by Preservative Type: Unpres | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Methanol | Methyl 537 mod. with Isotope dilution PFAS 533 PFAS | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWM30-01_GW-091423 | 9/14/23 | 1425 | G | X | | | 2 | | | | | | | X | |
| EB-04_091423 | 9/14/23 | 1450 | G | X | | | 1 | | | | | | | X | equipment blank |
| tripblank | 9/14/23 | 1455 | G | X | | | 1 | | | | | | | X | tripblank |

| | | | | | |
|---|---|---|---|---|---|
| Turn Around Time Required (Prior lab approval required for expedited TAT.): ☑ Standard ☐ Rush (Specify) | Sample Disposal: ☐ Return to Client ☒ Disposal by Lab | Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown | | QC Requirements (Specify) | |
| 1. Relinquished by: Sommer Guy | Date: 9/14/23 | Time: 1700 | 1. Received by: FedEx | Date: 9/14/23 | Time: 1700 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | Date: 9.15.23 | Time: 1030 | 4. Laboratory received by: Karen Weems | Date: 9.15.23 | Time: 1030 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack
Receipt Temp: 4.0 °C
Temp Blank: Y ☐ N



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ARCADIS US

**PACE ANALYTICAL SERVICES, LLC**
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: US ARCADIS | Report to Contact: Alexis Crisp | Telephone No. / E-mail: Alexis.crisp@arcadis.com | Quote No. |
| Address: US 28550 Cabot Dr #500 Novi | Sampler's Signature: x | Analysis (Attach list if more space is needed): Report Chlate 28 Compounds | Page 2 of 2 |
| City: Novi / State: MI / Zip Code: 48377 | Printed Name: Lottie Jay | | |
| Project Name: Racer PNC | | | |
| Project No.: 30167840.00031.SG | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab / Composite | Matrix: Aqueous | Matrix: Soil | Matrix: Non-Aqueous | No. of Containers by Preservative Type: Unpres. | HCl | HNO3 | H2SO4 | NaOH | Na2S2O3 | Field Filtered | Method 537 mod. with isotope dilution per QSM 5.1 | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWMS-03_GW-091423 | 9/14/23 | 1435 | G | X | | | 2 | | | | | | | X | |
| DUP-02-GW-091423 | " | — | G | X | | | 2 | | | | | | | X | |

Y115017

KBS2

| Turn Around Time Required (Prior lab approval required for expedited TAT.) | Sample Disposal | Possible Hazard Identification | QC Requirements (Specify) |
|---|---|---|---|
| ☐ Standard ☐ Rush (Specify) | ☐ Return to Client ☑ Disposal by Lab | ☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown | |

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Lottie Jay/Lottie | 9/14/23 | 1525 | 1. Received by: Jonnmen | 9/14/23 | 1525 |
| 2. Relinquished by: Jonnmen | 9/14/23 | 1700 | 2. Received by: FedEx | 9/14/23 | 1700 |
| 3. Relinquished by: | Date | Time | 3. Received by: | Date | Time |
| 4. Relinquished by: Fedex | 9.15.23 | 1030 | 4. Laboratory received by: Keyon Mercer | 9.15.23 | 1030 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack Receipt Temp. 4.0 °C Temp Blank ☑ Y ☐ N

PACE ANALYTICAL SERVICES, LLC

DC#_Title: ENV-FRM-WCOL-0286 v02_Samples Receipt Checklist (SRC)
Effective Date: 8/2/2022

# Sample Receipt Checklist (SRC)

Client: Arcadis  Cooler Inspected by/date: KDRW / 09/15/203  Lot #: YT15017

Means of receipt: ☐ Pace ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | | 1. Were custody seals present on the cooler? |
| ☑ Yes | ☐ No | ☐ NA | 2. If custody seals were present, were they intact and unbroken? |

pH Strip ID: NA  Chlorine Strip ID: NA  Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt  %Solid Snap-Cup ID: NA

4.0 / 4.0 °C  NA / NA °C  NA / NA °C  NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles  IR Gun ID: 8  IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | ☐ NA | 3. Were all coolers received at or below 6.0°C? If no, was Project Manager notified? PM was Notified by: phone / email / face-to-face (circle one). |
| ☑ Yes | ☐ No | ☐ NA | 4. Is the commercial courier's packing slip attached to this form? |
| ☑ Yes | ☐ No | | 5. Were proper custody procedures (relinquished/received) followed? |
| ☑ Yes | ☐ No | | 6. Were sample IDs listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 7. Was collection date & time listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 8. Did all container label information (ID, date, time) agree with the COC? |
| ☑ Yes | ☐ No | | 9. Were tests to be performed listed on the COC? |
| ☑ Yes | ☐ No | | 10. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____ |
| ☑ Yes | ☐ No | | 11. Was adequate sample volume available? |
| ☑ Yes | ☐ No | | 12. Were all samples received within ½ the holding time or 48 hours, whichever comes first? |
| ☑ Yes | ☐ No | | 13. Were all samples containers accounted for? (No missing/excess) |
| ☑ Yes | ☐ No | ☐ NA | 14. Were VOA, 8015C and RSK-175 samples free of bubbles >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials? |
| ☐ Yes | ☐ No | ☑ NA | 15. Were all DRO/metals/nutrient samples received at a pH of < 2? |
| ☐ Yes | ☐ No | ☑ NA | 16. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9? |
| ☐ Yes | ☐ No | ☑ NA | 17. Were all applicable $NH_3$/TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine? |
| ☐ Yes | ☑ No | ☐ NA | 18. Was the quote number listed on the container label? If yes, Quote # _____ |

**Sample Preservation** (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA _____ were received incorrectly preserved and were adjusted accordingly in sample receiving with NA _____ mL of circle one: $H_2SO_4$, $HNO_3$, HCl, NaOH using SR # NA _____. Time of preservation NA _____. If more than one preservative is needed, please note in the comments below.

Sample(s) NA _____ were received with bubbles >6 mm in diameter.

Samples(s) NA _____ were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Unique ID: NA _____.

Comments:

Qualtrax ID: 56360  Pace® Analytical Services, LLC  Page 1 of 1

# Report of Analysis

**Arcadis U.S., Inc.**
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Alexis Crisp

Project Name: RACER PNC

Project Number: 30167840.00031

Lot Number:**YI19014**

Date Completed:10/12/2023

Kathy Smith

10/12/2023 9:15 AM
Approved and released by:
Project Manager II: **Kathy E. Smith**

The electronic signature above is the equivalent of a handwritten signature.
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Pace Analytical Services, LLC (*formerly Shealy Environmental Services, Inc.*)
106 Vantage Point Drive West Columbia, SC 29172
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

## Case Narrative
## Arcadis U.S., Inc.
### Lot Number: YI19014

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.4 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples were compliant with DOD QSM 5.4 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). The CF is calculated as follows:

CF = DF * FV / Vo

FV is volume of extract (mL)
Vo is initial sample volume (mL)
DF is dilution factor. For undiluted analysis, DF = 1.

Sample concentration for aqueous samples:
Concentration (ng/L) = Cs*CF,

$$C_s = \frac{\left(\frac{(A_s x C_{is})}{A_{is}}\right) - B}{M1}$$

Where

$C_s$ is on column concentration of target analyte in the sample (ng/L)
$C_{is}$ is concentration of internal standard in the sample (ng/L)
$A_s$ is peak response of target analyte in the sample
$A_{is}$ is peak response of internal standard in the sample
M1 is the average RF from ICAL or the slope from linear regression ICAL
B is the y-intercept from the ICAL

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18, PFAS by Isotope Dilution SOP.

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

PFAS
Samples YI19014-005, YI19014-006, YI19014-008, YI19014-009 required centrifugation prior to extraction, due to excessive solids present in the samples. Centrifugation was performed following the PFAS Aqueous Centrifuge Protocol; samples were spiked with Surrogate (SUR; Extracted Internal Standard/EIS) and shaken vigorously before being poured into a conical bottle and centrifuged. The centrifuged aqueous sample was decanted back into the original sample bottle, off of the condensed solids remaining in the centrifuge bottle. Original sample bottle was rinsed as normal and centrifuge bottle was rinsed with 4mL of MeOH. Centrifuge bottle rinsate was added to the elution. Samples concentrated to <5mL and reconstituted to 5mL using MeOH by transfer pipet.

Surrogate recovery for the following samples was outside the upper control limit: YI19014-004, YI19014-010, YI19014-011, YI19014-012, YI19014-013, YI19014-014, YI19014-015. These samples did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

Surrogate recovery for the following samples was outside control limits: YI19014-005, YI19014-006. Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Surrogate recovery for the following samples was outside control limits: YI19014-008, YI19014-009. Re-extraction and/or re-analysis was performed with concurring results. The original analysis has been reported.

## Sample Summary

## Arcadis U.S., Inc.

**Lot Number: YI19014**

**Project Name: RACER PNC**

**Project Number: 30167840.00031**

| Sample Number | Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| 001 | PZF17-05_GW-091523 | Aqueous | 09/15/2023 1304 | 09/19/2023 |
| 002 | EB-05_091523 | Aqueous | 09/15/2023 1610 | 09/19/2023 |
| 003 | Trip Blank | Aqueous | 09/16/2023 1000 | 09/19/2023 |
| 004 | MWF16-12_GW-091823 | Aqueous | 09/18/2023 1100 | 09/19/2023 |
| 005 | MWW10-SEN01-091823 | Aqueous | 09/18/2023 1340 | 09/19/2023 |
| 006 | TW-01-03_GW-091823 | Aqueous | 09/18/2023 1125 | 09/19/2023 |
| 007 | EB-02_091823 | Aqueous | 09/18/2023 1135 | 09/19/2023 |
| 008 | MW-01-17_GW-091823 | Aqueous | 09/18/2023 1425 | 09/19/2023 |
| 009 | DUP-03_GW-091823 | Aqueous | 09/18/2023 | 09/19/2023 |
| 010 | MWF16-06_GW-091523 | Aqueous | 09/15/2023 1300 | 09/19/2023 |
| 011 | MWF16-18_GW-091523 | Aqueous | 09/15/2023 1420 | 09/19/2023 |
| 012 | MWW10-03_GW-091523 | Aqueous | 09/15/2023 1250 | 09/19/2023 |
| 013 | MWW1-04_GW-091523 | Aqueous | 09/15/2023 1540 | 09/19/2023 |
| 014 | MWW10-04_GW-091523 | Aqueous | 09/15/2023 1130 | 09/19/2023 |
| 015 | DUP-01_GW-091523 | Aqueous | 09/15/2023 | 09/19/2023 |

(15 samples)

## Detection Summary

## Arcadis U.S., Inc.

**Lot Number: YI19014**

**Project Name: RACER PNC**

**Project Number: 30167840.00031**

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 001 | PZF17-05_GW-091523 | Aqueous | PFBS | PFAS by ID | 0.67 | J | ng/L | 9 |
| 001 | PZF17-05_GW-091523 | Aqueous | PFBA | PFAS by ID | 1.1 | J | ng/L | 9 |
| 004 | MWF16-12_GW-091823 | Aqueous | EtFOSAA | PFAS by ID | 1.4 | J | ng/L | 15 |
| 004 | MWF16-12_GW-091823 | Aqueous | PFHpS | PFAS by ID | 1.8 | J | ng/L | 15 |
| 004 | MWF16-12_GW-091823 | Aqueous | PFOSA | PFAS by ID | 3.5 | J | ng/L | 15 |
| 004 | MWF16-12_GW-091823 | Aqueous | PFHxS | PFAS by ID | 3.4 | J | ng/L | 15 |
| 004 | MWF16-12_GW-091823 | Aqueous | PFBA | PFAS by ID | 3.7 | J | ng/L | 15 |
| 004 | MWF16-12_GW-091823 | Aqueous | PFDA | PFAS by ID | 0.91 | J | ng/L | 15 |
| 004 | MWF16-12_GW-091823 | Aqueous | PFHpA | PFAS by ID | 6.0 | | ng/L | 15 |
| 004 | MWF16-12_GW-091823 | Aqueous | PFHxA | PFAS by ID | 12 | | ng/L | 15 |
| 004 | MWF16-12_GW-091823 | Aqueous | PFNA | PFAS by ID | 2.2 | J | ng/L | 15 |
| 004 | MWF16-12_GW-091823 | Aqueous | PFOA | PFAS by ID | 24 | | ng/L | 15 |
| 004 | MWF16-12_GW-091823 | Aqueous | PFPeA | PFAS by ID | 11 | | ng/L | 15 |
| 004 | MWF16-12_GW-091823 | Aqueous | PFOS | PFAS by ID | 110 | | ng/L | 15 |
| 005 | MWW10-SEN01-091823 | Aqueous | PFHxS | PFAS by ID | 2.9 | J | ng/L | 17 |
| 005 | MWW10-SEN01-091823 | Aqueous | PFHpA | PFAS by ID | 3.4 | J | ng/L | 17 |
| 005 | MWW10-SEN01-091823 | Aqueous | PFHxA | PFAS by ID | 6.0 | | ng/L | 17 |
| 005 | MWW10-SEN01-091823 | Aqueous | PFOA | PFAS by ID | 8.7 | | ng/L | 17 |
| 005 | MWW10-SEN01-091823 | Aqueous | PFOS | PFAS by ID | 18 | | ng/L | 17 |
| 006 | TW-01-03_GW-091823 | Aqueous | PFHpS | PFAS by ID | 3.1 | J | ng/L | 19 |
| 006 | TW-01-03_GW-091823 | Aqueous | PFHxS | PFAS by ID | 19 | | ng/L | 19 |
| 006 | TW-01-03_GW-091823 | Aqueous | PFNA | PFAS by ID | 1.1 | J | ng/L | 19 |
| 006 | TW-01-03_GW-091823 | Aqueous | PFOA | PFAS by ID | 21 | | ng/L | 19 |
| 006 | TW-01-03_GW-091823 | Aqueous | PFOS | PFAS by ID | 150 | | ng/L | 19 |
| 008 | MW-01-17_GW-091823 | Aqueous | PFBS | PFAS by ID | 7.0 | | ng/L | 23 |
| 008 | MW-01-17_GW-091823 | Aqueous | PFPeS | PFAS by ID | 3.4 | J | ng/L | 23 |
| 008 | MW-01-17_GW-091823 | Aqueous | PFHxS | PFAS by ID | 13 | | ng/L | 23 |
| 008 | MW-01-17_GW-091823 | Aqueous | PFBA | PFAS by ID | 18 | Q | ng/L | 23 |
| 008 | MW-01-17_GW-091823 | Aqueous | PFHpA | PFAS by ID | 5.7 | | ng/L | 23 |
| 008 | MW-01-17_GW-091823 | Aqueous | PFHxA | PFAS by ID | 9.2 | | ng/L | 23 |
| 008 | MW-01-17_GW-091823 | Aqueous | PFNA | PFAS by ID | 0.67 | J | ng/L | 23 |
| 008 | MW-01-17_GW-091823 | Aqueous | PFOA | PFAS by ID | 14 | | ng/L | 23 |
| 008 | MW-01-17_GW-091823 | Aqueous | PFOS | PFAS by ID | 13 | | ng/L | 23 |
| 009 | DUP-03_GW-091823 | Aqueous | PFBS | PFAS by ID | 4.9 | | ng/L | 25 |
| 009 | DUP-03_GW-091823 | Aqueous | PFHxS | PFAS by ID | 13 | | ng/L | 25 |
| 009 | DUP-03_GW-091823 | Aqueous | PFHpA | PFAS by ID | 6.0 | | ng/L | 25 |
| 009 | DUP-03_GW-091823 | Aqueous | PFHxA | PFAS by ID | 9.6 | | ng/L | 25 |
| 009 | DUP-03_GW-091823 | Aqueous | PFNA | PFAS by ID | 0.72 | J | ng/L | 25 |
| 009 | DUP-03_GW-091823 | Aqueous | PFOA | PFAS by ID | 13 | | ng/L | 25 |
| 009 | DUP-03_GW-091823 | Aqueous | PFOS | PFAS by ID | 14 | | ng/L | 25 |
| 010 | MWF16-06_GW-091523 | Aqueous | PFBS | PFAS by ID | 4.2 | | ng/L | 27 |
| 010 | MWF16-06_GW-091523 | Aqueous | PFHpS | PFAS by ID | 5.1 | | ng/L | 27 |
| 010 | MWF16-06_GW-091523 | Aqueous | PFPeS | PFAS by ID | 4.8 | | ng/L | 27 |

# Detection Summary (Continued)

## Lot Number: YI19014

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 010 | MWF16-06_GW-091523 | Aqueous | PFHxS | PFAS by ID | 17 | | ng/L | 27 |
| 010 | MWF16-06_GW-091523 | Aqueous | PFBA | PFAS by ID | 9.6 | | ng/L | 27 |
| 010 | MWF16-06_GW-091523 | Aqueous | PFHpA | PFAS by ID | 7.7 | | ng/L | 27 |
| 010 | MWF16-06_GW-091523 | Aqueous | PFHxA | PFAS by ID | 14 | | ng/L | 27 |
| 010 | MWF16-06_GW-091523 | Aqueous | PFOA | PFAS by ID | 40 | | ng/L | 27 |
| 010 | MWF16-06_GW-091523 | Aqueous | PFPeA | PFAS by ID | 13 | | ng/L | 27 |
| 010 | MWF16-06_GW-091523 | Aqueous | PFOS | PFAS by ID | 49 | | ng/L | 27 |
| 011 | MWF16-18_GW-091523 | Aqueous | PFHxS | PFAS by ID | 2.2 | J | ng/L | 29 |
| 011 | MWF16-18_GW-091523 | Aqueous | PFBA | PFAS by ID | 10 | | ng/L | 29 |
| 011 | MWF16-18_GW-091523 | Aqueous | PFHpA | PFAS by ID | 3.5 | | ng/L | 29 |
| 011 | MWF16-18_GW-091523 | Aqueous | PFHxA | PFAS by ID | 4.2 | | ng/L | 29 |
| 011 | MWF16-18_GW-091523 | Aqueous | PFNA | PFAS by ID | 0.91 | J | ng/L | 29 |
| 011 | MWF16-18_GW-091523 | Aqueous | PFOA | PFAS by ID | 12 | | ng/L | 29 |
| 011 | MWF16-18_GW-091523 | Aqueous | PFPeA | PFAS by ID | 4.8 | | ng/L | 29 |
| 011 | MWF16-18_GW-091523 | Aqueous | PFOS | PFAS by ID | 13 | | ng/L | 29 |
| 012 | MWW10-03_GW-091523 | Aqueous | PFBS | PFAS by ID | 12 | | ng/L | 31 |
| 012 | MWW10-03_GW-091523 | Aqueous | PFHpS | PFAS by ID | 1.6 | J | ng/L | 31 |
| 012 | MWW10-03_GW-091523 | Aqueous | PFPeS | PFAS by ID | 15 | | ng/L | 31 |
| 012 | MWW10-03_GW-091523 | Aqueous | PFHxS | PFAS by ID | 44 | | ng/L | 31 |
| 012 | MWW10-03_GW-091523 | Aqueous | PFBA | PFAS by ID | 21 | | ng/L | 31 |
| 012 | MWW10-03_GW-091523 | Aqueous | PFHpA | PFAS by ID | 30 | | ng/L | 31 |
| 012 | MWW10-03_GW-091523 | Aqueous | PFHxA | PFAS by ID | 29 | | ng/L | 31 |
| 012 | MWW10-03_GW-091523 | Aqueous | PFOA | PFAS by ID | 50 | | ng/L | 31 |
| 012 | MWW10-03_GW-091523 | Aqueous | PFPeA | PFAS by ID | 27 | | ng/L | 31 |
| 013 | MWW1-04_GW-091523 | Aqueous | EtFOSAA | PFAS by ID | 15 | | ng/L | 33 |
| 013 | MWW1-04_GW-091523 | Aqueous | MeFOSAA | PFAS by ID | 1.0 | J | ng/L | 33 |
| 013 | MWW1-04_GW-091523 | Aqueous | PFDS | PFAS by ID | 0.88 | J | ng/L | 33 |
| 013 | MWW1-04_GW-091523 | Aqueous | PFOSA | PFAS by ID | 1.7 | J | ng/L | 33 |
| 013 | MWW1-04_GW-091523 | Aqueous | PFHxS | PFAS by ID | 4.5 | | ng/L | 33 |
| 013 | MWW1-04_GW-091523 | Aqueous | PFDA | PFAS by ID | 0.87 | J | ng/L | 33 |
| 013 | MWW1-04_GW-091523 | Aqueous | PFHpA | PFAS by ID | 3.1 | J | ng/L | 33 |
| 013 | MWW1-04_GW-091523 | Aqueous | PFNA | PFAS by ID | 1.3 | J | ng/L | 33 |
| 013 | MWW1-04_GW-091523 | Aqueous | PFOA | PFAS by ID | 6.8 | | ng/L | 33 |
| 013 | MWW1-04_GW-091523 | Aqueous | PFPeA | PFAS by ID | 5.2 | | ng/L | 33 |
| 013 | MWW1-04_GW-091523 | Aqueous | PFOS | PFAS by ID | 130 | | ng/L | 33 |
| 014 | MWW10-04_GW-091523 | Aqueous | PFHxS | PFAS by ID | 5.7 | | ng/L | 35 |
| 014 | MWW10-04_GW-091523 | Aqueous | PFBA | PFAS by ID | 8.3 | J | ng/L | 35 |
| 014 | MWW10-04_GW-091523 | Aqueous | PFDA | PFAS by ID | 0.94 | J | ng/L | 35 |
| 014 | MWW10-04_GW-091523 | Aqueous | PFHpA | PFAS by ID | 11 | | ng/L | 35 |
| 014 | MWW10-04_GW-091523 | Aqueous | PFHxA | PFAS by ID | 18 | | ng/L | 35 |
| 014 | MWW10-04_GW-091523 | Aqueous | PFNA | PFAS by ID | 16 | | ng/L | 35 |
| 014 | MWW10-04_GW-091523 | Aqueous | PFOA | PFAS by ID | 45 | | ng/L | 35 |
| 014 | MWW10-04_GW-091523 | Aqueous | PFPeA | PFAS by ID | 15 | | ng/L | 35 |
| 014 | MWW10-04_GW-091523 | Aqueous | PFOS | PFAS by ID | 48 | | ng/L | 35 |
| 015 | DUP-01_GW-091523 | Aqueous | PFHxS | PFAS by ID | 5.0 | | ng/L | 37 |
| 015 | DUP-01_GW-091523 | Aqueous | PFDA | PFAS by ID | 1.1 | J | ng/L | 37 |
| 015 | DUP-01_GW-091523 | Aqueous | PFHpA | PFAS by ID | 14 | | ng/L | 37 |
| 015 | DUP-01_GW-091523 | Aqueous | PFHxA | PFAS by ID | 15 | | ng/L | 37 |

# Detection Summary (Continued)

## Lot Number: YI19014

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 015 | DUP-01_GW-091523 | Aqueous | PFNA | PFAS by ID | 15 | | ng/L | 37 |
| 015 | DUP-01_GW-091523 | Aqueous | PFOA | PFAS by ID | 45 | | ng/L | 37 |
| 015 | DUP-01_GW-091523 | Aqueous | PFPeA | PFAS by ID | 15 | | ng/L | 37 |
| 015 | DUP-01_GW-091523 | Aqueous | PFOS | PFAS by ID | 47 | | ng/L | 37 |

(95 detections)

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-001**

Description: **PZF17-05_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1304** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/29/2023 2329 | ARC2 | 09/27/2023 1602 | 85922 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 0.62 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.4 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.4 | 0.81 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 0.70 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 0.87 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **0.67** | **J** | **3.7** | **0.39** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.72 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.46 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.66 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.57 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.7 | 0.51 | ng/L | 1 |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **1.1** | **J** | **3.7** | **0.56** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.44 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.7 | 0.42 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.7 | 0.64 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.43 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.7 | 0.77 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.51 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.58 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.7 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 116 | 25-150 |
| 13C2_6:2FTS | | 95 | 25-150 |
| 13C2_8:2FTS | | 81 | 25-150 |
| 13C2_PFDoA | | 73 | 25-150 |
| 13C2_PFTeDA | | 83 | 25-150 |
| 13C3_PFBS | | 93 | 25-150 |
| 13C3_PFHxS | | 84 | 25-150 |
| 13C3-HFPO-DA | | 92 | 25-150 |
| 13C4_PFBA | | 80 | 25-150 |
| 13C4_PFHpA | | 87 | 25-150 |
| 13C5_PFHxA | | 93 | 25-150 |
| 13C5_PFPeA | | 92 | 25-150 |
| 13C6_PFDA | | 80 | 25-150 |
| 13C7_PFUdA | | 82 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-001**

Description: **PZF17-05_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1304** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 89 | 25-150 |
| 13C8_PFOS | | 84 | 25-150 |
| 13C8_PFOSA | | 79 | 10-150 |
| 13C9_PFNA | | 90 | 25-150 |
| d5-EtFOSAA | | 85 | 25-150 |
| d3-MeFOSAA | | 83 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-002**

Description: **EB-05_091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1610** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/29/2023 2339 | ARC2 | 09/27/2023 1602 | 85922 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.6 | 0.63 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.6 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.6 | 0.83 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.6 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.6 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.6 | 0.88 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.8 | 0.39 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.74 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.47 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.67 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.45 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.8 | 0.42 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.8 | 0.65 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.8 | 0.78 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.51 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 117 | 25-150 |
| 13C2_6:2FTS | | 139 | 25-150 |
| 13C2_8:2FTS | | 105 | 25-150 |
| 13C2_PFDoA | | 102 | 25-150 |
| 13C2_PFTeDA | | 105 | 25-150 |
| 13C3_PFBS | | 111 | 25-150 |
| 13C3_PFHxS | | 100 | 25-150 |
| 13C3-HFPO-DA | | 106 | 25-150 |
| 13C4_PFBA | | 108 | 25-150 |
| 13C4_PFHpA | | 110 | 25-150 |
| 13C5_PFHxA | | 112 | 25-150 |
| 13C5_PFPeA | | 112 | 25-150 |
| 13C6_PFDA | | 108 | 25-150 |
| 13C7_PFUdA | | 103 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-002**

Description: **EB-05_091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1610** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 116 | 25-150 |
| 13C8_PFOS | | 112 | 25-150 |
| 13C8_PFOSA | | 98 | 10-150 |
| 13C9_PFNA | | 114 | 25-150 |
| d5-EtFOSAA | | 106 | 25-150 |
| d3-MeFOSAA | | 107 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-003**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/16/2023 1000** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/29/2023 2350 | ARC2 | 09/27/2023 1602 | 85922 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.2 | 0.43 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.2 | 0.59 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.2 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.2 | 0.78 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.2 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.2 | 0.43 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.2 | 0.67 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.2 | 0.83 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.37 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.70 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.45 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.64 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.53 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.6 | 0.49 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.40 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.61 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.41 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.6 | 0.74 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.49 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.6 | 1.8 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 88 | 25-150 |
| 13C2_6:2FTS | | 94 | 25-150 |
| 13C2_8:2FTS | | 83 | 25-150 |
| 13C2_PFDoA | | 78 | 25-150 |
| 13C2_PFTeDA | | 88 | 25-150 |
| 13C3_PFBS | | 91 | 25-150 |
| 13C3_PFHxS | | 85 | 25-150 |
| 13C3-HFPO-DA | | 93 | 25-150 |
| 13C4_PFBA | | 91 | 25-150 |
| 13C4_PFHpA | | 90 | 25-150 |
| 13C5_PFHxA | | 94 | 25-150 |
| 13C5_PFPeA | | 87 | 25-150 |
| 13C6_PFDA | | 90 | 25-150 |
| 13C7_PFUdA | | 91 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-003**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/16/2023 1000** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 92 | 25-150 |
| 13C8_PFOS | | 85 | 25-150 |
| 13C8_PFOSA | | 81 | 10-150 |
| 13C9_PFNA | | 93 | 25-150 |
| d5-EtFOSAA | | 90 | 25-150 |
| d3-MeFOSAA | | 82 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-004**

Description: **MWF16-12_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1100** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0032 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.8 | 0.64 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.8 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.8 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.8 | 0.85 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| **N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)** | **2991-50-6** | **PFAS by ID SOP** | **1.4** | **J** | **7.8** | **0.73** | **ng/L** | **1** |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.8 | 0.91 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.9 | 0.40 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.76 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **1.8** | **J** | **3.9** | **0.48** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.69 | ng/L | 1 |
| **Perfluoro-1-octanesulfonamide (PFOSA)** | **754-91-6** | **PFAS by ID SOP** | **3.5** | **J** | **3.9** | **0.60** | **ng/L** | **1** |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **3.4** | **J** | **3.9** | **0.54** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **3.7** | **J** | **3.9** | **0.58** | **ng/L** | **1** |
| **Perfluoro-n-decanoic acid (PFDA)** | **335-76-2** | **PFAS by ID SOP** | **0.91** | **J** | **3.9** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.46 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **6.0** | | **3.9** | **0.43** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **12** | | **3.9** | **0.67** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **2.2** | **J** | **3.9** | **0.45** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **24** | | **3.9** | **0.81** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **11** | | **3.9** | **0.53** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.61 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **110** | | **3.9** | **1.9** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 256 | 25-150 |
| 13C2_6:2FTS | N | 168 | 25-150 |
| 13C2_8:2FTS | | 119 | 25-150 |
| 13C2_PFDoA | | 91 | 25-150 |
| 13C2_PFTeDA | | 92 | 25-150 |
| 13C3_PFBS | | 94 | 25-150 |
| 13C3_PFHxS | | 94 | 25-150 |
| 13C3-HFPO-DA | | 87 | 25-150 |
| 13C4_PFBA | | 55 | 25-150 |
| 13C4_PFHpA | | 88 | 25-150 |
| 13C5_PFHxA | | 99 | 25-150 |
| 13C5_PFPeA | | 92 | 25-150 |
| 13C6_PFDA | | 102 | 25-150 |
| 13C7_PFUdA | | 101 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-004**

Description: **MWF16-12_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1100** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 105 | 25-150 |
| 13C8_PFOS | | 93 | 25-150 |
| 13C8_PFOSA | | 92 | 10-150 |
| 13C9_PFNA | | 107 | 25-150 |
| d5-EtFOSAA | | 95 | 25-150 |
| d3-MeFOSAA | | 106 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-005**

Description: **MWW10-SEN01-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1340** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0043 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.9 | 0.48 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.9 | 0.65 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.9 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.9 | 2.0 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.9 | 0.86 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.9 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.9 | 0.48 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.9 | 0.74 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.9 | 0.92 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.9 | 0.41 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.77 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.49 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.70 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.60 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.59 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **2.9** | **J** | **3.9** | **0.54** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | Q | 3.9 | 0.59 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.9 | 0.52 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.47 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **3.4** | **J** | **3.9** | **0.44** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **6.0** | | **3.9** | **0.68** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.9 | 0.46 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **8.7** | | **3.9** | **0.82** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.9 | 0.54 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.59 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.52 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.62 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **18** | | **3.9** | **2.0** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 234 | 25-150 |
| 13C2_6:2FTS | N | 298 | 25-150 |
| 13C2_8:2FTS | N | 236 | 25-150 |
| 13C2_PFDoA | | 90 | 25-150 |
| 13C2_PFTeDA | | 86 | 25-150 |
| 13C3_PFBS | | 76 | 25-150 |
| 13C3_PFHxS | | 83 | 25-150 |
| 13C3-HFPO-DA | | 61 | 25-150 |
| 13C4_PFBA | N | 24 | 25-150 |
| 13C4_PFHpA | | 56 | 25-150 |
| 13C5_PFHxA | | 56 | 25-150 |
| 13C5_PFPeA | | 43 | 25-150 |
| 13C6_PFDA | | 99 | 25-150 |
| 13C7_PFUdA | | 103 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-005**

Description: **MWW10-SEN01-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1340** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 83 | 25-150 |
| 13C8_PFOS | | 87 | 25-150 |
| 13C8_PFOSA | | 84 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 |
| d5-EtFOSAA | | 108 | 25-150 |
| d3-MeFOSAA | | 112 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-006**

Description: **TW-01-03_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1125** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0054 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.1 | 0.43 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.1 | 0.59 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.1 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.1 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.1 | 0.78 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.1 | 0.43 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.1 | 0.67 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.1 | 0.83 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.37 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.69 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **3.1** | **J** | **3.6** | **0.44** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.63 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.53 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **19** | | **3.6** | **0.49** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | Q | 3.6 | 0.53 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.40 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.61 | ng/L | 1 |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **1.1** | **J** | **3.6** | **0.41** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **21** | | **3.6** | **0.74** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.53 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **150** | | **3.6** | **1.8** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 260 | 25-150 |
| 13C2_6:2FTS | N | 246 | 25-150 |
| 13C2_8:2FTS | N | 249 | 25-150 |
| 13C2_PFDoA | | 63 | 25-150 |
| 13C2_PFTeDA | | 44 | 25-150 |
| 13C3_PFBS | | 70 | 25-150 |
| 13C3_PFHxS | | 62 | 25-150 |
| 13C3-HFPO-DA | | 45 | 25-150 |
| 13C4_PFBA | N | 17 | 25-150 |
| 13C4_PFHpA | | 28 | 25-150 |
| 13C5_PFHxA | | 33 | 25-150 |
| 13C5_PFPeA | | 29 | 25-150 |
| 13C6_PFDA | | 66 | 25-150 |
| 13C7_PFUdA | | 74 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-006**

Description: **TW-01-03_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1125** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 55 | 25-150 |
| 13C8_PFOS | | 71 | 25-150 |
| 13C8_PFOSA | | 35 | 10-150 |
| 13C9_PFNA | | 66 | 25-150 |
| d5-EtFOSAA | | 72 | 25-150 |
| d3-MeFOSAA | | 69 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-007**

Description: **EB-02_091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1135** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0104 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.2 | 0.44 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.2 | 0.60 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.2 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.2 | 0.79 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.2 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.2 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.2 | 0.68 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.2 | 0.84 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.38 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.70 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.45 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.64 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.6 | 0.50 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.43 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.41 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.62 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.6 | 0.75 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.49 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.57 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.6 | 1.8 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 93 | 25-150 |
| 13C2_6:2FTS | | 80 | 25-150 |
| 13C2_8:2FTS | | 74 | 25-150 |
| 13C2_PFDoA | | 81 | 25-150 |
| 13C2_PFTeDA | | 91 | 25-150 |
| 13C3_PFBS | | 87 | 25-150 |
| 13C3_PFHxS | | 86 | 25-150 |
| 13C3-HFPO-DA | | 86 | 25-150 |
| 13C4_PFBA | | 90 | 25-150 |
| 13C4_PFHpA | | 83 | 25-150 |
| 13C5_PFHxA | | 87 | 25-150 |
| 13C5_PFPeA | | 83 | 25-150 |
| 13C6_PFDA | | 87 | 25-150 |
| 13C7_PFUdA | | 87 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-007**

Description: **EB-02_091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1135** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 92 | 25-150 |
| 13C8_PFOS | | 86 | 25-150 |
| 13C8_PFOSA | | 83 | 10-150 |
| 13C9_PFNA | | 86 | 25-150 |
| d5-EtFOSAA | | 86 | 25-150 |
| d3-MeFOSAA | | 82 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-008**

Description: **MW-01-17_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1425** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0251 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 0.61 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.3 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.3 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.3 | 0.80 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 0.69 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 0.85 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **7.0** | | **3.7** | **0.38** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.71 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.46 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.65 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **3.4** | **J** | **3.7** | **0.54** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **13** | | **3.7** | **0.51** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **18** | **Q** | **3.7** | **0.55** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.48 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.43 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **5.7** | | **3.7** | **0.41** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **9.2** | | **3.7** | **0.63** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **0.67** | **J** | **3.7** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **14** | | **3.7** | **0.76** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.50 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.57 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **13** | | **3.7** | **1.8** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 220 | 25-150 |
| 13C2_6:2FTS | N | 285 | 25-150 |
| 13C2_8:2FTS | N | 249 | 25-150 |
| 13C2_PFDoA | | 104 | 25-150 |
| 13C2_PFTeDA | | 91 | 25-150 |
| 13C3_PFBS | | 76 | 25-150 |
| 13C3_PFHxS | | 95 | 25-150 |
| 13C3-HFPO-DA | | 59 | 25-150 |
| 13C4_PFBA | N | 21 | 25-150 |
| 13C4_PFHpA | | 64 | 25-150 |
| 13C5_PFHxA | | 61 | 25-150 |
| 13C5_PFPeA | | 40 | 25-150 |
| 13C6_PFDA | | 112 | 25-150 |
| 13C7_PFUdA | | 119 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-008**

Description: **MW-01-17_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1425** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 101 | 25-150 |
| 13C8_PFOS | | 107 | 25-150 |
| 13C8_PFOSA | | 90 | 10-150 |
| 13C9_PFNA | | 110 | 25-150 |
| d5-EtFOSAA | | 125 | 25-150 |
| d3-MeFOSAA | | 118 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-009**

Description: **DUP-03_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0301 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 0.62 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.4 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.4 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.4 | 0.81 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 0.70 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 0.87 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **4.9** | | **3.7** | **0.39** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.72 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.46 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.66 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.57 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **13** | | **3.7** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | Q | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.44 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **6.0** | | **3.7** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **9.6** | | **3.7** | **0.64** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **0.72** | **J** | **3.7** | **0.43** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **13** | | **3.7** | **0.77** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.51 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.58 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **14** | | **3.7** | **1.9** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 247 | 25-150 |
| 13C2_6:2FTS | N | 317 | 25-150 |
| 13C2_8:2FTS | N | 214 | 25-150 |
| 13C2_PFDoA | | 101 | 25-150 |
| 13C2_PFTeDA | | 85 | 25-150 |
| 13C3_PFBS | | 82 | 25-150 |
| 13C3_PFHxS | | 90 | 25-150 |
| 13C3-HFPO-DA | | 59 | 25-150 |
| 13C4_PFBA | N | 21 | 25-150 |
| 13C4_PFHpA | | 61 | 25-150 |
| 13C5_PFHxA | | 62 | 25-150 |
| 13C5_PFPeA | | 40 | 25-150 |
| 13C6_PFDA | | 111 | 25-150 |
| 13C7_PFUdA | | 113 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-009**

Description: **DUP-03_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 25-150 |
| 13C8_PFOS | | 89 | 25-150 |
| 13C8_PFOSA | | 96 | 10-150 |
| 13C9_PFNA | | 107 | 25-150 |
| d5-EtFOSAA | | 125 | 25-150 |
| d3-MeFOSAA | | 116 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-010**

Description: **MWF16-06_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1300** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0312 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 0.57 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.9 | 0.76 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 0.65 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 0.81 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **4.2** | | **3.5** | **0.36** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.67 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **5.1** | | **3.5** | **0.43** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.62 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.53 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **4.8** | | **3.5** | **0.51** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **17** | | **3.5** | **0.48** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **9.6** | | **3.5** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.45 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **7.7** | | **3.5** | **0.39** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **14** | | **3.5** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.40 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **40** | | **3.5** | **0.72** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **13** | | **3.5** | **0.47** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **49** | | **3.5** | **1.7** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 201 | 25-150 |
| 13C2_6:2FTS | N | 171 | 25-150 |
| 13C2_8:2FTS | | 102 | 25-150 |
| 13C2_PFDoA | | 95 | 25-150 |
| 13C2_PFTeDA | | 89 | 25-150 |
| 13C3_PFBS | | 94 | 25-150 |
| 13C3_PFHxS | | 99 | 25-150 |
| 13C3-HFPO-DA | | 85 | 25-150 |
| 13C4_PFBA | | 73 | 25-150 |
| 13C4_PFHpA | | 90 | 25-150 |
| 13C5_PFHxA | | 104 | 25-150 |
| 13C5_PFPeA | | 90 | 25-150 |
| 13C6_PFDA | | 103 | 25-150 |
| 13C7_PFUdA | | 89 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-010**

Description: **MWF16-06_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1300** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 110 | 25-150 |
| 13C8_PFOS | | 100 | 25-150 |
| 13C8_PFOSA | | 91 | 10-150 |
| 13C9_PFNA | | 102 | 25-150 |
| d5-EtFOSAA | | 89 | 25-150 |
| d3-MeFOSAA | | 81 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-011**

Description: **MWF16-18_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1420** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0323 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 0.57 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.9 | 0.76 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 0.65 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 0.81 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.5 | 0.36 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.67 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.43 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.62 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.53 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.51 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **2.2** | **J** | **3.5** | **0.48** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **10** | | **3.5** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.45 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **3.5** | | **3.5** | **0.39** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **4.2** | | **3.5** | **0.60** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **0.91** | **J** | **3.5** | **0.40** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **12** | | **3.5** | **0.72** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **4.8** | | **3.5** | **0.47** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **13** | | **3.5** | **1.7** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 299 | 25-150 |
| 13C2_6:2FTS | N | 231 | 25-150 |
| 13C2_8:2FTS | | 128 | 25-150 |
| 13C2_PFDoA | | 94 | 25-150 |
| 13C2_PFTeDA | | 87 | 25-150 |
| 13C3_PFBS | | 91 | 25-150 |
| 13C3_PFHxS | | 100 | 25-150 |
| 13C3-HFPO-DA | | 65 | 25-150 |
| 13C4_PFBA | | 46 | 25-150 |
| 13C4_PFHpA | | 84 | 25-150 |
| 13C5_PFHxA | | 95 | 25-150 |
| 13C5_PFPeA | | 73 | 25-150 |
| 13C6_PFDA | | 105 | 25-150 |
| 13C7_PFUdA | | 98 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-011**

Description: **MWF16-18_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1420** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 107 | 25-150 |
| 13C8_PFOS | | 99 | 25-150 |
| 13C8_PFOSA | | 94 | 10-150 |
| 13C9_PFNA | | 114 | 25-150 |
| d5-EtFOSAA | | 100 | 25-150 |
| d3-MeFOSAA | | 92 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-012**

Description: **MWW10-03_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1250** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0602 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.5 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.5 | 0.62 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.5 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.5 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.5 | 0.82 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.5 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.5 | 0.45 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.5 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.5 | 0.88 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **12** | | **3.8** | **0.39** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.73 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **1.6** | **J** | **3.8** | **0.47** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.67 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **15** | | **3.8** | **0.56** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **44** | | **3.8** | **0.52** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **21** | | **3.8** | **0.56** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **30** | | **3.8** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **29** | | **3.8** | **0.65** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.43 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **50** | | **3.8** | **0.78** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **27** | | **3.8** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 234 | 25-150 |
| 13C2_6:2FTS | N | 304 | 25-150 |
| 13C2_8:2FTS | N | 167 | 25-150 |
| 13C2_PFDoA | | 100 | 25-150 |
| 13C2_PFTeDA | | 94 | 25-150 |
| 13C3_PFBS | | 84 | 25-150 |
| 13C3_PFHxS | | 89 | 25-150 |
| 13C3-HFPO-DA | | 57 | 25-150 |
| 13C4_PFBA | | 27 | 25-150 |
| 13C4_PFHpA | | 59 | 25-150 |
| 13C5_PFHxA | | 64 | 25-150 |
| 13C5_PFPeA | | 45 | 25-150 |
| 13C6_PFDA | | 109 | 25-150 |
| 13C7_PFUdA | | 98 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-012**

Description: **MWW10-03_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1250** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 88 | 25-150 |
| 13C8_PFOS | | 97 | 25-150 |
| 13C8_PFOSA | | 95 | 10-150 |
| 13C9_PFNA | | 103 | 25-150 |
| d5-EtFOSAA | | 105 | 25-150 |
| d3-MeFOSAA | | 101 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-013**

Description: **MWW1-04_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1540** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0333 | ARC2 | 09/28/2023 2045 | 86111 |
| 2 | SOP SPE | PFAS by ID SOP | 1 | 10/11/2023 0146 | OMNS | 10/03/2023 1731 | 86454 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.8 | 0.64 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.8 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.8 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.8 | 0.85 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| **N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)** | **2991-50-6** | **PFAS by ID SOP** | **15** | | **7.8** | **0.73** | **ng/L** | **1** |
| **N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)** | **2355-31-9** | **PFAS by ID SOP** | **1.0** | **J** | **7.8** | **0.90** | **ng/L** | **1** |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.9 | 0.40 | ng/L | 1 |
| **Perfluoro-1-decanesulfonic acid (PFDS)** | **335-77-3** | **PFAS by ID SOP** | **0.88** | **J** | **3.9** | **0.76** | **ng/L** | **1** |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.48 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.69 | ng/L | 1 |
| **Perfluoro-1-octanesulfonamide (PFOSA)** | **754-91-6** | **PFAS by ID SOP** | **1.7** | **J** | **3.9** | **0.59** | **ng/L** | **1** |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **4.5** | | **3.9** | **0.54** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 40 | 6.0 | ng/L | 2 |
| **Perfluoro-n-decanoic acid (PFDA)** | **335-76-2** | **PFAS by ID SOP** | **0.87** | **J** | **3.9** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.46 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **3.1** | **J** | **3.9** | **0.43** | **ng/L** | **1** |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.9 | 0.67 | ng/L | 1 |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **1.3** | **J** | **3.9** | **0.45** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **6.8** | | **3.9** | **0.80** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **5.2** | | **3.9** | **0.53** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.61 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **130** | | **3.9** | **1.9** | **ng/L** | **1** |

| Surrogate | Run 1 Q | Run 1 % Recovery | Run 1 Acceptance Limits | Run 2 Q | Run 2 % Recovery | Run 2 Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C2_4:2FTS | N | 275 | 25-150 | N | 268 | 25-150 |
| 13C2_6:2FTS | N | 335 | 25-150 | N | 174 | 25-150 |
| 13C2_8:2FTS | N | 293 | 25-150 | | 108 | 25-150 |
| 13C2_PFDoA | | 106 | 25-150 | | 93 | 25-150 |
| 13C2_PFTeDA | | 88 | 25-150 | | 88 | 25-150 |
| 13C3_PFBS | | 89 | 25-150 | | 97 | 25-150 |
| 13C3_PFHxS | | 88 | 25-150 | | 96 | 25-150 |
| 13C3-HFPO-DA | | 58 | 25-150 | | 75 | 25-150 |
| 13C4_PFBA | N | 4.0 | 25-150 | | 84 | 25-150 |
| 13C4_PFHpA | | 59 | 25-150 | | 88 | 25-150 |
| 13C5_PFHxA | | 76 | 25-150 | | 93 | 25-150 |
| 13C5_PFPeA | | 29 | 25-150 | | 99 | 25-150 |
| 13C6_PFDA | | 102 | 25-150 | | 88 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-013**

Description: **MWW1-04_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1540** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C7_PFUdA | | 108 | 25-150 | | 101 | 25-150 |
| 13C8_PFOA | | 87 | 25-150 | | 97 | 25-150 |
| 13C8_PFOS | | 95 | 25-150 | | 98 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 | | 95 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 | | 106 | 25-150 |
| d5-EtFOSAA | | 127 | 25-150 | | 94 | 25-150 |
| d3-MeFOSAA | | 115 | 25-150 | | 97 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-014**

Description: **MWW10-04_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1130** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0344 | ARC2 | 09/28/2023 2045 | 86111 |
| 2 | SOP SPE | PFAS by ID SOP | 1 | 10/11/2023 0156 | OMNS | 10/03/2023 1731 | 86454 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.7 | 0.47 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.7 | 0.64 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.7 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.7 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.7 | 0.85 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.7 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.7 | 0.47 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.7 | 0.73 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.7 | 0.90 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.9 | 0.40 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.75 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.48 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.69 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.59 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.57 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **5.7** | | **3.9** | **0.53** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **8.3** | **J** | **40** | **6.0** | **ng/L** | **2** |
| **Perfluoro-n-decanoic acid (PFDA)** | **335-76-2** | **PFAS by ID SOP** | **0.94** | **J** | **3.9** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.46 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **11** | | **3.9** | **0.43** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **18** | | **3.9** | **0.67** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **16** | | **3.9** | **0.45** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **45** | | **3.9** | **0.80** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **15** | | **3.9** | **0.53** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.61 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **48** | | **3.9** | **1.9** | **ng/L** | **1** |

| Surrogate | Run 1 Q | Run 1 % Recovery | Run 1 Acceptance Limits | Run 2 Q | Run 2 % Recovery | Run 2 Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C2_4:2FTS | N | 236 | 25-150 | N | 251 | 25-150 |
| 13C2_6:2FTS | N | 298 | 25-150 | N | 161 | 25-150 |
| 13C2_8:2FTS | N | 241 | 25-150 | | 106 | 25-150 |
| 13C2_PFDoA | | 100 | 25-150 | | 84 | 25-150 |
| 13C2_PFTeDA | | 91 | 25-150 | | 84 | 25-150 |
| 13C3_PFBS | | 73 | 25-150 | | 93 | 25-150 |
| 13C3_PFHxS | | 83 | 25-150 | | 90 | 25-150 |
| 13C3-HFPO-DA | | 47 | 25-150 | | 70 | 25-150 |
| 13C4_PFBA | N | 22 | 25-150 | | 75 | 25-150 |
| 13C4_PFHpA | | 54 | 25-150 | | 85 | 25-150 |
| 13C5_PFHxA | | 53 | 25-150 | | 88 | 25-150 |
| 13C5_PFPeA | | 35 | 25-150 | | 92 | 25-150 |
| 13C6_PFDA | | 97 | 25-150 | | 90 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-014**

Description: **MWW10-04_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1130** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C7_PFUdA | | 107 | 25-150 | | 96 | 25-150 |
| 13C8_PFOA | | 79 | 25-150 | | 95 | 25-150 |
| 13C8_PFOS | | 88 | 25-150 | | 99 | 25-150 |
| 13C8_PFOSA | | 73 | 10-150 | | 90 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 | | 99 | 25-150 |
| d5-EtFOSAA | | 110 | 25-150 | | 87 | 25-150 |
| d3-MeFOSAA | | 105 | 25-150 | | 90 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-015**

Description: **DUP-01_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0354 | ARC2 | 09/28/2023 2045 | 86111 |
| 2 | SOP SPE | PFAS by ID SOP | 1 | 10/11/2023 0207 | OMNS | 10/03/2023 1731 | 86454 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.5 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.5 | 0.62 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.5 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.5 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.5 | 0.82 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.5 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.5 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.5 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.8 | 0.39 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.73 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.47 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.67 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **5.0** | | **3.8** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 40 | 6.0 | ng/L | 2 |
| **Perfluoro-n-decanoic acid (PFDA)** | **335-76-2** | **PFAS by ID SOP** | **1.1** | **J** | **3.8** | **0.49** | **ng/L** | **1** |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **14** | | **3.8** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **15** | | **3.8** | **0.65** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **15** | | **3.8** | **0.43** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **45** | | **3.8** | **0.78** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **15** | | **3.8** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **47** | | **3.8** | **1.9** | **ng/L** | **1** |

| Surrogate | Run 1 Q | Run 1 % Recovery | Run 1 Acceptance Limits | Run 2 Q | Run 2 % Recovery | Run 2 Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C2_4:2FTS | N | 232 | 25-150 | N | 278 | 25-150 |
| 13C2_6:2FTS | N | 300 | 25-150 | N | 181 | 25-150 |
| 13C2_8:2FTS | N | 236 | 25-150 | | 103 | 25-150 |
| 13C2_PFDoA | | 98 | 25-150 | | 84 | 25-150 |
| 13C2_PFTeDA | | 86 | 25-150 | | 84 | 25-150 |
| 13C3_PFBS | | 74 | 25-150 | | 89 | 25-150 |
| 13C3_PFHxS | | 86 | 25-150 | | 94 | 25-150 |
| 13C3-HFPO-DA | | 54 | 25-150 | | 82 | 25-150 |
| 13C4_PFBA | N | 23 | 25-150 | | 77 | 25-150 |
| 13C4_PFHpA | | 50 | 25-150 | | 89 | 25-150 |
| 13C5_PFHxA | | 56 | 25-150 | | 95 | 25-150 |
| 13C5_PFPeA | | 38 | 25-150 | | 93 | 25-150 |
| 13C6_PFDA | | 101 | 25-150 | | 96 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-015**

Description: **DUP-01_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C7_PFUdA | | 97 | 25-150 | | 96 | 25-150 |
| 13C8_PFOA | | 76 | 25-150 | | 95 | 25-150 |
| 13C8_PFOS | | 88 | 25-150 | | 96 | 25-150 |
| 13C8_PFOSA | | 74 | 10-150 | | 86 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 | | 104 | 25-150 |
| d5-EtFOSAA | | 110 | 25-150 | | 84 | 25-150 |
| d3-MeFOSAA | | 98 | 25-150 | | 87 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# QC Summary

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ85922-001
**Batch:** 85922
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/27/2023 1602

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 0.48 | ng/L | 09/29/2023 1903 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 0.66 | ng/L | 09/29/2023 1903 |
| 8:2 FTS | ND | | 1 | 8.0 | 1.6 | ng/L | 09/29/2023 1903 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 09/29/2023 1903 |
| 4:2 FTS | ND | | 1 | 8.0 | 0.87 | ng/L | 09/29/2023 1903 |
| GenX | ND | | 1 | 8.0 | 2.1 | ng/L | 09/29/2023 1903 |
| ADONA | ND | | 1 | 8.0 | 0.48 | ng/L | 09/29/2023 1903 |
| EtFOSAA | ND | | 1 | 8.0 | 0.75 | ng/L | 09/29/2023 1903 |
| MeFOSAA | ND | | 1 | 8.0 | 0.93 | ng/L | 09/29/2023 1903 |
| PFBS | ND | | 1 | 4.0 | 0.41 | ng/L | 09/29/2023 1903 |
| PFDS | ND | | 1 | 4.0 | 0.78 | ng/L | 09/29/2023 1903 |
| PFHpS | ND | | 1 | 4.0 | 0.50 | ng/L | 09/29/2023 1903 |
| PFNS | ND | | 1 | 4.0 | 0.71 | ng/L | 09/29/2023 1903 |
| PFOSA | ND | | 1 | 4.0 | 0.61 | ng/L | 09/29/2023 1903 |
| PFPeS | ND | | 1 | 4.0 | 0.59 | ng/L | 09/29/2023 1903 |
| PFHxS | ND | | 1 | 4.0 | 0.55 | ng/L | 09/29/2023 1903 |
| PFBA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/29/2023 1903 |
| PFDA | ND | | 1 | 4.0 | 0.52 | ng/L | 09/29/2023 1903 |
| PFDoA | ND | | 1 | 4.0 | 0.47 | ng/L | 09/29/2023 1903 |
| PFHpA | ND | | 1 | 4.0 | 0.45 | ng/L | 09/29/2023 1903 |
| PFHxA | ND | | 1 | 4.0 | 0.69 | ng/L | 09/29/2023 1903 |
| PFNA | ND | | 1 | 4.0 | 0.46 | ng/L | 09/29/2023 1903 |
| PFOA | ND | | 1 | 4.0 | 0.83 | ng/L | 09/29/2023 1903 |
| PFPeA | ND | | 1 | 4.0 | 0.54 | ng/L | 09/29/2023 1903 |
| PFTeDA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/29/2023 1903 |
| PFTrDA | ND | | 1 | 4.0 | 0.53 | ng/L | 09/29/2023 1903 |
| PFUdA | ND | | 1 | 4.0 | 0.63 | ng/L | 09/29/2023 1903 |
| PFOS | ND | | 1 | 4.0 | 2.0 | ng/L | 09/29/2023 1903 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 88 | 25-150 |
| 13C2_6:2FTS | | 100 | 25-150 |
| 13C2_8:2FTS | | 82 | 25-150 |
| 13C2_PFDoA | | 81 | 25-150 |
| 13C2_PFTeDA | | 85 | 25-150 |
| 13C3_PFBS | | 91 | 25-150 |
| 13C3_PFHxS | | 87 | 25-150 |
| 13C3-HFPO-DA | | 93 | 25-150 |
| 13C4_PFBA | | 92 | 25-150 |
| 13C4_PFHpA | | 89 | 25-150 |
| 13C5_PFHxA | | 91 | 25-150 |
| 13C5_PFPeA | | 89 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ85922-001
**Batch:** 85922
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/27/2023 1602

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 89 | 25-150 |
| 13C7_PFUdA | | 82 | 25-150 |
| 13C8_PFOA | | 98 | 25-150 |
| 13C8_PFOS | | 82 | 25-150 |
| 13C8_PFOSA | | 86 | 10-150 |
| 13C9_PFNA | | 91 | 25-150 |
| d5-EtFOSAA | | 85 | 25-150 |
| d3-MeFOSAA | | 84 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ85922-002
**Batch:** 85922
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/27/2023 1602

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 14 | | 1 | 96 | 50-150 | 09/29/2023 1914 |
| 11Cl-PF3OUdS | 15 | 14 | | 1 | 96 | 50-150 | 09/29/2023 1914 |
| 8:2 FTS | 15 | 19 | | 1 | 124 | 50-150 | 09/29/2023 1914 |
| 6:2 FTS | 15 | 15 | | 1 | 99 | 50-150 | 09/29/2023 1914 |
| 4:2 FTS | 15 | 14 | | 1 | 95 | 50-150 | 09/29/2023 1914 |
| GenX | 32 | 31 | | 1 | 98 | 50-150 | 09/29/2023 1914 |
| ADONA | 15 | 15 | | 1 | 98 | 50-150 | 09/29/2023 1914 |
| EtFOSAA | 16 | 15 | | 1 | 94 | 50-150 | 09/29/2023 1914 |
| MeFOSAA | 16 | 18 | | 1 | 112 | 50-150 | 09/29/2023 1914 |
| PFBS | 14 | 15 | | 1 | 103 | 50-150 | 09/29/2023 1914 |
| PFDS | 15 | 15 | | 1 | 95 | 50-150 | 09/29/2023 1914 |
| PFHpS | 15 | 15 | | 1 | 96 | 50-150 | 09/29/2023 1914 |
| PFNS | 15 | 17 | | 1 | 109 | 50-150 | 09/29/2023 1914 |
| PFOSA | 16 | 16 | | 1 | 98 | 50-150 | 09/29/2023 1914 |
| PFPeS | 15 | 15 | | 1 | 103 | 50-150 | 09/29/2023 1914 |
| PFHxS | 15 | 16 | | 1 | 109 | 50-150 | 09/29/2023 1914 |
| PFBA | 16 | 15 | | 1 | 91 | 50-150 | 09/29/2023 1914 |
| PFDA | 16 | 17 | | 1 | 104 | 50-150 | 09/29/2023 1914 |
| PFDoA | 16 | 16 | | 1 | 98 | 50-150 | 09/29/2023 1914 |
| PFHpA | 16 | 16 | | 1 | 98 | 50-150 | 09/29/2023 1914 |
| PFHxA | 16 | 16 | | 1 | 98 | 50-150 | 09/29/2023 1914 |
| PFNA | 16 | 16 | | 1 | 102 | 50-150 | 09/29/2023 1914 |
| PFOA | 16 | 15 | | 1 | 95 | 50-150 | 09/29/2023 1914 |
| PFPeA | 16 | 16 | | 1 | 101 | 50-150 | 09/29/2023 1914 |
| PFTeDA | 16 | 15 | | 1 | 95 | 50-150 | 09/29/2023 1914 |
| PFTrDA | 16 | 15 | | 1 | 95 | 50-150 | 09/29/2023 1914 |
| PFUdA | 16 | 16 | | 1 | 101 | 50-150 | 09/29/2023 1914 |
| PFOS | 15 | 16 | | 1 | 106 | 50-150 | 09/29/2023 1914 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 103 | 25-150 |
| 13C2_6:2FTS | | 96 | 25-150 |
| 13C2_8:2FTS | | 88 | 25-150 |
| 13C2_PFDoA | | 88 | 25-150 |
| 13C2_PFTeDA | | 95 | 25-150 |
| 13C3_PFBS | | 99 | 25-150 |
| 13C3_PFHxS | | 96 | 25-150 |
| 13C3-HFPO-DA | | 106 | 25-150 |
| 13C4_PFBA | | 102 | 25-150 |
| 13C4_PFHpA | | 101 | 25-150 |
| 13C5_PFHxA | | 107 | 25-150 |
| 13C5_PFPeA | | 97 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ85922-002
**Batch:** 85922
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/27/2023 1602

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 92 | 25-150 |
| 13C7_PFUdA | | 90 | 25-150 |
| 13C8_PFOA | | 102 | 25-150 |
| 13C8_PFOS | | 97 | 25-150 |
| 13C8_PFOSA | | 94 | 10-150 |
| 13C9_PFNA | | 104 | 25-150 |
| d5-EtFOSAA | | 96 | 25-150 |
| d3-MeFOSAA | | 90 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ86111-001
**Batch:** 86111
**Analytical Method:** PFAS by ID SOP
**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/28/2023 2045

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 0.48 | ng/L | 09/30/2023 0001 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 0.66 | ng/L | 09/30/2023 0001 |
| 8:2 FTS | ND | | 1 | 8.0 | 1.6 | ng/L | 09/30/2023 0001 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 09/30/2023 0001 |
| 4:2 FTS | ND | | 1 | 8.0 | 0.87 | ng/L | 09/30/2023 0001 |
| GenX | ND | | 1 | 8.0 | 2.1 | ng/L | 09/30/2023 0001 |
| ADONA | ND | | 1 | 8.0 | 0.48 | ng/L | 09/30/2023 0001 |
| EtFOSAA | ND | | 1 | 8.0 | 0.75 | ng/L | 09/30/2023 0001 |
| MeFOSAA | ND | | 1 | 8.0 | 0.93 | ng/L | 09/30/2023 0001 |
| PFBS | ND | | 1 | 4.0 | 0.41 | ng/L | 09/30/2023 0001 |
| PFDS | ND | | 1 | 4.0 | 0.78 | ng/L | 09/30/2023 0001 |
| PFHpS | ND | | 1 | 4.0 | 0.50 | ng/L | 09/30/2023 0001 |
| PFNS | ND | | 1 | 4.0 | 0.71 | ng/L | 09/30/2023 0001 |
| PFOSA | ND | | 1 | 4.0 | 0.61 | ng/L | 09/30/2023 0001 |
| PFPeS | ND | | 1 | 4.0 | 0.59 | ng/L | 09/30/2023 0001 |
| PFHxS | ND | | 1 | 4.0 | 0.55 | ng/L | 09/30/2023 0001 |
| PFBA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/30/2023 0001 |
| PFDA | ND | | 1 | 4.0 | 0.52 | ng/L | 09/30/2023 0001 |
| PFDoA | ND | | 1 | 4.0 | 0.47 | ng/L | 09/30/2023 0001 |
| PFHpA | ND | | 1 | 4.0 | 0.45 | ng/L | 09/30/2023 0001 |
| PFHxA | ND | | 1 | 4.0 | 0.69 | ng/L | 09/30/2023 0001 |
| PFNA | ND | | 1 | 4.0 | 0.46 | ng/L | 09/30/2023 0001 |
| PFOA | ND | | 1 | 4.0 | 0.83 | ng/L | 09/30/2023 0001 |
| PFPeA | ND | | 1 | 4.0 | 0.54 | ng/L | 09/30/2023 0001 |
| PFTeDA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/30/2023 0001 |
| PFTrDA | ND | | 1 | 4.0 | 0.53 | ng/L | 09/30/2023 0001 |
| PFUdA | ND | | 1 | 4.0 | 0.63 | ng/L | 09/30/2023 0001 |
| PFOS | ND | | 1 | 4.0 | 2.0 | ng/L | 09/30/2023 0001 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 90 | 25-150 |
| 13C2_6:2FTS | | 90 | 25-150 |
| 13C2_8:2FTS | | 80 | 25-150 |
| 13C2_PFDoA | | 86 | 25-150 |
| 13C2_PFTeDA | | 95 | 25-150 |
| 13C3_PFBS | | 92 | 25-150 |
| 13C3_PFHxS | | 88 | 25-150 |
| 13C3-HFPO-DA | | 86 | 25-150 |
| 13C4_PFBA | | 92 | 25-150 |
| 13C4_PFHpA | | 95 | 25-150 |
| 13C5_PFHxA | | 94 | 25-150 |
| 13C5_PFPeA | | 88 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ86111-001
**Batch:** 86111
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/28/2023 2045

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 86 | 25-150 |
| 13C7_PFUdA | | 90 | 25-150 |
| 13C8_PFOA | | 101 | 25-150 |
| 13C8_PFOS | | 89 | 25-150 |
| 13C8_PFOSA | | 81 | 10-150 |
| 13C9_PFNA | | 97 | 25-150 |
| d5-EtFOSAA | | 93 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ86111-002
**Batch:** 86111
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/28/2023 2045

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 16 | | 1 | 105 | 50-150 | 09/30/2023 0011 |
| 11Cl-PF3OUdS | 15 | 15 | | 1 | 99 | 50-150 | 09/30/2023 0011 |
| 8:2 FTS | 15 | 13 | | 1 | 84 | 50-150 | 09/30/2023 0011 |
| 6:2 FTS | 15 | 17 | | 1 | 115 | 50-150 | 09/30/2023 0011 |
| 4:2 FTS | 15 | 14 | | 1 | 95 | 50-150 | 09/30/2023 0011 |
| GenX | 32 | 36 | | 1 | 114 | 50-150 | 09/30/2023 0011 |
| ADONA | 15 | 17 | | 1 | 113 | 50-150 | 09/30/2023 0011 |
| EtFOSAA | 16 | 16 | | 1 | 102 | 50-150 | 09/30/2023 0011 |
| MeFOSAA | 16 | 17 | | 1 | 107 | 50-150 | 09/30/2023 0011 |
| PFBS | 14 | 14 | | 1 | 99 | 50-150 | 09/30/2023 0011 |
| PFDS | 15 | 15 | | 1 | 100 | 50-150 | 09/30/2023 0011 |
| PFHpS | 15 | 16 | | 1 | 103 | 50-150 | 09/30/2023 0011 |
| PFNS | 15 | 17 | | 1 | 112 | 50-150 | 09/30/2023 0011 |
| PFOSA | 16 | 18 | | 1 | 110 | 50-150 | 09/30/2023 0011 |
| PFPeS | 15 | 16 | | 1 | 107 | 50-150 | 09/30/2023 0011 |
| PFHxS | 15 | 15 | | 1 | 105 | 50-150 | 09/30/2023 0011 |
| PFBA | 16 | 15 | | 1 | 92 | 50-150 | 09/30/2023 0011 |
| PFDA | 16 | 18 | | 1 | 111 | 50-150 | 09/30/2023 0011 |
| PFDoA | 16 | 16 | | 1 | 99 | 50-150 | 09/30/2023 0011 |
| PFHpA | 16 | 17 | | 1 | 104 | 50-150 | 09/30/2023 0011 |
| PFHxA | 16 | 16 | | 1 | 102 | 50-150 | 09/30/2023 0011 |
| PFNA | 16 | 16 | | 1 | 102 | 50-150 | 09/30/2023 0011 |
| PFOA | 16 | 17 | | 1 | 108 | 50-150 | 09/30/2023 0011 |
| PFPeA | 16 | 18 | | 1 | 110 | 50-150 | 09/30/2023 0011 |
| PFTeDA | 16 | 18 | | 1 | 110 | 50-150 | 09/30/2023 0011 |
| PFTrDA | 16 | 16 | | 1 | 97 | 50-150 | 09/30/2023 0011 |
| PFUdA | 16 | 16 | | 1 | 102 | 50-150 | 09/30/2023 0011 |
| PFOS | 15 | 16 | | 1 | 111 | 50-150 | 09/30/2023 0011 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 99 | 25-150 |
| 13C2_6:2FTS | | 99 | 25-150 |
| 13C2_8:2FTS | | 99 | 25-150 |
| 13C2_PFDoA | | 96 | 25-150 |
| 13C2_PFTeDA | | 101 | 25-150 |
| 13C3_PFBS | | 104 | 25-150 |
| 13C3_PFHxS | | 96 | 25-150 |
| 13C3-HFPO-DA | | 99 | 25-150 |
| 13C4_PFBA | | 102 | 25-150 |
| 13C4_PFHpA | | 100 | 25-150 |
| 13C5_PFHxA | | 101 | 25-150 |
| 13C5_PFPeA | | 100 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ86111-002
**Batch:** 86111
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/28/2023 2045

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 101 | 25-150 |
| 13C7_PFUdA | | 96 | 25-150 |
| 13C8_PFOA | | 104 | 25-150 |
| 13C8_PFOS | | 99 | 25-150 |
| 13C8_PFOSA | | 95 | 10-150 |
| 13C9_PFNA | | 100 | 25-150 |
| d5-EtFOSAA | | 96 | 25-150 |
| d3-MeFOSAA | | 99 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ86454-001
**Batch:** 86454
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 10/03/2023 1731

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| PFBA | ND | | 1 | 4.0 | 0.60 | ng/L | 10/11/2023 0103 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 97 | 25-150 |
| 13C2_6:2FTS | | 108 | 25-150 |
| 13C2_8:2FTS | | 93 | 25-150 |
| 13C2_PFDoA | | 101 | 25-150 |
| 13C2_PFTeDA | | 97 | 25-150 |
| 13C3_PFBS | | 103 | 25-150 |
| 13C3_PFHxS | | 109 | 25-150 |
| 13C3-HFPO-DA | | 103 | 25-150 |
| 13C4_PFBA | | 110 | 25-150 |
| 13C4_PFHpA | | 110 | 25-150 |
| 13C5_PFHxA | | 99 | 25-150 |
| 13C5_PFPeA | | 111 | 25-150 |
| 13C6_PFDA | | 98 | 25-150 |
| 13C7_PFUdA | | 103 | 25-150 |
| 13C8_PFOA | | 107 | 25-150 |
| 13C8_PFOS | | 109 | 25-150 |
| 13C8_PFOSA | | 98 | 10-150 |
| 13C9_PFNA | | 104 | 25-150 |
| d5-EtFOSAA | | 96 | 25-150 |
| d3-MeFOSAA | | 96 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ86454-002
**Batch:** 86454
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 10/03/2023 1731

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| PFBA | 16 | 16 | | 1 | 99 | 50-150 | 10/11/2023 0114 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 93 | 25-150 |
| 13C2_6:2FTS | | 107 | 25-150 |
| 13C2_8:2FTS | | 98 | 25-150 |
| 13C2_PFDoA | | 99 | 25-150 |
| 13C2_PFTeDA | | 94 | 25-150 |
| 13C3_PFBS | | 103 | 25-150 |
| 13C3_PFHxS | | 105 | 25-150 |
| 13C3-HFPO-DA | | 91 | 25-150 |
| 13C4_PFBA | | 101 | 25-150 |
| 13C4_PFHpA | | 108 | 25-150 |
| 13C5_PFHxA | | 94 | 25-150 |
| 13C5_PFPeA | | 105 | 25-150 |
| 13C6_PFDA | | 96 | 25-150 |
| 13C7_PFUdA | | 101 | 25-150 |
| 13C8_PFOA | | 103 | 25-150 |
| 13C8_PFOS | | 101 | 25-150 |
| 13C8_PFOSA | | 94 | 10-150 |
| 13C9_PFNA | | 102 | 25-150 |
| d5-EtFOSAA | | 98 | 25-150 |
| d3-MeFOSAA | | 93 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Chain of Custody
# and
# Miscellaneous Documents

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www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: Aradis | Report to Contact: Alexis Crisp | Telephone No. / E-mail: alexis.crisp@aradas.com Diana.linder@aradas.com | Quote No. |
| Address: 29550 Cabot Dr Suite #500 | Sampler's Signature: Samantha Szpaichler | Analysis (Attach list if more space is needed): Full Report EGLE 28 compounds | Page 1 of 4 |
| City: Novi | State: MI Zip Code: 48377 | | |
| Project Name: Ralph Pine | Printed Name: Samantha Szpaichler | | |
| Project No.: 30167840.00031 | P.O. No.: 30167840.00031 | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Sample Type (G=Grab C=Comp) | Matrix: Aqueous | Matrix: Solid | Matrix: Non-Aqueous | No of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Field Filtered | PFAS Analysis Required by DOD Lab? | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PZE17-05_GW-091523 | 9/15/23 | 1304 | G | 2 | | | 2 | | | | | | N | X | |
| EB-05_091523 | 9/15/23 | 1610 | G | 1 | | | 1 | | | | | | N | X | equipment blank |
| Trip Blank | 9/16/23 | 1000 | G | 1 | | | 1 | | | | | | N | X | trip blank |
| MWF16-12_GW-091823 | 9/18/23 | 1100 | G | 2 | | | 2 | | | | | | N | X | |
| MWW10-SEN01_GW-091823 | 9/18/23 | 1340 | G | 2 | | | 2 | | | | | | N | X | |
| ~~FB-10-01_GW-091823~~ SS | ~~9/18/23~~ | | G | 2 | | | 2 | | | | | | N | X | |

Turn Around Time Required (Prior lab approval required for expedited TAT): ☑ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☑ Disposal by Lab

Possible Hazard Identification: ☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Samantha Szpaichler / Aradis | 9/15/23 | 1510 | 1. Received by: Tammera Ely | 9/15/23 | 1510 |
| 2. Relinquished by: Tammera Ely | 9/18/23 | 1645 | 2. Received by: FedEx | 9/18/23 | 1645 |
| 3. Relinquished by: | Date | Time | 3. Received by: | Date | Time |
| 4. Relinquished by: FedEx | 9/18/23 | 1805 | 4. Laboratory received by: | 9/19/23 | 0805 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle) (Yes) No Ice Pack: Receipt Temp: 1.7 °C
Temp Blank: ☑ Y ☐ N

YI19014

KES2

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www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Alexis Crisp, Tiffany Linder | Telephone No. / E-mail: Alexis.crisp@arcadis.com, Tiffany.Linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: Jammer Guy | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds | Page 2 of 4 |
| City: Novi / State: MI / Zip Code: 48377 | Printed Name: Jammer Guy | | YI19014 |
| Project Name: Racer PNC | | | |
| Project No.: 30167840.00031 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab / Composite | Matrix: Aqueous | Matrix: Solid | Matrix: Non-Aqueous | No. of Containers by Preservative Type: Unpres. | HCl | HNO3 | H2SO4 | NaOH | Na2S2O3 | Field Filtered | Method 537.1 mod. with isotope dilution per WSP | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW-01-03_GW-091823 | 9/18/23 | 1125 | G | X | | | 2 | | | | | | | X | |
| EB-02_091823 | 9/18/23 | 1135 | G | X | | | 1 | | | | | | | X | equipment blank |
| MW-01-17_GW-091823 | 9/18/23 | 1425 | G | X | | | 2 | | | | | | | X | |
| DUP-03_GW-091823 | 9/18/23 | — | G | X | | | 2 | | | | | | | X | |

**Turn Around Time Required** (Prior lab approval required for expedited TAT.): ☒ Standard ☐ Rush (Specify)

**Sample Disposal**: ☐ Return to Client ☒ Disposal by Lab

**Possible Hazard Identification**: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

**QC Requirements (Specify)**

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Jammer Guy | 9/18/23 | 1645 | 1. Received by: FedEx | 9/18/23 | 1645 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | 9/19/23 | 1005 | 4. Laboratory received by | 9/16/23 | 1005 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on Ice (Circle): Yes / No — Ice Pack — Receipt Temp. 1.7 °C — Temp Blank: ☒ Y ☐ N



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www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: ARCADIS | Report to Contact: Alexis Crisp | Telephone No. / E-mail: tiffany.linder@arcadis.com; alexis.crisp@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr. #500 | Sampler's Signature: Garrett Link | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds | Page 3 of 4 |
| City: Nov. State: MI Zip Code: 48377 | Printed Name: Garrett Link | | YI19014 |
| Project Name: Pontiac North Campus (RACER) | | | IKES2 |
| Project No.: 30167840.00031 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab/Composite | Matrix: Aqueous | Matrix: Solid | Matrix: Non-aqueous | No. of Containers by Preservative Type: Unpres | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Field Filtered | (MS/MSD, 537 w/ isotope dilution per ASMS.1) | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~MWF16-12_GW-091523~~ | ~~9/15/23~~ | | G | X | | | X | | | | | | | | |
| MWF16-06_GW-091523 | 9/15/23 | 13:00 | G | 2 | | | 2 | | | | | | | X | |
| MWF16-18_GW-091523 | 9/15/23 | 14:20 | G | 2 | | | 2 | | | | | | | X | |

| Turn Around Time Required (Prior lab approval required for expedited TAT.) | Sample Disposal | Possible Hazard Identification | QC Requirements (Specify) |
|---|---|---|---|
| ☑ Standard ☐ Rush (Specify) | ☐ Return to Client ☑ Disposal by Lab | ☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown | |

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Garrett Link | 9/15/23 | 15:00 | 1. Received by: Arcadis | 9/15/23 | 1500 |
| 2. Relinquished by: Arcadis | 9/18/23 | 1510 | 2. Received by: Jennifer Eby | 9/18/23 | 1510 |
| 3. Relinquished by: Jennifer Eby | 9/18/23 | 1645 | 3. Received by: FedEx | 9/18/23 | 1645 |
| 4. Relinquished by: FedEx | 9/19/23 | 1005 | 4. Laboratory received by: | 9/19/23 | 1005 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack
Receipt Temp 1.7 °C
Temp Blank ☑ Y ☐ N



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**Number** 150049

| | | | |
|---|---|---|---|
| Client: ARCADIS | Report to Contact: Lexi Crisp | Telephone No. / E-mail: tiffany.linder@arcadis.com; alexis.crisp@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Lotte Jay | Analysis (Attach list if more space is needed): Report EGLE 28 (compound) | Page 4 of 4 |
| City: NOVI | State: MI | Zip Code: 48377 | |
| Project Name: Racer PNC | Printed Name: Lottie Jay | | YI19014 |
| Project No.: 30167840.00031 | P.O. No. | | KF52 |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab / Composite | Matrix: Aqueous | Matrix: Solid | Matrix: Other | No. of Containers by Preservative Type: Unpres. | HNO3 | H2SO4 | HCl | NaOH | Na2S2O3 | Field Filtered | Method 537 mod with isotope dilution per QSM 5.1 | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWW10-03_GW-091523 | 9/15/23 | 1250 | G | X | | | 2 | | | | | | | X | |
| MWW1-04_GW-091523 | | 1540 | G | X | | | 2 | | | | | | | X | |
| MWW10-04_GW-091523 | | 1130 | G | X | | | 2 | | | | | | | X | |
| DUP-01_GW-091523 | | — | G | X | | | 2 | | | | | | | X | |

**Turn Around Time Required** (Prior lab approval required for expedited TAT.): ☒ Standard ☐ Rush (Specify)

**Sample Disposal**: ☐ Return to Client ☒ Disposal by Lab

**Possible Hazard Identification**: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

**QC Requirements (Specify)**

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Lottie Jay | 9/15/23 | 1628 | 1. Received by: Arcadis | 9/15/23 | 1628 |
| 2. Relinquished by: Arcadis | 9/18/23 | 1510 | 2. Received by: Jammel Day | 9/18/23 | 1510 |
| 3. Relinquished by: Jammel Day | 9/19/23 | 1645 | 3. Received by: FedEx | 9/19/23 | 1645 |
| 4. Relinquished by: FedEx | 9/19/23 | 1685 | 4. Laboratory received by: [signature] | 9/19/23 | 1685 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on Ice (Circle): (Yes) No Ice Pack — Receipt Temp. 1.7 °C — Temp Blank ☒ ☐ N

PACE ANALYTICAL SERVICES, LLC

DC#_Title: ENV-FRM-WCOL-0286 v02_Samples Receipt Checklist (SRC)
Effective Date: 8/2/2022

# Sample Receipt Checklist (SRC)

Client: ARCADIS  Cooler Inspected by/date: KSC / 09/19/2023  Lot #: YII90114

| | | | |
|---|---|---|---|
| Means of receipt: ☐ Pace ☐ Client ☐ UPS ☑ FedEx ☐ Other: | | | |
| ☐ Yes | ☑ No | | 1. Were custody seals present on the cooler? |
| ☐ Yes | ☐ No | ☑ NA | 2. If custody seals were present, were they intact and unbroken? |

pH Strip ID: NA  Chlorine Strip ID: NA  Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt  %Solid Snap-Cup ID: NA

1.7 /1.7 °C  NA /NA °C  NA /NA °C  NA /NA °C

Method: ☑ Temperature Blank ☐ Against Bottles  IR Gun ID: 8  IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | ☐ NA | 3. Were all coolers received at or below 6.0°C? If no, was Project Manager notified? PM was Notified by: phone / email / face-to-face (circle one). |
| ☑ Yes | ☐ No | ☐ NA | 4. Is the commercial courier's packing slip attached to this form? |
| ☑ Yes | ☐ No | | 5. Were proper custody procedures (relinquished/received) followed? |
| ☑ Yes | ☐ No | | 6. Were sample IDs listed on the COC and all sample containers? |
| ☐ Yes | ☑ No | | 7. Was collection date & time listed on the COC and all sample containers? |
| ☐ Yes | ☑ No | | 8. Did all container label information (ID, date, time) agree with the COC? |
| ☐ Yes | ☑ No | | 9. Were tests to be performed listed on the COC? |
| ☑ Yes | ☐ No | | 10. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? |
| ☑ Yes | ☐ No | | 11. Was adequate sample volume available? |
| ☐ Yes | ☑ No | | 12. Were all samples received within ½ the holding time or 48 hours, whichever comes first? |
| ☑ Yes | ☐ No | | 13. Were all samples containers accounted for? (No missing/excess) |
| ☐ Yes | ☐ No | ☑ NA | 14. Were VOA, 8015C and RSK-175 samples free of bubbles >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials? |
| ☐ Yes | ☐ No | ☑ NA | 15. Were all DRO/metals/nutrient samples received at a pH of < 2? |
| ☐ Yes | ☐ No | ☑ NA | 16. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9? |
| ☐ Yes | ☐ No | ☑ NA | 17. Were all applicable $NH_3$/TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine? |
| ☐ Yes | ☐ No | ☑ NA | 18. Was the quote number listed on the container label? If yes. Quote # |

**Sample Preservation** (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA. ☐
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (if #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Unique ID: NA.

Comments:

Qualtrax ID: 56360  Pace® Analytical Services, LLC  Page 1 of 1

# Report of Analysis

**Arcadis U.S., Inc.**
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Tiffany Linder

Project Name: RACER PNC

Project Number: 30167840.00031

Lot Number:**YI20016**

Date Completed:10/03/2023

Kathy Smith

10/03/2023 10:56 AM
Approved and released by:
Project Manager II: **Kathy E. Smith**

The electronic signature above is the equivalent of a handwritten signature.
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106 Vantage Point Drive West Columbia, SC 29172
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

## Case Narrative
## Arcadis U.S., Inc.
### Lot Number: YI20016

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.4 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples were compliant with DOD QSM 5.4 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). The CF is calculated as follows:

CF = DF * FV / Vo

FV is volume of extract (mL)
Vo is initial sample volume (mL)
DF is dilution factor. For undiluted analysis, DF = 1.

Sample concentration for aqueous samples:
Concentration (ng/L) = Cs*CF,

$$C_s = \frac{\left(\frac{(A_s x C_{is})}{A_{is}}\right) - B}{M1}$$

Where

$C_s$ is on column concentration of target analyte in the sample (ng/L)
$C_{is}$ is concentration of internal standard in the sample (ng/L)
$A_s$ is peak response of target analyte in the sample
$A_{is}$ is peak response of internal standard in the sample
M1 is the average RF from ICAL or the slope from linear regression ICAL
B is the y-intercept from the ICAL

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18, PFAS by Isotope Dilution SOP.

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

PFAS
Samples YI20016-003, YI20016-006 required centrifugation prior to extraction, due to excessive solids present in the samples. Centrifugation was performed following the PFAS Aqueous Centrifuge Protocol; samples were spiked with Surrogate (SUR; Extracted Internal Standard/EIS) and shaken vigorously before being poured into a conical bottle and centrifuged. The centrifuged aqueous sample was decanted back into the original sample bottle, off of the condensed solids remaining in the centrifuge bottle. Original sample bottle was rinsed as normal and centrifuge bottle was rinsed with 4mL of MeOH. Centrifuge bottle rinsate was added to the elution. Samples concentrated to <5mL and reconstituted to 5mL using MeOH by transfer pipet.

The following sample was diluted due to the nature of the sample matrix: YI20016-002/MS/MSD, YI20016-003. The LOQ has been elevated to reflect the dilution. Sample was diluted due to foaminess.

Surrogate recovery for the following sample was outside control limits: YI20016-002. MS/MSD was performed with concurring results. The data has been reported.

Surrogate recovery for the following samples was outside the upper control limit: YI20016-003, YI20016-005. These samples did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

Surrogate recovery for the following sample was outside control limits: YI20016-006. Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Sample YI20016-006 and its DUP have analyte concentrations that do not agree. Samples have similiar surrogate recoveries, matrix interference, and both bottles were consumed on the same day. No other sample in the PB or run appear to match either the parent sample or the DUP. There is insufficient sample to reextract and the data has been reported.

## Sample Summary

## Arcadis U.S., Inc.

**Lot Number: YI20016**

**Project Name: RACER PNC**

**Project Number: 30167840.00031**

| Sample Number | Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| 001 | Trip Blank | Aqueous | 09/18/2023 1500 | 09/20/2023 |
| 002 | MWM16-52_GW-091923 | Aqueous | 09/19/2023 1115 | 09/20/2023 |
| 003 | MWW1-02_GW-091923 | Aqueous | 09/19/2023 1322 | 09/20/2023 |
| 004 | EB-06_091923 | Aqueous | 09/19/2023 1330 | 09/20/2023 |
| 005 | MWM30-02_GW-091923 | Aqueous | 09/19/2023 1120 | 09/20/2023 |
| 006 | TW-10-01_GW-091823 | Aqueous | 09/18/2023 1515 | 09/20/2023 |

(6 samples)

## Detection Summary

## Arcadis U.S., Inc.

**Lot Number: YI20016**

**Project Name: RACER PNC**

**Project Number: 30167840.00031**

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 002 | MWM16-52_GW-091923 | Aqueous | 6:2 FTS | PFAS by ID | 28 | JQ | ng/L | 8 |
| 002 | MWM16-52_GW-091923 | Aqueous | PFHxS | PFAS by ID | 25 | J | ng/L | 8 |
| 002 | MWM16-52_GW-091923 | Aqueous | PFHpA | PFAS by ID | 8.6 | J | ng/L | 8 |
| 002 | MWM16-52_GW-091923 | Aqueous | PFHxA | PFAS by ID | 12 | J | ng/L | 8 |
| 002 | MWM16-52_GW-091923 | Aqueous | PFOA | PFAS by ID | 21 | J | ng/L | 8 |
| 002 | MWM16-52_GW-091923 | Aqueous | PFOS | PFAS by ID | 65 | | ng/L | 8 |
| 003 | MWW1-02_GW-091923 | Aqueous | PFHxS | PFAS by ID | 15 | J | ng/L | 10 |
| 003 | MWW1-02_GW-091923 | Aqueous | PFBA | PFAS by ID | 43 | | ng/L | 10 |
| 003 | MWW1-02_GW-091923 | Aqueous | PFOA | PFAS by ID | 15 | J | ng/L | 10 |
| 003 | MWW1-02_GW-091923 | Aqueous | PFOS | PFAS by ID | 66 | | ng/L | 10 |
| 005 | MWM30-02_GW-091923 | Aqueous | PFBS | PFAS by ID | 2.9 | J | ng/L | 14 |
| 005 | MWM30-02_GW-091923 | Aqueous | PFHxS | PFAS by ID | 3.3 | J | ng/L | 14 |
| 005 | MWM30-02_GW-091923 | Aqueous | PFBA | PFAS by ID | 6.5 | | ng/L | 14 |
| 005 | MWM30-02_GW-091923 | Aqueous | PFHpA | PFAS by ID | 3.3 | J | ng/L | 14 |
| 005 | MWM30-02_GW-091923 | Aqueous | PFHxA | PFAS by ID | 3.4 | J | ng/L | 14 |
| 005 | MWM30-02_GW-091923 | Aqueous | PFOA | PFAS by ID | 6.7 | | ng/L | 14 |
| 005 | MWM30-02_GW-091923 | Aqueous | PFPeA | PFAS by ID | 3.0 | J | ng/L | 14 |
| 005 | MWM30-02_GW-091923 | Aqueous | PFOS | PFAS by ID | 3.1 | J | ng/L | 14 |
| 006 | TW-10-01_GW-091823 | Aqueous | 6:2 FTS | PFAS by ID | 24 | Q | ng/L | 16 |
| 006 | TW-10-01_GW-091823 | Aqueous | PFBS | PFAS by ID | 43 | | ng/L | 16 |
| 006 | TW-10-01_GW-091823 | Aqueous | PFHpS | PFAS by ID | 3.1 | J | ng/L | 16 |
| 006 | TW-10-01_GW-091823 | Aqueous | PFPeS | PFAS by ID | 13 | | ng/L | 16 |
| 006 | TW-10-01_GW-091823 | Aqueous | PFHxS | PFAS by ID | 47 | | ng/L | 16 |
| 006 | TW-10-01_GW-091823 | Aqueous | PFHpA | PFAS by ID | 7.0 | | ng/L | 16 |
| 006 | TW-10-01_GW-091823 | Aqueous | PFHxA | PFAS by ID | 45 | | ng/L | 16 |
| 006 | TW-10-01_GW-091823 | Aqueous | PFOA | PFAS by ID | 15 | | ng/L | 16 |
| 006 | TW-10-01_GW-091823 | Aqueous | PFOS | PFAS by ID | 81 | | ng/L | 16 |

(27 detections)

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-001**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1500** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 2000 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.6 | 0.63 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.6 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.6 | 0.83 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.6 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.6 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.8 | 0.39 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.74 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.47 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.68 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.45 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.8 | 0.42 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.8 | 0.65 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.8 | 0.79 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 91 | 25-150 |
| 13C2_6:2FTS | | 123 | 25-150 |
| 13C2_8:2FTS | | 90 | 25-150 |
| 13C2_PFDoA | | 74 | 25-150 |
| 13C2_PFTeDA | | 84 | 25-150 |
| 13C3_PFBS | | 93 | 25-150 |
| 13C3_PFHxS | | 84 | 25-150 |
| 13C3-HFPO-DA | | 89 | 25-150 |
| 13C4_PFBA | | 94 | 25-150 |
| 13C4_PFHpA | | 85 | 25-150 |
| 13C5_PFHxA | | 99 | 25-150 |
| 13C5_PFPeA | | 92 | 25-150 |
| 13C6_PFDA | | 80 | 25-150 |
| 13C7_PFUdA | | 79 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-001**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1500** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 91 | 25-150 |
| 13C8_PFOS | | 77 | 25-150 |
| 13C8_PFOSA | | 78 | 10-150 |
| 13C9_PFNA | | 85 | 25-150 |
| d5-EtFOSAA | | 86 | 25-150 |
| d3-MeFOSAA | | 77 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-002**

Description: **MWM16-52_GW-091923** Matrix: **Aqueous**

Date Sampled: **09/19/2023 1115** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 2011 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 80 | 4.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 80 | 6.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 80 | 16 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **28** | **JQ** | **80** | **20** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 80 | 8.7 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 80 | 21 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 80 | 4.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 80 | 7.5 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 80 | 9.3 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 40 | 4.1 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 40 | 7.8 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 40 | 5.0 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 40 | 7.1 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 40 | 6.1 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 40 | 5.9 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **25** | **J** | **40** | **5.5** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 40 | 6.0 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 40 | 5.2 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 40 | 4.7 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **8.6** | **J** | **40** | **4.5** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **12** | **J** | **40** | **6.9** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 40 | 4.6 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **21** | **J** | **40** | **8.3** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 40 | 5.4 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 40 | 6.0 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 40 | 5.3 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 40 | 6.3 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **65** | | **40** | **20** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 327 | 25-150 |
| 13C2_6:2FTS | N | 246 | 25-150 |
| 13C2_8:2FTS | N | 151 | 25-150 |
| 13C2_PFDoA | | 82 | 25-150 |
| 13C2_PFTeDA | | 82 | 25-150 |
| 13C3_PFBS | | 91 | 25-150 |
| 13C3_PFHxS | | 83 | 25-150 |
| 13C3-HFPO-DA | | 61 | 25-150 |
| 13C4_PFBA | | 72 | 25-150 |
| 13C4_PFHpA | | 72 | 25-150 |
| 13C5_PFHxA | | 90 | 25-150 |
| 13C5_PFPeA | | 80 | 25-150 |
| 13C6_PFDA | | 89 | 25-150 |
| 13C7_PFUdA | | 90 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-002**

Description: **MWM16-52_GW-091923** Matrix: **Aqueous**

Date Sampled: **09/19/2023 1115** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 92 | 25-150 |
| 13C8_PFOS | | 78 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 |
| 13C9_PFNA | | 90 | 25-150 |
| d5-EtFOSAA | | 97 | 25-150 |
| d3-MeFOSAA | | 90 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-003**

Description: **MWW1-02_GW-091923** Matrix: **Aqueous**

Date Sampled: **09/19/2023 1322** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/29/2023 1800 | ARC2 | 09/21/2023 1924 | 85448 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 80 | 4.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 80 | 6.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 80 | 16 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 80 | 8.7 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 80 | 21 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 80 | 4.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 80 | 7.5 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 80 | 9.3 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 40 | 4.1 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 40 | 7.8 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 40 | 5.0 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 40 | 7.1 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 40 | 6.1 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 40 | 5.9 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **15** | **J** | **40** | **5.5** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **43** | | **40** | **6.0** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 40 | 5.2 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 40 | 4.7 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 40 | 4.5 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 40 | 6.9 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 40 | 4.6 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **15** | **J** | **40** | **8.3** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 40 | 5.4 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 40 | 6.0 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 40 | 5.3 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 40 | 6.3 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **66** | | **40** | **20** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 242 | 25-150 |
| 13C2_6:2FTS | | 137 | 25-150 |
| 13C2_8:2FTS | | 105 | 25-150 |
| 13C2_PFDoA | | 97 | 25-150 |
| 13C2_PFTeDA | | 97 | 25-150 |
| 13C3_PFBS | | 96 | 25-150 |
| 13C3_PFHxS | | 93 | 25-150 |
| 13C3-HFPO-DA | | 91 | 25-150 |
| 13C4_PFBA | | 78 | 25-150 |
| 13C4_PFHpA | | 94 | 25-150 |
| 13C5_PFHxA | | 114 | 25-150 |
| 13C5_PFPeA | | 93 | 25-150 |
| 13C6_PFDA | | 123 | 25-150 |
| 13C7_PFUdA | | 94 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-003**

Description: **MWW1-02_GW-091923** Matrix: **Aqueous**

Date Sampled: **09/19/2023 1322** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 106 | 25-150 |
| 13C8_PFOS | | 93 | 25-150 |
| 13C8_PFOSA | | 98 | 10-150 |
| 13C9_PFNA | | 111 | 25-150 |
| d5-EtFOSAA | | 96 | 25-150 |
| d3-MeFOSAA | | 97 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-004**

Description: **EB-06_091923** Matrix: **Aqueous**

Date Sampled: **09/19/2023 1330** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/29/2023 1811 | ARC2 | 09/21/2023 1924 | 85448 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.6 | 0.63 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.6 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.6 | 0.83 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.6 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.6 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.6 | 0.88 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.8 | 0.39 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.74 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.47 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.67 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.45 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.8 | 0.42 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.8 | 0.65 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.8 | 0.79 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 104 | 25-150 |
| 13C2_6:2FTS | | 113 | 25-150 |
| 13C2_8:2FTS | | 105 | 25-150 |
| 13C2_PFDoA | | 98 | 25-150 |
| 13C2_PFTeDA | | 102 | 25-150 |
| 13C3_PFBS | | 103 | 25-150 |
| 13C3_PFHxS | | 102 | 25-150 |
| 13C3-HFPO-DA | | 104 | 25-150 |
| 13C4_PFBA | | 102 | 25-150 |
| 13C4_PFHpA | | 99 | 25-150 |
| 13C5_PFHxA | | 107 | 25-150 |
| 13C5_PFPeA | | 101 | 25-150 |
| 13C6_PFDA | | 105 | 25-150 |
| 13C7_PFUdA | | 98 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
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# PFAS by LC/MS/MS

| | | | |
|---|---|---|---|
| Client: **Arcadis U.S., Inc.** | | Laboratory ID: **YI20016-004** |
| Description: **EB-06_091923** | | Matrix: **Aqueous** |
| Date Sampled: **09/19/2023 1330** | Project Name: **RACER PNC** | |
| Date Received: **09/20/2023** | Project Number: **30167840.00031** | |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 107 | 25-150 |
| 13C8_PFOS | | 98 | 25-150 |
| 13C8_PFOSA | | 96 | 10-150 |
| 13C9_PFNA | | 112 | 25-150 |
| d5-EtFOSAA | | 99 | 25-150 |
| d3-MeFOSAA | | 103 | 25-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-005**

Description: **MWM30-02_GW-091923** Matrix: **Aqueous**

Date Sampled: **09/19/2023 1120** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/29/2023 1821 | ARC2 | 09/21/2023 1924 | 85448 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.7 | 0.46 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.7 | 0.64 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.7 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.7 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.7 | 0.84 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.7 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.7 | 0.47 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.7 | 0.72 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.7 | 0.90 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **2.9** | **J** | **3.9** | **0.40** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.75 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.48 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.69 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.59 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.57 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **3.3** | **J** | **3.9** | **0.53** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **6.5** | | **3.9** | **0.58** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.45 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **3.3** | **J** | **3.9** | **0.43** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **3.4** | **J** | **3.9** | **0.66** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.9 | 0.44 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **6.7** | | **3.9** | **0.80** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **3.0** | **J** | **3.9** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.60 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **3.1** | **J** | **3.9** | **1.9** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 206 | 25-150 |
| 13C2_6:2FTS | N | 154 | 25-150 |
| 13C2_8:2FTS | | 103 | 25-150 |
| 13C2_PFDoA | | 96 | 25-150 |
| 13C2_PFTeDA | | 108 | 25-150 |
| 13C3_PFBS | | 105 | 25-150 |
| 13C3_PFHxS | | 94 | 25-150 |
| 13C3-HFPO-DA | | 102 | 25-150 |
| 13C4_PFBA | | 82 | 25-150 |
| 13C4_PFHpA | | 97 | 25-150 |
| 13C5_PFHxA | | 111 | 25-150 |
| 13C5_PFPeA | | 105 | 25-150 |
| 13C6_PFDA | | 103 | 25-150 |
| 13C7_PFUdA | | 104 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-005**

Description: **MWM30-02_GW-091923** Matrix: **Aqueous**

Date Sampled: **09/19/2023 1120** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 109 | 25-150 |
| 13C8_PFOS | | 106 | 25-150 |
| 13C8_PFOSA | | 97 | 10-150 |
| 13C9_PFNA | | 112 | 25-150 |
| d5-EtFOSAA | | 102 | 25-150 |
| d3-MeFOSAA | | 101 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-006**

Description: **TW-10-01_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1515** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/29/2023 1842 | ARC2 | 09/21/2023 1924 | 85448 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.7 | 0.46 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.7 | 0.64 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.7 | 1.5 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **24** | **Q** | **7.7** | **1.9** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.7 | 0.84 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.7 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.7 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.7 | 0.72 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.7 | 0.89 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **43** | | **3.8** | **0.40** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.75 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **3.1** | **J** | **3.8** | **0.48** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.68 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **13** | | **3.8** | **0.57** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **47** | | **3.8** | **0.53** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | Q | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.45 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **7.0** | | **3.8** | **0.43** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **45** | | **3.8** | **0.66** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **15** | | **3.8** | **0.80** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.51 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.60 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **81** | | **3.8** | **1.9** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 219 | 25-150 |
| 13C2_6:2FTS | N | 223 | 25-150 |
| 13C2_8:2FTS | | 107 | 25-150 |
| 13C2_PFDoA | | 70 | 25-150 |
| 13C2_PFTeDA | | 60 | 25-150 |
| 13C3_PFBS | | 74 | 25-150 |
| 13C3_PFHxS | | 79 | 25-150 |
| 13C3-HFPO-DA | | 54 | 25-150 |
| 13C4_PFBA | N | 16 | 25-150 |
| 13C4_PFHpA | | 56 | 25-150 |
| 13C5_PFHxA | | 44 | 25-150 |
| 13C5_PFPeA | | 32 | 25-150 |
| 13C6_PFDA | | 92 | 25-150 |
| 13C7_PFUdA | | 79 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-006**

Description: **TW-10-01_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1515** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 83 | 25-150 |
| 13C8_PFOS | | 84 | 25-150 |
| 13C8_PFOSA | | 88 | 10-150 |
| 13C9_PFNA | | 93 | 25-150 |
| d5-EtFOSAA | | 80 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# QC Summary

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ85388-001
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP
**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 0.48 | ng/L | 09/22/2023 1546 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 0.66 | ng/L | 09/22/2023 1546 |
| 8:2 FTS | ND | | 1 | 8.0 | 1.6 | ng/L | 09/22/2023 1546 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 09/22/2023 1546 |
| 4:2 FTS | ND | | 1 | 8.0 | 0.87 | ng/L | 09/22/2023 1546 |
| GenX | ND | | 1 | 8.0 | 2.1 | ng/L | 09/22/2023 1546 |
| ADONA | ND | | 1 | 8.0 | 0.48 | ng/L | 09/22/2023 1546 |
| EtFOSAA | ND | | 1 | 8.0 | 0.75 | ng/L | 09/22/2023 1546 |
| MeFOSAA | ND | | 1 | 8.0 | 0.93 | ng/L | 09/22/2023 1546 |
| PFBS | ND | | 1 | 4.0 | 0.41 | ng/L | 09/22/2023 1546 |
| PFDS | ND | | 1 | 4.0 | 0.78 | ng/L | 09/22/2023 1546 |
| PFHpS | ND | | 1 | 4.0 | 0.50 | ng/L | 09/22/2023 1546 |
| PFNS | ND | | 1 | 4.0 | 0.71 | ng/L | 09/22/2023 1546 |
| PFOSA | ND | | 1 | 4.0 | 0.61 | ng/L | 09/22/2023 1546 |
| PFPeS | ND | | 1 | 4.0 | 0.59 | ng/L | 09/22/2023 1546 |
| PFHxS | ND | | 1 | 4.0 | 0.55 | ng/L | 09/22/2023 1546 |
| PFBA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/22/2023 1546 |
| PFDA | ND | | 1 | 4.0 | 0.52 | ng/L | 09/22/2023 1546 |
| PFDoA | ND | | 1 | 4.0 | 0.47 | ng/L | 09/22/2023 1546 |
| PFHpA | ND | | 1 | 4.0 | 0.45 | ng/L | 09/22/2023 1546 |
| PFHxA | ND | | 1 | 4.0 | 0.69 | ng/L | 09/22/2023 1546 |
| PFNA | ND | | 1 | 4.0 | 0.46 | ng/L | 09/22/2023 1546 |
| PFOA | ND | | 1 | 4.0 | 0.83 | ng/L | 09/22/2023 1546 |
| PFPeA | ND | | 1 | 4.0 | 0.54 | ng/L | 09/22/2023 1546 |
| PFTeDA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/22/2023 1546 |
| PFTrDA | ND | | 1 | 4.0 | 0.53 | ng/L | 09/22/2023 1546 |
| PFUdA | ND | | 1 | 4.0 | 0.63 | ng/L | 09/22/2023 1546 |
| PFOS | ND | | 1 | 4.0 | 2.0 | ng/L | 09/22/2023 1546 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 100 | 25-150 |
| 13C2_6:2FTS | | 108 | 25-150 |
| 13C2_8:2FTS | | 93 | 25-150 |
| 13C2_PFDoA | | 90 | 25-150 |
| 13C2_PFTeDA | | 98 | 25-150 |
| 13C3_PFBS | | 92 | 25-150 |
| 13C3_PFHxS | | 83 | 25-150 |
| 13C3-HFPO-DA | | 90 | 25-150 |
| 13C4_PFBA | | 94 | 25-150 |
| 13C4_PFHpA | | 86 | 25-150 |
| 13C5_PFHxA | | 89 | 25-150 |
| 13C5_PFPeA | | 89 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ85388-001
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 91 | 25-150 |
| 13C7_PFUdA | | 86 | 25-150 |
| 13C8_PFOA | | 88 | 25-150 |
| 13C8_PFOS | | 84 | 25-150 |
| 13C8_PFOSA | | 86 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 |
| d5-EtFOSAA | | 94 | 25-150 |
| d3-MeFOSAA | | 87 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ85388-002
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 16 | | 1 | 106 | 50-150 | 09/22/2023 1556 |
| 11Cl-PF3OUdS | 15 | 15 | | 1 | 102 | 50-150 | 09/22/2023 1556 |
| 8:2 FTS | 15 | 16 | | 1 | 105 | 50-150 | 09/22/2023 1556 |
| 6:2 FTS | 15 | 16 | | 1 | 103 | 50-150 | 09/22/2023 1556 |
| 4:2 FTS | 15 | 16 | | 1 | 107 | 50-150 | 09/22/2023 1556 |
| GenX | 32 | 32 | | 1 | 101 | 50-150 | 09/22/2023 1556 |
| ADONA | 15 | 18 | | 1 | 118 | 50-150 | 09/22/2023 1556 |
| EtFOSAA | 16 | 17 | | 1 | 105 | 50-150 | 09/22/2023 1556 |
| MeFOSAA | 16 | 16 | | 1 | 101 | 50-150 | 09/22/2023 1556 |
| PFBS | 14 | 15 | | 1 | 108 | 50-150 | 09/22/2023 1556 |
| PFDS | 15 | 16 | | 1 | 101 | 50-150 | 09/22/2023 1556 |
| PFHpS | 15 | 17 | | 1 | 109 | 50-150 | 09/22/2023 1556 |
| PFNS | 15 | 16 | | 1 | 107 | 50-150 | 09/22/2023 1556 |
| PFOSA | 16 | 14 | | 1 | 89 | 50-150 | 09/22/2023 1556 |
| PFPeS | 15 | 16 | | 1 | 108 | 50-150 | 09/22/2023 1556 |
| PFHxS | 15 | 16 | | 1 | 112 | 50-150 | 09/22/2023 1556 |
| PFBA | 16 | 16 | | 1 | 100 | 50-150 | 09/22/2023 1556 |
| PFDA | 16 | 17 | | 1 | 107 | 50-150 | 09/22/2023 1556 |
| PFDoA | 16 | 16 | | 1 | 100 | 50-150 | 09/22/2023 1556 |
| PFHpA | 16 | 17 | | 1 | 108 | 50-150 | 09/22/2023 1556 |
| PFHxA | 16 | 17 | | 1 | 108 | 50-150 | 09/22/2023 1556 |
| PFNA | 16 | 19 | | 1 | 118 | 50-150 | 09/22/2023 1556 |
| PFOA | 16 | 20 | | 1 | 123 | 50-150 | 09/22/2023 1556 |
| PFPeA | 16 | 16 | | 1 | 102 | 50-150 | 09/22/2023 1556 |
| PFTeDA | 16 | 17 | | 1 | 108 | 50-150 | 09/22/2023 1556 |
| PFTrDA | 16 | 18 | | 1 | 113 | 50-150 | 09/22/2023 1556 |
| PFUdA | 16 | 18 | | 1 | 113 | 50-150 | 09/22/2023 1556 |
| PFOS | 15 | 16 | | 1 | 109 | 50-150 | 09/22/2023 1556 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 101 | 25-150 |
| 13C2_6:2FTS | | 102 | 25-150 |
| 13C2_8:2FTS | | 86 | 25-150 |
| 13C2_PFDoA | | 81 | 25-150 |
| 13C2_PFTeDA | | 92 | 25-150 |
| 13C3_PFBS | | 99 | 25-150 |
| 13C3_PFHxS | | 89 | 25-150 |
| 13C3-HFPO-DA | | 95 | 25-150 |
| 13C4_PFBA | | 93 | 25-150 |
| 13C4_PFHpA | | 85 | 25-150 |
| 13C5_PFHxA | | 95 | 25-150 |
| 13C5_PFPeA | | 99 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ85388-002
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 89 | 25-150 |
| 13C7_PFUdA | | 82 | 25-150 |
| 13C8_PFOA | | 92 | 25-150 |
| 13C8_PFOS | | 81 | 25-150 |
| 13C8_PFOSA | | 86 | 10-150 |
| 13C9_PFNA | | 83 | 25-150 |
| d5-EtFOSAA | | 86 | 25-150 |
| d3-MeFOSAA | | 81 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MS

**Sample ID:** YI20016-002MS
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Parameter | Sample Amount (ng/L) | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | 150 | 150 | | 1 | 99 | 50-150 | 09/22/2023 2021 |
| 11Cl-PF3OUdS | ND | 150 | 160 | | 1 | 103 | 50-150 | 09/22/2023 2021 |
| 8:2 FTS | ND | 150 | 160 | | 1 | 106 | 50-150 | 09/22/2023 2021 |
| 6:2 FTS | 28 | 150 | 180 | | 1 | 101 | 50-150 | 09/22/2023 2021 |
| 4:2 FTS | ND | 150 | 170 | | 1 | 111 | 50-150 | 09/22/2023 2021 |
| GenX | ND | 320 | 390 | | 1 | 121 | 50-150 | 09/22/2023 2021 |
| ADONA | ND | 150 | 140 | | 1 | 93 | 50-150 | 09/22/2023 2021 |
| EtFOSAA | ND | 160 | 170 | | 1 | 109 | 50-150 | 09/22/2023 2021 |
| MeFOSAA | ND | 160 | 170 | | 1 | 106 | 50-150 | 09/22/2023 2021 |
| PFBS | ND | 140 | 150 | | 1 | 105 | 50-150 | 09/22/2023 2021 |
| PFDS | ND | 150 | 170 | | 1 | 110 | 50-150 | 09/22/2023 2021 |
| PFHpS | ND | 150 | 170 | | 1 | 109 | 50-150 | 09/22/2023 2021 |
| PFNS | ND | 150 | 150 | | 1 | 101 | 50-150 | 09/22/2023 2021 |
| PFOSA | ND | 160 | 170 | | 1 | 109 | 50-150 | 09/22/2023 2021 |
| PFPeS | ND | 150 | 150 | | 1 | 100 | 50-150 | 09/22/2023 2021 |
| PFHxS | 25 | 150 | 180 | | 1 | 107 | 50-150 | 09/22/2023 2021 |
| PFBA | ND | 160 | 150 | | 1 | 97 | 50-150 | 09/22/2023 2021 |
| PFDA | ND | 160 | 180 | | 1 | 115 | 50-150 | 09/22/2023 2021 |
| PFDoA | ND | 160 | 150 | | 1 | 97 | 50-150 | 09/22/2023 2021 |
| PFHpA | 8.6 | 160 | 170 | | 1 | 103 | 50-150 | 09/22/2023 2021 |
| PFHxA | 12 | 160 | 170 | | 1 | 98 | 50-150 | 09/22/2023 2021 |
| PFNA | ND | 160 | 170 | | 1 | 106 | 50-150 | 09/22/2023 2021 |
| PFOA | 21 | 160 | 190 | | 1 | 105 | 50-150 | 09/22/2023 2021 |
| PFPeA | ND | 160 | 180 | | 1 | 115 | 50-150 | 09/22/2023 2021 |
| PFTeDA | ND | 160 | 160 | | 1 | 102 | 50-150 | 09/22/2023 2021 |
| PFTrDA | ND | 160 | 170 | | 1 | 104 | 50-150 | 09/22/2023 2021 |
| PFUdA | ND | 160 | 200 | | 1 | 128 | 50-150 | 09/22/2023 2021 |
| PFOS | 65 | 150 | 220 | | 1 | 102 | 50-150 | 09/22/2023 2021 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | N | 326 | 25-150 |
| 13C2_6:2FTS | N | 262 | 25-150 |
| 13C2_8:2FTS | N | 173 | 25-150 |
| 13C2_PFDoA | | 92 | 25-150 |
| 13C2_PFTeDA | | 91 | 25-150 |
| 13C3_PFBS | | 97 | 25-150 |
| 13C3_PFHxS | | 86 | 25-150 |
| 13C3-HFPO-DA | | 67 | 25-150 |
| 13C4_PFBA | | 76 | 25-150 |
| 13C4_PFHpA | | 73 | 25-150 |
| 13C5_PFHxA | | 92 | 25-150 |
| 13C5_PFPeA | | 85 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MS

**Sample ID:** YI20016-002MS
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 95 | 25-150 |
| 13C7_PFUdA | | 99 | 25-150 |
| 13C8_PFOA | | 93 | 25-150 |
| 13C8_PFOS | | 87 | 25-150 |
| 13C8_PFOSA | | 88 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 |
| d5-EtFOSAA | | 108 | 25-150 |
| d3-MeFOSAA | | 105 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MSD

**Sample ID:** YI20016-002MD
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Parameter | Sample Amount (ng/L) | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | % RPD | %Rec Limit | % RPD Limit | Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | 150 | 160 | | 1 | 109 | 10 | 50-150 | 30 | 09/22/2023 2032 |
| 11Cl-PF3OUdS | ND | 150 | 160 | | 1 | 106 | 2.9 | 50-150 | 30 | 09/22/2023 2032 |
| 8:2 FTS | ND | 150 | 160 | | 1 | 105 | 1.1 | 50-150 | 30 | 09/22/2023 2032 |
| 6:2 FTS | 28 | 150 | 190 | | 1 | 108 | 6.3 | 50-150 | 30 | 09/22/2023 2032 |
| 4:2 FTS | ND | 150 | 140 | | 1 | 97 | 14 | 50-150 | 30 | 09/22/2023 2032 |
| GenX | ND | 320 | 420 | | 1 | 132 | 8.8 | 50-150 | 30 | 09/22/2023 2032 |
| ADONA | ND | 150 | 150 | | 1 | 95 | 2.0 | 50-150 | 30 | 09/22/2023 2032 |
| EtFOSAA | ND | 160 | 170 | | 1 | 104 | 4.3 | 50-150 | 30 | 09/22/2023 2032 |
| MeFOSAA | ND | 160 | 170 | | 1 | 105 | 0.77 | 50-150 | 30 | 09/22/2023 2032 |
| PFBS | ND | 140 | 140 | | 1 | 98 | 6.4 | 50-150 | 30 | 09/22/2023 2032 |
| PFDS | ND | 150 | 190 | | 1 | 125 | 13 | 50-150 | 30 | 09/22/2023 2032 |
| PFHpS | ND | 150 | 150 | | 1 | 97 | 11 | 50-150 | 30 | 09/22/2023 2032 |
| PFNS | ND | 150 | 180 | | 1 | 116 | 14 | 50-150 | 30 | 09/22/2023 2032 |
| PFOSA | ND | 160 | 170 | | 1 | 106 | 3.4 | 50-150 | 30 | 09/22/2023 2032 |
| PFPeS | ND | 150 | 160 | | 1 | 105 | 4.7 | 50-150 | 30 | 09/22/2023 2032 |
| PFHxS | 25 | 150 | 160 | | 1 | 94 | 11 | 50-150 | 30 | 09/22/2023 2032 |
| PFBA | ND | 160 | 150 | | 1 | 95 | 1.7 | 50-150 | 30 | 09/22/2023 2032 |
| PFDA | ND | 160 | 170 | | 1 | 109 | 5.3 | 50-150 | 30 | 09/22/2023 2032 |
| PFDoA | ND | 160 | 160 | | 1 | 99 | 2.6 | 50-150 | 30 | 09/22/2023 2032 |
| PFHpA | 8.6 | 160 | 180 | | 1 | 108 | 4.4 | 50-150 | 30 | 09/22/2023 2032 |
| PFHxA | 12 | 160 | 170 | | 1 | 100 | 1.7 | 50-150 | 30 | 09/22/2023 2032 |
| PFNA | ND | 160 | 180 | | 1 | 109 | 2.6 | 50-150 | 30 | 09/22/2023 2032 |
| PFOA | 21 | 160 | 180 | | 1 | 100 | 4.4 | 50-150 | 30 | 09/22/2023 2032 |
| PFPeA | ND | 160 | 180 | | 1 | 112 | 2.1 | 50-150 | 30 | 09/22/2023 2032 |
| PFTeDA | ND | 160 | 160 | | 1 | 102 | 0.58 | 50-150 | 30 | 09/22/2023 2032 |
| PFTrDA | ND | 160 | 160 | | 1 | 99 | 4.5 | 50-150 | 30 | 09/22/2023 2032 |
| PFUdA | ND | 160 | 170 | | 1 | 105 | 20 | 50-150 | 30 | 09/22/2023 2032 |
| PFOS | 65 | 150 | 230 | | 1 | 114 | 7.8 | 50-150 | 30 | 09/22/2023 2032 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | N | 342 | 25-150 |
| 13C2_6:2FTS | N | 261 | 25-150 |
| 13C2_8:2FTS | N | 153 | 25-150 |
| 13C2_PFDoA | | 83 | 25-150 |
| 13C2_PFTeDA | | 88 | 25-150 |
| 13C3_PFBS | | 93 | 25-150 |
| 13C3_PFHxS | | 84 | 25-150 |
| 13C3-HFPO-DA | | 61 | 25-150 |
| 13C4_PFBA | | 73 | 25-150 |
| 13C4_PFHpA | | 71 | 25-150 |
| 13C5_PFHxA | | 87 | 25-150 |
| 13C5_PFPeA | | 84 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MSD

**Sample ID:** YI20016-002MD
**Batch:** 85388
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1602

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 100 | 25-150 |
| 13C7_PFUdA | | 98 | 25-150 |
| 13C8_PFOA | | 88 | 25-150 |
| 13C8_PFOS | | 75 | 25-150 |
| 13C8_PFOSA | | 84 | 10-150 |
| 13C9_PFNA | | 86 | 25-150 |
| d5-EtFOSAA | | 101 | 25-150 |
| d3-MeFOSAA | | 98 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ85448-001
**Batch:** 85448
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1924

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 0.48 | ng/L | 09/29/2023 1635 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 0.66 | ng/L | 09/29/2023 1635 |
| 8:2 FTS | ND | | 1 | 8.0 | 1.6 | ng/L | 09/29/2023 1635 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 09/29/2023 1635 |
| 4:2 FTS | ND | | 1 | 8.0 | 0.87 | ng/L | 09/29/2023 1635 |
| GenX | ND | | 1 | 8.0 | 2.1 | ng/L | 09/29/2023 1635 |
| ADONA | ND | | 1 | 8.0 | 0.48 | ng/L | 09/29/2023 1635 |
| EtFOSAA | ND | | 1 | 8.0 | 0.75 | ng/L | 09/29/2023 1635 |
| MeFOSAA | ND | | 1 | 8.0 | 0.93 | ng/L | 09/29/2023 1635 |
| PFBS | ND | | 1 | 4.0 | 0.41 | ng/L | 09/29/2023 1635 |
| PFDS | ND | | 1 | 4.0 | 0.78 | ng/L | 09/29/2023 1635 |
| PFHpS | ND | | 1 | 4.0 | 0.50 | ng/L | 09/29/2023 1635 |
| PFNS | ND | | 1 | 4.0 | 0.71 | ng/L | 09/29/2023 1635 |
| PFOSA | ND | | 1 | 4.0 | 0.61 | ng/L | 09/29/2023 1635 |
| PFPeS | ND | | 1 | 4.0 | 0.59 | ng/L | 09/29/2023 1635 |
| PFHxS | ND | | 1 | 4.0 | 0.55 | ng/L | 09/29/2023 1635 |
| PFBA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/29/2023 1635 |
| PFDA | ND | | 1 | 4.0 | 0.52 | ng/L | 09/29/2023 1635 |
| PFDoA | ND | | 1 | 4.0 | 0.47 | ng/L | 09/29/2023 1635 |
| PFHpA | ND | | 1 | 4.0 | 0.45 | ng/L | 09/29/2023 1635 |
| PFHxA | ND | | 1 | 4.0 | 0.69 | ng/L | 09/29/2023 1635 |
| PFNA | ND | | 1 | 4.0 | 0.46 | ng/L | 09/29/2023 1635 |
| PFOA | ND | | 1 | 4.0 | 0.83 | ng/L | 09/29/2023 1635 |
| PFPeA | ND | | 1 | 4.0 | 0.54 | ng/L | 09/29/2023 1635 |
| PFTeDA | ND | | 1 | 4.0 | 0.60 | ng/L | 09/29/2023 1635 |
| PFTrDA | ND | | 1 | 4.0 | 0.53 | ng/L | 09/29/2023 1635 |
| PFUdA | ND | | 1 | 4.0 | 0.63 | ng/L | 09/29/2023 1635 |
| PFOS | ND | | 1 | 4.0 | 2.0 | ng/L | 09/29/2023 1635 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 98 | 25-150 |
| 13C2_6:2FTS | | 87 | 25-150 |
| 13C2_8:2FTS | | 86 | 25-150 |
| 13C2_PFDoA | | 84 | 25-150 |
| 13C2_PFTeDA | | 90 | 25-150 |
| 13C3_PFBS | | 94 | 25-150 |
| 13C3_PFHxS | | 89 | 25-150 |
| 13C3-HFPO-DA | | 91 | 25-150 |
| 13C4_PFBA | | 92 | 25-150 |
| 13C4_PFHpA | | 89 | 25-150 |
| 13C5_PFHxA | | 97 | 25-150 |
| 13C5_PFPeA | | 92 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ85448-001
**Batch:** 85448
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1924

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 98 | 25-150 |
| 13C7_PFUdA | | 95 | 25-150 |
| 13C8_PFOA | | 91 | 25-150 |
| 13C8_PFOS | | 94 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 |
| 13C9_PFNA | | 100 | 25-150 |
| d5-EtFOSAA | | 90 | 25-150 |
| d3-MeFOSAA | | 96 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ85448-002
**Batch:** 85448
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1924

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 15 | | 1 | 100 | 50-150 | 09/29/2023 1646 |
| 11Cl-PF3OUdS | 15 | 14 | | 1 | 92 | 50-150 | 09/29/2023 1646 |
| 8:2 FTS | 15 | 14 | | 1 | 94 | 50-150 | 09/29/2023 1646 |
| 6:2 FTS | 15 | 18 | | 1 | 118 | 50-150 | 09/29/2023 1646 |
| 4:2 FTS | 15 | 14 | | 1 | 96 | 50-150 | 09/29/2023 1646 |
| GenX | 32 | 34 | | 1 | 106 | 50-150 | 09/29/2023 1646 |
| ADONA | 15 | 16 | | 1 | 109 | 50-150 | 09/29/2023 1646 |
| EtFOSAA | 16 | 16 | | 1 | 102 | 50-150 | 09/29/2023 1646 |
| MeFOSAA | 16 | 18 | | 1 | 114 | 50-150 | 09/29/2023 1646 |
| PFBS | 14 | 14 | | 1 | 97 | 50-150 | 09/29/2023 1646 |
| PFDS | 15 | 15 | | 1 | 98 | 50-150 | 09/29/2023 1646 |
| PFHpS | 15 | 17 | | 1 | 114 | 50-150 | 09/29/2023 1646 |
| PFNS | 15 | 14 | | 1 | 91 | 50-150 | 09/29/2023 1646 |
| PFOSA | 16 | 15 | | 1 | 91 | 50-150 | 09/29/2023 1646 |
| PFPeS | 15 | 15 | | 1 | 99 | 50-150 | 09/29/2023 1646 |
| PFHxS | 15 | 17 | | 1 | 114 | 50-150 | 09/29/2023 1646 |
| PFBA | 16 | 15 | | 1 | 94 | 50-150 | 09/29/2023 1646 |
| PFDA | 16 | 17 | | 1 | 106 | 50-150 | 09/29/2023 1646 |
| PFDoA | 16 | 16 | | 1 | 98 | 50-150 | 09/29/2023 1646 |
| PFHpA | 16 | 14 | | 1 | 86 | 50-150 | 09/29/2023 1646 |
| PFHxA | 16 | 15 | | 1 | 94 | 50-150 | 09/29/2023 1646 |
| PFNA | 16 | 15 | | 1 | 92 | 50-150 | 09/29/2023 1646 |
| PFOA | 16 | 17 | | 1 | 104 | 50-150 | 09/29/2023 1646 |
| PFPeA | 16 | 16 | | 1 | 101 | 50-150 | 09/29/2023 1646 |
| PFTeDA | 16 | 16 | | 1 | 100 | 50-150 | 09/29/2023 1646 |
| PFTrDA | 16 | 15 | | 1 | 94 | 50-150 | 09/29/2023 1646 |
| PFUdA | 16 | 15 | | 1 | 94 | 50-150 | 09/29/2023 1646 |
| PFOS | 15 | 15 | | 1 | 103 | 50-150 | 09/29/2023 1646 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 101 | 25-150 |
| 13C2_6:2FTS | | 98 | 25-150 |
| 13C2_8:2FTS | | 89 | 25-150 |
| 13C2_PFDoA | | 93 | 25-150 |
| 13C2_PFTeDA | | 95 | 25-150 |
| 13C3_PFBS | | 101 | 25-150 |
| 13C3_PFHxS | | 89 | 25-150 |
| 13C3-HFPO-DA | | 101 | 25-150 |
| 13C4_PFBA | | 98 | 25-150 |
| 13C4_PFHpA | | 99 | 25-150 |
| 13C5_PFHxA | | 101 | 25-150 |
| 13C5_PFPeA | | 97 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ85448-002
**Batch:** 85448
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1924

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 98 | 25-150 |
| 13C7_PFUdA | | 102 | 25-150 |
| 13C8_PFOA | | 98 | 25-150 |
| 13C8_PFOS | | 97 | 25-150 |
| 13C8_PFOSA | | 95 | 10-150 |
| 13C9_PFNA | | 110 | 25-150 |
| d5-EtFOSAA | | 95 | 25-150 |
| d3-MeFOSAA | | 94 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MS

**Sample ID:** YI20016-005MS
**Batch:** 85448
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1924

| Parameter | Sample Amount (ng/L) | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | 15 | 15 | | 1 | 100 | 50-150 | 09/29/2023 1832 |
| 11Cl-PF3OUdS | ND | 16 | 14 | | 1 | 92 | 50-150 | 09/29/2023 1832 |
| 8:2 FTS | ND | 16 | 15 | | 1 | 94 | 50-150 | 09/29/2023 1832 |
| 6:2 FTS | ND | 16 | 17 | | 1 | 106 | 50-150 | 09/29/2023 1832 |
| 4:2 FTS | ND | 15 | 16 | | 1 | 102 | 50-150 | 09/29/2023 1832 |
| GenX | ND | 33 | 36 | | 1 | 110 | 50-150 | 09/29/2023 1832 |
| ADONA | ND | 16 | 16 | | 1 | 104 | 50-150 | 09/29/2023 1832 |
| EtFOSAA | ND | 17 | 16 | | 1 | 98 | 50-150 | 09/29/2023 1832 |
| MeFOSAA | ND | 17 | 15 | | 1 | 93 | 50-150 | 09/29/2023 1832 |
| PFBS | 2.9 | 15 | 18 | | 1 | 107 | 50-150 | 09/29/2023 1832 |
| PFDS | ND | 16 | 15 | | 1 | 97 | 50-150 | 09/29/2023 1832 |
| PFHpS | ND | 16 | 16 | | 1 | 101 | 50-150 | 09/29/2023 1832 |
| PFNS | ND | 16 | 15 | | 1 | 95 | 50-150 | 09/29/2023 1832 |
| PFOSA | ND | 17 | 16 | | 1 | 95 | 50-150 | 09/29/2023 1832 |
| PFPeS | ND | 15 | 16 | | 1 | 103 | 50-150 | 09/29/2023 1832 |
| PFHxS | 3.3 | 15 | 19 | | 1 | 105 | 50-150 | 09/29/2023 1832 |
| PFBA | 6.5 | 17 | 23 | | 1 | 100 | 50-150 | 09/29/2023 1832 |
| PFDA | ND | 17 | 16 | | 1 | 99 | 50-150 | 09/29/2023 1832 |
| PFDoA | ND | 17 | 17 | | 1 | 101 | 50-150 | 09/29/2023 1832 |
| PFHpA | 3.3 | 17 | 21 | | 1 | 105 | 50-150 | 09/29/2023 1832 |
| PFHxA | 3.4 | 17 | 21 | | 1 | 110 | 50-150 | 09/29/2023 1832 |
| PFNA | ND | 17 | 17 | | 1 | 103 | 50-150 | 09/29/2023 1832 |
| PFOA | 6.7 | 17 | 21 | | 1 | 86 | 50-150 | 09/29/2023 1832 |
| PFPeA | 3.0 | 17 | 19 | | 1 | 97 | 50-150 | 09/29/2023 1832 |
| PFTeDA | ND | 17 | 16 | | 1 | 96 | 50-150 | 09/29/2023 1832 |
| PFTrDA | ND | 17 | 16 | | 1 | 99 | 50-150 | 09/29/2023 1832 |
| PFUdA | ND | 17 | 16 | | 1 | 97 | 50-150 | 09/29/2023 1832 |
| PFOS | 3.1 | 15 | 19 | | 1 | 103 | 50-150 | 09/29/2023 1832 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | N | 158 | 25-150 |
| 13C2_6:2FTS | | 124 | 25-150 |
| 13C2_8:2FTS | | 94 | 25-150 |
| 13C2_PFDoA | | 81 | 25-150 |
| 13C2_PFTeDA | | 87 | 25-150 |
| 13C3_PFBS | | 84 | 25-150 |
| 13C3_PFHxS | | 85 | 25-150 |
| 13C3-HFPO-DA | | 83 | 25-150 |
| 13C4_PFBA | | 74 | 25-150 |
| 13C4_PFHpA | | 80 | 25-150 |
| 13C5_PFHxA | | 94 | 25-150 |
| 13C5_PFPeA | | 93 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MS

**Sample ID:** YI20016-005MS
**Batch:** 85448
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1924

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 93 | 25-150 |
| 13C7_PFUdA | | 84 | 25-150 |
| 13C8_PFOA | | 98 | 25-150 |
| 13C8_PFOS | | 88 | 25-150 |
| 13C8_PFOSA | | 92 | 10-150 |
| 13C9_PFNA | | 96 | 25-150 |
| d5-EtFOSAA | | 88 | 25-150 |
| d3-MeFOSAA | | 93 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - Duplicate

**Sample ID:** YI20016-006DU
**Batch:** 85448
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1924

| Parameter | Sample Amount (ng/L) | Result (ng/L) | Q | Dil | % RPD | %RPD Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| 11Cl-PF3OUdS | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| 8:2 FTS | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| 6:2 FTS | 24 | 2.1 | J,+ | 1 | 170 | 20 | 09/29/2023 1853 |
| 4:2 FTS | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| GenX | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| ADONA | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| EtFOSAA | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| MeFOSAA | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| PFBS | 43 | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| PFDS | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| PFHpS | 3.1 | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| PFNS | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| PFOSA | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| PFPeS | 13 | 1.8 | J,+ | 1 | 150 | 20 | 09/29/2023 1853 |
| PFHxS | 47 | 7.1 | + | 1 | 150 | 20 | 09/29/2023 1853 |
| PFBA | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| PFDA | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| PFDoA | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| PFHpA | 7.0 | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| PFHxA | 45 | 17 | + | 1 | 91 | 20 | 09/29/2023 1853 |
| PFNA | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| PFOA | 15 | 3.5 | J,+ | 1 | 120 | 20 | 09/29/2023 1853 |
| PFPeA | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| PFTeDA | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| PFTrDA | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| PFUdA | ND | ND | | 1 | 0.00 | 20 | 09/29/2023 1853 |
| PFOS | 81 | 9.7 | + | 1 | 160 | 20 | 09/29/2023 1853 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | N | 196 | 25-150 |
| 13C2_6:2FTS | N | 263 | 25-150 |
| 13C2_8:2FTS | | 104 | 25-150 |
| 13C2_PFDoA | | 73 | 25-150 |
| 13C2_PFTeDA | | 62 | 25-150 |
| 13C3_PFBS | | 80 | 25-150 |
| 13C3_PFHxS | | 85 | 25-150 |
| 13C3-HFPO-DA | | 55 | 25-150 |
| 13C4_PFBA | N | 16 | 25-150 |
| 13C4_PFHpA | | 60 | 25-150 |
| 13C5_PFHxA | | 46 | 25-150 |
| 13C5_PFPeA | | 32 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS - Duplicate

**Sample ID:** YI20016-006DU
**Batch:** 85448
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 09/21/2023 1924

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 100 | 25-150 |
| 13C7_PFUdA | | 82 | 25-150 |
| 13C8_PFOA | | 85 | 25-150 |
| 13C8_PFOS | | 86 | 25-150 |
| 13C8_PFOSA | | 80 | 10-150 |
| 13C9_PFNA | | 92 | 25-150 |
| d5-EtFOSAA | | 83 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Chain of Custody
# and
# Miscellaneous Documents

Pace Analytical®

**PACE ANALYTICAL SERVICES, LLC**
105 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Alexis Crisp, Tiffany Linder | Telephone No. / E-mail: Alexis.Crisp@arcadis.com, Tiffany.linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Jammer Guy | Analysis (Attach list if more space is needed): Report EGLE 28 compounds | Page 1 of 3 |
| City: Novi; State: MI; Zip Code: 48377 | Printed Name: Jammer Guy | | YI20016 KB52 |
| Project Name: Racer PNC | | | |
| Project No.: 30167840.00031 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab / Composite | Matrix: Aqueous | Matrix: Solid | Matrix: Non-aqueous | No of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Methanol | Method 537 mod, with 150 ppb dilution per QSM 5.1 | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tripblank | 9/18/23 | 1500 | G | X | | | 1 | | | | | | X | | tripblank |
| MWM16-52_GW-091923 | 9/19/23 | 1115 | G | X | | | 6 | | | | | | X | | Run MS/MSD |
| MWWI-02_GW-091923 | 9/19/23 | 1322 | G | X | | | 2 | | | | | | X | | |
| EB-06_091923 | 9/19/23 | 1330 | G | X | | | 1 | | | | | | X | | equipment blank |

| | | | | | | |
|---|---|---|---|---|---|---|
| Turn Around Time Required (Prior lab approval required for expedited TAT.): ☒ Standard ☐ Rush (Specify) | Sample Disposal: ☐ Return to Client ☒ Disposal by Lab | Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown | QC Requirements (Specify) | | | |
| 1. Relinquished by: Jammer Guy | Date: 9/19/23 | Time: 1630 | 1. Received by: FedEx | Date: 9/19/23 | Time: 1630 | |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time | |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time | |
| 4. Relinquished by: fedex | Date: 9.20.23 | Time: 1010 | 4. Laboratory received by: Keegan Williams | Date: 9.20.23 | Time: 1010 | |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on ice (Circle): (Yes) No Ice Pack: Receipt Temp: 3.6 °C Temp Blank: ☐ Y ☒ N

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106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: ARCADIS | Report to Contact: Lexi Crisp | Telephone No. / E-mail: tiffany.linder@arcadis.com alexis.crisp@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: X Lottie Jay | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds | Page 2 of 3 |
| City: NOVI | State: MI | Zip Code: 48377 | Printed Name: Lottie Jay |
| Project Name: Racer PNC | | | |
| Project No.: ~~Racer PNC-LT~~ 30167840.00031 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab/Composite | Matrix: Aqueous | Matrix: Solid | Matrix: Non-Aqueous | No of Containers by Preservative Type: Unpres. | HCSO4 | HNO3 | HCl | NaOH | Soda Ash | Other Preserved | Method 624 + MS/MSD with Isotope dilution per USEPA SOW | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWM30-02-GW-091923 | 9/19/23 | 1120 | G | X | | | 2 | | | | | | | X | |

YI20016

KR32

| Turn Around Time Required (Prior lab approval required for expedited TAT.) | Sample Disposal | Possible Hazard Identification | QC Requirements (Specify) |
|---|---|---|---|
| ☒ Standard ☐ Rush (Specify) | ☐ Return to Client ☒ Disposal by Lab | ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown | |

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Lottie Jay / ARCADIS | 9/19/23 | 1500 | 1. Received by: Jennifer Kay | 9/19/23 | 1500 |
| 2. Relinquished by: Jennifer Kay | 9/19/23 | 1630 | 2. Received by: Fed Ex | 9/19/23 | 1630 |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by | 9.20.2023 | 1010 | 4. Laboratory received by: Kelizeth Guerrero | 9.20.23 | 10:10 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack | Receipt Temp. 3.1 °C | Temp Blank ☐ Y ☒N



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**Number** 150049

| | | | |
|---|---|---|---|
| Client: Aradis | Report to Contact: Alexis Crisp | Telephone No. / E-mail: alexis.crisp@aradis.com; tiffany.binder@aradis.com | Quote No. |
| Address: 28550 Cabot Dr Suite #500 | Sampler's Signature: X | Analysis (Attach list if more space is needed) | Page 3 of 3 |
| City: Novi | State: MI Zip Code: 48377 | Printed Name: Samantha Szpanier | YI20016 |
| Project Name: Ruler PJC | | | |
| Project No.: 30167840.00031 | P.O. No.: 30167840.00031 | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Sample Temperature | Matrix: Aqueous | Matrix: Solid | Matrix: Non-aqueous | No. of Containers by Preservation Type: Unpres. | HNO3 | H2SO4 | HCl | NaOH | Na2S2O3 | Field Filtered | PFAS Method 537.1 / Isotope Dilution Analysis | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW-10-01, GW-091823 | 9/18/23 | 1515 | 6 | X | | | 2 | | | | | | N | X | |

**Turn Around Time Required (Prior lab approval required for expedited TAT.)**
☑ Standard ☐ Rush (Specify)

**Sample Disposal**
☐ Return to Client ☑ Disposal by Lab

**Possible Hazard Identification**
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

**QC Requirements (Specify)**

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Samantha Szpanier / Aradis | 9/19/23 | 1520 | 1. Received by: | 9/19/23 | 1520 |
| 2. Relinquished by: | 9/19/23 | 1630 | 2. Received by: FedEx | 9/19/23 | 1630 |
| 3. Relinquished by: | Date | Time | 3. Received by: | Date | Time |
| 4. Relinquished by: Fedex | 9.20.23 | 1010 | 4. Laboratory received by: | 9.20.23 | 1010 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack — Receipt Temp: 3.6 °C — Temp Blank ☐ Y (N)



PACE ANALYTICAL SERVICES, LLC

DC#_Title: ENV-FRM-WCOL-0286 v02_Samples Receipt Checklist (SRC)
Effective Date: 8/2/2022

# Sample Receipt Checklist (SRC)

Client: ARCADIS  Cooler Inspected by/date: KDRW / 09/20/2023  Lot #: YI20016

Means of receipt: ☐ Pace ☐ Client ☐ UPS ☑ FedEx ☐ Other:

| | | | |
|---|---|---|---|
| ☐ Yes | ☑ No | | 1. Were custody seals present on the cooler? |
| ☐ Yes | ☐ No | ☑ NA | 2. If custody seals were present, were they intact and unbroken? |

pH Strip ID: NA  Chlorine Strip ID: NA  Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt  %Solid Snap-Cup ID: NA

3.6 / 3.6 °C  NA / NA °C  NA / NA °C  NA / NA °C

Method: ☐ Temperature Blank ☑ Against Bottles  IR Gun ID: 8  IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | ☐ NA | 3. Were all coolers received at or below 6.0°C? If no, was Project Manager notified? PM was Notified by: phone / email / face-to-face (circle one). |
| ☑ Yes | ☐ No | ☐ NA | 4. Is the commercial courier's packing slip attached to this form? |
| ☑ Yes | ☐ No | | 5. Were proper custody procedures (relinquished/received) followed? |
| ☑ Yes | ☐ No | | 6. Were sample IDs listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 7. Was collection date & time listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 8. Did all container label information (ID, date, time) agree with the COC? |
| ☑ Yes | ☐ No | | 9. Were tests to be performed listed on the COC? |
| ☑ Yes | ☐ No | | 10. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? |
| ☑ Yes | ☐ No | | 11. Was adequate sample volume available? |
| ☑ Yes | ☐ No | | 12. Were all samples received within ½ the holding time or 48 hours, whichever comes first? |
| ☑ Yes | ☐ No | | 13. Were all samples containers accounted for? (No missing/excess) |
| ☐ Yes | ☐ No | ☑ NA | 14. Were VOA, 8015C and RSK-175 samples free of bubbles >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials? |
| ☑ Yes | ☐ No | ☐ NA | 15. Were all DRO/metals/nutrient samples received at a pH of < 2? |
| ☐ Yes | ☐ No | ☑ NA | 16. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9? |
| ☐ Yes | ☐ No | ☑ NA | 17. Were all applicable $NH_3$/TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine? |
| ☐ Yes | ☐ No | ☑ NA | 18. Was the quote number listed on the container label? If yes, Quote # |

**Sample Preservation** (Must be completed for any sample(s) incorrectly preserved or with headspace)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: $H_2SO_4$, $HNO_3$, HCl, NaOH using SR # NA. Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Unique ID: NA.

Comments:

Qualtrax ID: 56360

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Page 1 of 1

# Report of Analysis

**Arcadis U.S., Inc.**
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Tiffany Linder

Project Name: RACER PNC

Project Number: 30167840.00031

Lot Number:**YI22028**

Date Completed:10/05/2023

Kathy Smith

10/05/2023 9:51 AM
Approved and released by:
Project Manager II: **Kathy E. Smith**

The electronic signature above is the equivalent of a handwritten signature.
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Pace Analytical Services, LLC (*formerly Shealy Environmental Services, Inc.*)
106 Vantage Point Drive West Columbia, SC 29172
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

## Case Narrative
## Arcadis U.S., Inc.
### Lot Number: YI22028

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.4 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples were compliant with DOD QSM 5.4 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). The CF is calculated as follows:

CF = DF * FV / Vo

FV is volume of extract (mL)
Vo is initial sample volume (mL)
DF is dilution factor. For undiluted analysis, DF = 1.

Sample concentration for aqueous samples:
Concentration (ng/L) = Cs*CF,

$$C_s = \frac{\left(\frac{(A_s x C_{is})}{A_{is}}\right) - B}{M1}$$

Where

$C_s$ is on column concentration of target analyte in the sample (ng/L)
$C_{is}$ is concentration of internal standard in the sample (ng/L)
$A_s$ is peak response of target analyte in the sample
$A_{is}$ is peak response of internal standard in the sample
M1 is the average RF from ICAL or the slope from linear regression ICAL
B is the y-intercept from the ICAL

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18, PFAS by Isotope Dilution SOP.

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

PFAS
Samples YI22028-002, YI22028-004, YI22028-005 required centrifugation prior to extraction, due to excessive solids present in the samples. Centrifugation was performed following the PFAS Aqueous Centrifuge Protocol; samples were spiked with Surrogate (SUR; Extracted Internal Standard/EIS) and shaken vigorously before being poured into a conical bottle and centrifuged. The centrifuged aqueous sample was decanted back into the original sample bottle, off of the condensed solids remaining in the centrifuge bottle. Original sample bottle was rinsed as normal and centrifuge bottle was rinsed with 4mL of MeOH. Centrifuge bottle rinsate was added to the elution. Samples concentrated to <5mL and reconstituted to 5mL using MeOH by transfer pipet.

Surrogate recovery for the following sample was outside the upper control limit: YI22028-002. This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

Surrogate recovery for the following samples was outside control limits: YI22028-004, YI22028-005. Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

## Sample Summary

## Arcadis U.S., Inc.

**Lot Number: YI22028**

**Project Name: RACER PNC**

**Project Number: 30167840.00031**

| Sample Number | Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| 001 | Trip Blank | Aqueous | 09/21/2023 0845 | 09/22/2023 |
| 002 | MWDP-2R_GW-092123 | Aqueous | 09/21/2023 0923 | 09/22/2023 |
| 003 | EB-07_092123 | Aqueous | 09/21/2023 0930 | 09/22/2023 |
| 004 | SUMP_GW-092123 | Aqueous | 09/21/2023 1010 | 09/22/2023 |
| 005 | MW-03-17_GW-092123 | Aqueous | 09/21/2023 1310 | 09/22/2023 |

(5 samples)

## Detection Summary

## Arcadis U.S., Inc.

**Lot Number: YI22028**

**Project Name: RACER PNC**

**Project Number: 30167840.00031**

| Sample | Sample ID | Matrix | Parameter | Method | Result | Q | Units | Page |
|---|---|---|---|---|---|---|---|---|
| 002 | MWDP-2R_GW-092123 | Aqueous | PFBS | PFAS by ID | 5.3 | | ng/L | 8 |
| 002 | MWDP-2R_GW-092123 | Aqueous | PFPeS | PFAS by ID | 0.84 | J | ng/L | 8 |
| 002 | MWDP-2R_GW-092123 | Aqueous | PFHxS | PFAS by ID | 2.3 | J | ng/L | 8 |
| 002 | MWDP-2R_GW-092123 | Aqueous | PFBA | PFAS by ID | 18 | | ng/L | 8 |
| 002 | MWDP-2R_GW-092123 | Aqueous | PFHpA | PFAS by ID | 1.1 | J | ng/L | 8 |
| 002 | MWDP-2R_GW-092123 | Aqueous | PFHxA | PFAS by ID | 3.5 | | ng/L | 8 |
| 002 | MWDP-2R_GW-092123 | Aqueous | PFOA | PFAS by ID | 2.2 | J | ng/L | 8 |
| 002 | MWDP-2R_GW-092123 | Aqueous | PFPeA | PFAS by ID | 3.5 | | ng/L | 8 |
| 002 | MWDP-2R_GW-092123 | Aqueous | PFOS | PFAS by ID | 4.2 | | ng/L | 8 |
| 004 | SUMP_GW-092123 | Aqueous | PFHpS | PFAS by ID | 2.1 | J | ng/L | 12 |
| 004 | SUMP_GW-092123 | Aqueous | PFHxS | PFAS by ID | 11 | | ng/L | 12 |
| 004 | SUMP_GW-092123 | Aqueous | PFHpA | PFAS by ID | 4.4 | | ng/L | 12 |
| 004 | SUMP_GW-092123 | Aqueous | PFHxA | PFAS by ID | 7.4 | | ng/L | 12 |
| 004 | SUMP_GW-092123 | Aqueous | PFNA | PFAS by ID | 0.71 | J | ng/L | 12 |
| 004 | SUMP_GW-092123 | Aqueous | PFOA | PFAS by ID | 12 | | ng/L | 12 |
| 004 | SUMP_GW-092123 | Aqueous | PFOS | PFAS by ID | 120 | | ng/L | 12 |
| 005 | MW-03-17_GW-092123 | Aqueous | 6:2 FTS | PFAS by ID | 8.0 | Q | ng/L | 14 |
| 005 | MW-03-17_GW-092123 | Aqueous | PFBS | PFAS by ID | 3.3 | J | ng/L | 14 |
| 005 | MW-03-17_GW-092123 | Aqueous | PFHpS | PFAS by ID | 4.5 | | ng/L | 14 |
| 005 | MW-03-17_GW-092123 | Aqueous | PFOSA | PFAS by ID | 1.4 | J | ng/L | 14 |
| 005 | MW-03-17_GW-092123 | Aqueous | PFPeS | PFAS by ID | 2.7 | J | ng/L | 14 |
| 005 | MW-03-17_GW-092123 | Aqueous | PFHxS | PFAS by ID | 32 | | ng/L | 14 |
| 005 | MW-03-17_GW-092123 | Aqueous | PFBA | PFAS by ID | 15 | | ng/L | 14 |
| 005 | MW-03-17_GW-092123 | Aqueous | PFHpA | PFAS by ID | 8.6 | | ng/L | 14 |
| 005 | MW-03-17_GW-092123 | Aqueous | PFHxA | PFAS by ID | 14 | | ng/L | 14 |
| 005 | MW-03-17_GW-092123 | Aqueous | PFNA | PFAS by ID | 2.5 | J | ng/L | 14 |
| 005 | MW-03-17_GW-092123 | Aqueous | PFOA | PFAS by ID | 20 | | ng/L | 14 |
| 005 | MW-03-17_GW-092123 | Aqueous | PFPeA | PFAS by ID | 15 | | ng/L | 14 |
| 005 | MW-03-17_GW-092123 | Aqueous | PFOS | PFAS by ID | 140 | | ng/L | 14 |

(29 detections)

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-001**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/21/2023 0845** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/03/2023 1815 | ARC2 | 10/01/2023 2059 | 86250 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 0.61 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.3 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.3 | 0.80 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 0.69 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 0.85 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.7 | 0.38 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.71 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.46 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.65 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.54 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.7 | 0.50 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.48 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.43 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.7 | 0.41 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.7 | 0.63 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.42 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.7 | 0.76 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.50 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.57 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.7 | 1.8 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 91 | 25-150 |
| 13C2_6:2FTS | | 106 | 25-150 |
| 13C2_8:2FTS | | 76 | 25-150 |
| 13C2_PFDoA | | 91 | 25-150 |
| 13C2_PFTeDA | | 85 | 25-150 |
| 13C3_PFBS | | 90 | 25-150 |
| 13C3_PFHxS | | 95 | 25-150 |
| 13C3-HFPO-DA | | 92 | 25-150 |
| 13C4_PFBA | | 99 | 25-150 |
| 13C4_PFHpA | | 104 | 25-150 |
| 13C5_PFHxA | | 94 | 25-150 |
| 13C5_PFPeA | | 90 | 25-150 |
| 13C6_PFDA | | 92 | 25-150 |
| 13C7_PFUdA | | 85 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-001**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/21/2023 0845** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 97 | 25-150 |
| 13C8_PFOS | | 85 | 25-150 |
| 13C8_PFOSA | | 80 | 10-150 |
| 13C9_PFNA | | 91 | 25-150 |
| d5-EtFOSAA | | 92 | 25-150 |
| d3-MeFOSAA | | 80 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-002**

Description: **MWDP-2R_GW-092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 0923** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/03/2023 1826 | ARC2 | 10/01/2023 2059 | 86250 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.0 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.0 | 0.58 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.0 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.0 | 0.77 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.0 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.0 | 0.66 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.0 | 0.82 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **5.3** | | **3.5** | **0.36** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.68 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.44 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.62 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **0.84** | **J** | **3.5** | **0.52** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **2.3** | **J** | **3.5** | **0.48** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **18** | | **3.5** | **0.53** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **1.1** | **J** | **3.5** | **0.39** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **3.5** | | **3.5** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **2.2** | **J** | **3.5** | **0.73** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **3.5** | | **3.5** | **0.48** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.53 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.55 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **4.2** | | **3.5** | **1.8** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 292 | 25-150 |
| 13C2_6:2FTS | N | 180 | 25-150 |
| 13C2_8:2FTS | | 103 | 25-150 |
| 13C2_PFDoA | | 86 | 25-150 |
| 13C2_PFTeDA | | 81 | 25-150 |
| 13C3_PFBS | | 88 | 25-150 |
| 13C3_PFHxS | | 94 | 25-150 |
| 13C3-HFPO-DA | | 69 | 25-150 |
| 13C4_PFBA | | 50 | 25-150 |
| 13C4_PFHpA | | 97 | 25-150 |
| 13C5_PFHxA | | 88 | 25-150 |
| 13C5_PFPeA | | 74 | 25-150 |
| 13C6_PFDA | | 98 | 25-150 |
| 13C7_PFUdA | | 87 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-002**

Description: **MWDP-2R_GW-092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 0923** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 108 | 25-150 |
| 13C8_PFOS | | 96 | 25-150 |
| 13C8_PFOSA | | 90 | 10-150 |
| 13C9_PFNA | | 100 | 25-150 |
| d5-EtFOSAA | | 88 | 25-150 |
| d3-MeFOSAA | | 89 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-003**

Description: **EB-07_092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 0930** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/03/2023 1836 | ARC2 | 10/01/2023 2059 | 86250 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 0.60 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.3 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.3 | 0.80 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 0.68 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 0.85 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.38 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.71 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.45 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.65 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.6 | 0.50 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.43 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.41 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.63 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.6 | 0.76 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.50 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.57 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.6 | 1.8 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 94 | 25-150 |
| 13C2_6:2FTS | | 90 | 25-150 |
| 13C2_8:2FTS | | 84 | 25-150 |
| 13C2_PFDoA | | 95 | 25-150 |
| 13C2_PFTeDA | | 93 | 25-150 |
| 13C3_PFBS | | 96 | 25-150 |
| 13C3_PFHxS | | 99 | 25-150 |
| 13C3-HFPO-DA | | 100 | 25-150 |
| 13C4_PFBA | | 104 | 25-150 |
| 13C4_PFHpA | | 110 | 25-150 |
| 13C5_PFHxA | | 100 | 25-150 |
| 13C5_PFPeA | | 93 | 25-150 |
| 13C6_PFDA | | 97 | 25-150 |
| 13C7_PFUdA | | 88 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-003**

Description: **EB-07_092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 0930** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 25-150 |
| 13C8_PFOS | | 99 | 25-150 |
| 13C8_PFOSA | | 88 | 10-150 |
| 13C9_PFNA | | 88 | 25-150 |
| d5-EtFOSAA | | 94 | 25-150 |
| d3-MeFOSAA | | 89 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-004**

Description: **SUMP_GW-092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 1010** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/03/2023 1847 | ARC2 | 10/01/2023 2059 | 86250 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.5 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.5 | 0.62 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.5 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.5 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.5 | 0.82 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.5 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.5 | 0.45 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.5 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.8 | 0.39 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.73 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **2.1** | **J** | **3.8** | **0.47** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.67 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **11** | | **3.8** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | Q | 3.8 | 0.56 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **4.4** | | **3.8** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **7.4** | | **3.8** | **0.65** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **0.71** | **J** | **3.8** | **0.43** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **12** | | **3.8** | **0.78** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.51 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **120** | | **3.8** | **1.9** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 268 | 25-150 |
| 13C2_6:2FTS | N | 286 | 25-150 |
| 13C2_8:2FTS | N | 288 | 25-150 |
| 13C2_PFDoA | | 110 | 25-150 |
| 13C2_PFTeDA | | 85 | 25-150 |
| 13C3_PFBS | | 79 | 25-150 |
| 13C3_PFHxS | | 84 | 25-150 |
| 13C3-HFPO-DA | | 57 | 25-150 |
| 13C4_PFBA | N | 20 | 25-150 |
| 13C4_PFHpA | | 62 | 25-150 |
| 13C5_PFHxA | | 57 | 25-150 |
| 13C5_PFPeA | | 39 | 25-150 |
| 13C6_PFDA | | 101 | 25-150 |
| 13C7_PFUdA | | 112 | 25-150 |

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-004**

Description: **SUMP_GW-092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 1010** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 86 | 25-150 |
| 13C8_PFOS | | 82 | 25-150 |
| 13C8_PFOSA | | 78 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 |
| d5-EtFOSAA | | 142 | 25-150 |
| d3-MeFOSAA | | 117 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-005**

Description: **MW-03-17_GW-092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 1310** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/03/2023 1858 | ARC2 | 10/01/2023 2059 | 86250 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 0.60 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.3 | 1.5 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **8.0** | **Q** | **7.3** | **1.8** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.3 | 0.79 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 0.68 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 0.85 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.3** | **J** | **3.6** | **0.38** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.71 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **4.5** | | **3.6** | **0.45** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.65 | ng/L | 1 |
| **Perfluoro-1-octanesulfonamide (PFOSA)** | **754-91-6** | **PFAS by ID SOP** | **1.4** | **J** | **3.6** | **0.56** | **ng/L** | **1** |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **2.7** | **J** | **3.6** | **0.54** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **32** | | **3.6** | **0.50** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **15** | | **3.6** | **0.54** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.43 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **8.6** | | **3.6** | **0.41** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **14** | | **3.6** | **0.62** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **2.5** | **J** | **3.6** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **20** | | **3.6** | **0.75** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **15** | | **3.6** | **0.49** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.57 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **140** | | **3.6** | **1.8** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 267 | 25-150 |
| 13C2_6:2FTS | N | 249 | 25-150 |
| 13C2_8:2FTS | N | 184 | 25-150 |
| 13C2_PFDoA | | 95 | 25-150 |
| 13C2_PFTeDA | | 77 | 25-150 |
| 13C3_PFBS | | 79 | 25-150 |
| 13C3_PFHxS | | 96 | 25-150 |
| 13C3-HFPO-DA | | 60 | 25-150 |
| 13C4_PFBA | | 33 | 25-150 |
| 13C4_PFHpA | | 79 | 25-150 |
| 13C5_PFHxA | | 73 | 25-150 |
| 13C5_PFPeA | | 54 | 25-150 |
| 13C6_PFDA | | 103 | 25-150 |
| 13C7_PFUdA | | 109 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-005**

Description: **MW-03-17_GW-092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 1310** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 98 | 25-150 |
| 13C8_PFOS | | 87 | 25-150 |
| 13C8_PFOSA | | 85 | 10-150 |
| 13C9_PFNA | | 108 | 25-150 |
| d5-EtFOSAA | | 112 | 25-150 |
| d3-MeFOSAA | | 119 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# QC Summary

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ86250-001
**Batch:** 86250
**Analytical Method:** PFAS by ID SOP
**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 10/01/2023 2059

| Parameter | Result | Q | Dil | LOQ | DL | Units | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | ND | | 1 | 8.0 | 0.48 | ng/L | 10/03/2023 1412 |
| 11Cl-PF3OUdS | ND | | 1 | 8.0 | 0.66 | ng/L | 10/03/2023 1412 |
| 8:2 FTS | ND | | 1 | 8.0 | 1.6 | ng/L | 10/03/2023 1412 |
| 6:2 FTS | ND | | 1 | 8.0 | 2.0 | ng/L | 10/03/2023 1412 |
| 4:2 FTS | ND | | 1 | 8.0 | 0.87 | ng/L | 10/03/2023 1412 |
| GenX | ND | | 1 | 8.0 | 2.1 | ng/L | 10/03/2023 1412 |
| ADONA | ND | | 1 | 8.0 | 0.48 | ng/L | 10/03/2023 1412 |
| EtFOSAA | ND | | 1 | 8.0 | 0.75 | ng/L | 10/03/2023 1412 |
| MeFOSAA | ND | | 1 | 8.0 | 0.93 | ng/L | 10/03/2023 1412 |
| PFBS | ND | | 1 | 4.0 | 0.41 | ng/L | 10/03/2023 1412 |
| PFDS | ND | | 1 | 4.0 | 0.78 | ng/L | 10/03/2023 1412 |
| PFHpS | ND | | 1 | 4.0 | 0.50 | ng/L | 10/03/2023 1412 |
| PFNS | ND | | 1 | 4.0 | 0.71 | ng/L | 10/03/2023 1412 |
| PFOSA | ND | | 1 | 4.0 | 0.61 | ng/L | 10/03/2023 1412 |
| PFPeS | ND | | 1 | 4.0 | 0.59 | ng/L | 10/03/2023 1412 |
| PFHxS | ND | | 1 | 4.0 | 0.55 | ng/L | 10/03/2023 1412 |
| PFBA | ND | | 1 | 4.0 | 0.60 | ng/L | 10/03/2023 1412 |
| PFDA | ND | | 1 | 4.0 | 0.52 | ng/L | 10/03/2023 1412 |
| PFDoA | ND | | 1 | 4.0 | 0.47 | ng/L | 10/03/2023 1412 |
| PFHpA | ND | | 1 | 4.0 | 0.45 | ng/L | 10/03/2023 1412 |
| PFHxA | ND | | 1 | 4.0 | 0.69 | ng/L | 10/03/2023 1412 |
| PFNA | ND | | 1 | 4.0 | 0.46 | ng/L | 10/03/2023 1412 |
| PFOA | ND | | 1 | 4.0 | 0.83 | ng/L | 10/03/2023 1412 |
| PFPeA | ND | | 1 | 4.0 | 0.54 | ng/L | 10/03/2023 1412 |
| PFTeDA | ND | | 1 | 4.0 | 0.60 | ng/L | 10/03/2023 1412 |
| PFTrDA | ND | | 1 | 4.0 | 0.53 | ng/L | 10/03/2023 1412 |
| PFUdA | ND | | 1 | 4.0 | 0.63 | ng/L | 10/03/2023 1412 |
| PFOS | ND | | 1 | 4.0 | 2.0 | ng/L | 10/03/2023 1412 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 93 | 25-150 |
| 13C2_6:2FTS | | 95 | 25-150 |
| 13C2_8:2FTS | | 94 | 25-150 |
| 13C2_PFDoA | | 98 | 25-150 |
| 13C2_PFTeDA | | 98 | 25-150 |
| 13C3_PFBS | | 98 | 25-150 |
| 13C3_PFHxS | | 100 | 25-150 |
| 13C3-HFPO-DA | | 105 | 25-150 |
| 13C4_PFBA | | 102 | 25-150 |
| 13C4_PFHpA | | 114 | 25-150 |
| 13C5_PFHxA | | 100 | 25-150 |
| 13C5_PFPeA | | 99 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MB

**Sample ID:** YQ86250-001
**Batch:** 86250
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 10/01/2023 2059

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 100 | 25-150 |
| 13C7_PFUdA | | 93 | 25-150 |
| 13C8_PFOA | | 100 | 25-150 |
| 13C8_PFOS | | 101 | 25-150 |
| 13C8_PFOSA | | 91 | 10-150 |
| 13C9_PFNA | | 96 | 25-150 |
| d5-EtFOSAA | | 96 | 25-150 |
| d3-MeFOSAA | | 96 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ86250-002
**Batch:** 86250
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 10/01/2023 2059

| Parameter | Spike Amount (ng/L) | Result (ng/L) | Q | Dil | % Rec | %Rec Limit | Analysis Date |
|---|---|---|---|---|---|---|---|
| 9Cl-PF3ONS | 15 | 16 | | 1 | 105 | 50-150 | 10/03/2023 1422 |
| 11Cl-PF3OUdS | 15 | 16 | | 1 | 105 | 50-150 | 10/03/2023 1422 |
| 8:2 FTS | 15 | 17 | | 1 | 108 | 50-150 | 10/03/2023 1422 |
| 6:2 FTS | 15 | 16 | | 1 | 105 | 50-150 | 10/03/2023 1422 |
| 4:2 FTS | 15 | 16 | | 1 | 109 | 50-150 | 10/03/2023 1422 |
| GenX | 32 | 36 | | 1 | 113 | 50-150 | 10/03/2023 1422 |
| ADONA | 15 | 14 | | 1 | 94 | 50-150 | 10/03/2023 1422 |
| EtFOSAA | 16 | 17 | | 1 | 109 | 50-150 | 10/03/2023 1422 |
| MeFOSAA | 16 | 16 | | 1 | 98 | 50-150 | 10/03/2023 1422 |
| PFBS | 14 | 16 | | 1 | 112 | 50-150 | 10/03/2023 1422 |
| PFDS | 15 | 17 | | 1 | 108 | 50-150 | 10/03/2023 1422 |
| PFHpS | 15 | 13 | | 1 | 85 | 50-150 | 10/03/2023 1422 |
| PFNS | 15 | 16 | | 1 | 107 | 50-150 | 10/03/2023 1422 |
| PFOSA | 16 | 16 | | 1 | 100 | 50-150 | 10/03/2023 1422 |
| PFPeS | 15 | 16 | | 1 | 107 | 50-150 | 10/03/2023 1422 |
| PFHxS | 15 | 14 | | 1 | 96 | 50-150 | 10/03/2023 1422 |
| PFBA | 16 | 17 | | 1 | 108 | 50-150 | 10/03/2023 1422 |
| PFDA | 16 | 15 | | 1 | 91 | 50-150 | 10/03/2023 1422 |
| PFDoA | 16 | 15 | | 1 | 94 | 50-150 | 10/03/2023 1422 |
| PFHpA | 16 | 16 | | 1 | 100 | 50-150 | 10/03/2023 1422 |
| PFHxA | 16 | 16 | | 1 | 100 | 50-150 | 10/03/2023 1422 |
| PFNA | 16 | 15 | | 1 | 95 | 50-150 | 10/03/2023 1422 |
| PFOA | 16 | 16 | | 1 | 97 | 50-150 | 10/03/2023 1422 |
| PFPeA | 16 | 15 | | 1 | 97 | 50-150 | 10/03/2023 1422 |
| PFTeDA | 16 | 15 | | 1 | 95 | 50-150 | 10/03/2023 1422 |
| PFTrDA | 16 | 16 | | 1 | 97 | 50-150 | 10/03/2023 1422 |
| PFUdA | 16 | 15 | | 1 | 93 | 50-150 | 10/03/2023 1422 |
| PFOS | 15 | 17 | | 1 | 113 | 50-150 | 10/03/2023 1422 |

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C2_4:2FTS | | 92 | 25-150 |
| 13C2_6:2FTS | | 98 | 25-150 |
| 13C2_8:2FTS | | 85 | 25-150 |
| 13C2_PFDoA | | 104 | 25-150 |
| 13C2_PFTeDA | | 105 | 25-150 |
| 13C3_PFBS | | 95 | 25-150 |
| 13C3_PFHxS | | 106 | 25-150 |
| 13C3-HFPO-DA | | 90 | 25-150 |
| 13C4_PFBA | | 100 | 25-150 |
| 13C4_PFHpA | | 108 | 25-150 |
| 13C5_PFHxA | | 100 | 25-150 |
| 13C5_PFPeA | | 99 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

**Sample ID:** YQ86250-002
**Batch:** 86250
**Analytical Method:** PFAS by ID SOP

**Matrix:** Aqueous
**Prep Method:** SOP SPE
**Prep Date:** 10/01/2023 2059

| Surrogate | Q | % Rec | Acceptance Limit |
|---|---|---|---|
| 13C6_PFDA | | 105 | 25-150 |
| 13C7_PFUdA | | 92 | 25-150 |
| 13C8_PFOA | | 107 | 25-150 |
| 13C8_PFOS | | 89 | 25-150 |
| 13C8_PFOSA | | 97 | 10-150 |
| 13C9_PFNA | | 97 | 25-150 |
| d5-EtFOSAA | | 98 | 25-150 |
| d3-MeFOSAA | | 95 | 25-150 |

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Chain of Custody
# and
# Miscellaneous Documents

Pace Analytical®

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Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Alexis Crisp, Tiffany Linder | Telephone No. / E-mail: Alexis.crisp@arcadis.com, tiffany.linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Sommer Guy | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds* | Page 1 of 2 |
| City: Novi | State: MI | Zip Code: 48377 | Printed Name: Sommer Guy |
| Project Name: Racer PNC | | | |
| Project No.: 3116784D.00031 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab G / Composite C | Matrix: Aqueous | Soil | Non-aqueous | No of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Field Filtered | Method 537.1 and 533 PFAS Analysis | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tripblank | 9/21/23 | 0845 | G | X | | | 1 | | | | | | | X | tripblank |
| MWDP-2R_GW-092123 | 9/21/23 | 0923 | G | X | | | 2 | | | | | | | X | |
| EB-07_092123 | 9/21/23 | 0930 | G | X | | | 1 | | | | | | | X | Equipment blank |
| SUMP_GW-092123 | 9/21/23 | 1010 | G | X | | | 2 | | | | | | | X | |

YI22028

HSSI

Turn Around Time Required (Prior lab approval required for expedited TAT.): ☒ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Guy | 9/21/23 | 1700 | 1. Received by: FedEx | 9/21/23 | 1700 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | 9/22/23 | 1000 | 4. Laboratory received by: Brooke Sapelka | 9/22/23 | 1000 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack
Receipt Temp 1.9 °C
Temp Blank ☐ Y ☒ N

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Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: ARCADIS | Report to Contact: Lexi Crisp | Telephone No. / E-mail: tiffany.linder@arcadis.com; Alexis.crisp@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Lottie Jay | Analysis (Attach list if more space is needed): Report Edit 28 Compounds | Page 2 of 2 |
| City: Novi; State: MI; Zip Code: 48377 | Printed Name: Lottie Jay | | Lot # Bar Code: YI22028 KES2 |
| Project Name: Racer PNC | | | |
| Project No.: 30112891.00031 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab/Composite | Matrix: Aqueous | Solid | Non-Aqueous | No of Containers by Preservative Type: Unpres. | HCl/504 | NaOO | HCl | NaOH | ZnAc NB | Field Filtered | PFAS Analysis List of Analytes per QSM 5.1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-03-17_GW-092123 | 9/21/23 | 1310 | G | X | | | 2 | | | | | | | X |

**Turn Around Time Required (Prior lab approval required for expedited TAT.)**
X Standard ☐ Rush (Specify)

**Sample Disposal**
☐ Return to Client ☐ Disposal by Lab

**Possible Hazard Identification**
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

**QC Requirements (Specify)**

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Lottie Jay | 9/21/23 | 1530 | 1. Received by: Lorraine Guy | 9/21/23 | 1530 |
| 2. Relinquished by: Lorraine Guy | 9/21/23 | 1700 | 2. Received by: Fed Ex | 9/21/23 | 1700 |
| 3. Relinquished by: | Date | Time | 3. Received by: | Date | Time |
| 4. Relinquished by: FedEX | 9/22/23 | 1000 | 4. Laboratory received by: Vincent Esperon | 9/22/23 | 1000 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack — Receipt Temp. 0.9 °C — Temp Blank ☐ Y ☑ N



PACE ANALYTICAL SERVICES, LLC

DC#_Title: ENV-FRM-WCOL-0286 v02_Samples Receipt Checklist (SRC)
Effective Date: 8/2/2022

# Sample Receipt Checklist (SRC)

Client: ARCADIS  Cooler Inspected by/date: BRS2 / 09/22/23  Lot #: YI22028

Means of receipt: ☐ Pace ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

| | | | |
|---|---|---|---|
| ☐ Yes | ☑ No | | 1. Were custody seals present on the cooler? |
| ☐ Yes | ☐ No | ☑ NA | 2. If custody seals were present, were they intact and unbroken? |

pH Strip ID: NA  Chlorine Strip ID: NA  Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt  %Solid Snap-Cup ID: NA

1.9 / 1.9 °C  NA / NA °C  NA / NA °C  NA / NA °C

Method: ☐ Temperature Blank ☑ Against Bottles  IR Gun ID: 8  IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

| | | | |
|---|---|---|---|
| ☑ Yes | ☐ No | ☐ NA | 3. Were all coolers received at or below 6.0°C? If no, was Project Manager notified? PM was Notified by: phone / email / face-to-face (circle one). |
| ☑ Yes | ☐ No | ☐ NA | 4. Is the commercial courier's packing slip attached to this form? |
| ☑ Yes | ☐ No | | 5. Were proper custody procedures (relinquished/received) followed? |
| ☑ Yes | ☐ No | | 6. Were sample IDs listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 7. Was collection date & time listed on the COC and all sample containers? |
| ☑ Yes | ☐ No | | 8. Did all container label information (ID, date, time) agree with the COC? |
| ☑ Yes | ☐ No | | 9. Were tests to be performed listed on the COC? |
| ☑ Yes | ☐ No | | 10. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____ |
| ☑ Yes | ☐ No | | 11. Was adequate sample volume available? |
| ☑ Yes | ☐ No | | 12. Were all samples received within ½ the holding time or 48 hours, whichever comes first? |
| ☑ Yes | ☐ No | | 13. Were all samples containers accounted for? (No missing/excess) |
| ☐ Yes | ☐ No | ☑ NA | 14. Were VOA, 8015C and RSK-175 samples free of bubbles >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials? |
| ☐ Yes | ☐ No | ☑ NA | 15. Were all DRO/metals/nutrient samples received at a pH of < 2? |
| ☐ Yes | ☐ No | ☑ NA | 16. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9? |
| ☐ Yes | ☐ No | ☑ NA | 17. Were all applicable $NH_3$/TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine? |
| ☐ Yes | ☑ No | ☐ NA | 18. Was the quote number listed on the container label? If yes, Quote # _____ |

**Sample Preservation** (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA _____ were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA. ☐
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA _____ were received with bubbles >6 mm in diameter.

Samples(s) NA _____ were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Unique ID: NA.

Comments:

Qualtrax ID: 56360  Pace® Analytical Services, LLC  Page 1 of 1

# Appendix B

## Arcadis TGI for PFAS Sampling Procedures

ARCADIS Design & Consultancy for natural and built assets

# PFAS SAMPLING PROCEDURES AND LOW-FLOW GROUNDWATER PURGING FOR MONITORING WELLS

Rev. # 0

Date 6/19/2018

# PFAS SAMPLING PROCEDURES AND LOW-FLOW GROUNDWATER PURGING FOR MONITORING WELLS

REV. # 0

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# 1 SCOPE AND APPLICATION

The protocol presented in this methods and procedures document describes the procedures recommended to purge monitoring wells and collect groundwater samples for per- and polyfluoroalkyl substances (PFASs) using low flow sampling with a peristaltic pump. Samples will be analyzed for a specified list of PFASs using a modified version of United States (U.S.) Environmental Protection Agency (USEPA) method 537 following the U.S. Department of Defense and U.S. Department of Energy Quality Systems Manual 5.1 methods and procedures set forth in Table B-15.

This protocol has been developed in accordance with the USEPA Region I Low Stress (Low-Flow) Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells (EQASOP-GW4; September 19, 2017). PFAS sampling guidelines are incorporated from various guidance documents including the United States Army Corps of Engineers (2016), Department of Environment Regulation, Western Australia (2016), New Hampshire Department of Environmental Services (2016), and Massachusetts Department of Environmental Protection (2017). Staff should also review the Arcadis Technical Guidance Instruction (TGI) titled, Poly- and Perfluorinated Alkyl Substances (PFAS) Field Sampling Guidance (Arcadis 2018).

The project team should determine the last time the wells were developed and if additional development is necessary prior to sample collection. Groundwater samples should not be collected within one week following well development.

# 2 PERSONNEL QUALIFICATIONS

Arcadis personnel providing assistance to groundwater sample collection and associated activities should have a minimum of six months of related experience or an advanced degree in environmental sciences, engineering, hydrogeology, or geology. The supervisor of the groundwater sampling team should have at least one year of previous supervised groundwater sampling experience, preferably with PFAS related experience. Prior to mobilizing to the field, the groundwater sampling team should review and be thoroughly familiar with relevant site-specific documents including but not limited to the site work plan, field sampling plan, Health and Safety Plan (HASP), historical information, and site relevant documents. Additionally, the groundwater sampling team should review and be thoroughly familiar with documentation provided by equipment manufacturers for all equipment that will be used in the field prior to mobilization, in particular to confirm the sample materials that will be in contact with the water sample are compatibile with PFAS sample collection**.**

# 3 EQUIPMENT LIST

Specific to this activity, the following materials (or equivalent) should be available:

- Health and safety documents and equipment (as identified in the Programmatic Accident Prevention Plan and Site Safety and Health Plan)
- Site Plan, well construction records, prior groundwater sampling records (if available)

- Peristaltic pump (e.g., ISCO Model 150) or bladder pump (e.g., Geotech PFC-Free Portable Bladder Pumps)
- A power supply for the peristaltic pump; peristaltic pumps require electric power from either a generator or a deep cell battery.
- High Density Polyethylene (HDPE) tubing and/or silicon tubing of an appropriate size for the pump being used. When collecting samples for PFASs, Teflon® or polytetrafluoroethylene-containing or coated components or tubing are prohibited.
- HDPE bailers (if necessary)
- Water-level probe with fluorine-free materials (e.g., Geotech ET 3/8" with Delrin tip and Buna-N O-ring)
- Water-quality (temperature/pH/specific conductivity/oxidation reduction potential [ORP]/turbidity/dissolved oxygen [DO]) meter, flow-through measurement cell, and appropriate calibration standards. Several brands may be used, including:
    - YSI 6-Series Multi-Parameter Instrument
    - Horiba U-22 Multi-Parameter Instrument
    - Hydrolab Series 3 or Series 4a Multiprobe and Display
- Supplemental turbidity meter (e.g., Horiba U-10, Hach 2100P, LaMotte 2020). Turbidity measurements collected with multi-parameter meters have sometimes been shown to be unreliable due to fouling of the optic lens of the turbidity meter within the flow-through cell. A supplemental turbidity meter should be used to verify turbidity data during purging if such fouling is suspected. An in-line tee and valve should allow for collection of water for turbidity measurements before the pump discharge enters the flow-through cell. Note that industry improvements may eliminate the need for these supplemental measurements in the future.
- HDPE water sample containers (supplied by the laboratory) fitted with an unlined (no Teflon™), polypropylene screw cap. Sample bottles for standard groundwater sampling should not contain Trizma® preservative. If sample bottles with Trizma® are provided by the laboratory, request new sample bottles prior to sample collection.
- Appropriate blanks (field reagent blanks supplied by the laboratory)
- Fluorine-free cleaning equipment
- Groundwater sampling log
- Dedicated plastic sheeting (preferably HDPE) or other clean surface to prevent sample contact with the ground
- Clipboards, field binders, and field note pages that are not waterproof and are fluorine-free
- If high concentrations of PFAS related to class B firefighting foams are expected, bring 'shaker test' vials
- Ziploc® bags to hold ice and samples

- Appropriate blanks (field reagent blanks supplied by the laboratory)
- Appropriate transport containers (coolers) with ice and appropriate labeling, no blue ice should be used
- "PFAS-free" water provided by the laboratory for decontamination rinsing
- Alconox® or Liquinox®; note that Alconox® is known to contain trace levels of 1,4-dioxane
- Packing and shipping materials
- Chain-of-Custody (COC) Forms

Note the specific make/model of the equipment used during each sampling event on the groundwater sampling log. The maintenance requirements for the above equipment generally involve decontamination or periodic cleaning, battery charging, calibration, and proper storage, as specified by the manufacturer. For operational difficulties, the equipment should be serviced by a qualified technician.

# 4 CAUTIONS

- Do not perform field sampling when rain fall is persistent at a consistent rate that saturates the ground (i.e., formation of puddles) because rain gear is not permitted while sampling. Intermittent showers or fog are acceptable conditions to proceed. If rain showers occur; field gear must be removed from the monitoring well location until the rain subsides. If project timelines are tight, consider the use of a gazebo tent that can be erected over the top of the monitoring well to provide shelter from the rain. The canopy material is possibly a PFAS-treated surface and should be managed as such; therefore, wear gloves when moving the tent, change them immediately after moving the tent, and avoid further contact with the tent until all sampling activities have been finished and the team is ready to move on to the next sample location. Ensure that the canopy will not leak into the sampling area prior to use.
- Do not wear any outdoor performance wear that is water or stain resistant or appears to be. Performance wear such as Gore-Tex® or eVent™ are examples of clothing brands to avoid. Natural fabrics such as cotton are preferred. Synthetic fabrics may also be acceptable if there is no indication on the label that the fabric is water and stain resistant. Avoid contacting clothing with sampling equipment, bottles, and samples.
- Waterproof field books must not be used for field notes. Use loose paper on Masonite, plastic, or aluminum clip boards. Pens, pencils, and Sharpies may be used but should be kept away from sampling materials. One person should conduct the sampling while another records the field notes.
- To avoid potential food packaging-related PFAS contact, do not bring any food outside of the field vehicles onsite. Wash your hands after eating and remove any field garments or outer layers prior to eating.
- Safety footwear is often treated to provide a degree of waterproofing and increased durability and may represent a source of trace PFAS. For the health and safety of field personnel, footwear must be protected at all times to avoid potential PFAS contamination. To do this, do not touch your safety footwear in the immediate vicinity of the sampling location and do not allow gloves used for sampling to come in contact with safety footwear.

- Wear disposable nitrile gloves at all times.
    - Don a new pair of nitrile gloves before the following activities at each sample location:
        - Decontamination of re-usable sampling equipment;
        - Contact with sample bottles or “PFAS-free” water bottles;
        - Insertion of anything into the sample ports (e.g., HDPE tubing); and
        - Handling of any quality assurance/quality control samples including field blanks and equipment blanks.
    - Don a new pair of nitrile gloves after the following activities:
        - Handling of any non-dedicated sampling equipment;
        - Contact with contaminated surfaces; or
        - When judged necessary by field personnel.
- Shower at night. Do not use personal care products after showering such as lotions, makeup, and perfumes, UNLESS medically necessary.
- Use sunscreen and insect repellent ONLY if necessary for health and safety. If they are necessary, apply sunscreen and repellant prior to initiating field sampling. If sunscreen and/or repellant need to be reapplied, ensure a safe distance away from the sampling locations and equipment (i.e., more than 10 meters away). Wash hands after application. Don a new pair of gloves as noted above.
- Visitors are asked to remain at least 30 feet from sampling areas.

# 5 HEALTH AND SAFETY CONSIDERATIONS

Review all site-specific and procedural hazards as they are provided in the HASP, and review Job Safety Analysis (JSA) documents in the field each day prior to beginning work. The HASP and JSA documents should be present onsite during all field activities. Generators and cord and plug equipment should employ an overcurrent protection device such as an integrated ground fault circuit interrupter cord. If thunder or lighting is present, discontinue sampling and take cover until 30 minutes have passed after the last occurrence of thunder or lighting. Use caution when removing well caps as the well may be under pressure and the cap can dislodge forcefully and cause injury.

# 6 PROCEDURE

If a round of water level measurements for all site monitoring wells are planned as part of the project scope, the site-wide water level measurements should be collected in such a manner to avoid potential cross-contamination between the wells. Follow appropriate decontamination procedures for collection of water level measurements.

Peristaltic pumps are preferred when sampling for PFASs to minimize potential cross-contamination. If the depth to water is below the sampling range of a peristaltic pump (approximately 25 feet), a PFAS-free bladder pump is acceptable. Purge water should be collected and containerized according to the direction of the project team.

1. Calibrate field instruments according to manufacturer procedures for calibration and document.
2. Place plastic sheeting (preferably HDPE) adjacent to the sample port for use as a clean work area, if conditions allow. Otherwise, prevent sampling equipment from contacting the ground or other surface that could compromise sample integrity.
3. If required in the HASP, use a photoionization detector (PID) to measure the headspace before sampling. Open the well cover while standing upwind of the well. Remove the well cap and place it on the plastic sheeting. Insert the PID probe approximately 4 to 6 inches into the casing or the well headspace and cover it with a gloved hand. Record the PID reading in the field log. Perform air monitoring in the breathing zone according to the HASP and/or JSA.
4. Measure the initial depth to groundwater prior to placing the HDPE tubing.
5. Prepare and install the pump in the well: when using a peristaltic pump, slowly lower the HDPE sampling tubing into the well to a depth corresponding to the approximate center of the saturated screen section of the well. Any dedicated tubing in the well should be replaced with new HDPE tubing. The sampling tube must be kept at least 2 feet above the bottom of the well to prevent mobilization of any sediment present in the bottom of the well. If using a weight on the tubing ensure the material is PFAS free and has been deconned according to the procedures described in this document.
6. Measure the water level again with the pump in the well before starting the pump to ensure that it has stabilized. Start pumping the well at 200 to 500 milliliters (mL) per minute (or at a lower site-specific rate if specified). Adjust the pump rate to cause little or no water level drawdown in the well (less than 0.3 foot below the initial static depth to water measurement), and the water level should stabilize; however, this is not always possible. If the recovery rate is less than 50 mL per minute, or the well is being essentially dewatered during purging, the well should be sampled as soon as the water level has recovered sufficiently to collect the volume needed for all anticipated samples. Contact the project manager or other appropriate personnel to discuss.

   The water level should be monitored every 3 to 5 minutes (or as appropriate, lower flow rates may require longer time between readings) during pumping if the well diameter is of sufficient size to allow such monitoring. Do not break pump suction or cause entrainment of air in the sample. Record pumping rate adjustments and depths to water. If necessary, reduce pumping rates to the minimum capabilities of the pump to avoid pumping the well dry and/or to stabilize indicator parameters. Maintain a steady flow rate to the extent practicable. Review groundwater sampling records from previous sampling events (if available) prior to mobilization to estimate the optimum pumping rate and anticipated drawdown for the well in order to more efficiently reach a stabilized pumping condition.

   If the recharge rate of the well is very low, use approved alternative purging techniques, which will vary based on the well construction and screen position. For wells screened across the water table, the well may be pumped dry and sampling can commence as soon as the volume in the well has recovered sufficiently to permit collection of samples. For wells screened entirely below the water table, the well can be pumped until a stabilized level (which may be greater than the maximum displacement goal of 0.3 foot) is maintained and monitoring for stabilization of field indicator parameters can commence. If a lower stabilization level cannot be maintained, the well may be pumped until the drawdown is at a level slightly higher than top of the well screen. Sampling may

commence after one well volume has been removed and the well has recovered sufficiently to permit collection of samples.

During purging, monitor the field indicator parameters (e.g., turbidity, temperature, specific conductance, pH, ORP, and DO) every 3 to 5 minutes (or after each volume of the flow-through cell has been purged). Measure field indicator parameters using a flow-through analytical cell or a clean container such as a glass beaker. Record field indicator parameters on the groundwater sampling log. The well is considered stabilized and ready for sample collection when turbidity values remain within 10% (or within 1 nephelometric turbidity unit [NTU] if the turbidity reading is less than 5 NTU), the specific conductance and temperature values remain within 3%, ORP readings remain within ± 10 mV, DO values remain within 10%, and pH remains within 0.1 unit for three consecutive readings collected at 3- to 5-minute intervals (or other appropriate interval, alternate stabilization goals may exist in different geographic regions, consult the site-specific Work Plan for stabilization criteria). If the field indicator parameters do not stabilize within 1 hour of the start of purging, but the groundwater turbidity is below the goal of 10 NTU and the values for all other parameters are within 10%, the well can be sampled. If the parameters have stabilized but the turbidity is not in the range of the 5 NTU goal, the pump flow rate may be decreased to a minimum rate of 100 mL/min to reduce turbidity levels as low as possible.

DO is extremely susceptible to various external influences (including temperature or the presence of bubbles on the DO meter); care should be taken to minimize the agitation or other disturbance of water within the flow-through cell while collecting these measurements. If air bubbles are present on the DO probe or in the discharge tubing, remove them before taking a measurement. If DO values are not within acceptable range for the temperature of groundwater then again check for and remove air bubbles on the probe before re-measuring. If the DO value is 0.00 or less, then the meter should be serviced and re-calibrated. If the DO values are above possible results, then the meter should be serviced and re-calibrated.

During extreme weather conditions, stabilization of field indicator parameters may be difficult to attain. Modifications to the sampling procedures to alleviate these conditions (e.g., measuring the water temperature in the well adjacent to the pump intake) should be documented in the field notes. If other field conditions preclude stabilization of certain parameters, an explanation of why the parameters did not stabilize should also be documented on the groundwater sampling log.

7. After the indicator parameters have stabilized, collect groundwater samples by diverting flow out of the unfiltered discharge tubing into the appropriate labeled sample container. If a flow-through analytical cell is being used to measure field parameters, the flow-through cell should be disconnected after stabilization of the field indicator parameters and prior to groundwater sample collection. Under no circumstances should analytical samples be collected from the discharge of the flow-through cell.
8. Make sure the sample bottle caps have remained on the bottle until immediately prior to sample collection.
9. Don a new set of nitrile gloves prior to sample collection. While collecting the sample, make sure the bottle cap remains in the other hand of the sampler until replaced on the bottle. When the container is full (fill to the neck of the bottle, some headspace is acceptable), firmly screw on the cap (snug but

not too tight so that the screw cap is stripped). Do not use gloved hands to subsequently handle papers, pens, clothes, etc. before collecting the sample.

10. Collect any necessary duplicates and matrix spikes. As the laboratory should be analyzing the entire aqueous sample rather than sub-sampling, separate bottles will be required for these samples.
11. Do not rinse PFAS sample bottles during sampling. Do not filter samples.
12. Complete and attach the sample label(s) after sample collection and after the caps have been placed back on each container. Pre-printed labels are preferred, but pens and Sharpies® may be used.
13. Place sample bottles in a sealed Ziploc® bag. Place samples in coolers that are durable in transportation and keep the temperature between 0 and 4ºC until transported to the laboratory.
14. Record the sample name and time of sampling on the sample bottle label, in the field notes and note observations (e.g., physical appearance and the presence or lack of odors or sheens), and record on the COC form.
15. NOTE: If high concentrations of PFAS related to class B firefighting foams are expected in a groundwater sample, collect and shake a small portion of the sample (~10 to 25 mL) on site. If foaming is noted within the sample, document the foaming when samples are submitted for analysis; the 'shaker test' vial can then be disposed. This shaker test provides information about how each of the samples should be handled analytically. Therefore, note ‘shake test’ results on the COC form if appropriate.
16. Turn off the pump. Slowly remove the tubing from the well. If the tubing will be dedicated, store the tubing in an appropriate storage container. Do not allow the tubing or lines to touch the ground or any other surfaces which could contaminate them.
17. Complete the procedures for packaging, shipping, and handling with the associated COC.
18. Between uses, complete decontamination procedures for flow-through analytical cell and water level meter, and any equipment that comes into contact with well water (see decontamination procedures described in Section 9 below).
19. At the end of the day, perform a calibration check of field instruments.
20. The general procedures listed in this document can be used for collection of samples from groundwater treatment systems or other similar sampling of water. In order to collect samples from a sampling port on a groundwater treatment system or for a similar situation follow the safety and quality procedures listed in this document. As a general note on sampling ports, ensure that there is no indication of Teflon™ tape or other Teflon™ containing material.

# 7 WASTE MANAGEMENT

Materials generated during groundwater sampling activities, including disposable equipment, should be placed in appropriate containers. PFAS containing waste requires special considerations and containerized waste will be stored onsite for future management by the responsible party.

# 8 DATA RECORDING AND MANAGEMENT

Initial field logs and COC records should be transmitted to the Arcadis Project Manager at the end of each day unless otherwise directed. The groundwater team leader retains copies of the groundwater sampling logs until they are relinquished to the project file.

# 9 QUALITY ASSURANCE

In addition to the quality control samples to be collected in accordance with these methods and procedures, the following quality control procedures should be observed in the field:

- Collect samples from monitoring wells, in order of increasing concentration, to the extent known based on review of historical site information if available. If no analytical data are available, collect samples in order of upgradient, then furthest downgradient to source area locations.
- Bottle caps must remain in the hand of the sampler until replaced on the bottle.
- Labels must be completed after the caps have been placed back on each bottle.
- Equipment blanks should be collected from various sampling equipment including the pump, water level meter (following decontamination procedures), disposable tubing, and nitrile gloves.
- Collect equipment blanks using laboratory supplied “PFAS-free” water after wells with higher concentrations (if known) have been sampled.
- Field duplicates, matrix spike, and matrix spike duplicates will be collected at a frequency in accordance with the QAPP and applicable QAPP Addenda.
- Samples must be stored in appropriate transport containers (coolers) with ice (Ziploc© bags for use as ice containers) with appropriate labeling. Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples. Samples should be maintained at temperatures between 0 and 4$^{o}$C until transported to the laboratory.
- Operate all monitoring instrumentation in accordance with manufacturer’s instructions and calibration procedures. Calibrate instruments at the beginning of each day and verify the calibration at the end of each day. Record all calibration activities on calibration log sheets.
- Clean all groundwater sampling equipment prior to use in the first well and after each subsequent well following the procedure for PFAS equipment decontamination noted below. Clean all field equipment used at locations that are suspected of containing class B firefighting foam (i.e., those that foam during shaking or are known to be near a class B firefighting foam source zone) using each of the below steps repeated twice.
- The steps for PFAS equipment decontamination are as follows:
    - Donning a new pair of nitrile gloves;
    - Rinse sampling equipment with Alconox or Liquinox® cleaning solution; Scrub equipment with a plastic brush if needed;
    - Rinse two times with distilled water or deionized water;

- Rinse one time with “PFAS-free” water; and
- Collect all rinsate in a sealed pail for disposal. Do not reuse decontamination solutions between sampling locations

# 10 REFERENCES


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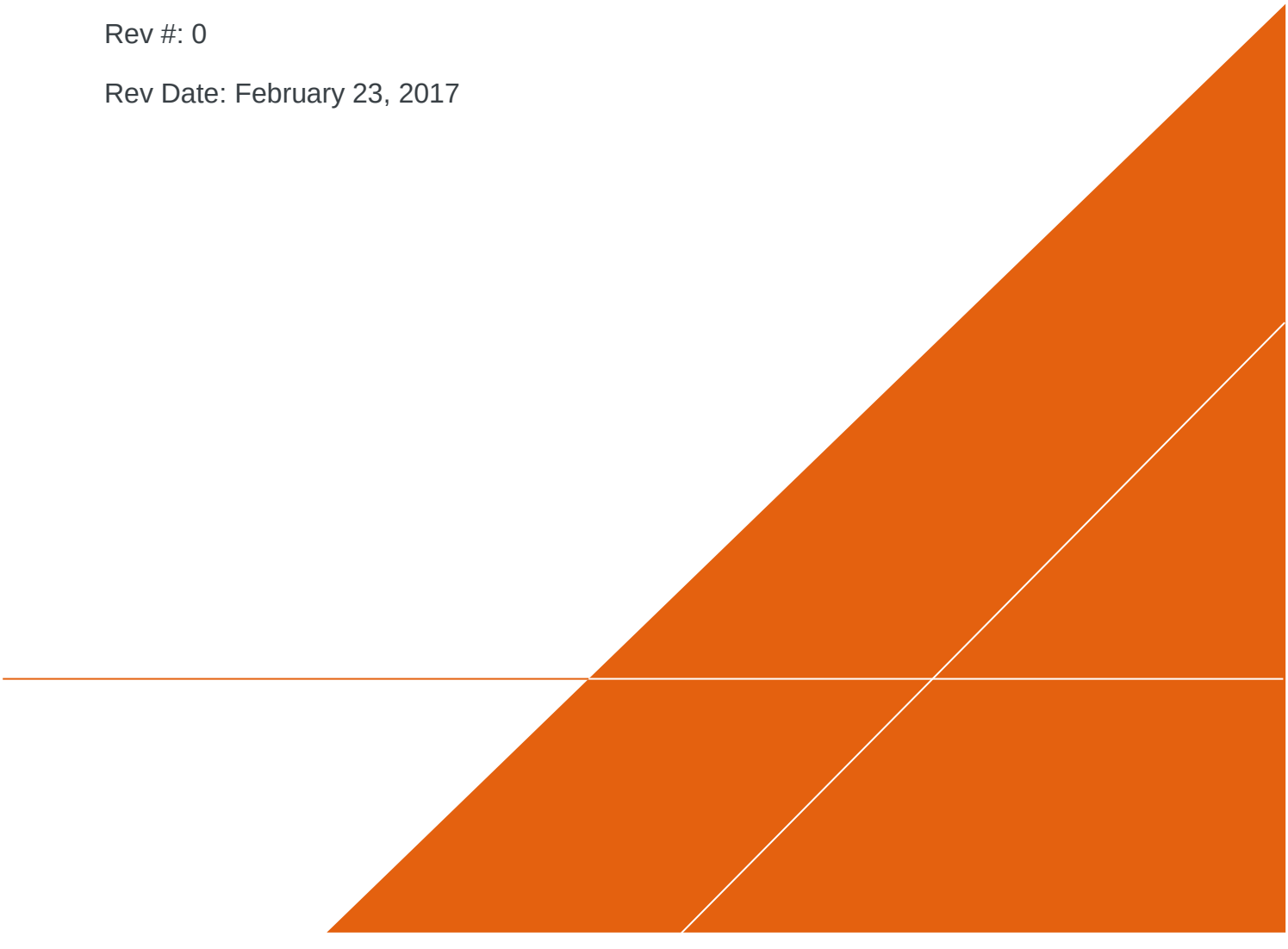
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# TGI - INVESTIGATION-DERIVED WASTE HANDLING AND STORAGE

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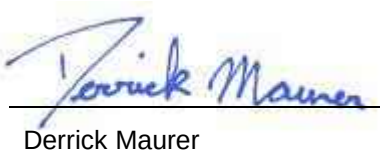


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# APPROVAL SIGNATURES

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# 1 INTRODUCTION

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

It is the responsibility of the Arcadis Certified Project Manager (CPM) to provide this document to the persons conducting services that fall under the scope and purpose of this procedure, instruction, and/or guidance. The Arcadis CPM will also ensure that the persons conducting the work falling under this document are appropriately trained and familiar with its content. The persons conducting the work under this document are required to meet the minimum competency requirements outlined herein, and inquire to the CPM regarding any questions, misunderstanding, or discrepancy related to the work under this document.

This document is not considered to be all inclusive nor does it apply to any and all projects. It is the CPM's responsibility to determine the proper scope and personnel required for each project. There may be project- and/or client- and/or state-specific requirements that may be more or less stringent than what is described herein. The CPM is responsible for informing Arcadis and/or Subcontractor personnel of omissions and/or deviations from this document that may be required for the project. In turn, project staff are required to inform the CPM if or when there is a deviation or omission from work performed as compared to what is described herein.

In following this document to execute the scope of work for a project, it may be necessary for staff to make professional judgment decisions to meet the project's scope of work based upon site conditions, staffing expertise, state-specific requirements, health and safety concerns, etc. Staff are required to consult with the CPM when or if a deviation or omission from this document is required that has not already been previously approved by the CPM. Upon approval by the CPM, the staff can perform the deviation or omission as confirmed by the CPM.

# 2 SCOPE AND APPLICATION

The objective of this Technical Guidance Instruction (TGI) is to describe the procedures to manage investigation-derived wastes (IDW), both hazardous and nonhazardous, generated during site activities, which may include, but are not limited to: drilling, trenching/excavation, construction, demolition, monitoring well sampling, soil sampling, decontamination and remediation. For the purposes of this TGI, IDW is considered to be discarded materials which are defined as solid waste by United States Environmental Protection Agency (EPA) standard 40 CFR § 261.2 (which may include liquids, solids, or sludges). IDW may include soil, groundwater, drilling fluids, decontamination liquids, as well as contaminated personal protective equipment (PPE), sorbent materials, construction and demolition debris, and disposable sampling materials. Hazardous or uncharacterized IDW will be collected and staged at the point of generation. Quantities small enough to be containerized in 55-gallon drums will be taken to a designated temporary onsite storage area (discussed in further detail under Drum Storage) pending characterization and disposal. IDW materials will be characterized using process knowledge and appropriate laboratory analyses to determine the waste classification and evaluate proper safe handling and disposal methods.

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This TGI describes the necessary equipment, field procedures, materials, regulatory references, and documentation procedures necessary for proper handling and storage of IDW up to the time it is properly transported from the project site and disposed. The procedures included in this TGI for handling and temporary storage of IDW are based on the EPA's guidance document *Guide to Management of Investigation Derived Wastes* (USEPA, 1992). IDW is assumed to be contaminated with the site constituents of concern (COCs) until analytical evidence indicates otherwise. IDW will be managed to ensure the protection of human health and the environment and will comply with all applicable or relevant and appropriate requirements (ARAR). Although not comprehensive, the following laws and regulations on Hazardous Waste Management should be considered as potential ARAR. It is the Arcadis Certified Project Manager (CPM) and/or designated Technical Expert to determine which laws and regulations, at all levels of government, are applicable to each project site and activity falling under this TGI.

Federal Laws and Regulations

- Resource Conservation and Recovery Act (RCRA) 42 USC § 6901-6987.
- Federal Hazardous Waste Regulations 40 CFR § 260-265

Department of Transportation (DOT) Hazardous Materials Transportation 49 CFR

Occupational Safety and Health Administration (OSHA) Regulations 29 CFR

State Laws and Regulations

- To be determined based on location of site and location of treatment, storage, and/or disposal facility (TSDF) to be utilized.

Regional, County, Municipal, and Local Regulations

- To be determined based on location of site and location of treatment, storage, and/or disposal facility (TSDF) to be utilized.

**Initial Storage**

Pending characterization, IDW will be temporarily stored appropriately within each area of contamination (AOC). Under RCRA, "storage" is defined as the "holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere" (40 CFR § 260.10). The onsite waste staging area will be in a secure and controlled area. Uncharacterized wastes are considered potentially hazardous wastes and must be stored in DOT approved packaging. Liquid wastes must be stored in DOT approved closed head drums or other approved containers (e.g., portable tank containers) that are compatible with the type of material stored therein. Solid materials must be stored in DOT approved open head drums where practicable. Larger quantities of solid IDW can be containerized in bulk containers (such as in a roll-off box). Soil from large excavation projects may be managed in stockpiles with within the AOC and does not need to be containerized until exiting the AOC.

**Characterization**

Waste characterization can either be based on generator knowledge, such as using historical process knowledge and safety data sheets (SDS), or can be based upon characterization sampling analytical results. IDW typically is not characterized using SDS as it is a mixture of aged chemicals and environmental media. Historical process knowledge should be used to determine if the IDW is a listed hazardous waste (40 CFR § 261.31-33). If the IDW is not a listed hazardous waste, waste

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characterization can be completed by laboratory analysis of representative samples of the IDW. The laboratory used for waste characterization analysis must have the appropriate state and federal accreditations and may be required to be pre-approved by the Client. IDW will be classified as RCRA hazardous or non-regulated under RCRA based on the waste characterization determination.

If IDW is characterized as RCRA hazardous waste, RCRA and DOT requirements must be followed for packaging, labeling, transporting, storing, and record keeping as described in 40 CFR § 262 and 49 CFR § 171-178. Waste material classified as RCRA nonhazardous may be handled and disposed of as nonhazardous waste in accordance with applicable federal, state, and local regulations.

**Storage Time Limitations**

Containerized hazardous wastes can be temporarily stored for a maximum of 90 calendar days from the accumulation start date for a large quantity generator or a maximum of 180 calendar days from the accumulation start date for a small quantity generator. Wastes classified as nonhazardous may be handled and disposed of as nonhazardous waste and are not subject to storage time limitations.

This is TGI may be modified by the CPM and/or Technical Expert for a specific project or client program, as required, dependent upon client requirements, site conditions, equipment limitations, or limitations imposed by the procedure. The resulting procedure employed to execute the work will be documented in the project work plans or reports. If changes to the sampling procedures are required due to unanticipated field conditions, the changes will be discussed with the CPM and/or Technical Expert as soon as practicable, and if approved to be performed, be documented.

# 3 PERSONNEL QUALIFICATIONS

Arcadis field sampling personnel will have current regulatory- and Arcadis-required health and safety training including 40-hour HAZWOPER training, site supervisor training, site-specific training, first aid, and cardiopulmonary resuscitation (CPR), as needed. Personnel handling and packaging hazardous waste and performing hazardous waste characterizations must have RCRA hazardous waste management training per 40 CFR § 264.16.

Although not common practice, in certain situations Arcadis personnel may sign waste profiles and/or waste manifests on a case by case basis for clients, provided the appropriate agreement is in place between Arcadis and the client documenting that Arcadis is not the generator, but is acting as an authorized representative of the generator. Arcadis personnel who sign waste profiles and/or waste manifests will have both current RCRA hazardous waste management training per 40 CFR § 264.16 and current DOT hazardous materials transportation training per 49 CFR § 172.704. Arcadis field personnel will also comply with client-specific training. In addition, Arcadis field sampling personnel will be knowledgeable in the relevant processes, procedures, and Technical Guidance Instructions (TGIs) and possess the demonstrated required skills and experience necessary to successfully complete the desired field work. The project health and safety plan (HASP) and other documents will identify other training requirements or access control requirements.

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# 4 EQUIPMENT LIST

The Following Materials, as required, will be available for IDW handling and Storage:

- Appropriate personal protective equipment as specified in the Site Health and Safety Plan (HASP)
- DOT approved containers
- Hammer
- Leather gloves
- Drum dolly
- Appropriate drum labels (outdoor waterproof self-adhesive)
- Portable tank container
- Appropriate labeling, packing, chain-of-custody forms, and shipping materials as determined by the CPM and/or Technical Expert.
- Indelible ink and/or permanent marking pens
- Plastic sheeting
- Appropriate sample containers, labels, and forms
- Stainless-steel bucket auger
- Stainless steel spatula or knife
- Stainless steel hand spade
- Stainless steel scoop
- Digital camera
- Field logbook

# 5 CAUTIONS

Filled drums can be very heavy, become unbalanced, or spill its contents. Therefore, use appropriate moving techniques and equipment for safe handling. Similar media (e.g. soils with other soils; or liquids with other liquids) will be stored in the same drums to aid in sample analysis and disposal. Drum lids must be secured to prevent rainwater from entering the drums and leakage during movement. Drums containing solid material may not contain any free liquids. Waste containers stored for extended periods of time may be subject to deterioration. Drum Over Packs may be used as secondary containment. All drums must be visually inspected for condition to ensure that they are in good condition without visible evidence of rusting, holes, breakage, etc., to prevent potential leakage and facilitate subsequent disposal. All drum lids must be verified as having a properly functioning secured lid prior to use.

# 6 HEALTH AND SAFETY CONSIDERATIONS

Click here and enter text] As determined by the site's known and suspected hazards, appropriate PPE must be worn by all field personnel within the designated work area. Exposure air monitoring may be required during certain field activities as required in the Site Health and Safety Plan. If soil excavation in areas with potentially hazardous contaminants is possible, contingency plans will be developed to address the potential for encountering gross contamination or non-aqueous phase liquids. All excavation

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activities shall be in compliance with OSHA standard 29 CFR 1926.651 Excavations, and any other applicable regulations.

Arcadis field personnel and subcontractors will be trained in and perform their work in compliance with all applicable federal, state, and local health and safety regulations as well as Arcadis' HASP and applicable Client health and safety requirements.

# 7 PROCEDURE

Specific waste temporary storage and handling procedures to be used are dependent upon the type of generated waste, including type of media (e.g. soils or free liquids) and constituents of concern. For this reason, IDW can be stored in a secure location onsite in separate 55-gallon storage drums, where solids can be stockpiled onsite (if nonhazardous) and purge water may be stored in portable tank containers. Waste materials such as broken sample bottles or equipment containers and wrappings will be stored in 55-gallon drums unless they were not in contact with sample media.

**Management of IDW**

Minimization of IDW should be considered by the project team during all phases of the project. Site managers may want to consider techniques such as replacing solvent based cleaners with aqueous-based cleaners for decontamination of equipment, reuse of equipment (where it can be properly decontaminated), limitation of traffic between exclusion and support zones, and drilling methods and sampling techniques that minimize the generation of waste. Alternative drilling and subsurface sampling methods may include the use of small diameter boreholes, as well as borehole testing methods such as a core penetrometer or direct push technique instead of coring.

**Drum Storage**

Drums containing hazardous waste will be stored in accordance with the requirements of 40 CFR 265 Subpart I (for containers) and 265 Subpart DD (for containment buildings). All 55-gallon drums will be stored at a secure, centralized onsite location that is readily accessible for vehicular pick-up. Drums confirmed as, or assumed to contain hazardous waste will be stored over an impervious surface provided with secondary spill containment. The storage location will, for drums containing liquid, have a containment system that can contain at least the larger of 10% of the aggregate volume of staged materials or 100% of the volume of the largest container. Drums will be closed during storage and be in good condition in accordance with the Guide to Management of Investigation-Derived Wastes (USEPA, 1992).

**Hazardous Waste Determination**

Waste material must be characterized to determine if it meets any of the federal definitions of hazardous waste as required by 40 CFR § 262.11. If the waste does not meet any of the federal definitions, it must then be established if any state-specific or local-specific hazardous waste criteria exist/apply.

**Generator Status**

Once hazardous waste determination has been made, the generator status will be determined. Large quantity generators (LQG) are generators who generate more than 1,000 kilograms of hazardous waste in a calendar month. Small quantity generators (SQG) of hazardous waste are generators who generate

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greater than 100 kilograms but less than 1,000 kilograms of hazardous waste in a calendar month. Conditionally exempt small quantity generators (CESQG) are generators who generate less than 100 kilograms of hazardous waste per month. Please note that a generator status may change from month to month and that a notice of this change is usually required by the generator's state agency.

**Accumulation Time for Hazardous Waste**

A LQG may accumulate hazardous waste on site for 90 calendar days or less without a permit and without having interim status, provided that such accumulation is in compliance with requirements in 40 CFR § 262.34. A SQG may accumulate hazardous waste on site for 180 calendar days or less without a permit or without having interim status, subject to the requirements of 40 CFR § 262.34(d). CESQG requirements are found in 40 CFR § 261.5. NOTE: The CESQG and SQG provisions of 40 CFR § 261.5, 262.20(e), 262.42(b) and 262.44 may not be recognized by some states (e.g., California and Rhode Island). State-specific and local-specific regulations must be reviewed and understood prior to the generation of hazardous waste.

Satellite Accumulation of Hazardous Waste Satellite accumulation (SAA) will mean the accumulation of as much as fifty-five (55) gallons of hazardous waste, or the accumulation of as much as one quart of acutely hazardous waste, in containers at or near any point of generation where the waste initially accumulates, which is under the control of the operator of the process generating the waste, without a permit or interim status and without complying with the requirements of 40 CFR § 262.34(a) and without any storage time limit, provided that the generator complies with 40 CFR § 262.34(c)(1)(i).

Once more than 55 gallons of hazardous waste accumulates in SAA, the generator has three days to move this waste into storage.

Storage recommendations for hazardous waste include:

- Ignitable Hazardous wastes must be >50 feet from the property line per 40 CFR § 265.176 (LQG generators only).
- Hazardous waste must be stored on a concrete slab (asphalt is acceptable if there are no free liquids in the waste) per 40 CFR § 265.176.
- Drainage must be directed away from the accumulation area.
- Area must be properly vented.
- Area must be secure.

**Drum/Container Labeling**

Drums will be labeled on both the side and lid of the drum using a permanent marking pen. Old drum labels must be removed to the extent possible, descriptions crossed out should any information remain, and new labels affixed on top of the old labels. Other containers used to store various types of waste (e.g., polyethylene tanks, roll-off boxes, end-dump trailers, etc.) will be labeled with an appropriate "Waste Container" or "Testing in Progress" label pending characterization. Drums and containers will be labeled as follows:

- Appropriate waste characterization label (Pending Analysis, Hazardous, or Nonhazardous)
- Waste generator's name (e.g., client name)
- Project Name
- Name and telephone number of Arcadis project manager

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- Composition of contents (e.g., used oil, acetone 40%, toluene 60%)
- Media (e.g., solid, liquid)
- Accumulation start date
- Drum number of total drums as reconciled with the Drum Inventory maintained in the field log book.

IDW containers will remain closed except when adding or removing waste. Immediately upon beginning to place waste into the drum/container, a “Waste Container” or “Pending Analysis” label will be filled out to include the information specified above, and affixed to the container. Once the contents of the container are identified as either non-hazardous or hazardous, the following additional labels will be applied.

- Containers with waste determined to be non-hazardous will be labeled with a green and white "Nonhazardous Waste" label over the "Waste Container" label.
- Containers with waste determined to be hazardous will be stored in an onsite storage area and will be labeled with the "Hazardous Waste" label and affixed over the "Waste Container" label.

The ACCUMULATION DATE for the hazardous waste is the date the waste is first placed in the container and is the same date as the date on the "Waste Container" label. DOT hazardous class labels must be applied to all hazardous waste containers for shipment offsite to an approved disposal or recycling facility. In addition, a DOT proper shipping name will be included on the hazardous waste label. The transporter should be equipped with the appropriate DOT placards. However, placarding or offering placards to the initial transporter is the responsibility of the generator per 40 CFR § 262.33.

**Inspections and Documentation**

All IDW will be documented as generated on a Drum Inventory Log maintained in the field log book. The Drum Inventory will record the generation date, type, quantity, matrix and origin (e.g., Boring-1, Test Pit 3, etc.) of materials in every drum, as well as a unique identification number for each drum. The drum inventory will be used during drum pickup to assist with labeling of drums. The drum storage area and any other areas of temporarily staged waste, such as soil/debris piles, will be inspected weekly. The weekly inspections will be recorded in the field notebook or on a Weekly Inspection Log. Digital photographs will be taken upon the initial generation and drumming/staging of waste, and final labeling after characterization to document compliance with labeling and storage protocols, and condition of the container. Evidence of damage, tampering or other discrepancy should be documented photographically.

**Emergency Response and Notifications**

Specific procedures for responding to site emergencies will be detailed in the HASP. If the generator is designated as a LQG, a Contingency Plan will need to be prepared to include emergency response and notification procedures per 40 CFR § 265 Subpart D. In the event of a fire, explosion, or other release which could threaten human health outside of the site or when Client or ARCADIS has knowledge of a spill that has reached surface water, Client or ARCADIS must immediately notify the National Response Center (800-424-8802) in accordance with 40 CFR § 262.34. Other notifications to state and/or other local regulatory agencies may also be necessary.

**Drilling Soil Cuttings and Muds**

Soil cuttings are solid to semi-solid soils generated during trenching activities, subsurface soil sampling, or installation of monitoring wells. Depending on the drilling method, drilling fluids known as "muds" may

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be used to remove soil cuttings. Drilling fluids flushed from the borehole must be directed into a settling section of a mud pit. This allows reuse of the decanted fluids after removal of the settled sediments. Soil cuttings will be labeled and stored in 55-gallon drums with bolt-sealed lids.

**Excavated Solids**

Excavated solids may include, but are not limited to: soil, fill, and construction and demolition debris. Prior to permitted treatment or offsite disposal, potentially hazardous excavated solids may be temporarily stockpiled onsite as long as the stockpile remains in the same AOC from where it was excavated. Potentially hazardous excavated solids removed from the AOC must be immediately containerized in labeled drums or closable top roll-offs lined with 9-mil polyvinyl chloride (PVC) sheeting and are subject to LQG storage time limits. Nonhazardous excavated solids can be stockpiled either inside or outside of the AOC, do not have to be containerized and are not subject to hazardous waste regulations. Potentially hazardous excavated solids must not be mixed with nonhazardous excavated solids. All classes of excavated solid stockpiles should be maintained in a secure area onsite. At a minimum, the floor of the stockpile area will be covered with a 20-mil high density polyethylene liner that is supported by a foundation or at least a 60-mil high density polyethylene liner that is not supported by a foundation. The excavated material will not contain free liquids. The owner/operator will provide controls for windblown dispersion, run-on control, and precipitation runoff. The run-on control system will prevent flow onto the active portion of the pile during peak discharge from at least a 25-year storm and the run-off management system will collect and control at least the water volume resulting from a 24-hour, 25-year storm (USEPA, 1992). Additionally, the stockpile area will be inspected on a weekly basis and after storm events. Individual states may require that the stockpile be inspected/certified by a licensed professional engineer. Stockpiled material will be covered with a 6-mil polyvinyl chloride (PVC) liner or sprayed dust control product. The stockpile cover will be secured in place with appropriate material (concrete blocks, weights, etc.) to prevent the movement of the cover.

**Decontamination Solutions**

Decontamination solutions are generated during the decontamination of personal protective equipment and sampling equipment. Decontamination solutions may range from detergents, organic solvents and acids used to decontaminate small field sampling equipment to steam cleaning rinsate used to wash heavy field equipment. These solutions are to be labeled and stored in closed head drums compatible with the decontamination solution. Decontamination procedures, including personnel and field sampling equipment, must comply with applicable Arcadis procedural documents.

**Disposable Equipment**

Disposable equipment includes personal protective equipment (e.g., tyvek coveralls, gloves, booties and APR cartridges) and disposable sampling equipment such as trowels or disposable bailers. If the media sampled exhibits hazardous characteristics per results of waste characterization sampling, contaminated disposable equipment will also be disposed of as a hazardous waste. If compatible with the original IDW waste stream (i.e., the IDW is a solid and the disposal equipment is a solid), the disposable equipment can be combined with the IDW. If these materials are not compatible (i.e., the IDW is a liquid and the disposal equipment is a solid), the disposable equipment will be stored onsite in separate labeled 55-gallon drums. Uncontaminated or decontaminated disposable equipment can be considered nonhazardous waste.

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### Purge Water

Purge water includes groundwater generated during well development, groundwater sampling, or aquifer testing. The volume of groundwater generated will dictate the appropriate storage procedure. Monitoring well development and groundwater sampling may generate three well volumes of groundwater or more. This volume will be stored in labeled 55-gallon drums. Aquifer tests may generate significantly greater volumes of groundwater depending on the well yield and the duration of the test. Therefore, large-volume portable polyethylene tanks will be considered for temporary storage pending groundwater-waste characterization.

### Purged Water Storage Tank Decontamination and Removal

The following procedures will be used for inspection, cleaning, and offsite removal of storage tanks used for temporary storage of purge water. These procedures are intended to be used for rented portable tanks such as Baker Tanks or Rain for Rent containers. Storage tanks will be made of inert plastic materials. The major steps for preparing a rented tank for return to a vendor include characterizing the purge water, disposing of the purge water, decontaminating the tank, final tank inspection, and mobilization. Decontamination and inspection procedures are described in further detail below.

- Tank Cleaning: Most vendors require that tanks be free of any visible sediment and water before returning, a professional cleaning service may be required. Each specific vendor should be consulted concerning specific requirements for returning tanks.
- Tank Inspection: After emptying the tank, purged water storage tanks should be inspected for debris, chemical staining, and physical damage. The vendors require that tanks be returned in the original condition (i.e., free of sediment, staining and no physical damage).

# 8 WASTE MANAGEMENT

### Soil/Solids Characterization

Waste characterization will be conducted in accordance with waste hauler, waste handling facility, and local/state/federal requirements. In general, RCRA hazardous wastes are those solid wastes determined by a Toxicity Characteristic Leaching Procedure (TCLP) test or to contain levels of certain toxic metals, pesticides, or other organic chemicals above specific applicable regulatory agency thresholds. If the one or more of 40 toxic compounds listed in Table I of 40 CFR § 261.24 are detected in the sample at levels above the maximum unregulated concentrations, the waste must be characterized as a toxic hazardous waste. Wastes can also be considered “listed” hazardous waste depending on site-specific processes.

Composite soil samples will be collected at a frequency of one sample per 10 cubic yard basis for stockpiled soil or one per 55-gallon drum for containerized. A four-point composite sample will be collected per 10 cubic yards of stockpiled material and for each drum. Sample and composite frequencies may be adjusted in accordance with the waste handling facility’s requirements. Waste characterization samples may be analyzed for the TCLP volatile organic compounds (VOCs), TCLP semi-volatile organic compounds (SVOCs), TCLP RCRA metals, and polychlorinated biphenyls (PCBs), as well as reactivity and flammability (flashpoint). Additional samples may be collected and analyzed by the laboratory on a contingency basis. Site-specific constituents of concern including pesticides may require additional

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sampling. Please note that state- or local-specific regulations may require a different or additional sampling approaches.

**Wastewater Characterization**

Waste characterization will be conducted in accordance with the requirements of the waste hauler, waste handling facility, and local/state/federal governments. In general, purge water should be analyzed by methods appropriate for the known contaminants, if any, that have been historically detected in the monitoring wells. Samples will be collected and analyzed in accordance with the requirements of the waste disposal facility. Wastewater characterization samples may be analyzed for TCLP volatile organic compounds (VOCs), TCLP semi-volatile organic compounds (SVOCs), TCLP RCRA metals, and polychlorinated biphenyls, as well as corrosivity (pH), reactivity and flammability (flashpoint). Additional samples may be collected and analyzed by the laboratory on a contingency basis. Site-specific constituents of concern including pesticides may require additional sampling. Please note that state- and/or local-specific regulations may require different or additional sampling approaches.

**Sample Handling and Shipping**

All samples will be appropriately labeled, packed, and shipped, and the chain-of-custody will be filled out in accordance with current Arcadis sample chain of custody, handling, packing, and shipping procedures and guidance instructions.

It should be noted that additional training is required for packaging and shipping of hazardous and/or dangerous materials. Please refer to the current Arcadis training requirements related to handling and shipping of samples, shipping determinations, and hazardous materials.

**Preparing Waste Shipment Documentation (Hazardous and Nonhazardous)**

Waste profiles will be prepared by the Arcadis CPM and forwarded, along with laboratory analytical data to the Client for approval/signature. The Client will then return the profile to Arcadis who will then forward to the waste removal contractor for preparation of a manifest. The manifest will be reviewed by Arcadis prior to forwarding to the Client for approval. Upon approval of the manifest, the Client will return the original signed manifest directly to the waste contractor or to the Arcadis CPM for forwarding to the waste contractor. Arcadis personnel may sign waste profiles and/or waste manifests on a case by case basis for clients, provided the appropriate agreement is in place between Arcadis and the client documenting that Arcadis is not the generator, but is acting as an authorized representative of the generator.

Final drum labeling and pickup will be supervised by an Arcadis representative who is trained and experienced with applicable waste labeling procedures. The Arcadis representative will have a copy of the drum inventory maintained in the field book and will reconcile the drum inventory with the profile numbers on the labels and on the manifest. Different profile numbers will be generated for different matrices or materials in the drums. For example, the profile number for drill cuttings will be different than the profile number for purge water. When there are multiple profiles it is critical that the proper label, with the profile number appropriate to a specific material be affixed to the proper drums. A copy of the Arcadis drum inventory will be provided to the waste transporter during drum pickup and to the facility receiving the waste.

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# 9 DATA RECORDING AND MANAGEMENT

Waste characterization sample handling, packing, and shipping procedures will be documented in accordance with relevant Arcadis procedures and guidance instructions as well as applicable client and/or project requirements, such as a Quality Assurance Project Plan or Sampling and Analysis Plan. Copies of the chain-of-custody forms will be maintained in the project file. Arcadis should photograph or maintain a copy of any hazardous waste manifest signed on behalf of Client in the corresponding office DOT record file.

# 10 QUALITY ASSURANCE

The CPM or APM will review all field documentation once per week for errors or omissions as compared to applicable project requirements including but not limited to: the proposal/scope of work, QAPP, SAP, HASP, etc. Deficiencies will be noted, tracked, and resolved. Upon correction, they will be noted for project documentation.

# 11 REFERENCES

United States Environmental Protection Agency (USEPA). 1992. Guide to Management of Investigation-Derived Wastes. Office of Remedial and Emergency Response. Hazardous Site Control Division. January 1992.

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# Appendix C

## Groundwater Sampling Logs

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MW-01-17 | | | **Date** | 09/18/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 59.0 degrees F and Cloudy. The wind is blowing NW at 11.4 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 7.45 | **Total Depth (ft-bmp)** | 10.73 | **Water Column (ft)** | 3.28 | **Gallons in Well** | 0.53 |
| **Purge Start** | 13:36 | **Pump Intake (ft-bmp)** | 9.5 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 14:35 | **Volumes Purged** | 43.40 | **Sample ID** | MW-01-17_GW-091823 | **Sampled by** | Sommer Guy |
| **Sample Time** | 14:25 | **Gallons Purged** | 23.00 | **Replicate/ Code No.** | DUP-03_GW-091823 | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 13:37 | 0 | 0 | 130 | 7.54 | -- | 8.24 | 2.4 | 19.2 | 0.58 | 18.3 | -82.4 | -- | -- |
| 13:42 | 5 | 5 | 130 | 7.54 | -- | 7.9 | 2.4 | 14.1 | 0.2 | 18.1 | -178.3 | -- | -- |
| 13:47 | 5 | 10 | 130 | 7.54 | -- | 7.84 | 2.4 | 7.57 | 0.13 | 18.2 | -195.1 | -- | -- |
| 13:52 | 5 | 15 | 130 | 7.54 | -- | 7.83 | 2.39 | 10.2 | 0.08 | 17.9 | -202.9 | -- | -- |
| 13:57 | 5 | 20 | 130 | 7.54 | -- | 7.79 | 2.39 | 6.63 | 0.09 | 18 | -202.5 | -- | -- |
| 14:02 | 5 | 25 | 130 | 7.54 | -- | 7.78 | 2.39 | 9.01 | 0.09 | 18.1 | -202.3 | -- | -- |
| 14:07 | 5 | 30 | 130 | 7.54 | -- | 7.79 | 2.39 | 5.58 | 0.09 | 18.1 | -203.8 | -- | -- |
| 14:12 | 5 | 35 | 130 | 7.54 | -- | 7.81 | 2.39 | 5.23 | 0.09 | 18.2 | -205.8 | -- | -- |
| 14:17 | 5 | 40 | 130 | 7.54 | -- | 7.81 | 2.4 | 5.78 | 0.09 | 17.9 | -207.2 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 4 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: USPS
Condition of Well: Good condition
Well Completion: Stick-up
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MW-02-17 | | | **Date** | 09/12/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 60.1 degrees F and Fog/Mist. The wind is blowing W/NW at 10.3 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 25.67 | **Total Depth (ft-bmp)** | 29.58 | **Water Column (ft)** | 3.91 | **Gallons in Well** | 0.64 |
| **Purge Start** | 10:17 | **Pump Intake (ft-bmp)** | 27 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 11:16 | **Volumes Purged** | 3.13 | **Sample ID** | MW-02-17_GW-091223 | **Sampled by** | Garrett Link |
| **Sample Time** | 11:10 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 10:22 | 0 | 0 | 145 | 25.69 | -- | 7.03 | 1.27 | 2.56 | 3.67 | 15.7 | 88.2 | -- | -- |
| 10:27 | 5 | 5 | 145 | 25.69 | -- | 7.04 | 1.24 | 2.1 | 3.53 | 15.5 | 80.1 | -- | -- |
| 10:32 | 5 | 10 | 145 | 25.69 | -- | 7.06 | 1.21 | 1.75 | 2.48 | 15.4 | 70.8 | -- | -- |
| 10:37 | 5 | 15 | 145 | 25.69 | -- | 7.07 | 1.2 | 1.67 | 2.33 | 15.4 | 66.6 | -- | -- |
| 10:42 | 5 | 20 | 145 | 25.69 | -- | 7.08 | 1.19 | 1.15 | 2.16 | 15.3 | 63.2 | -- | -- |
| 10:47 | 5 | 25 | 145 | 25.69 | -- | 7.09 | 1.18 | 0.76 | 2.07 | 15.3 | 60.9 | -- | -- |
| 10:52 | 5 | 30 | 145 | 25.69 | -- | 7.1 | 1.17 | 1.23 | 0.31 | 15.3 | 58.8 | -- | -- |
| 10:57 | 5 | 35 | 145 | 25.69 | -- | 7.1 | 1.17 | 0.8 | 0.37 | 15.4 | 57.2 | -- | -- |
| 11:02 | 5 | 40 | 145 | 25.69 | -- | 7.11 | 1.16 | 0.8 | 0.37 | 15.3 | 56 | -- | -- |
| 11:07 | 5 | 45 | 145 | 25.69 | -- | 7.11 | 1.16 | 0.02 | 0.39 | 15.4 | 54.4 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:** Well vault flooded w/ water.

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot  1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Powerhouse
Condition of Well: Good condition
Well Completion: Flush mount
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MW-03-17 | | | **Date** | 09/21/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 74 °F, Sunny, winds at mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 8.89 | **Total Depth (ft-bmp)** | 21.9 | **Water Column (ft)** | 13.01 | **Gallons in Well** | 2.11 |
| **Purge Start** | 12:05 | **Pump Intake (ft-bmp)** | 19.4 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 13:40 | **Volumes Purged** | 1.42 | **Sample ID** | MW-03-17_GW-092123 | **Sampled by** | Lottie Jay |
| **Sample Time** | 13:10 | **Gallons Purged** | 3.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 12:10 | 0 | 0 | 130 | 9.12 | -- | 7.32 | 0.91 | 63.8 | 0.32 | 15.9 | -82.4 | -- | -- |
| 12:15 | 5 | 5 | 130 | 9.13 | -- | 7.38 | 0.91 | 22.2 | 0.14 | 15.7 | -111.2 | -- | -- |
| 12:20 | 5 | 10 | 130 | 9.13 | -- | 7.42 | 0.91 | 64.6 | 0.08 | 15.5 | -126 | -- | -- |
| 12:25 | 5 | 15 | 130 | 9.13 | -- | 7.42 | 0.91 | 25.3 | 0.09 | 15.4 | -130.1 | -- | -- |
| 12:30 | 5 | 20 | 130 | 9.13 | -- | 7.42 | 0.9 | 25.9 | 0.07 | 15.3 | -134.1 | -- | -- |
| 12:35 | 5 | 25 | 110 | 9.13 | -- | 7.43 | 0.91 | 19 | 0.09 | 15.7 | -135.9 | -- | -- |
| 12:40 | 5 | 30 | 110 | 9.13 | -- | 7.42 | 0.91 | 16.3 | 0.07 | 15.7 | -136.5 | -- | -- |
| 12:45 | 5 | 35 | 110 | 9.13 | -- | 7.42 | 0.91 | 9.23 | 0.06 | 15.6 | -137.6 | -- | -- |
| 12:50 | 5 | 40 | 110 | 9.13 | -- | 7.42 | 0.91 | 17.1 | 0.06 | 15.6 | -138.2 | -- | -- |
| 12:55 | 5 | 45 | 110 | 9.13 | -- | 7.42 | 0.91 | 8.24 | 0.06 | 15.8 | -139.1 | -- | -- |
| 13:00 | 5 | 50 | 110 | 9.13 | -- | 7.42 | 0.91 | 5.84 | 0.06 | 15.7 | -139.6 | -- | -- |
| 13:05 | 5 | 55 | 110 | 9.13 | -- | 7.42 | 0.91 | 7.86 | 0.06 | 15.9 | -139.4 | -- | -- |
| 13:10 | 5 | 60 | 110 | 9.13 | -- | 7.42 | 0.91 | 6.12 | 0.05 | 16 | -140 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location:

Condition of Well:

Well Completion: NA

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MW-05-18 | | | **Date** | 09/12/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 68.0 degrees F and Mostly Cloudy. The wind is blowing W at 10.3 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 27.02 | **Total Depth (ft-bmp)** | 33.56 | **Water Column (ft)** | 6.54 | **Gallons in Well** | 1.06 |
| **Purge Start** | 16:03 | **Pump Intake (ft-bmp)** | 31 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 16:46 | **Volumes Purged** | 1.89 | **Sample ID** | MW-05-28_GW-091223 | **Sampled by** | Sommer Guy |
| **Sample Time** | 16:42 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 16:05 | 0 | 0 | 130 | 27.02 | -- | 7.62 | 0.75 | 17.5 | 5.27 | 16.1 | 99.1 | -- | -- |
| 16:10 | 5 | 5 | 130 | 27.02 | -- | 7.1 | 0.72 | 6.98 | 4.39 | 14.8 | 104.4 | -- | -- |
| 16:15 | 5 | 10 | 130 | 27.02 | -- | 7.04 | 0.72 | 3.93 | 3.45 | 16 | 97.5 | -- | -- |
| 16:20 | 5 | 15 | 130 | 27.02 | -- | 7.09 | 0.72 | 4.49 | 3.5 | 16.2 | 86.5 | -- | -- |
| 16:25 | 5 | 20 | 130 | 27.02 | -- | 7.11 | 0.72 | 4.63 | 2.9 | 16.3 | 78.6 | -- | -- |
| 16:30 | 5 | 25 | 130 | 27.02 | -- | 7.13 | 0.72 | 4.69 | 2.79 | 16.3 | 72.9 | -- | -- |
| 16:35 | 5 | 30 | 130 | 27.02 | -- | 7.1 | 0.73 | 4.22 | 2.81 | 16.1 | 70.5 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Fiero Powerhouse
Condition of Well: Good condition
Well Completion: Flush mount
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MW-43-14R | | | **Date** | 09/25/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 64.0 degrees F and Cloudy. The wind is blowing E/NE at 9.2 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 26.87 | **Total Depth (ft-bmp)** | 33.5 | **Water Column (ft)** | 6.63 | **Gallons in Well** | 1.08 |
| **Purge Start** | 11:44 | **Pump Intake (ft-bmp)** | 30.5 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 12:23 | **Volumes Purged** | 1.85 | **Sample ID** | MW-43-14R_GW-092523 | **Sampled by** | Sommer Guy |
| **Sample Time** | 12:20 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 11:45 | 0 | 0 | 130 | 27.02 | -- | 7.49 | 2.79 | 1.17 | 0.73 | 17.9 | 33.1 | -- | -- |
| 11:50 | 5 | 5 | 130 | 26.98 | -- | 7.62 | 2.83 | 2.31 | 0.5 | 17.6 | -72.1 | -- | -- |
| 11:55 | 5 | 10 | 130 | 26.98 | -- | 7.67 | 2.83 | 0.97 | 0.33 | 17.6 | -127.9 | -- | -- |
| 12:00 | 5 | 15 | 130 | 26.98 | -- | 7.7 | 2.83 | 0.62 | 0.24 | 17.6 | -153.6 | -- | -- |
| 12:05 | 5 | 20 | 130 | 26.98 | -- | 7.71 | 2.83 | 0.55 | 0.21 | 17.7 | -164.9 | -- | -- |
| 12:10 | 5 | 25 | 130 | 26.98 | -- | 7.72 | 2.83 | 0.63 | 0.2 | 17.8 | -168.2 | -- | -- |
| 12:15 | 5 | 30 | 130 | 26.98 | -- | 7.73 | 2.83 | 0.36 | 0.22 | 18.1 | -174.6 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: USPS
Well Locked at Arrival:
Condition of Well: Good condition
Well Locked at Departure:
Well Completion: Stick-up
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWDP-2R | | | **Date** | 09/21/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 55.9 degrees F and Patchy Fog and Fog/Mist. The wind is blowing undefined at 0.0 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 4.55 | **Total Depth (ft-bmp)** | 14.41 | **Water Column (ft)** | 9.86 | **Gallons in Well** | 1.6 |
| **Purge Start** | 08:41 | **Pump Intake (ft-bmp)** | 11.9 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 09:26 | **Volumes Purged** | 1.25 | **Sample ID** | MWDP-2R_GW-092123 | **Sampled by** | Sommer Guy |
| **Sample Time** | 09:23 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 08:42 | 0 | 0 | 130 | 4.68 | -- | 6.86 | 1.26 | 25.9 | 2.85 | 15.8 | 114.5 | -- | -- |
| 08:47 | 5 | 5 | 130 | 4.74 | -- | 6.77 | 1.25 | 17.4 | 3.28 | 15.9 | 71.7 | -- | -- |
| 08:52 | 5 | 10 | 130 | 4.83 | -- | 6.79 | 1.25 | 11.8 | 2.83 | 15.9 | 20.4 | -- | -- |
| 08:57 | 5 | 15 | 130 | 4.92 | -- | 6.84 | 1.25 | 5.91 | 2.93 | 16 | -14.3 | -- | -- |
| 09:02 | 5 | 20 | 130 | 4.97 | -- | 6.87 | 1.26 | 5.34 | 2.67 | 16 | -30 | -- | -- |
| 09:07 | 5 | 25 | 130 | 5.02 | -- | 6.9 | 1.26 | 4.92 | 2.48 | 16 | -40.2 | -- | -- |
| 09:12 | 5 | 30 | 130 | 5.06 | -- | 6.92 | 1.27 | 5.66 | 2.67 | 16 | -43.7 | -- | -- |
| 09:17 | 5 | 35 | 130 | 5.11 | -- | 6.93 | 1.27 | 5.7 | 2.52 | 15.9 | -48.3 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:** Equipment blank 07 collected here

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot

1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: South of Montcalm

Condition of Well: Good condition

Well Completion: Flush mount

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWF12-02R | | | **Date** | 09/12/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 64.0 degrees F and Cloudy. The wind is blowing W at 10.3 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 13.05 | **Total Depth (ft-bmp)** | 27.75 | **Water Column (ft)** | 14.7 | **Gallons in Well** | 2.39 |
| **Purge Start** | 13:32 | **Pump Intake (ft-bmp)** | 25.25 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 14:40 | **Volumes Purged** | 1.05 | **Sample ID** | MWF12-02R_GW-091223 | **Sampled by** | Garrett Link |
| **Sample Time** | 14:35 | **Gallons Purged** | 2.50 | **Replicate/ Code No.** | MWF12-02R_GW-091223 | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 13:32 | 0 | 0 | 150 | 13.06 | -- | 7.2 | 0.99 | 39.9 | 0.24 | 14.6 | 71 | -- | -- |
| 13:37 | 5 | 5 | 125 | 13.06 | -- | 7.21 | 0.97 | 40.3 | 0.15 | 15 | 67.7 | -- | -- |
| 13:42 | 5 | 10 | 125 | 13.06 | -- | 7.22 | 0.95 | 32 | 0.27 | 15.2 | 66 | -- | -- |
| 13:47 | 5 | 15 | 125 | 13.06 | -- | 7.22 | 0.94 | 25.5 | 0.16 | 15.1 | 64.9 | -- | -- |
| 13:52 | 5 | 20 | 125 | 13.06 | -- | 7.22 | 0.92 | 18.2 | 0.16 | 15.2 | 63.2 | -- | -- |
| 13:57 | 5 | 25 | 125 | 13.06 | -- | 7.22 | 0.9 | 15.5 | 0.16 | 15.2 | 62 | -- | -- |
| 14:02 | 5 | 30 | 125 | 13.06 | -- | 7.22 | 0.88 | 12.6 | 0.17 | 14.9 | 61.4 | -- | -- |
| 14:07 | 5 | 35 | 125 | 13.06 | -- | 7.21 | 0.88 | 9.09 | 0.19 | 15 | 61 | -- | -- |
| 14:12 | 5 | 40 | 125 | 13.06 | -- | 7.22 | 0.88 | 9.83 | 0.17 | 14.8 | 61.2 | -- | -- |
| 14:17 | 5 | 45 | 125 | 13.06 | -- | 7.22 | 0.87 | 8.72 | 0.17 | 14.8 | 60.3 | -- | -- |
| 14:22 | 5 | 50 | 125 | 13.06 | -- | 7.22 | 0.86 | 6.37 | 0.18 | 14.8 | 60.2 | -- | -- |
| 14:27 | 5 | 55 | 125 | 13.06 | -- | 7.22 | 0.87 | 5.99 | 0.21 | 15 | 59.8 | -- | -- |
| 14:32 | 5 | 60 | 125 | 13.06 | -- | 7.22 | 0.87 | 5.05 | 0.22 | 15.2 | 59.7 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 6 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Powerhouse
Condition of Well: Good condition
Well Completion: Flush mount
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWF15-01 | | | **Date** | 09/12/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 63 °F, Cloudy, winds at mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 18.13 | **Total Depth (ft-bmp)** | 28.66 | **Water Column (ft)** | 10.53 | **Gallons in Well** | 1.71 |
| **Purge Start** | 12:25 | **Pump Intake (ft-bmp)** | 25.4 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 13:35 | **Volumes Purged** | 1.75 | **Sample ID** | MWF15-01_GW-091223 | **Sampled by** | Lottie Jay |
| **Sample Time** | 13:30 | **Gallons Purged** | 3.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 12:30 | 0 | 0 | 130 | 18.16 | -- | 7.15 | 1.65 | 23.7 | 1.01 | 15.1 | 121.3 | -- | -- |
| 12:35 | 5 | 5 | 130 | 18.16 | -- | 7.16 | 1.64 | 15.5 | 0.68 | 14.8 | 115.3 | -- | -- |
| 12:40 | 5 | 10 | 130 | 18.16 | -- | 7.17 | 1.63 | 9.51 | 0.43 | 14.6 | 108.8 | -- | -- |
| 12:45 | 5 | 15 | 130 | 18.16 | -- | 7.16 | 1.6 | 9.06 | 0.35 | 14.7 | 103.5 | -- | -- |
| 12:50 | 5 | 20 | 130 | 18.16 | -- | 7.19 | 1.54 | 8.64 | 0.28 | 14.7 | 96.7 | -- | -- |
| 12:55 | 5 | 25 | 130 | 18.16 | -- | 7.2 | 1.47 | 6.39 | 0.24 | 14.5 | 91 | -- | -- |
| 13:00 | 5 | 30 | 130 | 18.16 | -- | 7.22 | 1.39 | 6.47 | 0.22 | 14.8 | 85.8 | -- | -- |
| 13:05 | 5 | 35 | 130 | 18.16 | -- | 7.22 | 1.34 | 6.64 | 0.2 | 14.6 | 80.4 | -- | -- |
| 13:10 | 5 | 40 | 130 | 18.16 | -- | 7.23 | 1.29 | 5.69 | 0.23 | 14.5 | 77.1 | -- | -- |
| 13:15 | 5 | 45 | 130 | 18.16 | -- | 7.23 | 1.26 | 4.94 | 0.19 | 14.5 | 75 | -- | -- |
| 13:20 | 5 | 50 | 130 | 18.16 | -- | 7.24 | 1.21 | 3.49 | 0.19 | 14.7 | 70.7 | -- | -- |
| 13:25 | 5 | 55 | 130 | 18.16 | -- | 7.24 | 1.18 | 3.93 | 0.19 | 14.7 | 67.2 | -- | -- |
| 13:30 | 5 | 60 | 130 | 18.16 | -- | 7.24 | 1.16 | 1.27 | 0.17 | 14.9 | 64.3 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location:

Condition of Well:

Well Completion: NA

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWF16-06 | | | **Date** | 09/15/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 66.0 degrees F and Mostly Cloudy. The wind is blowing at 6.9 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 12.02 | **Total Depth (ft-bmp)** | 28.65 | **Water Column (ft)** | 16.63 | **Gallons in Well** | 2.7 |
| **Purge Start** | 12:25 | **Pump Intake (ft-bmp)** | 26 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 13:11 | **Volumes Purged** | 0.46 | **Sample ID** | MWF16-06_GW-091523 | **Sampled by** | Garrett Link |
| **Sample Time** | 13:00 | **Gallons Purged** | 1.25 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 12:30 | 0 | 0 | 110 | 12.04 | -- | 7.87 | 0.391 | 7.49 | 3.74 | 17.6 | 72.6 | -- | -- |
| 12:35 | 5 | 5 | 100 | 12.05 | -- | 7.87 | 0.39 | 5.41 | 4.38 | 17.3 | 71.4 | -- | -- |
| 12:40 | 5 | 10 | 100 | 12.06 | -- | 7.88 | 0.394 | 1.85 | 4.12 | 17.3 | 69.3 | -- | -- |
| 12:45 | 5 | 15 | 100 | 12.07 | -- | 7.88 | 0.397 | 1.26 | 4.42 | 17.6 | 67 | -- | -- |
| 12:50 | 5 | 20 | 100 | 12.07 | -- | 7.86 | 0.397 | 0.49 | 4.38 | 17.2 | 66 | -- | -- |
| 12:55 | 5 | 25 | 100 | 12.1 | -- | 7.87 | 0.394 | 0.02 | 4.32 | 17.1 | 63.6 | -- | -- |
| 13:00 | 5 | 30 | 100 | 12.06 | -- | 7.88 | 0.395 | 0.26 | 4.52 | 17.5 | 61.8 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:** Initial log was lost due to app crashing, SWL is estimated

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: GFL SE
Well Locked at Arrival: yes
Condition of Well: Good condition
Well Locked at Departure: yes
Well Completion: Flush mount
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWF16-12 | | | **Date** | 09/18/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 55.9 degrees F and Mostly Cloudy. The wind is blowing W/NW at 8.1 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 13.27 | **Total Depth (ft-bmp)** | 18.89 | **Water Column (ft)** | 5.62 | **Gallons in Well** | 0.91 |
| **Purge Start** | 10:29 | **Pump Intake (ft-bmp)** | 16.89 | **Purge Method** | Low-Flow | **Purge Equipment** | Submersible |
| **Purge End** | 11:07 | **Volumes Purged** | 2.20 | **Sample ID** | MWF16-12 | **Sampled by** | Samantha Szpaichler |
| **Sample Time** | 11:00 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 10:32 | 0 | 0 | 120 | 13.72 | -- | 8.22 | 0.281 | 12.9 | 7.9 | 15.9 | 176.6 | -- | -- |
| 10:37 | 5 | 5 | 120 | 14.5 | -- | 8.21 | 0.266 | 9.4 | 1.61 | 16.1 | 177.3 | -- | -- |
| 10:42 | 5 | 10 | 120 | 15.06 | -- | 8.19 | 0.266 | 7.31 | 1.08 | 16 | 178.1 | -- | -- |
| 10:47 | 5 | 15 | 120 | 15.48 | -- | 8.16 | 0.265 | 15.1 | 1.6 | 16 | 179.3 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:** At 10:50 stopped purging as DTW lowered below tubing. Reached out to Ian Drost. Okay to sample and lower tubing as needed. Will note that parameters DO, Turb did not stabilize. Sampled at 11 am. Lowered 3" at 11:02

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: GFL
Condition of Well: Good condition,Other
Well Completion: Flush mount
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWF16-18 | | | **Date** | 09/15/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 68.0 degrees F and Mostly Cloudy. The wind is blowing S/SE at 8.1 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 20.52 | **Total Depth (ft-bmp)** | 31.48 | **Water Column (ft)** | 10.96 | **Gallons in Well** | 1.78 |
| **Purge Start** | 13:30 | **Pump Intake (ft-bmp)** | 29 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 14:27 | **Volumes Purged** | 0.98 | **Sample ID** | MWF16-18_GW-091523 | **Sampled by** | Garrett Link |
| **Sample Time** | 14:20 | **Gallons Purged** | 1.75 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 13:35 | 0 | 0 | 105 | 20.52 | -- | 7.02 | 0.86 | 2.16 | 0.38 | 18.2 | 64 | -- | -- |
| 13:40 | 5 | 5 | 105 | 20.52 | -- | 7.04 | 0.86 | 1.91 | 0.34 | 17.5 | 61.1 | -- | -- |
| 13:45 | 5 | 10 | 105 | 20.52 | -- | 7.05 | 0.86 | 2.33 | 0.29 | 16.8 | 59 | -- | -- |
| 13:50 | 5 | 15 | 105 | 20.52 | -- | 7.06 | 0.85 | 1.95 | 0.29 | 16.5 | 57.4 | -- | -- |
| 13:55 | 5 | 20 | 105 | 20.52 | -- | 7.07 | 0.86 | 1.93 | 0.31 | 16.7 | 56.1 | -- | -- |
| 14:00 | 5 | 25 | 105 | 20.51 | -- | 7.07 | 0.86 | 1.72 | 0.32 | 16.8 | 55.7 | -- | -- |
| 14:05 | 5 | 30 | 105 | 20.51 | -- | 7.07 | 0.86 | 1.27 | 0.32 | 16.3 | 55.6 | -- | -- |
| 14:10 | 5 | 35 | 105 | 20.51 | -- | 7.07 | 0.86 | 0.62 | 0.29 | 15.8 | 55.2 | -- | -- |
| 14:15 | 5 | 40 | 105 | 20.51 | -- | 7.08 | 0.86 | 0.13 | 0.31 | 16.1 | 54.2 | -- | -- |
| 14:20 | 5 | 45 | 105 | 20.51 | -- | 7.08 | 0.86 | 0.02 | 0.29 | 16.1 | 53.5 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: GFL East
Condition of Well: Good condition
Well Completion: Flush mount
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWF16-23 | | | **Date** | 09/12/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 67 °F, Partly cloudy , winds at mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 23.71 | **Total Depth (ft-bmp)** | 30.5 | **Water Column (ft)** | 6.79 | **Gallons in Well** | 1.1 |
| **Purge Start** | 14:00 | **Pump Intake (ft-bmp)** | 28 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 15:10 | **Volumes Purged** | 2.73 | **Sample ID** | MWF16-23_GW-091223 | **Sampled by** | Lottie Jay |
| **Sample Time** | 15:05 | **Gallons Purged** | 3.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 14:05 | 0 | 0 | 120 | 23.72 | -- | 7.06 | 0.426 | 22 | 3.38 | 22.2 | 55.9 | -- | -- |
| 14:10 | 5 | 5 | 120 | 23.72 | -- | 7.04 | 0.96 | 11.3 | 3.76 | 18.9 | 50.4 | -- | -- |
| 14:15 | 5 | 10 | 130 | 23.72 | -- | 7.15 | 0.98 | 1.45 | 1.54 | 18.6 | 52.3 | -- | -- |
| 14:20 | 5 | 15 | 130 | 23.72 | -- | 7.09 | 0.96 | 136 | 1.35 | 18.1 | 50.5 | -- | -- |
| 14:25 | 5 | 20 | 130 | 23.72 | -- | 6.99 | 0.91 | 244 | 0.22 | 16.9 | 48.1 | -- | -- |
| 14:30 | 5 | 25 | 130 | 23.72 | -- | 7.02 | 0.9 | 129 | 0.21 | 16.7 | 45.2 | -- | -- |
| 14:35 | 5 | 30 | 130 | 23.72 | -- | 7.05 | 0.89 | 59.3 | 0.24 | 17.4 | 41 | -- | -- |
| 14:40 | 5 | 35 | 130 | 23.72 | -- | 7.05 | 0.88 | 41.6 | 0.25 | 17.7 | 38.3 | -- | -- |
| 14:45 | 5 | 40 | 130 | 23.72 | -- | 7.05 | 0.87 | 26.9 | 0.29 | 18 | 36 | -- | -- |
| 14:50 | 5 | 45 | 130 | 23.72 | -- | 7.05 | 0.86 | 24.7 | 0.29 | 17.7 | 35.1 | -- | -- |
| 14:55 | 5 | 50 | 130 | 23.72 | -- | 7.04 | 0.84 | 20.3 | 0.35 | 17.5 | 34.4 | -- | -- |
| 15:00 | 5 | 55 | 130 | 23.72 | -- | 7.05 | 0.82 | 14.4 | 0.53 | 17.5 | 33 | -- | -- |
| 15:05 | 5 | 60 | 130 | 23.72 | -- | 7.05 | 0.8 | 8.6 | 0.6 | 17.8 | 31.8 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot

1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location:

Condition of Well:

Well Completion: NA

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWF16-25 | | | **Date** | 09/12/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 64.0 degrees F and Cloudy. The wind is blowing W at 10.3 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 25.86 | **Total Depth (ft-bmp)** | 37.18 | **Water Column (ft)** | 11.32 | **Gallons in Well** | 1.84 |
| **Purge Start** | 13:41 | **Pump Intake (ft-bmp)** | 35.8 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 14:23 | **Volumes Purged** | 1.36 | **Sample ID** | MWF16-25_GW-091223 | **Sampled by** | Sommer Guy |
| **Sample Time** | 14:17 | **Gallons Purged** | 2.50 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 13:43 | 0 | 0 | 130 | 25.86 | -- | 7.35 | 0.76 | 12.4 | 2.16 | 15.2 | 112 | -- | -- |
| 13:48 | 5 | 5 | 130 | 25.86 | -- | 7.11 | 0.75 | 10.1 | 2.59 | 15.3 | 119.6 | -- | -- |
| 13:53 | 5 | 10 | 130 | 25.86 | -- | 7.04 | 0.73 | 7.36 | 2.9 | 15.4 | 122.7 | -- | -- |
| 13:58 | 5 | 15 | 130 | 25.86 | -- | 7.06 | 0.69 | 5.36 | 3.13 | 15.2 | 122.1 | -- | -- |
| 14:03 | 5 | 20 | 130 | 25.86 | -- | 7.08 | 0.69 | 5.13 | 3.06 | 15.1 | 122.5 | -- | -- |
| 14:08 | 5 | 25 | 130 | 25.86 | -- | 7.09 | 0.69 | 5.75 | 3.24 | 15 | 123.5 | -- | -- |
| 14:13 | 5 | 30 | 130 | 25.86 | -- | 7.11 | 0.69 | 5.45 | 3.35 | 15.1 | 123.3 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot

1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Kennett ST North ROW

Well Locked at Arrival: yes

Condition of Well: Good condition,Missing bolts

Well Locked at Departure: yes

Well Completion: Flush mount

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWF16-26 | | | **Date** | 09/12/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 66.0 degrees F and Mostly Cloudy. The wind is blowing W/NW at 9.2 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 24.4 | **Total Depth (ft-bmp)** | 36.7 | **Water Column (ft)** | 12.3 | **Gallons in Well** | 2 |
| **Purge Start** | 14:48 | **Pump Intake (ft-bmp)** | 34.2 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 15:27 | **Volumes Purged** | 1.00 | **Sample ID** | MWF16-26_GW-091223 | **Sampled by** | Sommer Guy |
| **Sample Time** | 15:25 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 14:49 | 0 | 0 | 130 | 24.4 | -- | 7.33 | 1.45 | 4.26 | 5.22 | 14.9 | 144.4 | -- | -- |
| 14:54 | 5 | 5 | 130 | 24.4 | -- | 7 | 1.44 | 4.15 | 3.57 | 14.5 | 141.2 | -- | -- |
| 14:59 | 5 | 10 | 130 | 24.4 | -- | 6.97 | 1.4 | 4.73 | 3.93 | 14.5 | 137.6 | -- | -- |
| 15:04 | 5 | 15 | 130 | 24.4 | -- | 7.01 | 1.34 | 6.93 | 3.74 | 14.5 | 135 | -- | -- |
| 15:09 | 5 | 20 | 130 | 24.4 | -- | 7.02 | 1.32 | 2.98 | 3.79 | 14.5 | 133.7 | -- | -- |
| 15:14 | 5 | 25 | 130 | 24.4 | -- | 7.02 | 1.31 | 2.64 | 3.97 | 14.7 | 132.5 | -- | -- |
| 15:19 | 5 | 30 | 130 | 24.4 | -- | 7.06 | 1.3 | 2.34 | 3.76 | 14.9 | 127.6 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Baldwin ROW east
Condition of Well:
Well Completion: Flush mount
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWF7-02 | | | **Date** | 09/12/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 60 °F, Cloudy, winds at mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 18.68 | **Total Depth (ft-bmp)** | 22.87 | **Water Column (ft)** | 4.19 | **Gallons in Well** | 0.68 |
| **Purge Start** | 10:20 | **Pump Intake (ft-bmp)** | 20 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 11:37 | **Volumes Purged** | 2.94 | **Sample ID** | MWF7-02_GW-091223 | **Sampled by** | Lottie Jay |
| **Sample Time** | 11:25 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 10:25 | 0 | 0 | 130 | 18.73 | -- | 7.05 | 1.09 | 156 | 3.74 | 15.6 | 81.9 | -- | -- |
| 10:30 | 5 | 5 | 130 | 18.72 | -- | 7.07 | 1.08 | 95.2 | 2.41 | 15.6 | 74.5 | -- | -- |
| 10:35 | 5 | 10 | 130 | 18.72 | -- | 7.17 | 1.09 | 30.1 | 3.14 | 15.7 | 66.1 | -- | -- |
| 10:40 | 5 | 15 | 130 | 18.72 | -- | 7.17 | 1.08 | 19 | 4.1 | 15.6 | 63.2 | -- | -- |
| 10:45 | 5 | 20 | 130 | 18.72 | -- | 7.16 | 1.08 | 19.4 | 4.06 | 15.4 | 62.4 | -- | -- |
| 10:50 | 5 | 25 | 130 | 18.72 | -- | 7.15 | 1.08 | 15.2 | 4.03 | 15.4 | 61.3 | -- | -- |
| 10:55 | 5 | 30 | 130 | 18.72 | -- | 7.18 | 1.08 | 8.74 | 4.03 | 15.3 | 59.1 | -- | -- |
| 11:00 | 5 | 35 | 130 | 18.72 | -- | 7.18 | 1.08 | 5.15 | 4.02 | 15.3 | 58.2 | -- | -- |
| 11:05 | 5 | 40 | 130 | 18.72 | -- | 7.19 | 1.08 | 3.94 | 3.98 | 15.3 | 56.9 | -- | -- |
| 11:10 | 5 | 45 | 130 | 18.72 | -- | 7.19 | 1.09 | 1.68 | 3.95 | 15.3 | 56.2 | -- | -- |
| 11:15 | 5 | 50 | 130 | 18.72 | -- | 7.19 | 1.09 | 0.46 | 3.92 | 15.3 | 55.7 | -- | -- |
| 11:20 | 5 | 55 | 130 | 18.72 | -- | 7.19 | 1.08 | 2.46 | 3.91 | 15.3 | 54.8 | -- | -- |
| 11:25 | 5 | 60 | 130 | 18.72 | -- | 7.19 | 1.09 | 4.59 | 3.89 | 15.3 | 54.7 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:** Equipment Blank 03 taken here

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot

1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location:

Condition of Well:

Well Completion: NA

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWM16-52 | | | **Date** | 09/19/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 59.0 degrees F and Mostly Clear. The wind is blowing W at 4.7 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 26.84 | **Total Depth (ft-bmp)** | 37.2 | **Water Column (ft)** | 10.36 | **Gallons in Well** | 1.68 |
| **Purge Start** | 10:29 | **Pump Intake (ft-bmp)** | 34.7 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 11:30 | **Volumes Purged** | 1.19 | **Sample ID** | MWM16-52_GW-091923 | **Sampled by** | Sommer Guy |
| **Sample Time** | 11:15 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | MWM16-52_GW-091923 | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 10:30 | 0 | 0 | 130 | 27.16 | -- | 7.64 | 2.31 | 24.3 | 1.64 | 15.6 | -110.8 | -- | -- |
| 10:35 | 5 | 5 | 130 | 27.16 | -- | 7.15 | 2.32 | 22.4 | 0.72 | 15.9 | -98.2 | -- | -- |
| 10:40 | 5 | 10 | 130 | 27.16 | -- | 7.03 | 2.45 | 13.4 | 0.32 | 15.7 | -95.2 | -- | -- |
| 10:45 | 5 | 15 | 130 | 27.16 | -- | 7.06 | 2.38 | 10.3 | 0.24 | 15.5 | -102.8 | -- | -- |
| 10:50 | 5 | 20 | 130 | 27.16 | -- | 7.07 | 2.38 | 10.4 | 0.22 | 15.3 | -108.4 | -- | -- |
| 10:55 | 5 | 25 | 130 | 27.16 | -- | 7.08 | 2.35 | 9.56 | 0.14 | 15.5 | -115 | -- | -- |
| 11:00 | 5 | 30 | 130 | 27.16 | -- | 7.09 | 2.35 | 8.64 | 0.14 | 15.3 | -120.6 | -- | -- |
| 11:05 | 5 | 35 | 130 | 27.16 | -- | 7.09 | 2.33 | 7.88 | 0.14 | 15.2 | -124.8 | -- | -- |
| 11:10 | 5 | 40 | 130 | 27.16 | -- | 7.1 | 2.33 | 8.52 | 0.14 | 15.4 | -129.1 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 6 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Upull lot
Condition of Well: Good condition
Well Completion: Flush mount
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWM2-22 | | | **Date** | 09/25/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 63.0 degrees F and Cloudy. The wind is blowing E at 9.2 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 17.02 | **Total Depth (ft-bmp)** | 24.22 | **Water Column (ft)** | 7.2 | **Gallons in Well** | 1.17 |
| **Purge Start** | 10:39 | **Pump Intake (ft-bmp)** | 21.7 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 11:20 | **Volumes Purged** | 1.71 | **Sample ID** | MWM2-22_GW-092523 | **Sampled by** | Sommer Guy |
| **Sample Time** | 11:15 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 10:40 | 0 | 0 | 130 | 17.03 | -- | 6.98 | 0.74 | 0.02 | 0.89 | 16.8 | 19.4 | -- | -- |
| 10:45 | 5 | 5 | 130 | 17.03 | -- | 6.92 | 0.75 | 0.02 | 0.6 | 17 | -14.7 | -- | -- |
| 10:50 | 5 | 10 | 130 | 17.03 | -- | 6.92 | 0.76 | 0.02 | 0.59 | 17 | -29.4 | -- | -- |
| 10:55 | 5 | 15 | 130 | 17.03 | -- | 6.91 | 0.77 | 0.02 | 0.5 | 16.8 | -37.4 | -- | -- |
| 11:00 | 5 | 20 | 130 | 17.03 | -- | 6.9 | 0.78 | 0.02 | 0.28 | 16.8 | -41.7 | -- | -- |
| 11:05 | 5 | 25 | 130 | 17.03 | -- | 6.9 | 0.78 | 0.02 | 0.3 | 16.7 | -44.7 | -- | -- |
| 11:10 | 5 | 30 | 130 | 17.03 | -- | 6.89 | 0.79 | 0.02 | 0.28 | 16.7 | -46.8 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Tatro/Recycling
Well Locked at Arrival:
Condition of Well: Good condition
Well Locked at Departure:
Well Completion: Stick-up
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWM2-28 | | | **Date** | 09/25/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 60.1 degrees F and Cloudy. The wind is blowing E/NE at 8.1 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 16.7 | **Total Depth (ft-bmp)** | 25.79 | **Water Column (ft)** | 9.09 | **Gallons in Well** | 1.48 |
| **Purge Start** | 09:39 | **Pump Intake (ft-bmp)** | 23.3 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 10:24 | **Volumes Purged** | 1.35 | **Sample ID** | MWM2-28_GW-092523 | **Sampled by** | Sommer Guy |
| **Sample Time** | 10:20 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 09:40 | 0 | 0 | 130 | 16.81 | -- | 7.72 | 0.7 | 1.46 | 0.71 | 17.1 | 88.5 | -- | -- |
| 09:45 | 5 | 5 | 130 | 16.81 | -- | 6.96 | 0.63 | 1.9 | 0.37 | 17.1 | 77.9 | -- | -- |
| 09:50 | 5 | 10 | 130 | 16.81 | -- | 6.92 | 0.62 | 0.89 | 0.21 | 17.1 | 24 | -- | -- |
| 09:55 | 5 | 15 | 130 | 16.81 | -- | 6.97 | 0.62 | 1.72 | 0.19 | 17.2 | -13 | -- | -- |
| 10:00 | 5 | 20 | 130 | 16.81 | -- | 7.01 | 0.62 | 0.3 | 0.16 | 17.2 | -29.2 | -- | -- |
| 10:05 | 5 | 25 | 130 | 16.81 | -- | 7.06 | 0.62 | 0.09 | 0.16 | 17.3 | -38.8 | -- | -- |
| 10:10 | 5 | 30 | 130 | 16.81 | -- | 7.09 | 0.62 | 0.02 | 0.16 | 17.3 | -42.5 | -- | -- |
| 10:15 | 5 | 35 | 130 | 16.81 | -- | 7.11 | 0.62 | 0.02 | 0.16 | 17.3 | -48.3 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Tatro/ Recycling
Condition of Well: Good condition
Well Completion: Stick-up
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWM30-01 | | | **Date** | 09/14/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 64.0 degrees F and Mostly Cloudy. The wind is blowing W/SW at 3.4 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 23.58 | **Total Depth (ft-bmp)** | 34.63 | **Water Column (ft)** | 11.05 | **Gallons in Well** | 1.8 |
| **Purge Start** | 13:39 | **Pump Intake (ft-bmp)** | 32.1 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 14:31 | **Volumes Purged** | 1.11 | **Sample ID** | MWM30-01_GW-091423 | **Sampled by** | Sommer Guy |
| **Sample Time** | 14:25 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 13:40 | 0 | 0 | 130 | 23.6 | -- | 7.46 | 1.04 | 43.7 | 3.69 | 17.2 | 10.3 | -- | -- |
| 13:45 | 5 | 5 | 130 | 23.6 | -- | 6.87 | 1.01 | 40 | 2.99 | 16.3 | -47.4 | -- | -- |
| 13:50 | 5 | 10 | 130 | 23.6 | -- | 6.83 | 1 | 28.4 | 2.49 | 16.6 | -54 | -- | -- |
| 13:55 | 5 | 15 | 130 | 23.6 | -- | 6.83 | 0.99 | 22.4 | 2.46 | 16.3 | -55.5 | -- | -- |
| 14:00 | 5 | 20 | 130 | 23.6 | -- | 6.85 | 0.99 | 15.7 | 2.53 | 16.1 | -56.9 | -- | -- |
| 14:05 | 5 | 25 | 130 | 23.6 | -- | 6.87 | 0.99 | 13.7 | 2.14 | 16.3 | -57.4 | -- | -- |
| 14:10 | 5 | 30 | 130 | 23.6 | -- | 6.91 | 0.99 | 11.2 | 2.26 | 16.3 | -59.7 | -- | -- |
| 14:15 | 5 | 35 | 130 | 23.6 | -- | 6.93 | 0.99 | 10.8 | 2.25 | 16.4 | -59.9 | -- | -- |
| 14:20 | 5 | 40 | 130 | 23.6 | -- | 6.94 | 0.98 | 8.91 | 2.14 | 16.6 | -61.5 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:** Equipment blank 04 collected here

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Upull lot south

Condition of Well: Good condition,Missing well cover and bolts

Well Completion: Flush mount

Well Locked at Arrival:

Well Locked at Departure:

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWM30-02 | | | **Date** | 09/19/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 59 °F, Sunny, winds at mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 19.15 | **Total Depth (ft-bmp)** | 32.35 | **Water Column (ft)** | 13.2 | **Gallons in Well** | 2.14 |
| **Purge Start** | 10:30 | **Pump Intake (ft-bmp)** | 29.8 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 11:30 | **Volumes Purged** | 1.40 | **Sample ID** | MWM30-02_GW-091923 | **Sampled by** | Lottie Jay |
| **Sample Time** | 11:20 | **Gallons Purged** | 3.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 10:35 | 0 | 0 | 100 | 19.24 | -- | 7.22 | 1.04 | 169 | 2.55 | 17 | 152.8 | -- | -- |
| 10:40 | 10 | 10 | 110 | 19.28 | -- | 7.3 | 1.03 | 117 | 1.1 | 16.8 | 137.4 | -- | -- |
| 10:45 | 5 | 15 | 110 | 19.32 | -- | 7.31 | 1.04 | 96.5 | 0.86 | 16.4 | 119.6 | -- | -- |
| 10:50 | 5 | 20 | 110 | 19.35 | -- | 7.33 | 1.04 | 58.9 | 0.73 | 16.4 | 121.4 | -- | -- |
| 10:55 | 5 | 20 | 110 | 19.36 | -- | 7.38 | 1.02 | 23.9 | 0.57 | 16.6 | 105.1 | -- | -- |
| 11:00 | 5 | 25 | 110 | 19.4 | -- | 7.38 | 1.03 | 9.8 | 0.57 | 16.3 | 98.4 | -- | -- |
| 11:05 | 5 | 30 | 110 | 19.46 | -- | 7.39 | 1.03 | 5.74 | 0.57 | 16.3 | 92.2 | -- | -- |
| 11:10 | 5 | 35 | 110 | 19.37 | -- | 7.38 | 1.03 | 1.85 | 0.61 | 16.4 | 88 | -- | -- |
| 11:15 | 5 | 40 | 110 | 19.42 | -- | 7.39 | 1.03 | 1.61 | 0.62 | 16.4 | 85.2 | -- | -- |
| 11:20 | 5 | 45 | 110 | 19.46 | -- | 7.39 | 1.03 | 2.01 | 0.61 | 16.4 | 80.9 | Small white particles | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot  1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location:
Condition of Well:
Well Completion: NA
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWM5-03 | | | **Date** | 09/14/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 64 °F, Sunny, winds at mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 21.13 | **Total Depth (ft-bmp)** | 33.29 | **Water Column (ft)** | 12.16 | **Gallons in Well** | 1.98 |
| **Purge Start** | 12:30 | **Pump Intake (ft-bmp)** | 30.8 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 14:53 | **Volumes Purged** | 2.53 | **Sample ID** | MWM5-03_GW-091423 | **Sampled by** | Lottie Jay |
| **Sample Time** | 14:35 | **Gallons Purged** | 5.00 | **Replicate/ Code No.** | DUP-02_GW-091423 | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 12:35 | 0 | 0 | 130 | 21.13 | -- | 6.6 | 8.83 | 60 | 1.58 | 16.7 | 72.3 | -- | -- |
| 12:40 | 5 | 5 | 130 | 21.15 | -- | 6.64 | 8.73 | 56.7 | 0.41 | 17.1 | 35 | -- | -- |
| 12:45 | 5 | 10 | 130 | 21.15 | -- | 6.71 | 8.74 | 49.4 | 0.24 | 16.4 | 5.7 | -- | -- |
| 12:50 | 5 | 15 | 130 | 21.15 | -- | 6.72 | 8.72 | 46.4 | 0.2 | 16.3 | -13 | -- | -- |
| 12:55 | 5 | 20 | 110 | 21.15 | -- | 6.73 | 8.57 | 41.4 | 0.17 | 16 | -27.8 | -- | -- |
| 13:00 | 5 | 25 | 130 | 21.15 | -- | 6.74 | 8.52 | 36.4 | 0.17 | 16.6 | -36 | -- | -- |
| 13:05 | 5 | 30 | 130 | 21.15 | -- | 6.74 | 8.44 | 32.2 | 0.16 | 16.5 | -41.1 | -- | -- |
| 13:10 | 5 | 35 | 100 | 21.15 | -- | 6.74 | 8.34 | 30.6 | 0.14 | 16.6 | -46.5 | -- | -- |
| 13:15 | 5 | 40 | 100 | 21.15 | -- | 6.74 | 8.33 | 25.1 | 0.14 | 16.7 | -47.8 | -- | -- |
| 13:20 | 5 | 45 | 100 | 21.15 | -- | 6.74 | 8.28 | 25.4 | 0.13 | 17 | -50.6 | -- | -- |
| 13:25 | 5 | 50 | 100 | 21.15 | -- | 6.74 | 8.21 | 24.6 | 0.12 | 16.4 | -53.6 | -- | -- |
| 13:30 | 5 | 55 | 100 | 21.15 | -- | 6.74 | 8.19 | 18.3 | 0.12 | 16.8 | -55.9 | -- | -- |
| 13:35 | 5 | 60 | 100 | 21.15 | -- | 6.74 | 8.16 | 18.2 | 0.13 | 17.2 | -57.2 | -- | -- |
| 13:40 | 5 | 65 | 100 | 21.15 | -- | 6.74 | 8.2 | 15.4 | 0.14 | 17.3 | -58.1 | -- | -- |
| 13:45 | 5 | 70 | 100 | 21.15 | -- | 6.74 | 8.27 | 32.4 | 0.14 | 16.7 | -59 | -- | -- |
| 13:50 | 5 | 75 | 100 | 21.15 | -- | 6.75 | 8.18 | 39.5 | 0.13 | 16.7 | -60.1 | -- | -- |
| 13:55 | 5 | 80 | 100 | 21.15 | -- | 6.75 | 8.09 | 37.4 | 0.13 | 16.6 | -61.3 | -- | -- |
| 14:00 | 5 | 85 | 100 | 21.15 | -- | 6.75 | 8.08 | 29.1 | 0.12 | 16.6 | -61.4 | -- | -- |
| 14:05 | 5 | 90 | 100 | 21.15 | -- | 6.75 | 8.04 | 28.1 | 0.11 | 16.8 | -62.2 | -- | -- |
| 14:10 | 5 | 95 | 100 | 21.15 | -- | 6.75 | 8.04 | 24.8 | 0.11 | 16.6 | -62.4 | -- | -- |
| 14:15 | 5 | 100 | 100 | 21.15 | -- | 6.75 | 8.04 | 17.1 | 0.11 | 16.6 | -62.7 | -- | -- |
| 14:20 | 5 | 105 | 100 | 21.15 | -- | 6.75 | 8.03 | 23 | 0.11 | 16.9 | -63 | -- | -- |
| 14:25 | 5 | 110 | 100 | 21.15 | -- | 6.75 | 8.06 | 18.3 | 0.11 | 16.8 | -63.6 | -- | -- |
| 14:30 | 5 | 115 | 100 | 21.15 | -- | 6.75 | -63.7 | 18.8 | 0.1 | 16.3 | -63.8 | Clear | Mild |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 4 | None |

**Comments:** Higher turbidity at this well, not going below 18.8 NTU

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot

1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location:

Well Locked at Arrival: yes

Condition of Well:

Well Locked at Departure: yes

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWOS-01 | | | **Date** | 09/13/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 53.1 degrees F and Partly Cloudy. The wind is blowing N/NW at 8.1 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 7.19 | **Total Depth (ft-bmp)** | 12.95 | **Water Column (ft)** | 5.76 | **Gallons in Well** | 0.94 |
| **Purge Start** | 09:42 | **Pump Intake (ft-bmp)** | 10.45 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 10:55 | **Volumes Purged** | 3.19 | **Sample ID** | MWOS-01_GW-091323 | **Sampled by** | Garrett Link |
| **Sample Time** | 10:45 | **Gallons Purged** | 3.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 09:45 | 0 | 0 | 125 | 7.19 | -- | 6.86 | 1.76 | 70 | 0.23 | 16.8 | 122.3 | -- | -- |
| 09:50 | 5 | 5 | 150 | 7.21 | -- | 6.89 | 1.74 | 39 | 0.11 | 16.8 | 115.4 | -- | -- |
| 09:55 | 5 | 10 | 150 | 7.21 | -- | 6.93 | 1.73 | 38.5 | 0.15 | 16.9 | 112 | -- | -- |
| 10:00 | 5 | 15 | 150 | 7.21 | -- | 6.94 | 1.72 | 25.8 | 0.12 | 16.6 | 108.2 | -- | -- |
| 10:05 | 5 | 20 | 150 | 7.22 | -- | 6.94 | 1.7 | 26.2 | 0.1 | 16.7 | 105.9 | -- | -- |
| 10:10 | 5 | 25 | 150 | 7.22 | -- | 6.96 | 1.69 | 21.4 | 0.08 | 16.9 | 103.7 | -- | -- |
| 10:15 | 5 | 30 | 150 | 7.22 | -- | 6.97 | 1.68 | 13.9 | 0.09 | 17 | 102.3 | -- | -- |
| 10:20 | 5 | 35 | 150 | 7.22 | -- | 6.98 | 1.67 | 14.1 | 0.1 | 16.9 | 101 | -- | -- |
| 10:25 | 5 | 40 | 150 | 7.22 | -- | 7 | 1.66 | 13.9 | 0.1 | 16.8 | 100.5 | -- | -- |
| 10:30 | 5 | 45 | 150 | 7.22 | -- | 7.01 | 1.65 | 9.46 | 0.09 | 16.9 | 99.8 | -- | -- |
| 10:35 | 5 | 50 | 150 | 7.22 | -- | 7.02 | 1.65 | 8.51 | 0.09 | 16.8 | 99.5 | -- | -- |
| 10:40 | 5 | 55 | 150 | 7.22 | -- | 7.02 | 1.64 | 8.95 | 0.09 | 16.8 | 98.9 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Off-site; Montcalm st

Well Locked at Arrival: yes

Condition of Well: Good condition

Well Locked at Departure: yes

Well Completion: Flush mount

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWOS-01 | | | **Date** | 09/13/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 53.1 degrees F and Partly Cloudy. The wind is blowing N/NW at 8.1 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 7.19 | **Total Depth (ft-bmp)** | 12.95 | **Water Column (ft)** | 5.76 | **Gallons in Well** | 0.94 |
| **Purge Start** | 09:42 | **Pump Intake (ft-bmp)** | 10.45 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 10:55 | **Volumes Purged** | 3.19 | **Sample ID** | MWOS-01_GW-091323 | **Sampled by** | Garrett Link |
| **Sample Time** | 10:45 | **Gallons Purged** | 3.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 09:45 | 0 | 0 | 125 | 7.19 | -- | 6.86 | 1.76 | 70 | 0.23 | 16.8 | 122.3 | -- | -- |
| 09:50 | 5 | 5 | 150 | 7.21 | -- | 6.89 | 1.74 | 39 | 0.11 | 16.8 | 115.4 | -- | -- |
| 09:55 | 5 | 10 | 150 | 7.21 | -- | 6.93 | 1.73 | 38.5 | 0.15 | 16.9 | 112 | -- | -- |
| 10:00 | 5 | 15 | 150 | 7.21 | -- | 6.94 | 1.72 | 25.8 | 0.12 | 16.6 | 108.2 | -- | -- |
| 10:05 | 5 | 20 | 150 | 7.22 | -- | 6.94 | 1.7 | 26.2 | 0.1 | 16.7 | 105.9 | -- | -- |
| 10:10 | 5 | 25 | 150 | 7.22 | -- | 6.96 | 1.69 | 21.4 | 0.08 | 16.9 | 103.7 | -- | -- |
| 10:15 | 5 | 30 | 150 | 7.22 | -- | 6.97 | 1.68 | 13.9 | 0.09 | 17 | 102.3 | -- | -- |
| 10:20 | 5 | 35 | 150 | 7.22 | -- | 6.98 | 1.67 | 14.1 | 0.1 | 16.9 | 101 | -- | -- |
| 10:25 | 5 | 40 | 150 | 7.22 | -- | 7 | 1.66 | 13.9 | 0.1 | 16.8 | 100.5 | -- | -- |
| 10:30 | 5 | 45 | 150 | 7.22 | -- | 7.01 | 1.65 | 9.46 | 0.09 | 16.9 | 99.8 | -- | -- |
| 10:35 | 5 | 50 | 150 | 7.22 | -- | 7.02 | 1.65 | 8.51 | 0.09 | 16.8 | 99.5 | -- | -- |
| 10:40 | 5 | 55 | 150 | 7.22 | -- | 7.02 | 1.64 | 8.95 | 0.09 | 16.8 | 98.9 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250 mL Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Off-site; Montcalm st

Well Locked at Arrival: yes

Condition of Well: Good condition

Well Locked at Departure: yes

Well Completion: Flush mount

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWOS-02 | | | **Date** | 09/13/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 55 °F, Partly cloudy, winds at mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 6.89 | **Total Depth (ft-bmp)** | 15.9 | **Water Column (ft)** | 9.01 | **Gallons in Well** | 1.46 |
| **Purge Start** | 10:05 | **Pump Intake (ft-bmp)** | 13.5 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 12:05 | **Volumes Purged** | 1.37 | **Sample ID** | MWOS-02_GW-091323 | **Sampled by** | Lottie Jay |
| **Sample Time** | 11:35 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 10:10 | 0 | 0 | 120 | 6.89 | -- | 6.93 | 2.84 | 369 | 0.19 | 16.9 | 145.2 | -- | -- |
| 10:15 | 5 | 5 | 120 | 6.89 | -- | 7.08 | 2.86 | 199 | 0.11 | 16.8 | 72.7 | -- | -- |
| 10:20 | 5 | 10 | 120 | 6.89 | -- | 7.11 | 2.86 | 223 | 0.1 | 16.8 | 51.4 | -- | -- |
| 10:25 | 5 | 15 | 120 | 6.89 | -- | 7.14 | 2.86 | 118 | 0.14 | 16.9 | 26 | -- | -- |
| 10:30 | 5 | 20 | 120 | 6.89 | -- | 7.15 | 2.86 | 41.4 | 0.13 | 16.9 | 19.5 | -- | -- |
| 10:35 | 5 | 25 | 120 | 6.89 | -- | 7.16 | 2.84 | 39.4 | 0.16 | 16.5 | 13.6 | -- | -- |
| 10:40 | 5 | 30 | 120 | 6.89 | -- | 7.16 | 2.81 | 53.2 | 0.08 | 16.9 | 3.5 | -- | -- |
| 10:45 | 5 | 35 | 120 | 6.89 | -- | 7.17 | 2.78 | 50.6 | 0.12 | 16.9 | -11.2 | -- | -- |
| 10:50 | 5 | 40 | 120 | 6.89 | -- | 7.17 | 2.78 | 105 | 0.2 | 16.9 | -16 | -- | -- |
| 10:55 | 5 | 45 | 120 | 6.89 | -- | 7.17 | 2.76 | 29.3 | 0.16 | 17.1 | -28.3 | -- | -- |
| 11:00 | 5 | 50 | 100 | 6.89 | -- | 7.17 | 2.76 | 25.7 | 0.1 | 17.1 | -34.4 | -- | -- |
| 11:05 | 5 | 55 | 100 | 6.89 | -- | 7.17 | 2.75 | 31 | 0.07 | 17 | -43 | -- | -- |
| 11:10 | 5 | 60 | 100 | 6.89 | -- | 7.17 | 2.74 | 28.6 | 0.08 | 17 | -45.7 | -- | -- |
| 11:15 | 5 | 65 | 100 | 6.89 | -- | 7.17 | 2.74 | 64.9 | 0.06 | 17 | -47.6 | -- | -- |
| 11:20 | 5 | 70 | 100 | 6.89 | -- | 7.17 | 2.73 | 24.5 | 0.06 | 17 | -51.2 | -- | -- |
| 11:25 | 5 | 75 | 100 | 6.89 | -- | 7.17 | 2.72 | 20.7 | 0.17 | 17 | -52.3 | -- | -- |
| 11:30 | 5 | 80 | 100 | 6.89 | -- | 7.18 | 2.76 | 12.4 | 0.17 | 17 | -54.5 | -- | -- |
| 11:35 | 5 | 85 | 100 | 6.89 | -- | 7.18 | 2.72 | 9.43 | 0.17 | 17.1 | -56.1 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location:
Condition of Well:
Well Completion: NA
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWOS-03 | | | **Date** | 09/13/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 53.1 degrees F and Partly Cloudy. The wind is blowing N/NW at 8.1 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 7.13 | **Total Depth (ft-bmp)** | 18.72 | **Water Column (ft)** | 11.59 | **Gallons in Well** | 1.88 |
| **Purge Start** | 10:04 | **Pump Intake (ft-bmp)** | 16.2 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 10:54 | **Volumes Purged** | 1.06 | **Sample ID** | MWOS-10_GW-091323 | **Sampled by** | Sommer Guy |
| **Sample Time** | 10:43 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 10:05 | 0 | 0 | 130 | 7.4 | -- | 6.65 | 1.79 | 6.19 | 8.63 | 13.9 | 34.6 | -- | -- |
| 10:10 | 5 | 5 | 130 | 7.66 | -- | 6.57 | 1.75 | 8.21 | 8.2 | 14.2 | -13 | -- | -- |
| 10:15 | 5 | 10 | 130 | 7.77 | -- | 6.59 | 1.74 | 6.53 | 7.44 | 14 | -26.6 | -- | -- |
| 10:20 | 5 | 15 | 130 | 7.8 | -- | 6.59 | 1.75 | 5.21 | 7.56 | 13.9 | -31.1 | -- | -- |
| 10:25 | 5 | 20 | 130 | 7.81 | -- | 6.6 | 1.75 | 5.36 | 7.34 | 13.8 | -34 | -- | -- |
| 10:30 | 5 | 25 | 130 | 7.81 | -- | 6.61 | 1.75 | 5.58 | 7.21 | 13.8 | -36.8 | -- | -- |
| 10:35 | 5 | 30 | 130 | 7.81 | -- | 6.62 | 1.75 | 5.54 | 7.06 | 13.8 | -38.6 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:** Equipment blank 01 taken here

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot

1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Sidewalk. South ROW Montcalm

Condition of Well: Good condition

Well Completion: Flush mount

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWOS-04 | | | **Date** | 09/13/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 57.9 degrees F and Cloudy. The wind is blowing NW at 5.8 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 3.67 | **Total Depth (ft-bmp)** | 12.85 | **Water Column (ft)** | 9.18 | **Gallons in Well** | 1.49 |
| **Purge Start** | 11:56 | **Pump Intake (ft-bmp)** | 10 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 13:50 | **Volumes Purged** | 1.34 | **Sample ID** | MWOS-04_GW-091323 | **Sampled by** | Sommer Guy |
| **Sample Time** | 13:10 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 11:58 | 0 | 0 | 130 | 3.86 | -- | 6.9 | 2.66 | 23.1 | 6.67 | 16.9 | -90.4 | -- | -- |
| 12:03 | 5 | 5 | 130 | 4.03 | -- | 6.78 | 2.6 | 24.3 | 5.8 | 17.1 | -87.7 | -- | -- |
| 12:08 | 5 | 10 | 130 | 4.25 | -- | 6.78 | 2.53 | 25.6 | 5.35 | 17.4 | -86.4 | -- | -- |
| 12:13 | 5 | 15 | 130 | 4.42 | -- | 6.8 | 2.5 | 20.1 | 5.27 | 17.7 | -86.7 | -- | -- |
| 12:18 | 5 | 20 | 130 | 4.57 | -- | 6.8 | 2.47 | 15 | 5.14 | 17.9 | -87 | -- | -- |
| 12:23 | 5 | 25 | 130 | 4.73 | -- | 6.8 | 2.47 | 17.6 | 4.9 | 17.9 | -87.1 | -- | -- |
| 12:28 | 5 | 30 | 130 | 4.9 | -- | 6.79 | 2.48 | 15.6 | 4.73 | 17.8 | -87 | -- | -- |
| 12:33 | 5 | 35 | 130 | 5.01 | -- | 6.79 | 2.49 | 9.26 | 4.73 | 17.9 | -87.3 | -- | -- |
| 12:38 | 5 | 40 | 130 | 5.1 | -- | 6.79 | 2.49 | 11.1 | 4.58 | 17.9 | -87.9 | -- | -- |
| 12:43 | 5 | 45 | 130 | 5.2 | -- | 6.79 | 2.49 | 9.57 | 4.34 | 17.9 | -88.1 | -- | -- |
| 12:48 | 5 | 50 | 130 | 5.22 | -- | 6.79 | 2.51 | 4.69 | 4.27 | 18 | -88.5 | -- | -- |
| 12:53 | 5 | 55 | 130 | 5.22 | -- | 6.8 | 2.51 | 6.6 | 4.19 | 17.8 | -88.9 | -- | -- |
| 12:58 | 5 | 60 | 130 | 5.34 | -- | 6.78 | 2.51 | 5.52 | 4.15 | 17.8 | -88.7 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: In sidewalk. Southern ROW of Montcalm

Condition of Well: Good condition

Well Completion: Flush mount

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWOS-09R | | | **Date** | 09/12/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 66.0 degrees F and Mostly Cloudy. The wind is blowing W/NW at 9.2 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 27.06 | **Total Depth (ft-bmp)** | 32.21 | **Water Column (ft)** | 5.15 | **Gallons in Well** | 0.84 |
| **Purge Start** | 15:17 | **Pump Intake (ft-bmp)** | 30 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 16:38 | **Volumes Purged** | 2.98 | **Sample ID** | MWOS-09R_GW-091223 | **Sampled by** | Garrett Link |
| **Sample Time** | 16:35 | **Gallons Purged** | 2.50 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 15:30 | 0 | 0 | 125 | 27.08 | -- | 7.18 | 0.85 | 47.5 | 1.94 | 15.9 | 66.1 | -- | -- |
| 15:35 | 5 | 5 | 125 | 27.08 | -- | 7.21 | 0.83 | 38.4 | 0.22 | 15.9 | 63.5 | -- | -- |
| 15:40 | 2 | 10 | 155 | 27.08 | -- | 7.18 | 0.85 | 32.6 | 0.31 | 15.8 | 64.7 | -- | -- |
| 15:45 | 5 | 15 | 125 | 27.08 | -- | 7.19 | 0.87 | 27.1 | 0.6 | 15.6 | 65 | -- | -- |
| 15:50 | 5 | 20 | 125 | 27.08 | -- | 7.19 | 0.87 | 19.9 | 0.62 | 15.6 | 64.6 | -- | -- |
| 15:55 | 5 | 25 | 125 | 27.08 | -- | 7.19 | 0.87 | 14 | 0.4 | 15.5 | 64.7 | -- | -- |
| 16:00 | 5 | 30 | 125 | 27.08 | -- | 7.2 | 0.87 | 9.69 | 0.35 | 15.7 | 64.3 | -- | -- |
| 16:05 | 5 | 35 | 125 | 27.08 | -- | 7.2 | 0.87 | 9.43 | 0.3 | 15.5 | 64.1 | -- | -- |
| 16:10 | 5 | 40 | 125 | 27.08 | -- | 7.2 | 0.87 | 7.99 | 0.31 | 15.4 | 64.2 | -- | -- |
| 16:15 | 5 | 45 | 125 | 27.08 | -- | 7.2 | 0.87 | 7.94 | 0.3 | 15.4 | 64 | -- | -- |
| 16:20 | 5 | 50 | 125 | 27.08 | -- | 7.19 | 0.87 | 6.3 | 0.33 | 15.4 | 64.1 | -- | -- |
| 16:25 | 5 | 55 | 125 | 27.08 | -- | 7.21 | 0.87 | 5.04 | 0.33 | 15.4 | 64 | -- | -- |
| 16:30 | 5 | 60 | 125 | 27.08 | -- | 7.2 | 0.87 | 4.92 | 0.35 | 15.3 | 63.8 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:** Well vault flooded with water apron arrival.

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Offsite near powerhouse
Condition of Well: Good condition
Well Completion: Flush mount
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWOS-10 | | | **Date** | 09/12/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 67 °F, Light Rain, winds at mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 28.32 | **Total Depth (ft-bmp)** | 32.72 | **Water Column (ft)** | 4.4 | **Gallons in Well** | 0.71 |
| **Purge Start** | 15:55 | **Pump Intake (ft-bmp)** | 30 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 17:05 | **Volumes Purged** | 4.23 | **Sample ID** | MWOS-10_GW-091233 | **Sampled by** | Lottie Jay |
| **Sample Time** | 17:00 | **Gallons Purged** | 3.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 16:00 | 0 | 0 | 130 | 28.32 | -- | 7.22 | 0.97 | 84 | 1.5 | 16.2 | 89.7 | -- | -- |
| 16:05 | 5 | 5 | 130 | 28.33 | -- | 7.22 | 0.95 | 51.9 | 1.02 | 15.9 | 85.8 | -- | -- |
| 16:10 | 5 | 10 | 130 | 28.33 | -- | 7.28 | 0.95 | 31.6 | 0.95 | 15.8 | 78.3 | -- | -- |
| 16:15 | 5 | 15 | 130 | 28.33 | -- | 7.31 | 0.96 | 28 | 1.07 | 15.8 | 73.8 | -- | -- |
| 16:20 | 5 | 20 | 130 | 28.33 | -- | 7.31 | 0.96 | 24.7 | 1.52 | 15.7 | 70.2 | -- | -- |
| 16:25 | 5 | 25 | 130 | 28.33 | -- | 7.31 | 0.97 | 18.7 | 1.47 | 15.8 | 63.8 | -- | -- |
| 16:30 | 5 | 30 | 130 | 28.33 | -- | 7.32 | 0.97 | 18.2 | 1.3 | 16.4 | 61 | -- | -- |
| 16:35 | 5 | 35 | 130 | 28.33 | -- | 7.31 | 0.96 | 14.9 | 1.14 | 16.2 | 60.3 | -- | -- |
| 16:40 | 5 | 40 | 130 | 28.33 | -- | 7.31 | 0.962 | 12.8 | 1.23 | 16.1 | 56.6 | -- | -- |
| 16:45 | 5 | 45 | 130 | 28.33 | -- | 7.3 | 0.96 | 8.59 | 1.24 | 15.8 | 55.2 | -- | -- |
| 16:50 | 5 | 50 | 130 | 28.33 | -- | 7.31 | 0.95 | 7.28 | 1.21 | 15.9 | 53.1 | -- | -- |
| 16:55 | 5 | 55 | 130 | 28.33 | -- | 7.31 | 0.95 | 5.05 | 1.25 | 15.6 | 50.2 | -- | -- |
| 17:00 | 5 | 60 | 130 | 28.33 | -- | 7.31 | 0.95 | 6.39 | 1.12 | 15.6 | 48.8 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location:

Condition of Well:

Well Completion: NA

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWW10-03 | | | **Date** | 09/15/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 65 °F, Sunny, winds at mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 7.21 | **Total Depth (ft-bmp)** | 13.09 | **Water Column (ft)** | 5.88 | **Gallons in Well** | 0.96 |
| **Purge Start** | 12:15 | **Pump Intake (ft-bmp)** | 11.5 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 13:38 | **Volumes Purged** | 2.08 | **Sample ID** | MWW10-03_GW-091523 | **Sampled by** | Lottie Jay |
| **Sample Time** | 12:50 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 12:20 | 0 | 0 | 120 | 7.21 | -- | 6.87 | 0.93 | 157 | 0.33 | 21.5 | 122.3 | -- | -- |
| 12:25 | 12 | 12 | 120 | 7.14 | -- | 6.92 | 0.92 | 6.7 | 0.29 | 21.4 | 109.8 | -- | -- |
| 12:30 | 5 | 10 | 120 | 7.16 | -- | 6.95 | 0.91 | 2.23 | 0.33 | 21.3 | 105.4 | -- | -- |
| 12:35 | 5 | 15 | 120 | 7.17 | -- | 6.96 | 0.92 | 0.98 | 0.3 | 21.4 | 99.9 | -- | -- |
| 12:40 | 5 | 20 | 120 | 7.19 | -- | 6.96 | 0.92 | 0.83 | 0.13 | 21.7 | 95 | -- | -- |
| 12:45 | 5 | 25 | 120 | 7.19 | -- | 6.96 | 0.92 | 0.58 | 0.12 | 21.6 | 91.8 | -- | -- |
| 12:50 | 5 | 30 | 120 | 7.19 | -- | 6.96 | 0.92 | 0.02 | 0.12 | 21.6 | 90.4 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:** Wasps

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location:

Condition of Well:

Well Completion: NA

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWW10-04 | | | **Date** | 09/15/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 60 °F, Sunny, winds at mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 8.27 | **Total Depth (ft-bmp)** | 14 | **Water Column (ft)** | 5.73 | **Gallons in Well** | 0.93 |
| **Purge Start** | 10:25 | **Pump Intake (ft-bmp)** | 11.5 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 11:47 | **Volumes Purged** | 2.69 | **Sample ID** | MWW10-04_GW-091523 | **Sampled by** | Lottie Jay |
| **Sample Time** | 11:30 | **Gallons Purged** | 2.50 | **Replicate/ Code No.** | DUP-01_GW-091223 | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 10:30 | 0 | 0 | 110 | 8.33 | -- | 6.74 | 0.66 | 82.1 | 0.35 | 20.3 | 137.5 | -- | -- |
| 10:35 | 5 | 5 | 120 | 8.33 | -- | 7.07 | 0.63 | 70 | 0.13 | 20.7 | 125.1 | -- | -- |
| 10:40 | 5 | 10 | 120 | 8.35 | -- | 7.12 | 0.62 | 46.7 | 0.14 | 20.7 | 116 | -- | -- |
| 10:45 | 5 | 15 | 120 | 8.35 | -- | 7.13 | 0.63 | 21.1 | 0.1 | 20.8 | 113.8 | -- | -- |
| 10:50 | 5 | 20 | 120 | 8.37 | -- | 7.13 | 0.63 | 12 | 0.08 | 20.7 | 112.8 | -- | -- |
| 10:55 | 5 | 25 | 120 | 8.37 | -- | 7.13 | 0.64 | 7.66 | 0.09 | 20.6 | 112 | -- | -- |
| 11:00 | 5 | 30 | 120 | 8.37 | -- | 7.13 | 0.64 | 7.43 | 0.09 | 20.7 | 111 | -- | -- |
| 11:05 | 5 | 35 | 120 | 8.37 | -- | 7.13 | 0.64 | 6.48 | 0.09 | 20.8 | 110.3 | -- | -- |
| 11:10 | 5 | 40 | 120 | 8.38 | -- | 7.13 | 0.64 | 6.38 | 0.06 | 20.6 | 110 | -- | -- |
| 11:15 | 5 | 45 | 120 | 8.38 | -- | 7.13 | 0.64 | 5.2 | 0.09 | 20.4 | 109.2 | -- | -- |
| 11:20 | 5 | 50 | 120 | 8.38 | -- | 7.13 | 0.65 | 4.11 | 0.07 | 20.4 | 107.9 | -- | -- |
| 11:25 | 5 | 55 | 120 | 8.38 | -- | 7.13 | 0.66 | 3.81 | 0.07 | 20.1 | 107.8 | -- | -- |
| 11:30 | 5 | 60 | 120 | 8.38 | -- | 7.13 | 0.65 | 1.91 | 0.06 | 20.1 | 107.5 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 4 | None |

**Comments:** Wasps

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location:

Condition of Well:

Well Completion: NA

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWW1-02 | | | **Date** | 09/19/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 64.9 degrees F and Mostly Cloudy. The wind is blowing W at 9.2 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 5.17 | **Total Depth (ft-bmp)** | 15.07 | **Water Column (ft)** | 9.9 | **Gallons in Well** | 1.61 |
| **Purge Start** | 12:36 | **Pump Intake (ft-bmp)** | 12.6 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 13:26 | **Volumes Purged** | 1.24 | **Sample ID** | MWW1-02_GW-091923 | **Sampled by** | Sommer Guy |
| **Sample Time** | 13:22 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 12:37 | 0 | 0 | 130 | 5.25 | -- | 6.79 | 2.54 | 7.56 | 5.22 | 16.4 | -94.9 | -- | -- |
| 12:42 | 5 | 5 | 130 | 5.25 | -- | 6.68 | 2.54 | 11.4 | 0.44 | 16.3 | -96.3 | -- | -- |
| 12:47 | 5 | 10 | 130 | 5.25 | -- | 6.68 | 2.53 | 11.4 | 0.31 | 16.5 | -98.4 | -- | -- |
| 12:52 | 5 | 15 | 130 | 5.25 | -- | 6.69 | 2.53 | 25.5 | 0.26 | 16.3 | -99.9 | -- | -- |
| 12:57 | 5 | 20 | 130 | 5.25 | -- | 6.71 | 2.52 | 6.53 | 0.36 | 17.1 | -101.6 | -- | -- |
| 13:02 | 5 | 25 | 130 | 5.25 | -- | 6.72 | 2.52 | 14.1 | 0.36 | 16.9 | -102.7 | -- | -- |
| 13:07 | 5 | 30 | 130 | 5.25 | -- | 6.72 | 2.51 | 6.53 | 0.4 | 17.3 | -102.9 | -- | -- |
| 13:12 | 5 | 35 | 130 | 5.25 | -- | 6.73 | 2.51 | 6.41 | 0.39 | 17.4 | -103.5 | -- | -- |
| 13:17 | 5 | 40 | 130 | 5.25 | -- | 6.74 | 2.51 | 6.74 | 0.4 | 17.6 | -103.8 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:** Equipment blank 06 taken here

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

| | | | |
|---|---|---|---|
| Well Location: | USPS | Well Locked at Arrival: | yes |
| Condition of Well: | Good condition | Well Locked at Departure: | yes |
| Well Completion: | Stick-up | Key Number To Well: | NA |

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWW1-04 | | | **Date** | 09/15/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 69 °F, Sunny, winds at mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 5.75 | **Total Depth (ft-bmp)** | 16.4 | **Water Column (ft)** | 10.65 | **Gallons in Well** | 1.73 |
| **Purge Start** | 14:35 | **Pump Intake (ft-bmp)** | 14 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 16:12 | **Volumes Purged** | 1.73 | **Sample ID** | MWW1-04_GW-091523 | **Sampled by** | Lottie Jay |
| **Sample Time** | 15:40 | **Gallons Purged** | 3.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 14:40 | 0 | 0 | 120 | 5.76 | -- | 10.81 | 0.55 | 80.4 | 0.76 | 22 | -131.8 | -- | -- |
| 14:45 | 5 | 5 | 100 | 5.76 | -- | 10.61 | 0.002 | 47.1 | 0.49 | 22.1 | -131.1 | -- | -- |
| 14:50 | 5 | 10 | 100 | 5.76 | -- | 10.85 | 0.54 | 34.4 | 0.27 | 21.8 | -141.5 | -- | -- |
| 14:56 | 6 | 16 | 100 | 5.76 | -- | 10.87 | 0.54 | 26.9 | 0.19 | 21.6 | -144 | -- | -- |
| 15:00 | 4 | 20 | 100 | 5.77 | -- | 10.83 | 0.531 | 24.7 | 0.04 | 21.2 | -157.6 | -- | -- |
| 15:05 | 5 | 25 | 100 | 5.77 | -- | 10.77 | 0.509 | 19.2 | 0.04 | 21.2 | -156.9 | -- | -- |
| 15:10 | 5 | 30 | 100 | 5.77 | -- | 10.71 | 0.503 | 13.5 | 0.05 | 21.4 | -149.4 | -- | -- |
| 15:15 | 5 | 35 | 100 | 5.76 | -- | 10.66 | 0.493 | 8.6 | 0.05 | 21.3 | -142.7 | -- | -- |
| 15:20 | 5 | 40 | 100 | 5.76 | -- | 10.57 | 0.478 | 9.07 | 0.07 | 21.3 | -130.9 | -- | -- |
| 15:25 | 5 | 45 | 100 | 5.76 | -- | 10.52 | 0.47 | 9.32 | 0.07 | 20.8 | -121.1 | -- | -- |
| 15:30 | 5 | 50 | 100 | 5.76 | -- | 10.49 | 0.465 | 7.86 | 0.08 | 21 | -117.2 | -- | -- |
| 15:35 | 5 | 55 | 100 | 5.76 | -- | 10.43 | 0.463 | 7 | 0.07 | 20.9 | -111 | -- | -- |
| 15:40 | 5 | 60 | 100 | 5.76 | -- | 10.38 | 0.46 | 6.99 | 0.06 | 20.7 | -109.6 | Clear | Mild |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location:

Condition of Well:

Well Completion: NA

Well Locked at Arrival: yes

Well Locked at Departure: yes

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWW1-06 | | | **Date** | 09/13/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 65 °F, Partly cloudy, winds at mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 5.54 | **Total Depth (ft-bmp)** | 14 | **Water Column (ft)** | 8.46 | **Gallons in Well** | 1.37 |
| **Purge Start** | 12:40 | **Pump Intake (ft-bmp)** | 11.5 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 13:57 | **Volumes Purged** | 2.19 | **Sample ID** | MWW1-06_GW-091323 | **Sampled by** | Lottie Jay |
| **Sample Time** | 13:50 | **Gallons Purged** | 3.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 12:45 | 0 | 0 | 130 | 5.54 | -- | 7.06 | 0.565 | 324 | 0.16 | 14.9 | -51.2 | -- | -- |
| 12:50 | 5 | 5 | 130 | 5.54 | -- | 7.09 | 0.564 | 72.9 | 0.09 | 14.9 | -59.5 | -- | -- |
| 12:55 | 5 | 10 | 130 | 5.54 | -- | 7.14 | 0.571 | 19.1 | 0.07 | 14.8 | -67.9 | -- | -- |
| 13:00 | 5 | 15 | 130 | 5.54 | -- | 7.15 | 0.578 | 42.5 | 0.06 | 14.7 | -76.2 | -- | -- |
| 13:05 | 5 | 20 | 110 | 5.54 | -- | 7.13 | 0.589 | 81.1 | 0.09 | 15.4 | -82.4 | -- | -- |
| 13:10 | 5 | 25 | 110 | 5.54 | -- | 7.13 | 0.589 | 125 | 0.04 | 15.3 | -86.1 | -- | -- |
| 13:15 | 5 | 30 | 110 | 5.54 | -- | 7.12 | 0.591 | 52.5 | 0.03 | 14.9 | -91.7 | -- | -- |
| 13:20 | 5 | 35 | 110 | 5.54 | -- | 7.12 | 0.591 | 32.5 | 0.01 | 14.8 | -97.2 | -- | -- |
| 13:25 | 5 | 40 | 110 | 5.54 | -- | 7.12 | 0.593 | 20.9 | 0.02 | 14.7 | -100.8 | -- | -- |
| 13:30 | 5 | 45 | 110 | 5.54 | -- | 7.12 | 0.593 | 19.3 | 0.02 | 14.7 | -102 | -- | -- |
| 13:35 | 5 | 50 | 110 | 5.54 | -- | 7.12 | 0.596 | 14.6 | 0.05 | 14.7 | -105.5 | -- | -- |
| 13:40 | 5 | 55 | 110 | 5.54 | -- | 7.12 | 0.596 | 13.3 | 0.04 | 14.7 | -107.8 | -- | -- |
| 13:45 | 5 | 60 | 110 | 5.54 | -- | 7.11 | 0.602 | 12.3 | 0.03 | 14.6 | -110.1 | -- | -- |
| 13:50 | 5 | 65 | 110 | 5.54 | -- | 7.11 | 0.605 | 9.89 | 0.03 | 14.6 | -111.2 | Clear | Medium |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location:
Condition of Well:
Well Completion: NA
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | MWW10-SEN01 | | | **Date** | 09/18/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 55.9 degrees F and Cloudy. The wind is blowing W/NW at 8.1 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 16.64 | **Total Depth (ft-bmp)** | 22.48 | **Water Column (ft)** | 5.84 | **Gallons in Well** | 0.95 |
| **Purge Start** | 12:20 | **Pump Intake (ft-bmp)** | 17.8 | **Purge Method** | Low-Flow | **Purge Equipment** | Submersible |
| **Purge End** | 13:47 | **Volumes Purged** | | **Sample ID** | NA | **Sampled by** | Samantha Szpaichler |
| **Sample Time** | | **Gallons Purged** | | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 12:23 | 0 | 0 | 120 | 16.98 | -- | 7.14 | 0.96 | 83.5 | 2.99 | 15.6 | 6.1 | -- | -- |
| 12:28 | 5 | 5 | 120 | 17.85 | -- | 7.15 | 0.95 | 78 | 1.95 | 15.7 | -7.6 | -- | -- |
| 12:33 | 5 | 10 | 120 | 17.96 | -- | 7.2 | 0.94 | 78 | 1.97 | 15.8 | -18.6 | -- | -- |
| 12:38 | 5 | 15 | 120 | 18.04 | -- | 7.14 | 0.96 | 30.5 | 1.51 | 15.5 | -35.2 | -- | -- |
| 12:43 | 5 | 20 | 120 | 18.06 | -- | 7.14 | 0.96 | 28.5 | 1.41 | 16.1 | -38.2 | -- | -- |
| 12:48 | 5 | 25 | 120 | 18.06 | -- | 7.12 | 0.97 | 42.7 | 1.54 | 16 | -43.5 | -- | -- |
| 12:53 | 5 | 30 | 120 | 18.42 | -- | 7.13 | 1.01 | 42.7 | 0.4 | 16.1 | -82.3 | -- | -- |
| 12:58 | 5 | 35 | 120 | 18.42 | -- | 7.11 | 1.02 | 45.2 | 0.65 | 16.3 | -83.2 | -- | -- |
| 13:03 | 5 | 40 | 120 | 18.42 | -- | 7.13 | 1.02 | 35.9 | 0.96 | 16.8 | -89.6 | -- | -- |
| 13:08 | 5 | 45 | 120 | 18.56 | -- | 7.15 | 1.04 | 11.2 | 0.99 | 16.9 | -90.4 | -- | -- |
| 13:13 | 5 | 50 | 120 | 18.68 | -- | 7.1 | 1.23 | 10.9 | 0.4 | 16.9 | -108.8 | -- | -- |
| 13:18 | 5 | 55 | 120 | 18.68 | -- | 7.12 | 1.2 | 0.64 | 0.28 | 16.4 | -113.1 | -- | -- |
| 13:23 | 5 | 60 | 120 | 19.02 | -- | 7.11 | 1.11 | 0.02 | 0.3 | 16.3 | -103.5 | -- | -- |
| 13:28 | 5 | 65 | 120 | 19.13 | -- | 7.12 | 1.12 | 0.02 | 0.32 | 15.9 | -101.1 | -- | -- |
| 13:33 | 5 | 70 | 120 | 19.13 | -- | 7.11 | 1.14 | 0.02 | 0.3 | 15.9 | -102.7 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250 mL Plastic | 2 | None |

**Comments:** Lowered tubing at 12:46 5". At 1:08 lowered 6". Lowered 5" at 1:32

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: USPS
Condition of Well: Good condition
Well Completion: Stick-up
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | PZF17-05 | | | **Date** | 09/15/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 64.0 degrees F and Mostly Clear. The wind is blowing S/SE at 5.8 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 26.03 | **Total Depth (ft-bmp)** | 34.1 | **Water Column (ft)** | 8.07 | **Gallons in Well** | 1.31 |
| **Purge Start** | 12:26 | **Pump Intake (ft-bmp)** | 32.1 | **Purge Method** | Low-Flow | **Purge Equipment** | Submersible |
| **Purge End** | 13:15 | **Volumes Purged** | 1.53 | **Sample ID** | PZF17-05_GW-091523 | **Sampled by** | Samantha Szpaichler |
| **Sample Time** | 13:05 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 12:28 | 0 | 0 | 130 | 26.04 | -- | 7.2 | 0.65 | 1.33 | 3.81 | 17 | 220.7 | -- | -- |
| 12:33 | 5 | 5 | 130 | 26.04 | -- | 7.24 | 0.63 | 1.14 | 3.3 | 17.3 | 219 | -- | -- |
| 12:38 | 5 | 10 | 130 | 26.04 | -- | 7.3 | 0.65 | 0.62 | 3.59 | 16.7 | 221.6 | -- | -- |
| 12:43 | 5 | 15 | 130 | 26.04 | -- | 7.19 | 0.65 | 0.69 | 3.77 | 16.5 | 222.8 | -- | -- |
| 12:48 | 5 | 20 | 130 | 26.04 | -- | 7.19 | 0.66 | 0.07 | 3.38 | 17 | 224.4 | -- | -- |
| 12:53 | 5 | 25 | 130 | 26.04 | -- | 7.21 | 0.66 | 0.1 | 3.2 | 17 | 225.5 | -- | -- |
| 12:58 | 5 | 30 | 130 | 26.04 | -- | 7.23 | 0.66 | 0.02 | 3.19 | 17 | 225.8 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:** Equipment blank 05 collected here

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Former Fiero Parking lot
Well Locked at Arrival: yes
Condition of Well: Good condition
Well Locked at Departure: yes
Well Completion: Flush mount
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | SUMP | | | **Date** | 09/21/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 63.0 degrees F and Fog/Mist. The wind is blowing SE at 3 mph | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | | **Well Casing Material** | NA |
| **Static Water Level (ft-bmp)** | 1.18 | **Total Depth (ft-bmp)** | 7 | **Water Column (ft)** | 5.82 | **Gallons in Well** | |
| **Purge Start** | 10:04 | **Pump Intake (ft-bmp)** | | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | | **Volumes Purged** | | **Sample ID** | SUMP_GW-092123 | **Sampled by** | Sommer Guy |
| **Sample Time** | 10:10 | **Gallons Purged** | 0.10 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 10:06 | 0 | 0 | 130 | 1.18 | -- | 7.69 | 3.07 | 21.5 | 1.44 | 15.2 | -80.9 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot

1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location:

Condition of Well:

Well Completion: NA

Well Locked at Arrival:

Well Locked at Departure:

Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | TW-01-03 | | | **Date** | 09/18/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 55.9 degrees F and Mostly Cloudy. The wind is blowing W/NW at 8.1 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 14.24 | **Total Depth (ft-bmp)** | 23.06 | **Water Column (ft)** | 8.82 | **Gallons in Well** | 1.43 |
| **Purge Start** | 10:48 | **Pump Intake (ft-bmp)** | 20.5 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 11:27 | **Volumes Purged** | 1.40 | **Sample ID** | TW-01-03_GW-091823 | **Sampled by** | Sommer Guy |
| **Sample Time** | 11:25 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 10:49 | 0 | 0 | 130 | 14.35 | -- | 7.22 | 10.52 | 9.03 | 0.57 | 15.1 | -91.2 | -- | -- |
| 10:54 | 5 | 5 | 130 | 14.35 | -- | 6.96 | 10.56 | 5.47 | 0.29 | 15.2 | -103.5 | -- | -- |
| 10:59 | 5 | 10 | 130 | 14.35 | -- | 6.93 | 10.57 | 7.7 | 0.22 | 15 | -107.2 | -- | -- |
| 11:04 | 5 | 15 | 130 | 14.35 | -- | 6.93 | 10.52 | 6.15 | 0.18 | 14.9 | -109.8 | -- | -- |
| 11:09 | 5 | 20 | 130 | 14.35 | -- | 6.96 | 10.42 | 6.16 | 0.15 | 15 | -113.9 | -- | -- |
| 11:14 | 5 | 25 | 130 | 14.35 | -- | 6.97 | 10.23 | 6.18 | 0.15 | 15.1 | -116.1 | -- | -- |
| 11:19 | 5 | 30 | 130 | 14.35 | -- | 6.99 | 10.12 | 6.7 | 0.14 | 14.9 | -119.6 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 3 | None |

**Comments:** Equipment blank 02 collected here

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: USPS
Condition of Well: Good condition
Well Completion: Stick-up
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | TW-10-01 | | | **Date** | 09/18/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 61.0 degrees F and Partly Cloudy. The wind is blowing NW at 10.3 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 19.24 | **Total Depth (ft-bmp)** | 32.79 | **Water Column (ft)** | 13.55 | **Gallons in Well** | 2.2 |
| **Purge Start** | 14:21 | **Pump Intake (ft-bmp)** | 30.79 | **Purge Method** | Low-Flow | **Purge Equipment** | Submersible |
| **Purge End** | 15:20 | **Volumes Purged** | 0.91 | **Sample ID** | TW-10-01_GW-091823 | **Sampled by** | Samantha Szpaichler |
| **Sample Time** | 15:20 | **Gallons Purged** | 2.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 14:24 | 0 | 0 | 120 | 19.43 | -- | 6.98 | 1.38 | 2.91 | 5.11 | 17.5 | -84.5 | -- | -- |
| 14:29 | 5 | 5 | 120 | 19.35 | -- | 6.91 | 1.41 | 1.74 | 0.9 | 17.6 | -84.4 | -- | -- |
| 14:34 | 5 | 10 | 120 | 19.32 | -- | 6.94 | 1.42 | 1.36 | 0.52 | 17.9 | -82.6 | -- | -- |
| 14:39 | 5 | 15 | 120 | 19.32 | -- | 6.94 | 1.42 | 0.11 | 0.43 | 18 | -81.1 | -- | -- |
| 14:44 | 5 | 20 | 120 | 19.32 | -- | 6.9 | 1.42 | 0.36 | 0.3 | 17.4 | -80 | -- | -- |
| 14:49 | 5 | 25 | 120 | 19.32 | -- | 6.93 | 1.42 | 0.02 | 0.2 | 17.3 | -78.5 | -- | -- |
| 14:54 | 5 | 30 | 120 | 19.32 | -- | 6.95 | 1.42 | 0.02 | 0.16 | 17 | -78 | -- | -- |
| 14:59 | 5 | 35 | 120 | 19.32 | -- | 6.92 | 1.43 | 0.02 | 0.18 | 16.5 | -77.3 | -- | -- |
| 15:04 | 5 | 40 | 120 | 19.32 | -- | 6.95 | 1.44 | 0.02 | 0.18 | 16.3 | -77 | -- | -- |
| 15:09 | 5 | 45 | 120 | 19.32 | -- | 6.92 | 1.46 | 0.02 | 0.17 | 16.3 | -76.9 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: USPS
Condition of Well: Good condition
Well Completion: Stick-up
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | TW-ROW-01 | | | **Date** | 09/13/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 57.9 degrees F and Cloudy. The wind is blowing NW at 5.8 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 1.72 | **Total Depth (ft-bmp)** | 7.96 | **Water Column (ft)** | 6.24 | **Gallons in Well** | 1.01 |
| **Purge Start** | 12:44 | **Pump Intake (ft-bmp)** | 5.4 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 13:35 | **Volumes Purged** | 0.99 | **Sample ID** | TW-ROW-01_GW-091323 | **Sampled by** | Garrett Link |
| **Sample Time** | 13:30 | **Gallons Purged** | 1.00 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 12:45 | 0 | 0 | 110 | 1.85 | -- | 6.86 | 2.61 | 11.1 | 0.74 | 18.7 | 97.1 | -- | -- |
| 12:50 | 5 | 5 | 110 | 1.85 | -- | 6.88 | 2.68 | 10.8 | 0.7 | 18.9 | 92.9 | -- | -- |
| 12:55 | 5 | 10 | 110 | 1.87 | -- | 6.9 | 2.54 | 4.7 | 0.61 | 18.6 | 88.1 | -- | -- |
| 13:00 | 5 | 15 | 110 | 1.87 | -- | 6.92 | 2.33 | 5.17 | 0.48 | 18.6 | 84.8 | -- | -- |
| 13:05 | 5 | 20 | 110 | 1.87 | -- | 6.91 | 2.26 | 2 | 0.5 | 18.9 | 83.2 | -- | -- |
| 13:10 | 5 | 25 | 110 | 1.88 | -- | 6.91 | 2.24 | 1.46 | 0.39 | 19.1 | 81.7 | -- | -- |
| 13:15 | 5 | 30 | 110 | 1.88 | -- | 6.9 | 2.26 | 2.49 | 0.34 | 18.5 | 80.6 | -- | -- |
| 13:20 | 5 | 35 | 110 | 1.88 | -- | 6.9 | 2.25 | 2.05 | 0.33 | 18.6 | 79.2 | -- | -- |
| 13:25 | 5 | 40 | 110 | 1.88 | -- | 6.9 | 2.27 | 1.99 | 0.34 | 18.8 | 77.3 | Clear | None |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Off-site, Montcalm ROW
Condition of Well: Good condition
Well Completion: Flush mount
Well Locked at Arrival: yes
Well Locked at Departure: yes
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Groundwater Sampling Form

ARCADIS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Number** | 30167840 | **Well ID** | TW-ROW-03 | | | **Date** | 09/13/2023 |
| **Project Name/Location** | RACER Pontiac North Campus 2023 | | **Weather(°F)** | 57.0 degrees F and Cloudy. The wind is blowing NW at 8.1 mph. | | | |
| **Measuring Pt. Description** | Top of Inner Casing | **MP Elevation** | | **Casing Diameter (in)** | 2 | **Well Casing Material** | PVC |
| **Static Water Level (ft-bmp)** | 1.42 | **Total Depth (ft-bmp)** | 7.98 | **Water Column (ft)** | 6.56 | **Gallons in Well** | 1.07 |
| **Purge Start** | 11:36 | **Pump Intake (ft-bmp)** | 5.4 | **Purge Method** | Low-Flow | **Purge Equipment** | Peristaltic |
| **Purge End** | 12:20 | **Volumes Purged** | 1.40 | **Sample ID** | TW-ROW-03_GW-091323 | **Sampled by** | Garrett Link |
| **Sample Time** | 12:15 | **Gallons Purged** | 1.50 | **Replicate/ Code No.** | NA | **Sample Type** | Grab |

| Time | Minutes Elapsed | Total Elapsed Minutes | Rate mL/min | Depth to Water (ft) | Gallons Purged | pH (standard units) | Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature °C | Redox (mV) | Appearance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Color | Odor |
| 11:38 | 0 | 0 | 175 | 2.19 | -- | 6.89 | 2.33 | 12.9 | 0.3 | 19.2 | 113.6 | -- | -- |
| 11:43 | 5 | 5 | 175 | 2.49 | -- | 6.93 | 2.37 | 8.18 | 0.16 | 19.2 | 105.2 | -- | -- |
| 11:48 | 5 | 10 | 110 | 2.29 | -- | 6.95 | 2.31 | 4.93 | 0.12 | 19.3 | 98.7 | -- | -- |
| 11:53 | 5 | 15 | 110 | 2.37 | -- | 6.95 | 2.34 | 4.85 | 0.11 | 19.4 | 96.2 | -- | -- |
| 11:58 | 5 | 20 | 110 | 2.43 | -- | 6.95 | 2.35 | 3.56 | 0.09 | 19.3 | 92.7 | -- | -- |
| 12:03 | 5 | 25 | 110 | 2.43 | -- | 6.96 | 2.41 | 3.1 | 0.1 | 19.1 | 90.3 | -- | -- |
| 12:08 | 5 | 30 | 110 | 2.43 | -- | 6.96 | 2.42 | 2.85 | 0.1 | 19.4 | 87.4 | -- | -- |
| 12:13 | 5 | 35 | 110 | 2.43 | -- | 6.95 | 2.44 | 3.22 | 0.11 | 19.5 | 85.4 | Clear | Mild |

| Constituent Sampled | Container | Number | Preservative |
|---|---|---|---|
| PFAS | 250mL HDPE Plastic | 2 | None |

**Comments:**

**Well Casing Volume Conversion**

Well diameter (inches) = gallons per foot  1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

**Well Information**

Well Location: Off-site, Montcalm st ROW
Well Locked at Arrival: no
Condition of Well: Missing bolts,Missing lock,Needs repairs
Well Locked at Departure: no
Well Completion: Flush mount
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

# Appendix D

## Laboratory Data Validation Summary

Racer

# DATA REVIEW

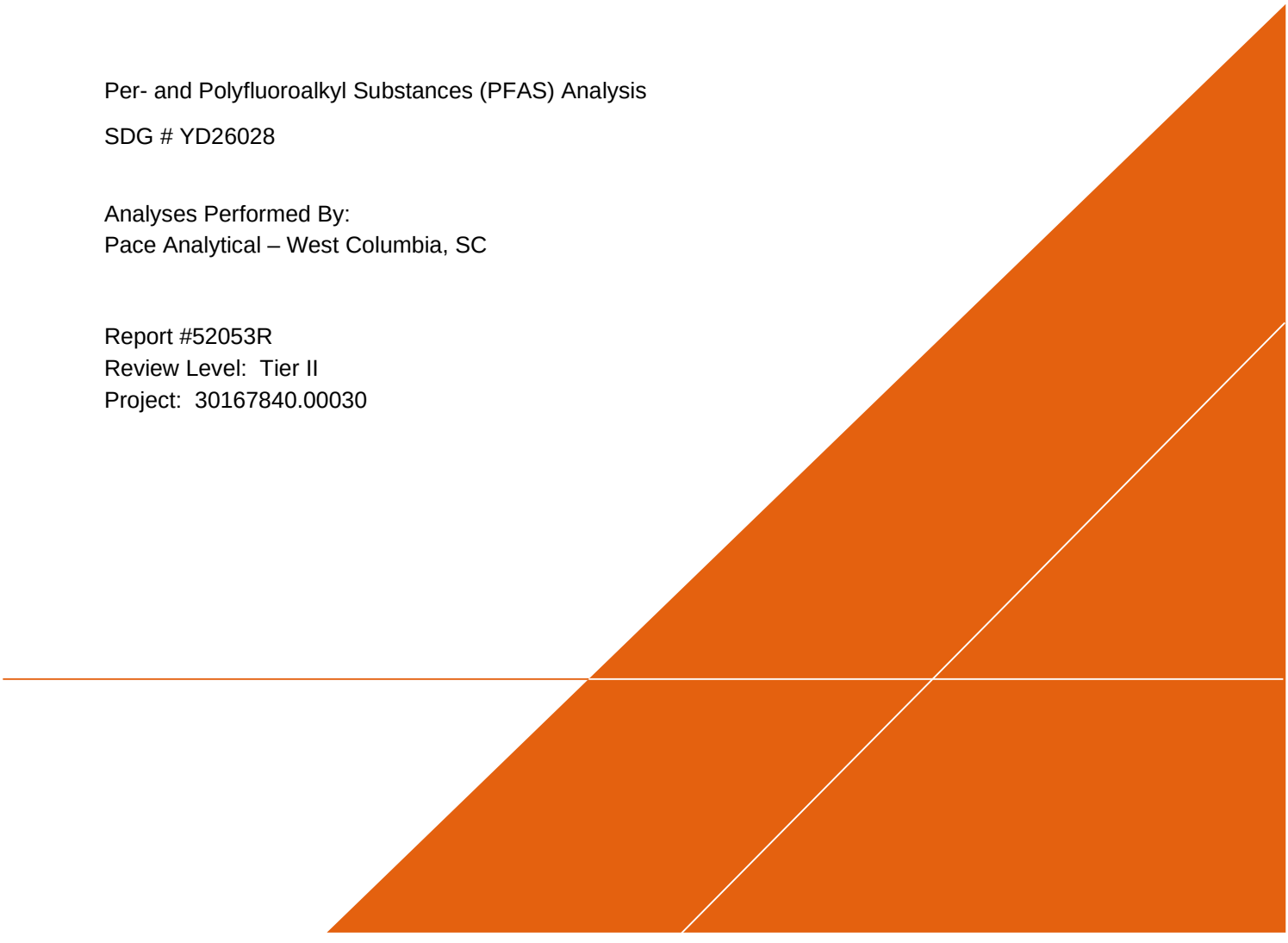
## Pontiac North Campus, MI

Per- and Polyfluoroalkyl Substances (PFAS) Analysis

SDG # YD26028

Analyses Performed By:
Pace Analytical – West Columbia, SC

Report #52053R
Review Level: Tier II
Project: 30167840.00030



# SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #YD26028 for samples collected in association with the Racer PNC, MI Site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

| Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | PFAS | SVOC | PCB | MET | MISC |
| MWM16-37-GW | YD26028-1 | Water | 04/25/23 | | X | | | | |
| MWM30-01-GW | YD26028-2 | Water | 04/25/23 | | X | | | | |
| MWM5-02-GW | YD26028-3 | Water | 04/25/23 | | X | | | | |
| MWF16-23-GW | YD26028-4 | Water | 04/25/23 | | X | | | | |
| MWF12-02R-GW | YD26028-5 | Water | 04/25/23 | | X | | | | |
| MW-02-17-GW | YD26028-6 | Water | 04/25/23 | | X | | | | |
| Trip Blank | YD26028-7 | Water | 04/25/23 | | X | | | | |

## ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

| Items Reviewed | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| 1. Sample receipt condition | | X | | X | |
| 2. Requested analyses and sample results | | X | | X | |
| 3. Master tracking list | | X | | X | |
| 4. Methods of analysis | | X | | X | |
| 5. Reporting limits | | X | | X | |
| 6. Sample collection date | | X | | X | |
| 7. Laboratory sample received date | | X | | X | |
| 8. Sample preservation verification (as applicable) | | X | | X | |
| 9. Sample preparation/extraction/analysis dates | | X | | X | |
| 10. Fully executed Chain-of-Custody (COC) form | | X | | X | |
| 11. Narrative summary of QA or sample problems provided | | X | | X | |
| 12. Data Package Completeness and Compliance | | X | | X | |

Note:
QA - Quality Assurance

## ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) Modified Method 537. Data were reviewed in accordance with the USEPA National Functional Guidelines for Organic Superfund Methods Data Review, EPA 540-R-20-005, November 2020 (with reference to the historical USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999 as appropriate) and USEPA Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537, EPA 910-R-18-001, November 2018; and Department of Defense (DoD) Quality Systems Manual (QSM) 5.3, DoD Final General Data Validation Guidelines, November 2019.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
  - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
  - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
  - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and

provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

## PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ANALYSIS

### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

| Method | Matrix | Holding Time | Preservation |
|---|---|---|---|
| USEPA modified Method 537 | Water | 28 days to extraction; 28 days from extraction to analysis | Cool to <6 °C |

All samples were initially analyzed within the specified holding time criteria.

### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, field, and equipment blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Equipment blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

### 3. Extracted Internal Standard (EIS)/Surrogate Compounds

Labeled standards must be added to all field samples and QC samples prior to extraction. EIS recoveries must be within DoD QSM 5.3 specified limits of 50% to150%.

Sample locations associated with EIS exhibiting recoveries outside of the control limits are presented in the following table.

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWM16-37-GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| MWM30-01-GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| | 13C4-PFBA | Perfluoro-n-butanoic acid (PFBA) | < 50% but > 20% |
| MWM5-02-GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWM5-02-GW | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| MWF12-02R-GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |

The criteria used to evaluate the EIS recoveries are presented in the following table. In the case of an EIS deviation, the sample results associated with the EIS are qualified as documented in the table below.

| Control Limit | Sample Result | Qualification |
|---|---|---|
| < 50% but > 20% | Non-detect | UJ |
| | Detect | J |
| > 150% | Non-detect | No Action |
| | Detect | J |
| < 20% | Non-detect | R |
| | Detect | R |

## 4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within 50-150%. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within 30%.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD performed on samples MWM16-37-GW and MWF12-02R-GW exhibited recoveries and RPDs within the control limits.

## 5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

## 6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for soil matrices.

A field duplicate was not included in the data package.

## 7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

## DATA VALIDATION CHECKLIST FOR PFAs

| PFAs: USEPA modified Method 537 | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| **LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)** | | | | | |
| **Tier II Validation** | | | | | |
| Holding times | | X | | X | |
| Reporting limits (units) | | X | | X | |
| Blanks | | | | | |
| A. Method blanks | | X | | X | |
| B. Equipment blanks | X | | | | X |
| C. Trip blanks | | X | | X | |
| Laboratory Control Sample (LCS) %R | | X | | X | |
| Laboratory Control Sample Duplicate(LCSD) %R | X | | | | X |
| LCS/LCSD Precision (RPD) | X | | | | X |
| Matrix Spike (MS) %R | | X | | X | |
| Matrix Spike Duplicate (MSD) %R | | X | | X | |
| MS/MSD Precision (RPD) | | X | | X | |
| Field Duplicate (RPD) | X | | | | X |
| Extracted Internal Standards (EIS) Recoveries | | X | X | | |
| Dilution Factor | | X | | X | |
| Moisture Content | X | | | | X |

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE: 

DATE: December 5, 2023

PEER REVIEW: Joseph C. Houser

DATE: December 19, 2023

# CHAIN OF CUSTODY

# CORRECTED SAMPLE ANALYSIS DATA SHEETS

Pace Analytical

**PACE ANALYTICAL SERVICES, LLC**
108 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 146507

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Tiffany Linder, Alexis Crisp | Telephone No. / E-mail: Tiffany.Linder@arcadis.com, Alexis.Crisp@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Sommer Guy | Analysis (Attach list if more space is needed): Report EGLE 24 Compounds | Page 1 of 1 |
| City: Novi / State: MI / Zip Code: 48377 | Printed Name: Sommer Guy Lotte Jay | | YD26028 |
| Project Name: RacerPNC | | | KES2 |
| Project No.: 30167840.00030 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab (G) / Composite (C) | Matrix: Aqueous | Soil | Non-Aqueous | No of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | NaS2O3 | Methanol | Filtered (Y/N) | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWM16-37_GW-042523 | 4/25/23 | 1028 | G | 6 | | | 6 | | | | | | | X | Run MS/MSD |
| MWM30-01_GW-042523 | 4/25/23 | 1040 | G | 2 | | | 2 | | | | | | | X | |
| MWM5-02_GW-042523 | 4/25/23 | 1210 | G | 2 | | | 2 | | | | | | | X | |
| MWF16-23_GW-042523 | 4/25/23 | 1307 | G | 2 | | | 2 | | | | | | | X | |
| MWF12-02R_GW-042523 | 4/25/23 | 1425 | G | 6 | | | 6 | | | | | | | X | Run MS/MSD |
| MW-02-17_GW-042523 | 4/25/23 | 1420 | G | 2 | | | 2 | | | | | | | X | |
| trip blank | 4/25/23 | 1730 | G | 1 | | | 1 | | | | | | | X | |

Turn Around Time Required (Prior lab approval required for expedited TAT.): X Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client X Dispose by Lab

Possible Hazard Identification: X Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Guy | 4/25/23 | 1750 | 1. Received by: FedEx | 4/25/23 | 1750 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | 4/26/23 | 1025 | 4. Laboratory received by | 4/26/23 | 1025 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY: Received on ice (Circle) (Yes) No Ice Pack; Receipt Temp. 1.7 °C; Temp Blank ☐ Y ☐ N

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: (illegible)



PACE ANALYTICAL SERVICES, LLC

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-001**

Description: **MWM16-37_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1028** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/12/2023 0448 | OMNS | 05/10/2023 1430 | 74943 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | ~~Q~~ | 6.9 | 1.7 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **1.4** | **JM-03** | **3.5** | **0.86** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **0.93** | **JM-03** | **3.5** | **0.86** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **5.8** | **M-03** | **3.5** | **0.86** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **6.4** | **M-03** | **3.5** | **0.86** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **1.5** | **J** | **3.5** | **0.86** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **1.9** | **JM-03** | **3.5** | **0.86** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **2.5** | **JM-03** | **3.5** | **0.86** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **2.0** | **J** | **3.5** | **0.86** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **4.4** | **M-03** | **3.5** | **0.86** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 174 | 50-150 |
| 13C2_6:2FTS | | 128 | 50-150 |
| 13C2_8:2FTS | | 108 | 50-150 |
| 13C2_PFDoA | | 81 | 50-150 |
| 13C2_PFTeDA | | 93 | 50-150 |
| 13C3_PFBS | | 111 | 50-150 |
| 13C3_PFHxS | | 116 | 50-150 |
| 13C3-HFPO-DA | | 101 | 50-150 |
| 13C4_PFBA | | 84 | 50-150 |
| 13C4_PFHpA | | 116 | 50-150 |
| 13C5_PFHxA | | 106 | 50-150 |
| 13C5_PFPeA | | 99 | 50-150 |
| 13C6_PFDA | | 101 | 50-150 |
| 13C7_PFUdA | | 92 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-001**

Description: **MWM16-37_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1028** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 111 | 50-150 |
| 13C8_PFOS | | 106 | 50-150 |
| 13C8_PFOSA | | 90 | 50-150 |
| 13C9_PFNA | | 115 | 50-150 |
| d5-EtFOSAA | | 96 | 50-150 |
| d3-MeFOSAA | | 100 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-002**

Description: **MWM30-01_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1040** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/12/2023 0319 | ARC2 | 05/10/2023 1430 | 74943 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.1 | 2.0 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.1 | 2.0 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 8.1 | 2.0 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **34** | **Q** J | **8.1** | **2.0** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 8.1 | 2.0 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.1 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.1 | 2.0 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.1 | 2.0 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.1 | 2.0 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **4.6** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **2.4** | **JM-03** | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **8.3** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **24** | **QM-03** J | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **15** | | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **20** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **45** | | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **18** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 223 | 50-150 |
| 13C2_6:2FTS | N | 243 | 50-150 |
| 13C2_8:2FTS | N | 193 | 50-150 |
| 13C2_PFDoA | | 90 | 50-150 |
| 13C2_PFTeDA | | 95 | 50-150 |
| 13C3_PFBS | | 77 | 50-150 |
| 13C3_PFHxS | | 99 | 50-150 |
| 13C3-HFPO-DA | | 74 | 50-150 |
| 13C4_PFBA | N | 26 | 50-150 |
| 13C4_PFHpA | | 90 | 50-150 |
| 13C5_PFHxA | | 74 | 50-150 |
| 13C5_PFPeA | | 55 | 50-150 |
| 13C6_PFDA | | 108 | 50-150 |
| 13C7_PFUdA | | 101 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-002**

Description: **MWM30-01_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1040** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 98 | 50-150 |
| 13C8_PFOS | | 106 | 50-150 |
| 13C8_PFOSA | | 103 | 50-150 |
| 13C9_PFNA | | 113 | 50-150 |
| d5-EtFOSAA | | 118 | 50-150 |
| d3-MeFOSAA | | 114 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-003**

Description: **MWM5-02_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1210** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/12/2023 0332 | ARC2 | 05/10/2023 1430 | 74943 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.9 | 1.7 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **0.95** | **JM-03** | **3.5** | **0.86** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | M-03 | 3.5 | 0.86 | ng/L | 1 |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **2.5** | **J** | **3.5** | **0.86** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **1.0** | **JM-03** | **3.5** | **0.86** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **1.3** | **JM-03** | **3.5** | **0.86** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 196 | 50-150 |
| 13C2_6:2FTS | N | 158 | 50-150 |
| 13C2_8:2FTS | | 125 | 50-150 |
| 13C2_PFDoA | | 105 | 50-150 |
| 13C2_PFTeDA | | 104 | 50-150 |
| 13C3_PFBS | | 117 | 50-150 |
| 13C3_PFHxS | | 116 | 50-150 |
| 13C3-HFPO-DA | | 111 | 50-150 |
| 13C4_PFBA | | 83 | 50-150 |
| 13C4_PFHpA | | 117 | 50-150 |
| 13C5_PFHxA | | 118 | 50-150 |
| 13C5_PFPeA | | 110 | 50-150 |
| 13C6_PFDA | | 109 | 50-150 |
| 13C7_PFUdA | | 99 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-003**

Description: **MWM5-02_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1210** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 119 | 50-150 |
| 13C8_PFOS | | 114 | 50-150 |
| 13C8_PFOSA | | 102 | 50-150 |
| 13C9_PFNA | | 119 | 50-150 |
| d5-EtFOSAA | | 112 | 50-150 |
| d3-MeFOSAA | | 112 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-004**

Description: **MWF16-23_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1307** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/12/2023 0526 | OMNS | 05/10/2023 1430 | 74943 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **6.7** | **M-03** | **3.5** | **0.87** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **1.3** | **JM-03** | **3.5** | **0.87** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **6.1** | **M-03** | **3.5** | **0.87** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **26** | | **3.5** | **0.87** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **9.8** | **M-03** | **3.5** | **0.87** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **23** | | **3.5** | **0.87** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **12** | | **3.5** | **0.87** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **63** | **M-03** | **3.5** | **0.87** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **14** | | **3.5** | **0.87** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 145 | 50-150 |
| 13C2_6:2FTS | | 97 | 50-150 |
| 13C2_8:2FTS | | 87 | 50-150 |
| 13C2_PFDoA | | 65 | 50-150 |
| 13C2_PFTeDA | | 71 | 50-150 |
| 13C3_PFBS | | 97 | 50-150 |
| 13C3_PFHxS | | 98 | 50-150 |
| 13C3-HFPO-DA | | 90 | 50-150 |
| 13C4_PFBA | | 65 | 50-150 |
| 13C4_PFHpA | | 96 | 50-150 |
| 13C5_PFHxA | | 95 | 50-150 |
| 13C5_PFPeA | | 93 | 50-150 |
| 13C6_PFDA | | 92 | 50-150 |
| 13C7_PFUdA | | 80 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-004**

Description: **MWF16-23_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1307** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 101 | 50-150 |
| 13C8_PFOS | | 89 | 50-150 |
| 13C8_PFOSA | | 85 | 50-150 |
| 13C9_PFNA | | 97 | 50-150 |
| d5-EtFOSAA | | 73 | 50-150 |
| d3-MeFOSAA | | 80 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-005**

Description: **MWF12-02R_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1425** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/12/2023 0539 | OMNS | 05/10/2023 1430 | 74943 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.6 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.6 | 1.9 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.7** | **JM-03** | **3.8** | **0.95** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **1.6** | **JM-03** | **3.8** | **0.95** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **5.9** | **M-03** | **3.8** | **0.95** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **22** | **M-03** | **3.8** | **0.95** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **4.4** | **M-03** | **3.8** | **0.95** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **12** | | **3.8** | **0.95** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **11** | **M-03** | **3.8** | **0.95** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **14** | **M-03** | **3.8** | **0.95** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.95 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **4.0** | **M-03** | **3.8** | **0.95** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 239 | 50-150 |
| 13C2_6:2FTS | N | 155 | 50-150 |
| 13C2_8:2FTS | | 112 | 50-150 |
| 13C2_PFDoA | | 83 | 50-150 |
| 13C2_PFTeDA | | 94 | 50-150 |
| 13C3_PFBS | | 103 | 50-150 |
| 13C3_PFHxS | | 108 | 50-150 |
| 13C3-HFPO-DA | | 97 | 50-150 |
| 13C4_PFBA | | 56 | 50-150 |
| 13C4_PFHpA | | 102 | 50-150 |
| 13C5_PFHxA | | 100 | 50-150 |
| 13C5_PFPeA | | 88 | 50-150 |
| 13C6_PFDA | | 101 | 50-150 |
| 13C7_PFUdA | | 97 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-005**

Description: **MWF12-02R_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1425** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 114 | 50-150 |
| 13C8_PFOS | | 105 | 50-150 |
| 13C8_PFOSA | | 94 | 50-150 |
| 13C9_PFNA | | 115 | 50-150 |
| d5-EtFOSAA | | 94 | 50-150 |
| d3-MeFOSAA | | 103 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-006**

Description: **MW-02-17_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1420** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/12/2023 0617 | OMNS | 05/10/2023 1430 | 74943 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.0 | 2.0 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **9.3** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **5.8** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **10** | | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **12** | | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **6.4** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **11** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **7.7** | **M-03** | **4.0** | **1.0** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **7.2** | | **4.0** | **1.0** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.0 | 1.0 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 111 | 50-150 |
| 13C2_6:2FTS | | 87 | 50-150 |
| 13C2_8:2FTS | | 89 | 50-150 |
| 13C2_PFDoA | | 75 | 50-150 |
| 13C2_PFTeDA | | 83 | 50-150 |
| 13C3_PFBS | | 94 | 50-150 |
| 13C3_PFHxS | | 94 | 50-150 |
| 13C3-HFPO-DA | | 88 | 50-150 |
| 13C4_PFBA | | 70 | 50-150 |
| 13C4_PFHpA | | 90 | 50-150 |
| 13C5_PFHxA | | 90 | 50-150 |
| 13C5_PFPeA | | 90 | 50-150 |
| 13C6_PFDA | | 84 | 50-150 |
| 13C7_PFUdA | | 84 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-006**

Description: **MW-02-17_GW-042523** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1420** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 92 | 50-150 |
| 13C8_PFOS | | 89 | 50-150 |
| 13C8_PFOSA | | 78 | 50-150 |
| 13C9_PFNA | | 94 | 50-150 |
| d5-EtFOSAA | | 77 | 50-150 |
| d3-MeFOSAA | | 84 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-007**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1730** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/12/2023 0630 | OMNS | 05/10/2023 1430 | 74943 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 100 | 50-150 |
| 13C2_6:2FTS | | 92 | 50-150 |
| 13C2_8:2FTS | | 99 | 50-150 |
| 13C2_PFDoA | | 86 | 50-150 |
| 13C2_PFTeDA | | 98 | 50-150 |
| 13C3_PFBS | | 97 | 50-150 |
| 13C3_PFHxS | | 105 | 50-150 |
| 13C3-HFPO-DA | | 98 | 50-150 |
| 13C4_PFBA | | 101 | 50-150 |
| 13C4_PFHpA | | 102 | 50-150 |
| 13C5_PFHxA | | 101 | 50-150 |
| 13C5_PFPeA | | 103 | 50-150 |
| 13C6_PFDA | | 99 | 50-150 |
| 13C7_PFUdA | | 96 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD26028-007**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **04/25/2023 1730** Project Name: **RACER PNC**

Date Received: **04/26/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 50-150 |
| 13C8_PFOS | | 97 | 50-150 |
| 13C8_PFOSA | | 88 | 50-150 |
| 13C9_PFNA | | 106 | 50-150 |
| d5-EtFOSAA | | 92 | 50-150 |
| d3-MeFOSAA | | 98 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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Racer

# DATA REVIEW

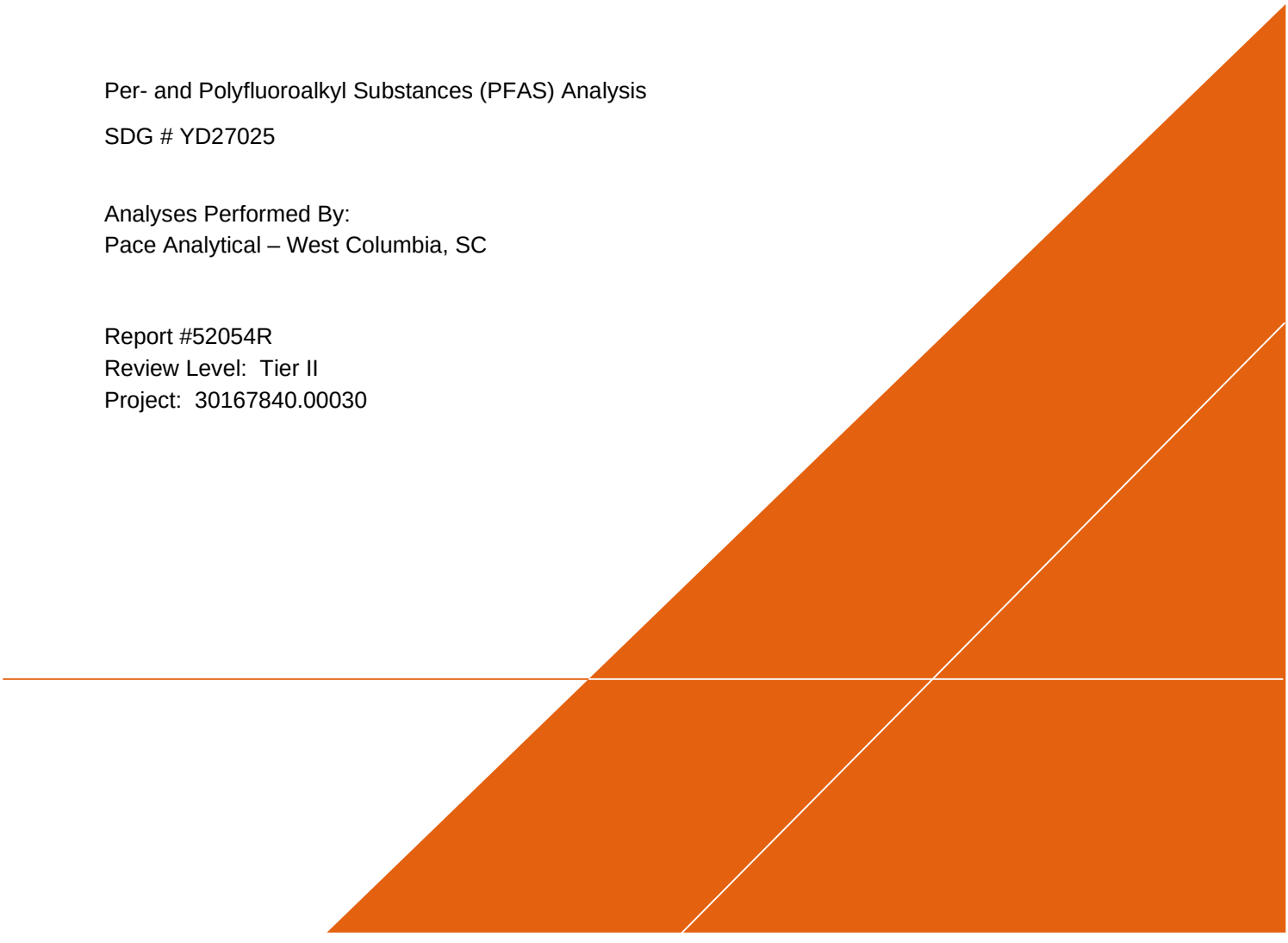
## Pontiac North Campus, MI

Per- and Polyfluoroalkyl Substances (PFAS) Analysis

SDG # YD27025

Analyses Performed By:
Pace Analytical – West Columbia, SC

Report #52054R
Review Level: Tier II
Project: 30167840.00030



# SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #YD27025 for samples collected in association with the Racer PNC, MI Site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

| Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | PFAS | SVOC | PCB | MET | MISC |
| TW-MD-01-GW | YD27025-1 | Water | 04/26/23 | | X | | | | |
| EB-02 | YD27025-2 | Water | 04/26/23 | | X | | | | |
| SLEEPVAULT-GW | YD27025-3 | Water | 04/26/23 | | X | | | | |
| MWW10-SEN01-GW | YD27025-4 | Water | 04/26/23 | | X | | | | |
| TW-01-03-GW | YD27025-5 | Water | 04/26/23 | | X | | | | |
| MWW10-04-GW | YD27025-6 | Water | 04/26/23 | | X | | | | |
| Trip Blank | YD27025-7 | Water | 04/26/23 | | X | | | | |

## ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

| Items Reviewed | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| 1. Sample receipt condition | | X | | X | |
| 2. Requested analyses and sample results | | X | | X | |
| 3. Master tracking list | | X | | X | |
| 4. Methods of analysis | | X | | X | |
| 5. Reporting limits | | X | | X | |
| 6. Sample collection date | | X | | X | |
| 7. Laboratory sample received date | | X | | X | |
| 8. Sample preservation verification (as applicable) | | X | | X | |
| 9. Sample preparation/extraction/analysis dates | | X | | X | |
| 10. Fully executed Chain-of-Custody (COC) form | | X | | X | |
| 11. Narrative summary of QA or sample problems provided | | X | | X | |
| 12. Data Package Completeness and Compliance | | X | | X | |

Note:
QA - Quality Assurance

## ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) Modified Method 537. Data were reviewed in accordance with the USEPA National Functional Guidelines for Organic Superfund Methods Data Review, EPA 540-R-20-005, November 2020 (with reference to the historical USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999 as appropriate) and USEPA Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537, EPA 910-R-18-001, November 2018; and Department of Defense (DoD) Quality Systems Manual (QSM) 5.3, DoD Final General Data Validation Guidelines, November 2019.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
  - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
  - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
  - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and

provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

## PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ANALYSIS

### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

| Method | Matrix | Holding Time | Preservation |
|---|---|---|---|
| USEPA modified Method 537 | Water | 28 days to extraction; 28 days from extraction to analysis | Cool to <6 °C |

All samples were initially analyzed within the specified holding time criteria.

### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, field, and equipment blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Equipment blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

### 3. Extracted Internal Standard (EIS)/Surrogate Compounds

Labeled standards must be added to all field samples and QC samples prior to extraction. EIS recoveries must be within DoD QSM 5.3 specified limits of 50% to150%.

Sample locations associated with EIS exhibiting recoveries outside of the control limits are presented in the following table.

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| TW-MD-01-GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C4-PFBA | Perfluoro-n-butanoic acid (PFBA) | < 50% but > 20% |
| SLEEPVAULT-GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| MWW10-SEN01-GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWW10-SEN01-GW | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| TW-01-03-GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| | d5-EtFPSAA | N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | >150 |
| | d3-MeFOSAA | N-methylperfluoro-1-octanesulfonamidoacetic acid | >150 |
| MWW10-04-GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| | 13C4-PFBA | Perfluoro-n-butanoic acid (PFBA) | < 50% but > 20% |

The criteria used to evaluate the EIS recoveries are presented in the following table. In the case of an EIS deviation, the sample results associated with the EIS are qualified as documented in the table below.

| Control Limit | Sample Result | Qualification |
|---|---|---|
| < 50% but > 20% | Non-detect | UJ |
| | Detect | J |
| > 150% | Non-detect | No Action |
| | Detect | J |
| < 20% | Non-detect | R |
| | Detect | R |

## 4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within 50-150%. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within 30%.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A site-specific MS/MSD was not included in the data package.

The laboratory duplicate performed on sample TW-MD-01-GW exhibited RPDs within the control limits.

### 5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

### 6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for soil matrices.

A field duplicate was not included in the data package.

### 7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

## DATA VALIDATION CHECKLIST FOR PFAs

| PFAs: USEPA modified Method 537 | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| **LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)** | | | | | |
| **Tier II Validation** | | | | | |
| Holding times | | X | | X | |
| Reporting limits (units) | | X | | X | |
| Blanks | | | | | |
| A. Method blanks | | X | | X | |
| B. Equipment blanks | | X | | X | |
| C. Trip blanks | | X | | X | |
| Laboratory Control Sample (LCS) %R | | X | | X | |
| Laboratory Control Sample Duplicate(LCSD) %R | X | | | | X |
| LCS/LCSD Precision (RPD) | X | | | | X |
| Matrix Spike (MS) %R | X | | | | X |
| Matrix Spike Duplicate (MSD) %R | X | | | | X |
| MS/MSD Precision (RPD) | X | | | | X |
| Field/Lab Duplicate (RPD) | | X | | X | |
| Extracted Internal Standards (EIS) Recoveries | | X | X | | |
| Dilution Factor | | X | | X | |
| Moisture Content | X | | | | X |

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE: 

DATE: December 5, 2023

PEER REVIEW: Joseph C. Houser

DATE: December 19, 2023

# CHAIN OF CUSTODY

# CORRECTED SAMPLE ANALYSIS DATA SHEETS

**PACE ANALYTICAL SERVICES, LLC**
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 146504

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Tiffany. Linder Alexis Crisp | Telephone No / E-mail: Alexis.Crisp@arcadis.com tiffany.linder@arcadis.com | Quote No. |
| Address: 28555 Cabot Dr #500 | Sampler's Signature: x Sommer Guy | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds | Page 1 of |
| City: Novi / State: MI / Zip Code: 48377 | Printed Name: Sommer Guy | | YD27025 |
| Project Name: Racer PNC | | | RES2 |
| Project No.: 30167840.00030 | P.O. No.: | | |

| Sample ID / Description (Containers for each sample may be combined on one line) | Collection Date(s) | Collection Time (Military) | Grab G / Composite C | Matrix: Aqueous | Soil | Non-Aqueous | No of Containers by Preservative Type: Unpres. | HCl | HNO3 | H2SO4 | NaOH | Na2S2O3 | Field Filtered | PFAS Method 537 mod. with isotope dilution (533 Table 4) | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW-MD-01_GW-042623 | 4/26/23 | 1000 | G | 2 | | | 2 | | | | | | | X | |
| EB-02_042623 | 4/26/23 | 1010 | G | 2 | | | 2 | | | | | | | X | Equipment Blank |
| SEEPVAULT_GW-042623 | 4/26/23 | 1030 | G | 2 | | | 2 | | | | | | | X | |
| MWM10-SEN01_GW-042623 | 4/26/23 | 1255 | G | 2 | | | 2 | | | | | | | X | |
| TW-01-03_GW-042623 | 4/26/23 | 1515 | G | 2 | | | 2 | | | | | | | X | |
| MWM10-04_GW-042623 | 4/26/23 | 1650 | G | 2 | | | 2 | | | | | | | X | |
| tripblank | 4/26/23 | 1710 | G | 1 | | | 1 | | | | | | | X | tripblank |

Turn Around Time Required (Prior lab approval required for expedited TAT): ☒ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Guy | 4/26/23 | 1750 | 1. Received by: FedEx | 4/26/23 | 1750 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | 4.27.23 | 1010 | 4. Laboratory received by: Kayem Reams | 4.27.23 | 1010 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY: Received on Ice (Circle) (Yes) No Ice Pack — Receipt Temp 2.8 °C — Temp Blank ☒ Y ☐ N

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: ME003N2-01



PACE ANALYTICAL SERVICES, LLC

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-001**

Description: **TW-MD-01_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1000** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/30/2023 2008 | ARC2 | 05/15/2023 1720 | 75308 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.2 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.2 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **1.3** | **JM-03** | **3.6** | **0.90** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **0.97** | **JM-03** | **3.6** | **0.90** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **5.6** | **M-03** | **3.6** | **0.90** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **2.7** | **JQM-03** | **3.6** | **0.90** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **1.2** | **JM-03** | **3.6** | **0.90** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **4.6** | **M-03** | **3.6** | **0.90** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **1.3** | **JM-03** | **3.6** | **0.90** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 259 | 50-150 |
| 13C2_6:2FTS | N | 187 | 50-150 |
| 13C2_8:2FTS | | 130 | 50-150 |
| 13C2_PFDoA | | 102 | 50-150 |
| 13C2_PFTeDA | | 101 | 50-150 |
| 13C3_PFBS | | 85 | 50-150 |
| 13C3_PFHxS | | 99 | 50-150 |
| 13C3-HFPO-DA | | 90 | 50-150 |
| 13C4_PFBA | N | 40 | 50-150 |
| 13C4_PFHpA | | 108 | 50-150 |
| 13C5_PFHxA | | 98 | 50-150 |
| 13C5_PFPeA | | 73 | 50-150 |
| 13C6_PFDA | | 112 | 50-150 |
| 13C7_PFUdA | | 106 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-001**

Description: **TW-MD-01_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1000** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 112 | 50-150 |
| 13C8_PFOS | | 109 | 50-150 |
| 13C8_PFOSA | | 117 | 50-150 |
| 13C9_PFNA | | 112 | 50-150 |
| d5-EtFOSAA | | 111 | 50-150 |
| d3-MeFOSAA | | 110 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-002**

Description: **EB-02_042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1010** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/30/2023 2033 | ARC2 | 05/15/2023 1720 | 75308 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.1 | 1.0 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 89 | 50-150 |
| 13C2_6:2FTS | | 90 | 50-150 |
| 13C2_8:2FTS | | 96 | 50-150 |
| 13C2_PFDoA | | 92 | 50-150 |
| 13C2_PFTeDA | | 93 | 50-150 |
| 13C3_PFBS | | 84 | 50-150 |
| 13C3_PFHxS | | 91 | 50-150 |
| 13C3-HFPO-DA | | 87 | 50-150 |
| 13C4_PFBA | | 89 | 50-150 |
| 13C4_PFHpA | | 91 | 50-150 |
| 13C5_PFHxA | | 93 | 50-150 |
| 13C5_PFPeA | | 88 | 50-150 |
| 13C6_PFDA | | 89 | 50-150 |
| 13C7_PFUdA | | 93 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-002**

Description: **EB-02_042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1010** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 92 | 50-150 |
| 13C8_PFOS | | 91 | 50-150 |
| 13C8_PFOSA | | 100 | 50-150 |
| 13C9_PFNA | | 91 | 50-150 |
| d5-EtFOSAA | | 95 | 50-150 |
| d3-MeFOSAA | | 95 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-003**

Description: **SEEPVAULT_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1030** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/30/2023 2046 | ARC2 | 05/15/2023 1720 | 75308 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **12** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **14** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **11** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **100** | **M-03** | **40** | **10** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 215 | 50-150 |
| 13C2_6:2FTS | N | 173 | 50-150 |
| 13C2_8:2FTS | | 150 | 50-150 |
| 13C2_PFDoA | | 105 | 50-150 |
| 13C2_PFTeDA | | 109 | 50-150 |
| 13C3_PFBS | | 106 | 50-150 |
| 13C3_PFHxS | | 105 | 50-150 |
| 13C3-HFPO-DA | | 104 | 50-150 |
| 13C4_PFBA | | 79 | 50-150 |
| 13C4_PFHpA | | 118 | 50-150 |
| 13C5_PFHxA | | 117 | 50-150 |
| 13C5_PFPeA | | 96 | 50-150 |
| 13C6_PFDA | | 120 | 50-150 |
| 13C7_PFUdA | | 120 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-003**

Description: **SEEPVAULT_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1030** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 119 | 50-150 |
| 13C8_PFOS | | 116 | 50-150 |
| 13C8_PFOSA | | 126 | 50-150 |
| 13C9_PFNA | | 119 | 50-150 |
| d5-EtFOSAA | | 124 | 50-150 |
| d3-MeFOSAA | | 127 | 50-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-004**

Description: **MWW10-SEN01_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1255** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/30/2023 2059 | ARC2 | 05/15/2023 1720 | 75308 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **10** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | M-03 | 40 | 10 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **15** | **JM-03** | **40** | **10** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 202 | 50-150 |
| 13C2_6:2FTS | N | 170 | 50-150 |
| 13C2_8:2FTS | | 134 | 50-150 |
| 13C2_PFDoA | | 101 | 50-150 |
| 13C2_PFTeDA | | 113 | 50-150 |
| 13C3_PFBS | | 109 | 50-150 |
| 13C3_PFHxS | | 111 | 50-150 |
| 13C3-HFPO-DA | | 105 | 50-150 |
| 13C4_PFBA | | 87 | 50-150 |
| 13C4_PFHpA | | 115 | 50-150 |
| 13C5_PFHxA | | 119 | 50-150 |
| 13C5_PFPeA | | 101 | 50-150 |
| 13C6_PFDA | | 117 | 50-150 |
| 13C7_PFUdA | | 117 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-004**

Description: **MWW10-SEN01_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1255** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 124 | 50-150 |
| 13C8_PFOS | | 115 | 50-150 |
| 13C8_PFOSA | | 127 | 50-150 |
| 13C9_PFNA | | 114 | 50-150 |
| d5-EtFOSAA | | 120 | 50-150 |
| d3-MeFOSAA | | 124 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-005**

Description: **TW-01-03_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1515** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/31/2023 1617 | ARC2 | 05/15/2023 1720 | 75308 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **19** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **29** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **97** | **M-03** | **40** | **10** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 385 | 50-150 |
| 13C2_6:2FTS | N | 327 | 50-150 |
| 13C2_8:2FTS | N | 344 | 50-150 |
| 13C2_PFDoA | | 134 | 50-150 |
| 13C2_PFTeDA | | 118 | 50-150 |
| 13C3_PFBS | | 113 | 50-150 |
| 13C3_PFHxS | | 125 | 50-150 |
| 13C3-HFPO-DA | | 107 | 50-150 |
| 13C4_PFBA | | 84 | 50-150 |
| 13C4_PFHpA | | 115 | 50-150 |
| 13C5_PFHxA | | 115 | 50-150 |
| 13C5_PFPeA | | 102 | 50-150 |
| 13C6_PFDA | | 131 | 50-150 |
| 13C7_PFUdA | | 144 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-005**

Description: **TW-01-03_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1515** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 117 | 50-150 |
| 13C8_PFOS | | 125 | 50-150 |
| 13C8_PFOSA | | 128 | 50-150 |
| 13C9_PFNA | | 126 | 50-150 |
| d5-EtFOSAA | N | 183 | 50-150 |
| d3-MeFOSAA | N | 162 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-006**

Description: **MWW10-04_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1650** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/31/2023 1630 | ARC2 | 05/15/2023 1720 | 75308 |
| 2 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/06/2023 2308 | ARC2 | 06/05/2023 1453 | 76891 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.3 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.3 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.3 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **1.2** | **JM-03** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **6.9** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **11** | **QM-03** J | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **17** | | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **19** | | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **12** | | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **78** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **18** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **18** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |

| Surrogate | Run 1 Q | Run 1 % Recovery | Run 1 Acceptance Limits | Run 2 Q | Run 2 % Recovery | Run 2 Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C2_4:2FTS | N | 292 | 50-150 | HN | 280 | 50-150 |
| 13C2_6:2FTS | N | 299 | 50-150 | HN | 304 | 50-150 |
| 13C2_8:2FTS | N | 277 | 50-150 | HN | 321 | 50-150 |
| 13C2_PFDoA | | 119 | 50-150 | H | 91 | 50-150 |
| 13C2_PFTeDA | | 104 | 50-150 | H | 73 | 50-150 |
| 13C3_PFBS | | 90 | 50-150 | H | 61 | 50-150 |
| 13C3_PFHxS | | 107 | 50-150 | H | 68 | 50-150 |
| 13C3-HFPO-DA | | 80 | 50-150 | HN | 41 | 50-150 |
| 13C4_PFBA | N | 33 | 50-150 | HN | 18 | 50-150 |
| 13C4_PFHpA | | 91 | 50-150 | HN | 44 | 50-150 |
| 13C5_PFHxA | | 82 | 50-150 | HN | 44 | 50-150 |
| 13C5_PFPeA | | 61 | 50-150 | HN | 28 | 50-150 |
| 13C6_PFDA | | 108 | 50-150 | H | 82 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-006**

Description: **MWW10-04_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1650** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C7_PFUdA | | 124 | 50-150 | H | 93 | 50-150 |
| 13C8_PFOA | | 91 | 50-150 | H | 60 | 50-150 |
| 13C8_PFOS | | 115 | 50-150 | HM-03 | 82 | 50-150 |
| 13C8_PFOSA | | 111 | 50-150 | H | 69 | 50-150 |
| 13C9_PFNA | | 108 | 50-150 | H | 77 | 50-150 |
| d5-EtFOSAA | | 145 | 50-150 | H | 105 | 50-150 |
| d3-MeFOSAA | | 126 | 50-150 | H | 98 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-006**

Description: **MWW10-04_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1650** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/31/2023 1630 | ARC2 | 05/15/2023 1720 | 75308 |
| 2 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/06/2023 2308 | ARC2 | 06/05/2023 1453 | 76891 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | H | 7.1 | 1.8 | ng/L | 2 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | H | 7.1 | 1.8 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | HQ | 7.1 | 1.8 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | HQ | 7.1 | 1.8 | ng/L | 2 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | HQ | 7.1 | 1.8 | ng/L | 2 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | HQ | 7.1 | 1.8 | ng/L | 2 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | H | 7.1 | 1.8 | ng/L | 2 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | H | 7.1 | 1.8 | ng/L | 2 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | H | 7.1 | 1.8 | ng/L | 2 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **6.8** | **HM-03** | **3.6** | **0.89** | **ng/L** | **2** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **9.1** | **HQM-03** | **3.6** | **0.89** | **ng/L** | **2** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **19** | **HQM-03** | **3.6** | **0.89** | **ng/L** | **2** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **25** | **HQM-03** | **3.6** | **0.89** | **ng/L** | **2** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **11** | **H** | **3.6** | **0.89** | **ng/L** | **2** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **79** | **HM-03** | **3.6** | **0.89** | **ng/L** | **2** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **21** | **HQM-03** | **3.6** | **0.89** | **ng/L** | **2** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | H | 3.6 | 0.89 | ng/L | 2 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **21** | **HM-03** | **3.6** | **0.89** | **ng/L** | **2** |

| Surrogate | Run 1 Q | Run 1 % Recovery | Run 1 Acceptance Limits | Run 2 Q | Run 2 % Recovery | Run 2 Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C2_4:2FTS | N | 292 | 50-150 | HN | 280 | 50-150 |
| 13C2_6:2FTS | N | 299 | 50-150 | HN | 304 | 50-150 |
| 13C2_8:2FTS | N | 277 | 50-150 | HN | 321 | 50-150 |
| 13C2_PFDoA | | 119 | 50-150 | H | 91 | 50-150 |
| 13C2_PFTeDA | | 104 | 50-150 | H | 73 | 50-150 |
| 13C3_PFBS | | 90 | 50-150 | H | 61 | 50-150 |
| 13C3_PFHxS | | 107 | 50-150 | H | 68 | 50-150 |
| 13C3-HFPO-DA | | 80 | 50-150 | HN | 41 | 50-150 |
| 13C4_PFBA | N | 33 | 50-150 | HN | 18 | 50-150 |
| 13C4_PFHpA | | 91 | 50-150 | HN | 44 | 50-150 |
| 13C5_PFHxA | | 82 | 50-150 | HN | 44 | 50-150 |
| 13C5_PFPeA | | 61 | 50-150 | HN | 28 | 50-150 |
| 13C6_PFDA | | 108 | 50-150 | H | 82 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-006**

Description: **MWW10-04_GW-042623** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1650** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C7_PFUdA | | 124 | 50-150 | H | 93 | 50-150 |
| 13C8_PFOA | | 91 | 50-150 | H | 60 | 50-150 |
| 13C8_PFOS | | 115 | 50-150 | HM-03 | 82 | 50-150 |
| 13C8_PFOSA | | 111 | 50-150 | H | 69 | 50-150 |
| 13C9_PFNA | | 108 | 50-150 | H | 77 | 50-150 |
| d5-EtFOSAA | | 145 | 50-150 | H | 105 | 50-150 |
| d3-MeFOSAA | | 126 | 50-150 | H | 98 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-007**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1710** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/31/2023 1643 | ARC2 | 05/15/2023 1720 | 75308 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.4 | 2.1 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.2 | 1.1 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 129 | 50-150 |
| 13C2_6:2FTS | | 108 | 50-150 |
| 13C2_8:2FTS | | 110 | 50-150 |
| 13C2_PFDoA | | 114 | 50-150 |
| 13C2_PFTeDA | | 115 | 50-150 |
| 13C3_PFBS | | 113 | 50-150 |
| 13C3_PFHxS | | 114 | 50-150 |
| 13C3-HFPO-DA | | 117 | 50-150 |
| 13C4_PFBA | | 114 | 50-150 |
| 13C4_PFHpA | | 118 | 50-150 |
| 13C5_PFHxA | | 122 | 50-150 |
| 13C5_PFPeA | | 109 | 50-150 |
| 13C6_PFDA | | 110 | 50-150 |
| 13C7_PFUdA | | 112 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD27025-007**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **04/26/2023 1710** Project Name: **RACER PNC**

Date Received: **04/27/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 116 | 50-150 |
| 13C8_PFOS | | 117 | 50-150 |
| 13C8_PFOSA | | 119 | 50-150 |
| 13C9_PFNA | | 114 | 50-150 |
| d5-EtFOSAA | | 120 | 50-150 |
| d3-MeFOSAA | | 113 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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Racer

# DATA REVIEW

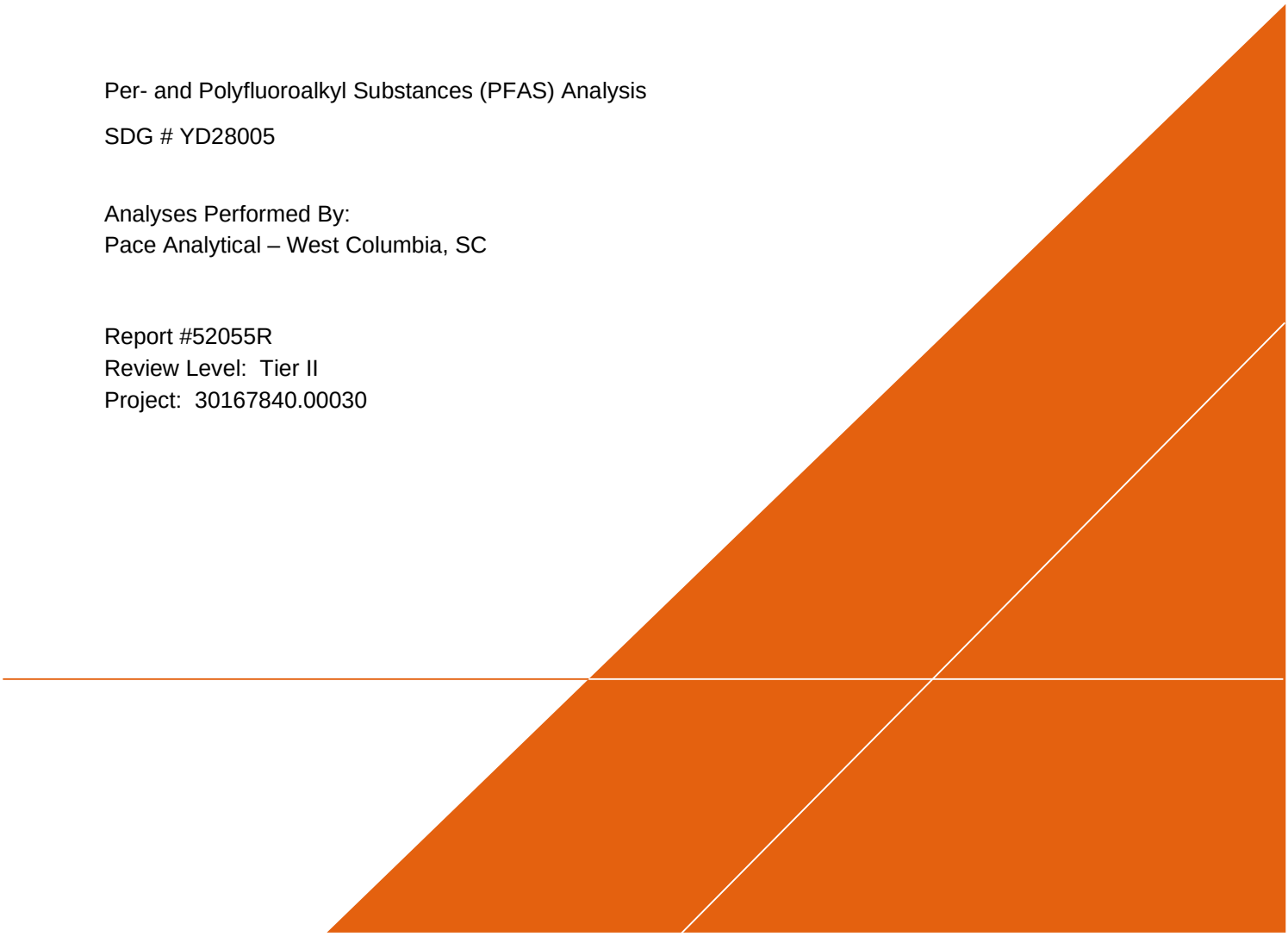
## Pontiac North Campus, MI

Per- and Polyfluoroalkyl Substances (PFAS) Analysis

SDG # YD28005

Analyses Performed By:
Pace Analytical – West Columbia, SC

Report #52055R
Review Level: Tier II
Project: 30167840.00030



# SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #YD28005 for samples collected in association with the Racer PNC, MI Site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

| Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | PFAS | SVOC | PCB | MET | MISC |
| MWF16-05_GW | YD28005-1 | Water | 04/27/23 | | X | | | | |
| MWF8-01_GW | YD28005-2 | Water | 04/27/23 | | X | | | | |
| MWF16-18_GW | YD28005-3 | Water | 04/27/23 | | X | | | | |
| MWF16-06_GW | YD28005-4 | Water | 04/27/23 | | X | | | | |
| MWF12-01R_GW | YD28005-5 | Water | 04/27/23 | | X | | | | |
| MW0S-05_GW | YD28005-6 | Water | 04/27/23 | | X | | | | |
| DUP-01_GW | YD28005-7 | Water | 04/27/23 | MWF12-01R_GW | X | | | | |
| TRIP BLANK | YD28005-8 | Water | 04/27/23 | | X | | | | |

## ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

| Items Reviewed | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| 1. Sample receipt condition | | X | | X | |
| 2. Requested analyses and sample results | | X | | X | |
| 3. Master tracking list | | X | | X | |
| 4. Methods of analysis | | X | | X | |
| 5. Reporting limits | | X | | X | |
| 6. Sample collection date | | X | | X | |
| 7. Laboratory sample received date | | X | | X | |
| 8. Sample preservation verification (as applicable) | | X | | X | |
| 9. Sample preparation/extraction/analysis dates | | X | | X | |
| 10. Fully executed Chain-of-Custody (COC) form | | X | | X | |
| 11. Narrative summary of QA or sample problems provided | | X | | X | |
| 12. Data Package Completeness and Compliance | | X | | X | |

Note:
QA - Quality Assurance

## ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) Modified Method 537. Data were reviewed in accordance with the USEPA National Functional Guidelines for Organic Superfund Methods Data Review, EPA 540-R-20-005, November 2020 (with reference to the historical USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999 as appropriate) and USEPA Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537, EPA 910-R-18-001, November 2018; and Department of Defense (DoD) Quality Systems Manual (QSM) 5.3, DoD Final General Data Validation Guidelines, November 2019.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
  - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
  - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
  - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and

provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

**DATA REVIEW REPORT**

## PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ANALYSIS

### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

| Method | Matrix | Holding Time | Preservation |
|---|---|---|---|
| USEPA modified Method 537 | Water | 28 days to extraction; 28 days from extraction to analysis | Cool to <6 °C |

All samples were initially analyzed within the specified holding time criteria.

### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, field, and equipment blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Equipment blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

### 3. Extracted Internal Standard (EIS)/Surrogate Compounds

Labeled standards must be added to all field samples and QC samples prior to extraction. EIS recoveries must be within DoD QSM 5.3 specified limits of 50% to150%.

Sample locations associated with EIS exhibiting recoveries outside of the control limits are presented in the following table.

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWF16-05_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| MWF16-18_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C4-PFBA | Perfluoro-n-butanoic acid (PFBA) | < 50% but > 20% |
| MWF12-O1R_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C8_PFOS | 11Cl-PF3OUdS (F-53B Minor) | >150 |

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWF12-O1R_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| | 13C8_PFOS | 9Cl-PF3ONS (F-53B Major) | >150 |
| | 13C3_PFHxS | ADONA | >150 |
| | 13C3-HFPO-DA | HFPO-DA (GenX) | >150 |
| | d5-EtFOSAA | N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA) | >150 |
| | d3-MeFOSAA | N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA) | >150 |
| | 13C3_PFBS | Perfluorobutanesulfonic acid (PFBS) | >150 |
| | 13C8_PFOS | Perfluorodecanesulfonic acid (PFDS) | >150 |
| | 13C6_PFDA | Perfluorodecanoic acid (PFDA) | >150 |
| | 13C2-PFDoA | Perfluorododecanoic acid (PFDoA) | >150 |
| | 13C3_PFHxS | Perfluoroheptanesulfonic Acid (PFHpS) | >150 |
| | 13C4_PFHpA | Perfluoroheptanoic acid (PFHpA) | >150 |
| | 13C3_PFHxS | Perfluorohexanesulfonic acid (PFHxS) | >150 |
| | 13C5_PFHxA | Perfluorohexanoic acid (PFHxA) | >150 |
| | 13C8_PFOS | Perfluorononanesulfonic acid (PFNS) | >150 |
| | 13C9_PFNA | Perfluorononanoic acid (PFNA) | >150 |
| | 13C8_PFOSA | Perfluorooctane Sulfonamide (PFOSA) | >150 |
| | 13C8_PFOS | Perfluorooctane sulfonic acid | >150 |
| | 13C8_PFOA | Perfluorooctanoic acid | >150 |
| | 13C3_PFBS | Perfluoropentanesulfonic acid (PFPeS) | >150 |
| | 13C5_PFPeA | Perfluoropentanoic acid (PFPeA) | >150 |
| | 13C2_PFTeDA | Perfluorotetradecanoic acid (PFTeA) | >150 |
| | 13C2-PFDoA | Perfluorotridecanoic Acid (PFTriA) | >150 |
| | 13C7_PFUdA | Perfluoroundecanoic acid (PFUnA) | >150 |
| MWOS-05_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| DUP-01 | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |

The criteria used to evaluate the EIS recoveries are presented in the following table. In the case of an EIS deviation, the sample results associated with the EIS are qualified as documented in the table below.

| Control Limit | Sample Result | Qualification |
|---|---|---|
| < 50% but > 20% | Non-detect | UJ |
| | Detect | J |
| > 150% | Non-detect | No Action |
| | Detect | J |
| < 20% | Non-detect | R |
| | Detect | R |

### 4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within 50-150%. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within 30%.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS and laboratory duplicate performed on sample MWF12-01R_GW exhibited recoveries and RPDs within the control limits.

### 5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

### 6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

| Sample ID/Duplicate ID | Compound | Sample Result | Duplicate Result | RPD |
|---|---|---|---|---|
| MWF12-01R_GW / DUP-01_GW | Perfluorobutanesulfonic acid (PFBS) | 1.8 J | 3.5 J | AC |
| | Perfluorohexanesulfonic acid (PFHxS) | 1.8 J | 4.0 | AC |
| | Perfluorobutanoic acid (PFBA) | 4.3 | 9.0 | AC |
| | Perfluoroheptanoic acid (PFHpA) | 0.90 J | 1.6 J | AC |

| Sample ID/Duplicate ID | Compound | Sample Result | Duplicate Result | RPD |
|---|---|---|---|---|
| | Perfluorohexanoic acid (PFHxA) | 1.8 J | 2.6 J | AC |
| | Perfluorooctanoic acid (PFOA) | 3.2 J | 6.7 | AC |
| | Perfluoropentanoic acid (PFPeA) | 1.9 J | 2.7 J | AC |
| | Perfluorooctane sulfonic acid (PFOS) | 3.5 U | 0.90 J | AC |

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

## 7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

## DATA VALIDATION CHECKLIST FOR PFAs

| PFAs: USEPA modified Method 537 | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| **LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)** | | | | | |
| **Tier II Validation** | | | | | |
| Holding times | | X | | X | |
| Reporting limits (units) | | X | | X | |
| Blanks | | | | | |
| A. Method blanks | | X | | X | |
| B. Equipment blanks | X | | | | X |
| C. Trip blanks | | X | | X | |
| Laboratory Control Sample (LCS) %R | | X | | X | |
| Laboratory Control Sample Duplicate(LCSD) %R | X | | | | X |
| LCS/LCSD Precision (RPD) | X | | | | X |
| Matrix Spike (MS) %R | | X | | X | |
| Matrix Spike Duplicate (MSD) %R | X | | | | X |
| MS/MSD Precision (RPD) | X | | | | X |
| Field Duplicate (RPD) | | X | | X | |
| Extracted Internal Standards (EIS) Recoveries | | X | X | | |
| Dilution Factor | | X | | X | |
| Moisture Content | X | | | | X |

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE: 

DATE: December 17, 2023

PEER REVIEW: Joseph C. Houser

DATE: December 19, 2023

# CHAIN OF CUSTODY

# CORRECTED SAMPLE ANALYSIS DATA SHEETS

Pace Analytical®

**PACE ANALYTICAL SERVICES, LLC**
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 146506

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Tiffany Linder, Alexis Crisp | Telephone No. / E-mail: tiffany.linder@arcadis.com, Alexis.Crisp@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: Jommel Guy | Analysis (Attach list if more space is needed): Repost EGLE 28 Compounds | Page 1 of 1 |
| City: NOVI | State: MI | Zip Code: 48377 | Printed Name: Jommel Guy |
| Project Name: Racer PNC | | | YD28005 |
| Project No.: 30167840.00030 | P.O. No.: | | KESZ |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | G=Grab C=Composite | Matrix: Aqueous | Soil | Air/Gas | No. of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | NaHSO4 | PFAS Method 537.1mod. with isotope dilution PZ (Y/N) | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWF16-05_GW-042723 | 4/27/23 | 0940 | G | 2 | | | 2 | | | | | | | X | |
| MWF18-01_GW-042723 | 4/27/23 | 1035 | G | 2 | | | 2 | | | | | | | X | |
| MWF16-18_GW-042723 | 4/27/23 | 1125 | G | 2 | | | 2 | | | | | | | X | |
| MWF16-06_GW-042723 | 4/27/23 | 1220 | G | 2 | | | 2 | | | | | | | X | |
| MWF12-01R_GW-042723 | 4/27/23 | 1342 | G | 2 | | | 2 | | | | | | | X | |
| MWOS-05_GW-042723 | 4/27/23 | 1453 | G | 2 | | | 2 | | | | | | | X | |
| DUP-01_GW-042723 | 4/27/23 | — | G | 2 | | | 2 | | | | | | | X | |
| tripblank | 4/27/23 | 1410 | G | 1 | | | 1 | | | | | | | X | tripblank |

**Turn Around Time Required (Prior lab approval required for expedited TAT.):** ☒ Standard ☐ Rush (Specify)

**Sample Disposal:** ☐ Return to Client ☒ Disposal by Lab

**Possible Hazard Identification:** ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

**QC Requirements (Specify)**

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Jommel Guy | 4/27/23 | 1550 | 1. Received by: FedEx | 4/27/23 | 1550 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: Fedex | 4-28-23 | 930 | 4. Laboratory received by: [signature] | 4-28-23 | 930 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on Ice (Circle): (Yes) No Ice Pack — Receipt Temp. 1.5 °C — Temp Blank: ☒ Y ☐ N

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: ME003N2-01



PACE ANALYTICAL SERVICES, LLC

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-001**

Description: **MWF16-05_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 0940** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/18/2023 1856 | ALM | 05/17/2023 1903 | 75586 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.4 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.4 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.3** | **JM-03** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **2.8** | **JM-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **6.8** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **8.8** | | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **2.8** | **JM-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **8.6** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **4.8** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **7.4** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 243 | 50-150 |
| 13C2_6:2FTS | N | 151 | 50-150 |
| 13C2_8:2FTS | | 104 | 50-150 |
| 13C2_PFDoA | | 89 | 50-150 |
| 13C2_PFTeDA | | 84 | 50-150 |
| 13C3_PFBS | | 100 | 50-150 |
| 13C3_PFHxS | | 103 | 50-150 |
| 13C3-HFPO-DA | | 82 | 50-150 |
| 13C4_PFBA | | 63 | 50-150 |
| 13C4_PFHpA | | 90 | 50-150 |
| 13C5_PFHxA | | 98 | 50-150 |
| 13C5_PFPeA | | 82 | 50-150 |
| 13C6_PFDA | | 96 | 50-150 |
| 13C7_PFUdA | | 86 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-001**

Description: **MWF16-05_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 0940** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 110 | 50-150 |
| 13C8_PFOS | | 95 | 50-150 |
| 13C8_PFOSA | | 97 | 50-150 |
| 13C9_PFNA | | 97 | 50-150 |
| d5-EtFOSAA | | 94 | 50-150 |
| d3-MeFOSAA | | 85 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-002**

Description: **MWF8-01_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1035** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/18/2023 1917 | ALM | 05/17/2023 1903 | 75586 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.6** | | **3.6** | **0.89** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **1.6** | **JM-03** | **3.6** | **0.89** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 111 | 50-150 |
| 13C2_6:2FTS | | 98 | 50-150 |
| 13C2_8:2FTS | | 89 | 50-150 |
| 13C2_PFDoA | | 81 | 50-150 |
| 13C2_PFTeDA | | 81 | 50-150 |
| 13C3_PFBS | | 105 | 50-150 |
| 13C3_PFHxS | | 91 | 50-150 |
| 13C3-HFPO-DA | | 86 | 50-150 |
| 13C4_PFBA | | 86 | 50-150 |
| 13C4_PFHpA | | 95 | 50-150 |
| 13C5_PFHxA | | 87 | 50-150 |
| 13C5_PFPeA | | 94 | 50-150 |
| 13C6_PFDA | | 86 | 50-150 |
| 13C7_PFUdA | | 86 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-002**

Description: **MWF8-01_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1035** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 104 | 50-150 |
| 13C8_PFOS | | 88 | 50-150 |
| 13C8_PFOSA | | 95 | 50-150 |
| 13C9_PFNA | | 94 | 50-150 |
| d5-EtFOSAA | | 92 | 50-150 |
| d3-MeFOSAA | M-03 | 84 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-003**

Description: **MWF16-18_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1125** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/18/2023 1928 | ALM | 05/17/2023 1903 | 75586 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.1 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.1 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **10** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **1.3** | **J** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **13** | | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **33** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **14** | **QM-03** J | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **20** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **21** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **41** | | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **16** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 249 | 50-150 |
| 13C2_6:2FTS | N | 294 | 50-150 |
| 13C2_8:2FTS | | 128 | 50-150 |
| 13C2_PFDoA | | 85 | 50-150 |
| 13C2_PFTeDA | | 86 | 50-150 |
| 13C3_PFBS | | 88 | 50-150 |
| 13C3_PFHxS | | 88 | 50-150 |
| 13C3-HFPO-DA | | 65 | 50-150 |
| 13C4_PFBA | N | 40 | 50-150 |
| 13C4_PFHpA | | 64 | 50-150 |
| 13C5_PFHxA | | 72 | 50-150 |
| 13C5_PFPeA | | 58 | 50-150 |
| 13C6_PFDA | | 99 | 50-150 |
| 13C7_PFUdA | | 87 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-003**

Description: **MWF16-18_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1125** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 109 | 50-150 |
| 13C8_PFOS | | 97 | 50-150 |
| 13C8_PFOSA | | 93 | 50-150 |
| 13C9_PFNA | | 105 | 50-150 |
| d5-EtFOSAA | | 90 | 50-150 |
| d3-MeFOSAA | | 95 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-004**

Description: **MWF16-06_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1220** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 2 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 1510 | ALM | 05/23/2023 1402 | 75963 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | ~~Q~~ | 7.0 | 1.7 | ng/L | 2 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 2 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.4** | **J** | **3.5** | **0.87** | **ng/L** | **2** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **5.7** | | **3.5** | **0.87** | **ng/L** | **2** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **5.1** | | **3.5** | **0.87** | **ng/L** | **2** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **18** | **~~M-03~~** | **3.5** | **0.87** | **ng/L** | **2** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **9.1** | | **3.5** | **0.87** | **ng/L** | **2** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **7.5** | | **3.5** | **0.87** | **ng/L** | **2** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **8.8** | **~~M-03~~** | **3.5** | **0.87** | **ng/L** | **2** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **42** | **M-03** | **3.5** | **0.87** | **ng/L** | **2** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **10** | **M-03** | **3.5** | **0.87** | **ng/L** | **2** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.87 | ng/L | 2 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **38** | **~~M-03~~** | **3.5** | **0.87** | **ng/L** | **2** |

| Surrogate | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 207 | 50-150 |
| 13C2_6:2FTS | | 132 | 50-150 |
| 13C2_8:2FTS | | 89 | 50-150 |
| 13C2_PFDoA | | 93 | 50-150 |
| 13C2_PFTeDA | | 90 | 50-150 |
| 13C3_PFBS | | 97 | 50-150 |
| 13C3_PFHxS | | 93 | 50-150 |
| 13C3-HFPO-DA | | 93 | 50-150 |
| 13C4_PFBA | | 70 | 50-150 |
| 13C4_PFHpA | | 93 | 50-150 |
| 13C5_PFHxA | | 108 | 50-150 |
| 13C5_PFPeA | | 96 | 50-150 |
| 13C6_PFDA | | 98 | 50-150 |
| 13C7_PFUdA | | 91 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-004**

Description: **MWF16-06_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1220** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 119 | 50-150 |
| 13C8_PFOS | | 97 | 50-150 |
| 13C8_PFOSA | | 92 | 50-150 |
| 13C9_PFNA | | 104 | 50-150 |
| d5-EtFOSAA | | 93 | 50-150 |
| d3-MeFOSAA | | 89 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-005**

Description: **MWF12-01R_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1342** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/18/2023 1949 | ALM | 05/17/2023 1903 | 75586 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **1.8** | **JQM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **1.8** | **JQM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **4.3** | | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **0.90** | **JQM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **1.8** | **JQM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **3.2** | **JQ** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **1.9** | **JQM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 397 | 50-150 |
| 13C2_6:2FTS | N | 222 | 50-150 |
| 13C2_8:2FTS | N | 182 | 50-150 |
| 13C2_PFDoA | N | 157 | 50-150 |
| 13C2_PFTeDA | N | 161 | 50-150 |
| 13C3_PFBS | N | 192 | 50-150 |
| 13C3_PFHxS | N | 178 | 50-150 |
| 13C3-HFPO-DA | N | 162 | 50-150 |
| 13C4_PFBA | | 120 | 50-150 |
| 13C4_PFHpA | N | 179 | 50-150 |
| 13C5_PFHxA | N | 181 | 50-150 |
| 13C5_PFPeA | N | 159 | 50-150 |
| 13C6_PFDA | N | 180 | 50-150 |
| 13C7_PFUdA | N | 159 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-005**

Description: **MWF12-01R_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1342** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | N | 212 | 50-150 |
| 13C8_PFOS | N | 173 | 50-150 |
| 13C8_PFOSA | N | 174 | 50-150 |
| 13C9_PFNA | N | 186 | 50-150 |
| d5-EtFOSAA | M-03N | 165 | 50-150 |
| d3-MeFOSAA | N | 171 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-006**

Description: **MW0S-05_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1453** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 2 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 1521 | ALM | 05/23/2023 1402 | 75963 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.9 | 1.7 | ng/L | 2 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 2 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **2.9** | **JM-03** | **3.5** | **0.86** | **ng/L** | **2** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **2.3** | **JM-03** | **3.5** | **0.86** | **ng/L** | **2** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **12** | | **3.5** | **0.86** | **ng/L** | **2** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **2.1** | **JM-03** | **3.5** | **0.86** | **ng/L** | **2** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **2.5** | **J** | **3.5** | **0.86** | **ng/L** | **2** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.86 | ng/L | 2 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **2.7** | **JM-03** | **3.5** | **0.86** | **ng/L** | **2** |

| Surrogate | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 207 | 50-150 |
| 13C2_6:2FTS | | 150 | 50-150 |
| 13C2_8:2FTS | | 84 | 50-150 |
| 13C2_PFDoA | | 89 | 50-150 |
| 13C2_PFTeDA | | 85 | 50-150 |
| 13C3_PFBS | | 91 | 50-150 |
| 13C3_PFHxS | | 93 | 50-150 |
| 13C3-HFPO-DA | | 85 | 50-150 |
| 13C4_PFBA | | 54 | 50-150 |
| 13C4_PFHpA | | 93 | 50-150 |
| 13C5_PFHxA | | 99 | 50-150 |
| 13C5_PFPeA | | 91 | 50-150 |
| 13C6_PFDA | | 98 | 50-150 |
| 13C7_PFUdA | | 93 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-006**

Description: **MW0S-05_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1453** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 115 | 50-150 |
| 13C8_PFOS | | 95 | 50-150 |
| 13C8_PFOSA | | 85 | 50-150 |
| 13C9_PFNA | | 105 | 50-150 |
| d5-EtFOSAA | | 101 | 50-150 |
| d3-MeFOSAA | | 89 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-007**

Description: **DUP-01_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 2 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 1531 | ALM | 05/23/2023 1402 | 75963 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | ~~Q~~ | 7.2 | 1.8 | ng/L | 2 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 2 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.5** | **J** | **3.6** | **0.90** | **ng/L** | **2** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **4.0** | **~~M-03~~** | **3.6** | **0.90** | **ng/L** | **2** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **9.0** | | **3.6** | **0.90** | **ng/L** | **2** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **1.6** | **J~~M-03~~** | **3.6** | **0.90** | **ng/L** | **2** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **2.6** | **J** | **3.6** | **0.90** | **ng/L** | **2** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **6.7** | | **3.6** | **0.90** | **ng/L** | **2** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **2.7** | **J** | **3.6** | **0.90** | **ng/L** | **2** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.90 | ng/L | 2 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **0.90** | **J** | **3.6** | **0.90** | **ng/L** | **2** |

| Surrogate | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 191 | 50-150 |
| 13C2_6:2FTS | | 111 | 50-150 |
| 13C2_8:2FTS | | 85 | 50-150 |
| 13C2_PFDoA | | 90 | 50-150 |
| 13C2_PFTeDA | | 93 | 50-150 |
| 13C3_PFBS | | 95 | 50-150 |
| 13C3_PFHxS | | 93 | 50-150 |
| 13C3-HFPO-DA | | 82 | 50-150 |
| 13C4_PFBA | | 57 | 50-150 |
| 13C4_PFHpA | | 99 | 50-150 |
| 13C5_PFHxA | | 93 | 50-150 |
| 13C5_PFPeA | | 89 | 50-150 |
| 13C6_PFDA | | 91 | 50-150 |
| 13C7_PFUdA | | 86 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-007**

Description: **DUP-01_GW-042723** Matrix: **Aqueous**

Date Sampled: **04/27/2023** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 103 | 50-150 |
| 13C8_PFOS | | 90 | 50-150 |
| 13C8_PFOSA | | 88 | 50-150 |
| 13C9_PFNA | | 94 | 50-150 |
| d5-EtFOSAA | | 93 | 50-150 |
| d3-MeFOSAA | | 85 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-008**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1410** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/18/2023 2032 | ALM | 05/17/2023 1903 | 75586 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.8 | 1.7 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.4 | 0.85 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 80 | 50-150 |
| 13C2_6:2FTS | | 75 | 50-150 |
| 13C2_8:2FTS | | 78 | 50-150 |
| 13C2_PFDoA | | 76 | 50-150 |
| 13C2_PFTeDA | | 60 | 50-150 |
| 13C3_PFBS | | 94 | 50-150 |
| 13C3_PFHxS | | 87 | 50-150 |
| 13C3-HFPO-DA | | 86 | 50-150 |
| 13C4_PFBA | | 86 | 50-150 |
| 13C4_PFHpA | | 84 | 50-150 |
| 13C5_PFHxA | | 86 | 50-150 |
| 13C5_PFPeA | | 80 | 50-150 |
| 13C6_PFDA | | 78 | 50-150 |
| 13C7_PFUdA | | 74 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YD28005-008**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **04/27/2023 1410** Project Name: **Racer PNC**

Date Received: **04/28/2023** Project Number: **30171056.0370B**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | M-03 | 93 | 50-150 |
| 13C8_PFOS | | 79 | 50-150 |
| 13C8_PFOSA | | 83 | 50-150 |
| 13C9_PFNA | | 87 | 50-150 |
| d5-EtFOSAA | | 83 | 50-150 |
| d3-MeFOSAA | M-03 | 82 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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Racer

# DATA REVIEW

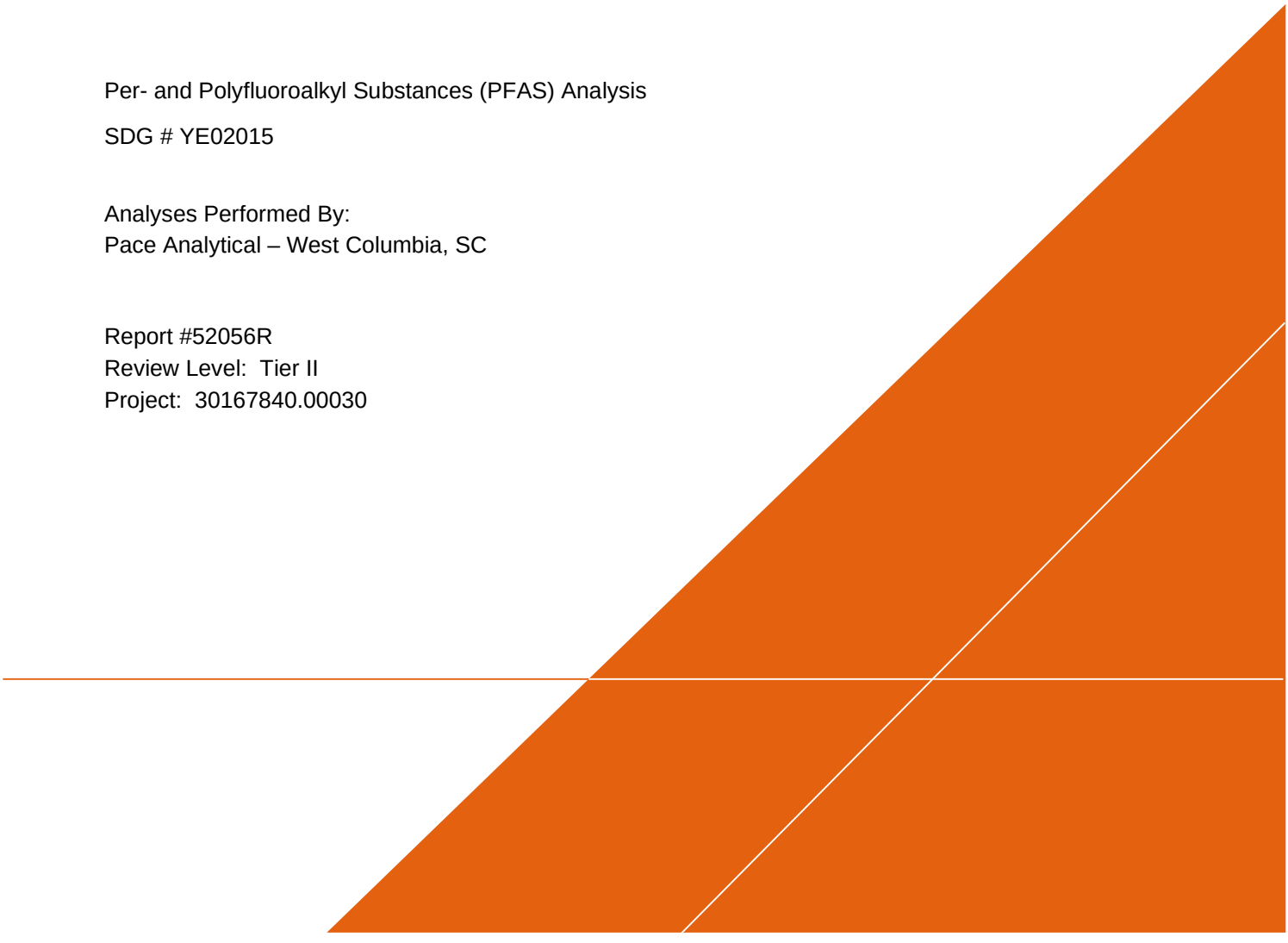
## Pontiac North Campus, MI

Per- and Polyfluoroalkyl Substances (PFAS) Analysis

SDG # YE02015

Analyses Performed By:
Pace Analytical – West Columbia, SC

Report #52056R
Review Level: Tier II
Project: 30167840.00030



# SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #YE02015 for samples collected in association with the Racer PNC, MI Site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

| Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | PFAS | SVOC | PCB | MET | MISC |
| MWM16-30_GW | YE02015-1 | Water | 05/01/23 | | X | | | | |
| MWM4-05_GW | YE02015-2 | Water | 05/01/23 | | X | | | | |
| MWM32-01_GW | YE02015-3 | Water | 05/01/23 | | X | | | | |
| MWM2-28_GW | YE02015-4 | Water | 05/01/23 | | X | | | | |
| MWM2-22_GW | YE02015-5 | Water | 05/01/23 | | X | | | | |
| DUP-02_GW | YE02015-6 | Water | 05/01/23 | MWM16-30_GW | X | | | | |
| Trip Blank | YE02015-7 | Water | 05/01/23 | | X | | | | |

## ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

| Items Reviewed | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| 1. Sample receipt condition | | X | | X | |
| 2. Requested analyses and sample results | | X | | X | |
| 3. Master tracking list | | X | | X | |
| 4. Methods of analysis | | X | | X | |
| 5. Reporting limits | | X | | X | |
| 6. Sample collection date | | X | | X | |
| 7. Laboratory sample received date | | X | | X | |
| 8. Sample preservation verification (as applicable) | | X | | X | |
| 9. Sample preparation/extraction/analysis dates | | X | | X | |
| 10. Fully executed Chain-of-Custody (COC) form | | X | | X | |
| 11. Narrative summary of QA or sample problems provided | | X | | X | |
| 12. Data Package Completeness and Compliance | | X | | X | |

Note:
QA - Quality Assurance

## ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) Modified Method 537. Data were reviewed in accordance with the USEPA National Functional Guidelines for Organic Superfund Methods Data Review, EPA 540-R-20-005, November 2020 (with reference to the historical USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999 as appropriate) and USEPA Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537, EPA 910-R-18-001, November 2018; and Department of Defense (DoD) Quality Systems Manual (QSM) 5.3, DoD Final General Data Validation Guidelines, November 2019.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
  - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
  - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
  - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and

provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

## PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ANALYSIS

### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

| Method | Matrix | Holding Time | Preservation |
|---|---|---|---|
| USEPA modified Method 537 | Water | 28 days to extraction; 28 days from extraction to analysis | Cool to <6 °C |

All samples were initially analyzed within the specified holding time criteria.

### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, field, and equipment blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Equipment blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

### 3. Extracted Internal Standard (EIS)/Surrogate Compounds

Labeled standards must be added to all field samples and QC samples prior to extraction. EIS recoveries must be within DoD QSM 5.3 specified limits of 50% to150%.

Sample locations associated with EIS exhibiting recoveries outside of the control limits are presented in the following table.

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWM16-30_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C4-PFBA | Perfluoro-n-butanoic acid (PFBA) | < 50% but > 20% |
| MWM4-05_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| MWM32-01_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWM32-01_GW | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| MWM2-28_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| | 13C4-PFBA | Perfluoro-n-butanoic acid (PFBA) | < 50% but > 20% |
| MWM2-22_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| DUP-02_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C4-PFBA | Perfluoro-n-butanoic acid (PFBA) | < 50% but > 20% |

The criteria used to evaluate the EIS recoveries are presented in the following table. In the case of an EIS deviation, the sample results associated with the EIS are qualified as documented in the table below.

| Control Limit | Sample Result | Qualification |
|---|---|---|
| < 50% but > 20% | Non-detect | UJ |
| | Detect | J |
| > 150% | Non-detect | No Action |
| | Detect | J |
| < 20% | Non-detect | R |
| | Detect | R |

### 4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within 50-150%. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within 30%.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A site-specific MS/MSD was not included in the data package.

## 5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

## 6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

| Sample ID/Duplicate ID | Compound | Sample Result | Duplicate Result | RPD |
|---|---|---|---|---|
| MMW16-30_GW / DUP-02 | Perfluorobutanesulfonic acid (PFBS) | 3.0 J | 3.0 J | AC |
| | Perfluoropentanesulfonic acid (PFPeS) | 1.0 J | 3.7 U | AC |
| | Perfluorohexanesulfonic acid (PFHxS) | 4.7 | 4.6 | AC |
| | Perfluorobutanoic acid (PFBA) | 12 | 11 | AC |
| | Perfluoroheptanoic acid (PFHpA) | 6.7 | 6.5 | AC |
| | Perfluorohexanoic acid (PFHxA) | 7.7 | 7.0 | AC |
| | Perfluorooctanoic acid (PFOA) | 3.8 J | 4.1 | AC |
| | Perfluoropentanoic acid (PFPeA) | 11 | 13 | AC |
| | Perfluorooctane sulfonic acid (PFOS) | 1.3 J | 1.2 J | AC |

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

## 7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

## DATA VALIDATION CHECKLIST FOR PFAs

| PFAs: USEPA modified Method 537 | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| **LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)** | | | | | |
| **Tier II Validation** | | | | | |
| Holding times | | X | | X | |
| Reporting limits (units) | | X | | X | |
| Blanks | | | | | |
| A. Method blanks | | X | | X | |
| B. Equipment blanks | X | | | | X |
| C. Trip blanks | | X | | X | |
| Laboratory Control Sample (LCS) %R | | X | | X | |
| Laboratory Control Sample Duplicate(LCSD) %R | X | | | | X |
| LCS/LCSD Precision (RPD) | X | | | | X |
| Matrix Spike (MS) %R | X | | | | X |
| Matrix Spike Duplicate (MSD) %R | X | | | | X |
| MS/MSD Precision (RPD) | X | | | | X |
| Field Duplicate (RPD) | | X | | X | |
| Extracted Internal Standards (EIS) Recoveries | | X | X | | |
| Dilution Factor | | X | | X | |
| Moisture Content | X | | | | X |

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE: 

DATE: December 17, 2023

PEER REVIEW: Joseph C. Houser

DATE: December 19, 2023

# CHAIN OF CUSTODY

# CORRECTED SAMPLE ANALYSIS DATA SHEETS

Pace Analytical®

**PACE ANALYTICAL SERVICES, LLC**
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 146505

| | | | |
|---|---|---|---|
| Client: ArCadis | Report to Contact: Tiffany Linder, Alexis Crisp | Telephone No. / E-mail: Alexis.Crisp@arcadis.com, tiffany.linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Sommer Guy | Analysis (Attach list if more space is needed): Report EGLE 28 compounds | Page: of |
| City: Novi / State: MI / Zip Code: 48377 | Printed Name: Sommer Guy | | YE02015 |
| Project Name: River PNC | | | |
| Project No.: 30167840.00030 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line) | Collection Date(s) | Collection Time (Military) | Grab / C-Composite | Matrix: Aqueous | Matrix: Soil | Matrix: Non-Aqueous | No. of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | Other | Other Analysis | PFAS - Per/Poly Fluoroalkyl Substances by ASTM D7979-17 Modified | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWM16-30_GW-050123 | 5/1/23 | 0838 | G | 2 | | | 2 | | | | | | | X | |
| MWM4-05_GW-050123 | 5/1/23 | 1132 | G | 2 | | | 2 | | | | | | | X | |
| MWM32-01_GW-050123 | 5/1/23 | 1250 | G | 2 | | | 2 | | | | | | | X | |
| MWM2-28_GW-050123 | 5/1/23 | 1413 | G | 2 | | | 2 | | | | | | | X | |
| MWM2-22_GW-050123 | 5/1/23 | 1505 | G | 2 | | | 2 | | | | | | | X | |
| DUP-02_GW-050123 | 5/1/23 | — | G | 2 | | | 2 | | | | | | | X | |
| tripblank | 5/1/23 | 1540 | G | 1 | | | 1 | | | | | | | X | tripblank |

Turn Around Time Required (Prior lab approval required for expedited TAT.): X Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client X Disposal by Lab

Possible Hazard Identification: X Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Guy | 5/1/23 | 1625 | 1. Received by: FedEx | 5/1/23 | 1625 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: fedex | 5-2-23 | 950 | 4. Laboratory received by: Keyanna Williams | 5/2/23 | 950 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on Ice (Circle): Yes No Ice Pack — Receipt Temp: 3.6 °C — Temp Blank: ☐ Y ☐ N

DISTRIBUTION: WHITE & YELLOW-Return to Laboratory with Sample(s); PINK-Field/Client Copy

Document Number: ME009N2-01



PACE ANALYTICAL SERVICES, LLC

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-001**

Description: **MWM16-30_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 0838** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 0211 | ARC2 | 05/19/2023 1219 | 75726 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.7 | 1.9 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.7 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.7 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.7 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.7 | 1.9 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.7 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.7 | 1.9 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.7 | 1.9 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.7 | 1.9 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.0** | **JM-03** | **3.9** | **0.96** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **1.0** | **JM-03** | **3.9** | **0.96** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **4.7** | **M-03** | **3.9** | **0.96** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **12** | **QM-03** J | **3.9** | **0.96** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **6.7** | | **3.9** | **0.96** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **7.7** | **M-03** | **3.9** | **0.96** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **3.8** | **JM-03** | **3.9** | **0.96** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **11** | | **3.9** | **0.96** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.96 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **1.3** | **JM-03** | **3.9** | **0.96** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 295 | 50-150 |
| 13C2_6:2FTS | N | 166 | 50-150 |
| 13C2_8:2FTS | | 110 | 50-150 |
| 13C2_PFDoA | | 88 | 50-150 |
| 13C2_PFTeDA | | 92 | 50-150 |
| 13C3_PFBS | | 95 | 50-150 |
| 13C3_PFHxS | | 101 | 50-150 |
| 13C3-HFPO-DA | | 88 | 50-150 |
| 13C4_PFBA | N | 31 | 50-150 |
| 13C4_PFHpA | | 105 | 50-150 |
| 13C5_PFHxA | | 93 | 50-150 |
| 13C5_PFPeA | | 67 | 50-150 |
| 13C6_PFDA | | 99 | 50-150 |
| 13C7_PFUdA | | 93 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-001**

Description: **MWM16-30_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 0838** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 105 | 50-150 |
| 13C8_PFOS | | 97 | 50-150 |
| 13C8_PFOSA | | 98 | 50-150 |
| 13C9_PFNA | | 109 | 50-150 |
| d5-EtFOSAA | | 95 | 50-150 |
| d3-MeFOSAA | | 103 | 50-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-002**

Description: **MWM4-05_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1132** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 0223 | ARC2 | 05/19/2023 1219 | 75726 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | ~~QM-03~~ | 7.4 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | ~~Q~~ | 7.4 | 1.9 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **2.5** | **~~JM-03~~** | **3.7** | **0.93** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **2.2** | **~~JM-03~~** | **3.7** | **0.93** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **8.5** | **~~M-03~~** | **3.7** | **0.93** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **2.6** | **~~JM-03~~** | **3.7** | **0.93** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **3.5** | **~~JM-03~~** | **3.7** | **0.93** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **4.2** | **~~M-03~~** | **3.7** | **0.93** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **3.8** | | **3.7** | **0.93** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.93 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **2.2** | **~~JM-03~~** | **3.7** | **0.93** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 251 | 50-150 |
| 13C2_6:2FTS | N | 169 | 50-150 |
| 13C2_8:2FTS | | 119 | 50-150 |
| 13C2_PFDoA | | 88 | 50-150 |
| 13C2_PFTeDA | | 93 | 50-150 |
| 13C3_PFBS | | 99 | 50-150 |
| 13C3_PFHxS | | 102 | 50-150 |
| 13C3-HFPO-DA | | 92 | 50-150 |
| 13C4_PFBA | | 55 | 50-150 |
| 13C4_PFHpA | | 105 | 50-150 |
| 13C5_PFHxA | | 102 | 50-150 |
| 13C5_PFPeA | | 85 | 50-150 |
| 13C6_PFDA | | 105 | 50-150 |
| 13C7_PFUdA | | 95 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-002**

Description: **MWM4-05_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1132** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 105 | 50-150 |
| 13C8_PFOS | | 95 | 50-150 |
| 13C8_PFOSA | | 99 | 50-150 |
| 13C9_PFNA | | 107 | 50-150 |
| d5-EtFOSAA | | 96 | 50-150 |
| d3-MeFOSAA | | 107 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-003**

Description: **MWM32-01_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1250** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 0236 | ARC2 | 05/19/2023 1219 | 75726 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 234 | 50-150 |
| 13C2_6:2FTS | N | 214 | 50-150 |
| 13C2_8:2FTS | N | 186 | 50-150 |
| 13C2_PFDoA | | 106 | 50-150 |
| 13C2_PFTeDA | | 103 | 50-150 |
| 13C3_PFBS | | 104 | 50-150 |
| 13C3_PFHxS | | 106 | 50-150 |
| 13C3-HFPO-DA | | 98 | 50-150 |
| 13C4_PFBA | | 86 | 50-150 |
| 13C4_PFHpA | | 110 | 50-150 |
| 13C5_PFHxA | | 110 | 50-150 |
| 13C5_PFPeA | | 97 | 50-150 |
| 13C6_PFDA | | 112 | 50-150 |
| 13C7_PFUdA | | 113 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-003**

Description: **MWM32-01_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1250** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 108 | 50-150 |
| 13C8_PFOS | | 99 | 50-150 |
| 13C8_PFOSA | | 105 | 50-150 |
| 13C9_PFNA | | 111 | 50-150 |
| d5-EtFOSAA | | 124 | 50-150 |
| d3-MeFOSAA | | 134 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-004**

Description: **MWM2-28_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1413** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 0249 | ARC2 | 05/19/2023 1219 | 75726 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)** | **39108-34-4** | **PFAS by ID SOP** | **2.3** | **JQM-03** | **7.0** | **1.8** | **ng/L** | **1** |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **3.9** | **JQM-03** | **7.0** | **1.8** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.7** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **1.1** | **JM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **4.2** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **14** | **QM-03 J** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-decanoic acid (PFDA)** | **335-76-2** | **PFAS by ID SOP** | **2.2** | **JM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **8.1** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **16** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **5.0** | | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **18** | | **3.5** | **0.88** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **14** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **56** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 331 | 50-150 |
| 13C2_6:2FTS | N | 312 | 50-150 |
| 13C2_8:2FTS | N | 359 | 50-150 |
| 13C2_PFDoA | | 103 | 50-150 |
| 13C2_PFTeDA | | 104 | 50-150 |
| 13C3_PFBS | | 89 | 50-150 |
| 13C3_PFHxS | | 92 | 50-150 |
| 13C3-HFPO-DA | | 74 | 50-150 |
| 13C4_PFBA | N | 29 | 50-150 |
| 13C4_PFHpA | | 82 | 50-150 |
| 13C5_PFHxA | | 77 | 50-150 |
| 13C5_PFPeA | | 57 | 50-150 |
| 13C6_PFDA | | 93 | 50-150 |
| 13C7_PFUdA | | 105 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-004**

Description: **MWM2-28_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1413** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 82 | 50-150 |
| 13C8_PFOS | | 93 | 50-150 |
| 13C8_PFOSA | | 80 | 50-150 |
| 13C9_PFNA | | 93 | 50-150 |
| d5-EtFOSAA | | 131 | 50-150 |
| d3-MeFOSAA | | 119 | 50-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-005**

Description: **MWM2-22_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1505** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 0302 | ARC2 | 05/19/2023 1219 | 75726 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 80 | 20 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **27** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **15** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **28** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **28** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **26** | **JM-03** | **40** | **10** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 40 | 10 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **77** | **M-03** | **40** | **10** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 221 | 50-150 |
| 13C2_6:2FTS | N | 183 | 50-150 |
| 13C2_8:2FTS | N | 171 | 50-150 |
| 13C2_PFDoA | | 108 | 50-150 |
| 13C2_PFTeDA | | 105 | 50-150 |
| 13C3_PFBS | | 105 | 50-150 |
| 13C3_PFHxS | | 110 | 50-150 |
| 13C3-HFPO-DA | | 99 | 50-150 |
| 13C4_PFBA | | 81 | 50-150 |
| 13C4_PFHpA | | 111 | 50-150 |
| 13C5_PFHxA | | 109 | 50-150 |
| 13C5_PFPeA | | 95 | 50-150 |
| 13C6_PFDA | | 113 | 50-150 |
| 13C7_PFUdA | | 113 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-005**

Description: **MWM2-22_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1505** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 107 | 50-150 |
| 13C8_PFOS | | 102 | 50-150 |
| 13C8_PFOSA | | 108 | 50-150 |
| 13C9_PFNA | | 113 | 50-150 |
| d5-EtFOSAA | | 128 | 50-150 |
| d3-MeFOSAA | | 136 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-006**

Description: **DUP-02_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 05/24/2023 0314 | ARC2 | 05/19/2023 1219 | 75726 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.4 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.4 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.0** | **JM-03** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | M-03 | 3.7 | 0.92 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **4.6** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **11** | **Q** J | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **6.5** | | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **7.0** | | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **4.1** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **13** | **M-03** | **3.7** | **0.92** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.92 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **1.2** | **JM-03** | **3.7** | **0.92** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 292 | 50-150 |
| 13C2_6:2FTS | N | 167 | 50-150 |
| 13C2_8:2FTS | | 110 | 50-150 |
| 13C2_PFDoA | | 88 | 50-150 |
| 13C2_PFTeDA | | 91 | 50-150 |
| 13C3_PFBS | | 97 | 50-150 |
| 13C3_PFHxS | | 102 | 50-150 |
| 13C3-HFPO-DA | | 86 | 50-150 |
| 13C4_PFBA | N | 31 | 50-150 |
| 13C4_PFHpA | | 105 | 50-150 |
| 13C5_PFHxA | | 92 | 50-150 |
| 13C5_PFPeA | | 66 | 50-150 |
| 13C6_PFDA | | 103 | 50-150 |
| 13C7_PFUdA | | 92 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-006**

Description: **DUP-02_GW-050123** Matrix: **Aqueous**

Date Sampled: **05/01/2023** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 105 | 50-150 |
| 13C8_PFOS | | 98 | 50-150 |
| 13C8_PFOSA | | 99 | 50-150 |
| 13C9_PFNA | | 109 | 50-150 |
| d5-EtFOSAA | | 93 | 50-150 |
| d3-MeFOSAA | | 106 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-007**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1540** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 2338 | ARC2 | 05/19/2023 1238 | 75750 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | M-03 | 6.9 | 1.7 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.4 | 0.86 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 92 | 50-150 |
| 13C2_6:2FTS | | 86 | 50-150 |
| 13C2_8:2FTS | | 96 | 50-150 |
| 13C2_PFDoA | | 93 | 50-150 |
| 13C2_PFTeDA | | 79 | 50-150 |
| 13C3_PFBS | | 95 | 50-150 |
| 13C3_PFHxS | | 91 | 50-150 |
| 13C3-HFPO-DA | | 95 | 50-150 |
| 13C4_PFBA | | 94 | 50-150 |
| 13C4_PFHpA | | 95 | 50-150 |
| 13C5_PFHxA | | 89 | 50-150 |
| 13C5_PFPeA | | 96 | 50-150 |
| 13C6_PFDA | | 94 | 50-150 |
| 13C7_PFUdA | | 95 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE02015-007**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **05/01/2023 1540** Project Name: **Racer PNC**

Date Received: **05/02/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 95 | 50-150 |
| 13C8_PFOS | | 89 | 50-150 |
| 13C8_PFOSA | | 91 | 50-150 |
| 13C9_PFNA | | 87 | 50-150 |
| d5-EtFOSAA | | 83 | 50-150 |
| d3-MeFOSAA | | 89 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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Racer

# DATA REVIEW

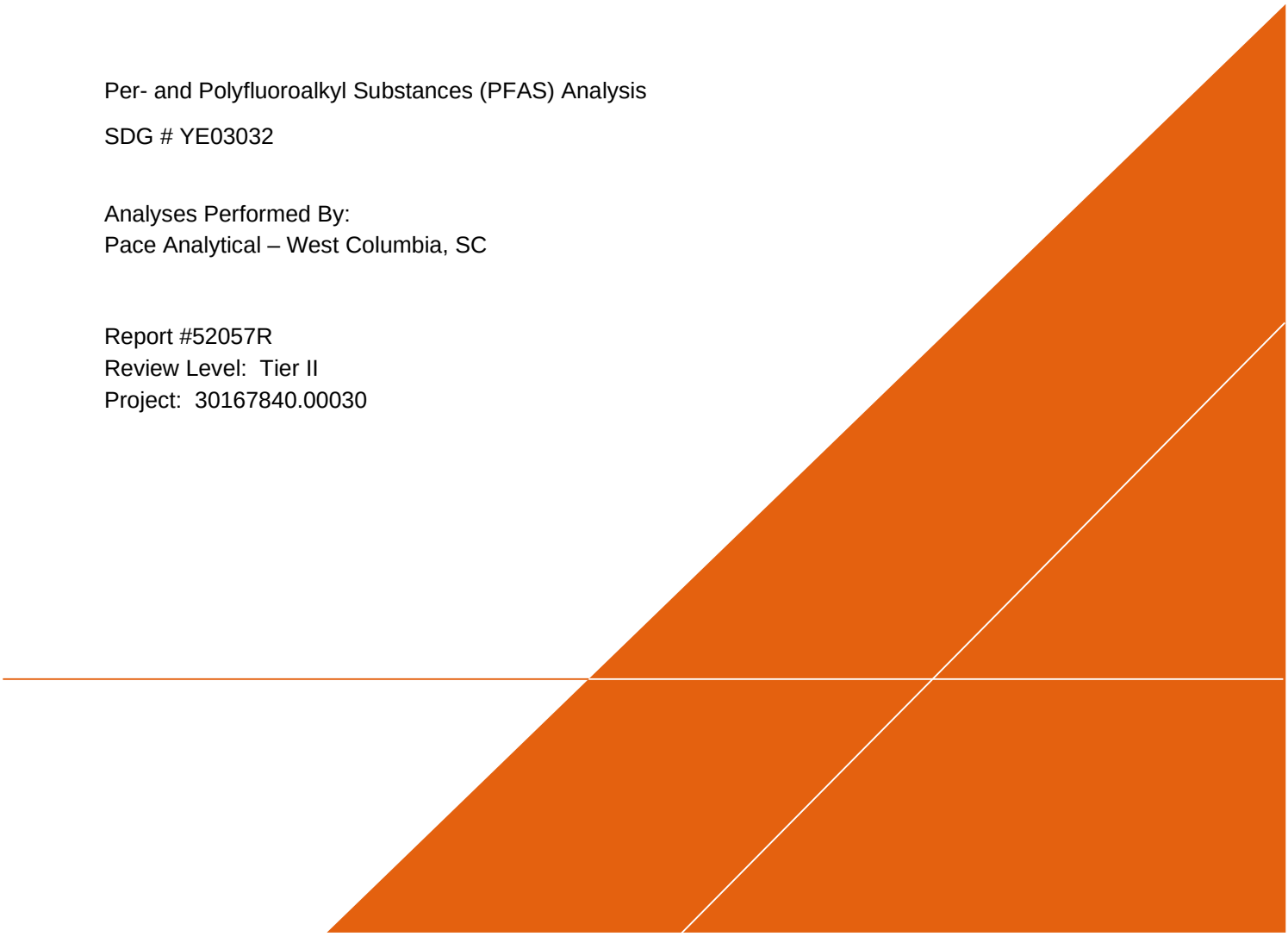
## Pontiac North Campus, MI

Per- and Polyfluoroalkyl Substances (PFAS) Analysis

SDG # YE03032

Analyses Performed By:
Pace Analytical – West Columbia, SC

Report #52057R
Review Level: Tier II
Project: 30167840.00030



# SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #YE03032 for samples collected in association with the Racer PNC, MI Site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

| Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | PFAS | SVOC | PCB | MET | MISC |
| MW-03-17-GW | YE03032-1 | Water | 05/02/23 | | X | | | | |
| MWM32-09-GW | YE03032-2 | Water | 05/02/23 | | X | | | | |
| EB-01 | YE03032-3 | Water | 05/02/23 | | X | | | | |
| MWF16-26-GW | YE03032-4 | Water | 05/02/23 | | X | | | | |
| MWW1-04-GW | YE03032-5 | Water | 05/02/23 | | X | | | | |
| DUP-03-GW | YE03032-6 | Water | 05/02/23 | MW-03-17-GW | X | | | | |
| TRIP BLANK | YE03032-7 | Water | 05/02/23 | | X | | | | |

## ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

| Items Reviewed | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| 1. Sample receipt condition | | X | | X | |
| 2. Requested analyses and sample results | | X | | X | |
| 3. Master tracking list | | X | | X | |
| 4. Methods of analysis | | X | | X | |
| 5. Reporting limits | | X | | X | |
| 6. Sample collection date | | X | | X | |
| 7. Laboratory sample received date | | X | | X | |
| 8. Sample preservation verification (as applicable) | | X | | X | |
| 9. Sample preparation/extraction/analysis dates | | X | | X | |
| 10. Fully executed Chain-of-Custody (COC) form | | X | | X | |
| 11. Narrative summary of QA or sample problems provided | | X | | X | |
| 12. Data Package Completeness and Compliance | | X | | X | |

Note:
QA - Quality Assurance

## ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) Modified Method 537. Data were reviewed in accordance with the USEPA National Functional Guidelines for Organic Superfund Methods Data Review, EPA 540-R-20-005, November 2020 (with reference to the historical USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999 as appropriate) and USEPA Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537, EPA 910-R-18-001, November 2018; and Department of Defense (DoD) Quality Systems Manual (QSM) 5.3, DoD Final General Data Validation Guidelines, November 2019.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
  - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
  - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
  - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and

provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

## PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ANALYSIS

### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

| Method | Matrix | Holding Time | Preservation |
|---|---|---|---|
| USEPA modified Method 537 | Water | 28 days to extraction; 28 days from extraction to analysis | Cool to <6 °C |

All samples were initially analyzed within the specified holding time criteria.

### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, field, and equipment blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Equipment blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

### 3. Extracted Internal Standard (EIS)/Surrogate Compounds

Labeled standards must be added to all field samples and QC samples prior to extraction. EIS recoveries must be within DoD QSM 5.3 specified limits of 50% to150%.

Sample locations associated with EIS exhibiting recoveries outside of the control limits are presented in the following table.

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MW-03-17-GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| | 13C4-PFBA | Perfluoro-n-butanoic acid (PFBA) | < 50% but > 20% |
| MWW1-04-GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWW1-04-GW | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| | 13C4-PFBA | Perfluoro-n-butanoic acid (PFBA) | <20% |
| DUP-03-GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| | 13C4-PFBA | Perfluoro-n-butanoic acid (PFBA) | < 50% but > 20% |

The criteria used to evaluate the EIS recoveries are presented in the following table. In the case of an EIS deviation, the sample results associated with the EIS are qualified as documented in the table below.

| Control Limit | Sample Result | Qualification |
|---|---|---|
| < 50% but > 20% | Non-detect | UJ |
| | Detect | J |
| > 150% | Non-detect | No Action |
| | Detect | J |
| < 20% | Non-detect | R |
| | Detect | R |

### 4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within 50-150%. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within 30%.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A site-specific MS/MSD was not included in the data package.

### 5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

### 6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent

sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

| Sample ID/Duplicate ID | Compound | Sample Result | Duplicate Result | RPD |
|---|---|---|---|---|
| MW-03-17-GW15 / DUP-03-GW | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | 8.8 | 9.6 | AC |
| | Perfluorobutanesulfonic acid (PFBS) | 5.2 | 4.0 | AC |
| | Perfluoroheptanesulfonic Acid (PFHpS) | 4.7 | 5.1 | AC |
| | Perfluoropentanesulfonic acid (PFPeS) | 4.0 | 3.8 | AC |
| | Perfluorohexanesulfonic acid (PFHxS) | 58 | 57 | 1.7% |
| | Perfluorobutanoic acid (PFBA) | 18 | 17 | 5.7% |
| | Perfluoroheptanoic acid (PFHpA) | 9.1 | 8.8 | AC |
| | Perfluorohexanoic acid (PFHxA) | 14 | 15 | AC |
| | Perfluorononanoic acid (PFNA) | 2.4 J | 2.2 J | AC |
| | Perfluorooctanoic acid (PFOA) | 27 | 27 | 0.0% |
| | Perfluoropentanoic acid (PFPeA) | 16 | 16 | 0.0% |
| | Perfluorooctane sulfonic acid (PFOS) | 140 | 140 | 0.0% |

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

## 7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

## DATA VALIDATION CHECKLIST FOR PFAs

| PFAs: USEPA modified Method 537 | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| **LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)** | | | | | |
| **Tier II Validation** | | | | | |
| Holding times | | X | | X | |
| Reporting limits (units) | | X | | X | |
| Blanks | | | | | |
| A. Method blanks | | X | | X | |
| B. Equipment blanks | | X | | X | |
| C. Trip blanks | | X | | X | |
| Laboratory Control Sample (LCS) %R | | X | | X | |
| Laboratory Control Sample Duplicate(LCSD) %R | X | | | | X |
| LCS/LCSD Precision (RPD) | X | | | | X |
| Matrix Spike (MS) %R | X | | | | X |
| Matrix Spike Duplicate (MSD) %R | X | | | | X |
| MS/MSD Precision (RPD) | X | | | | X |
| Field Duplicate (RPD) | | X | | X | |
| Extracted Internal Standards (EIS) Recoveries | | X | X | | |
| Dilution Factor | | X | | X | |
| Moisture Content | X | | | | X |

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE: 

DATE: December 17, 2023

PEER REVIEW: Joseph C. Houser

DATE: December 19, 2023

# CHAIN OF CUSTODY

# CORRECTED SAMPLE ANALYSIS DATA SHEETS

Pace Analytical®

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www.pacelabs.com

**Number** 146506

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Tiffany Linder, Alexis Cusp | Telephone No. / E-mail: Alexis.cusp@arcadis.com, tiffany.linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: Sommer Guy | Analysis (Attach list if more space is needed): Report EGLE 28 compounds | Page 1 of 1 |
| City: Novi; State: MI; Zip Code: 48377 | Printed Name: Sommer Guy | | Lot # Bar Code (lab use only): YE03032 |
| Project Name: Racer PNC | | | |
| Project No.: 30167840.00030 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Sample Type: G=Grab C=Composite | Matrix: Aqueous | Soil/Solid | Oil | Biota/Animal | No. of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Methanol | Other: Filtered (Y/N) | Analysis: Report EGLE 28 compounds per QSM 5.1 | Lab ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-03-17_GW-050223 | 5/2/23 | 0918 | G | 2 | | | | 2 | | | | | | | | X | |
| MWM32-09_GW-050223 | 5/2/23 | 1053 | G | 2 | | | | 2 | | | | | | | | X | |
| EB-01-050223 | 5/2/23 | 1105 | G | 2 | | | | 2 | | | | | | | | X | |
| MWF16-26_GW-050223 | 5/2/23 | 1155 | G | 2 | | | | 2 | | | | | | | | X | |
| MWW1-04_GW-050223 | 5/2/23 | 1308 | G | 2 | | | | 2 | | | | | | | | X | |
| Dup-03_GW-050223 | 5/2/23 | — | G | 2 | | | | 2 | | | | | | | | X | |
| tripblank | 5/2/23 | 1320 | G | 1 | | | | 1 | | | | | | | | X | tripblank |

Turn Around Time Required (Prior lab approval required for expedited TAT.): [X] Standard [ ] Rush (Specify)

Sample Disposal: [ ] Return to Client [X] Disposal by Lab

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison [ ] Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Guy | 5/2/23 | 1420 | 1. Received by: FedEx | 5/2/23 | 1420 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | 5/3/23 | 0945 | 4. Laboratory received by: Jennifer N Parker | 5/3/23 | 0945 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on ice (Circle): (Yes) No; Ice Pack:; Receipt Temp. 3.2 °C; Temp Blank: [ ] Y [X] N

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: ME003N2-01



PACE ANALYTICAL SERVICES, LLC

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-001**

Description: **MW-03-17-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 0918** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 1303 | ARC2 | 05/23/2023 1402 | 75967 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.8 | 2.0 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **8.8** | **Q** J | **7.8** | **2.0** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.8 | 2.0 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **5.2** | ~~M-03~~ | **3.9** | **0.98** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **4.7** | | **3.9** | **0.98** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **4.0** | ~~M-03~~ | **3.9** | **0.98** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **58** | | **3.9** | **0.98** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **18** | ~~QM-03~~ J | **3.9** | **0.98** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **9.1** | | **3.9** | **0.98** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **14** | ~~M-03~~ | **3.9** | **0.98** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **2.4** | ~~JM-03~~ | **3.9** | **0.98** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **27** | | **3.9** | **0.98** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **16** | ~~M-03~~ | **3.9** | **0.98** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.98 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **140** | ~~M-03~~ | **3.9** | **0.98** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 272 | 50-150 |
| 13C2_6:2FTS | N | 261 | 50-150 |
| 13C2_8:2FTS | N | 272 | 50-150 |
| 13C2_PFDoA | | 109 | 50-150 |
| 13C2_PFTeDA | | 90 | 50-150 |
| 13C3_PFBS | | 91 | 50-150 |
| 13C3_PFHxS | | 97 | 50-150 |
| 13C3-HFPO-DA | | 82 | 50-150 |
| 13C4_PFBA | N | 34 | 50-150 |
| 13C4_PFHpA | | 92 | 50-150 |
| 13C5_PFHxA | | 80 | 50-150 |
| 13C5_PFPeA | | 63 | 50-150 |
| 13C6_PFDA | | 112 | 50-150 |
| 13C7_PFUdA | | 120 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-001**

Description: **MW-03-17-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 0918** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 102 | 50-150 |
| 13C8_PFOS | | 95 | 50-150 |
| 13C8_PFOSA | | 99 | 50-150 |
| 13C9_PFNA | | 108 | 50-150 |
| d5-EtFOSAA | | 127 | 50-150 |
| d3-MeFOSAA | | 123 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-002**

Description: **MWM32-09-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1053** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 1316 | ARC2 | 05/23/2023 1402 | 75967 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 130 | 50-150 |
| 13C2_6:2FTS | | 103 | 50-150 |
| 13C2_8:2FTS | | 111 | 50-150 |
| 13C2_PFDoA | | 90 | 50-150 |
| 13C2_PFTeDA | | 92 | 50-150 |
| 13C3_PFBS | | 106 | 50-150 |
| 13C3_PFHxS | | 96 | 50-150 |
| 13C3-HFPO-DA | | 100 | 50-150 |
| 13C4_PFBA | | 69 | 50-150 |
| 13C4_PFHpA | | 99 | 50-150 |
| 13C5_PFHxA | | 94 | 50-150 |
| 13C5_PFPeA | | 89 | 50-150 |
| 13C6_PFDA | | 97 | 50-150 |
| 13C7_PFUdA | | 94 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-002**

Description: **MWM32-09-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1053** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 50-150 |
| 13C8_PFOS | | 90 | 50-150 |
| 13C8_PFOSA | | 91 | 50-150 |
| 13C9_PFNA | | 92 | 50-150 |
| d5-EtFOSAA | | 84 | 50-150 |
| d3-MeFOSAA | | 92 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-003**

Description: **EB-01-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1105** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 1329 | ARC2 | 05/23/2023 1402 | 75967 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 0.94 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 106 | 50-150 |
| 13C2_6:2FTS | | 101 | 50-150 |
| 13C2_8:2FTS | | 104 | 50-150 |
| 13C2_PFDoA | | 96 | 50-150 |
| 13C2_PFTeDA | | 92 | 50-150 |
| 13C3_PFBS | | 106 | 50-150 |
| 13C3_PFHxS | | 99 | 50-150 |
| 13C3-HFPO-DA | | 102 | 50-150 |
| 13C4_PFBA | | 96 | 50-150 |
| 13C4_PFHpA | | 101 | 50-150 |
| 13C5_PFHxA | | 98 | 50-150 |
| 13C5_PFPeA | | 96 | 50-150 |
| 13C6_PFDA | | 101 | 50-150 |
| 13C7_PFUdA | | 102 | 50-150 |

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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# PFAS by LC/MS/MS

| | | | |
|---|---|---|---|
| Client: **Arcadis U.S., Inc.** | | Laboratory ID: **YE03032-003** |
| Description: **EB-01-050223** | | Matrix: **Aqueous** |
| Date Sampled: **05/02/2023 1105** | Project Name: **Racer PNC** | |
| Date Received: **05/03/2023** | Project Number: **30167840.00030** | |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 106 | 50-150 |
| 13C8_PFOS | | 99 | 50-150 |
| 13C8_PFOSA | | 92 | 50-150 |
| 13C9_PFNA | | 96 | 50-150 |
| d5-EtFOSAA | | 94 | 50-150 |
| d3-MeFOSAA | | 96 | 50-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-004**

Description: **MWF16-26-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1155** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 1341 | ARC2 | 05/23/2023 1402 | 75967 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **15** | ~~**M-03**~~ | **3.6** | **0.89** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **14** | | **3.6** | **0.89** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **24** | | **3.6** | **0.89** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **8.6** | | **3.6** | **0.89** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **7.3** | | **3.6** | **0.89** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **17** | ~~**M-03**~~ | **3.6** | **0.89** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **34** | | **3.6** | **0.89** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **12** | | **3.6** | **0.89** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.6 | 0.89 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 113 | 50-150 |
| 13C2_6:2FTS | | 96 | 50-150 |
| 13C2_8:2FTS | | 105 | 50-150 |
| 13C2_PFDoA | | 91 | 50-150 |
| 13C2_PFTeDA | | 96 | 50-150 |
| 13C3_PFBS | | 118 | 50-150 |
| 13C3_PFHxS | | 101 | 50-150 |
| 13C3-HFPO-DA | | 101 | 50-150 |
| 13C4_PFBA | | 79 | 50-150 |
| 13C4_PFHpA | | 101 | 50-150 |
| 13C5_PFHxA | | 97 | 50-150 |
| 13C5_PFPeA | | 95 | 50-150 |
| 13C6_PFDA | | 101 | 50-150 |
| 13C7_PFUdA | | 95 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-004**

Description: **MWF16-26-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1155** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 98 | 50-150 |
| 13C8_PFOS | | 98 | 50-150 |
| 13C8_PFOSA | | 99 | 50-150 |
| 13C9_PFNA | | 95 | 50-150 |
| d5-EtFOSAA | | 92 | 50-150 |
| d3-MeFOSAA | | 95 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-005**

Description: **MWW1-04-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1308** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 1354 | ARC2 | 05/23/2023 1402 | 75967 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.1 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.1 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.1 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| **N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)** | **2991-50-6** | **PFAS by ID SOP** | **8.9** | **M-03** | **7.1** | **1.8** | **ng/L** | **1** |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | M-03 | 7.1 | 1.8 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | M-03 | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-1-octanesulfonamide (PFOSA)** | **754-91-6** | **PFAS by ID SOP** | **1.2** | **JM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **4.1** | **M-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | Q | 3.5 | 0.88 | ng/L | 1 R |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | M-03 | 3.5 | 0.88 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **2.8** | **JM-03** | **3.5** | **0.88** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **98** | | **3.5** | **0.88** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 267 | 50-150 |
| 13C2_6:2FTS | N | 277 | 50-150 |
| 13C2_8:2FTS | N | 281 | 50-150 |
| 13C2_PFDoA | | 104 | 50-150 |
| 13C2_PFTeDA | | 83 | 50-150 |
| 13C3_PFBS | | 91 | 50-150 |
| 13C3_PFHxS | | 93 | 50-150 |
| 13C3-HFPO-DA | | 80 | 50-150 |
| 13C4_PFBA | N | 13 | 50-150 |
| 13C4_PFHpA | | 91 | 50-150 |
| 13C5_PFHxA | | 78 | 50-150 |
| 13C5_PFPeA | | 65 | 50-150 |
| 13C6_PFDA | | 105 | 50-150 |
| 13C7_PFUdA | | 110 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-005**

Description: **MWW1-04-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1308** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 95 | 50-150 |
| 13C8_PFOS | | 93 | 50-150 |
| 13C8_PFOSA | | 93 | 50-150 |
| 13C9_PFNA | | 102 | 50-150 |
| d5-EtFOSAA | | 116 | 50-150 |
| d3-MeFOSAA | | 115 | 50-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-006**

Description: **DUP-03-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 1407 | ARC2 | 05/23/2023 1402 | 75967 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.2 | 1.8 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **9.6** | **Q** J | **7.2** | **1.8** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.2 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **4.0** | ~~M-03~~ | **3.6** | **0.91** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **5.1** | | **3.6** | **0.91** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **3.8** | ~~M-03~~ | **3.6** | **0.91** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **57** | | **3.6** | **0.91** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **17** | ~~QM-03~~ J | **3.6** | **0.91** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **8.8** | | **3.6** | **0.91** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **15** | | **3.6** | **0.91** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **2.2** | **J** | **3.6** | **0.91** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **27** | | **3.6** | **0.91** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **16** | ~~M-03~~ | **3.6** | **0.91** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.91 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **140** | ~~M-03~~ | **3.6** | **0.91** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 269 | 50-150 |
| 13C2_6:2FTS | N | 263 | 50-150 |
| 13C2_8:2FTS | N | 268 | 50-150 |
| 13C2_PFDoA | | 108 | 50-150 |
| 13C2_PFTeDA | | 87 | 50-150 |
| 13C3_PFBS | | 91 | 50-150 |
| 13C3_PFHxS | | 95 | 50-150 |
| 13C3-HFPO-DA | | 80 | 50-150 |
| 13C4_PFBA | N | 33 | 50-150 |
| 13C4_PFHpA | | 95 | 50-150 |
| 13C5_PFHxA | | 78 | 50-150 |
| 13C5_PFPeA | | 61 | 50-150 |
| 13C6_PFDA | | 115 | 50-150 |
| 13C7_PFUdA | | 118 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-006**

Description: **DUP-03-GW-050223** Matrix: **Aqueous**

Date Sampled: **05/02/2023** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 102 | 50-150 |
| 13C8_PFOS | | 97 | 50-150 |
| 13C8_PFOSA | | 97 | 50-150 |
| 13C9_PFNA | | 108 | 50-150 |
| d5-EtFOSAA | | 123 | 50-150 |
| d3-MeFOSAA | | 116 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-007**

Description: **TRIP BLANK** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1320** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP QSM B-15 | 1 | 06/01/2023 1419 | ARC2 | 05/23/2023 1402 | 75967 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.5 | 0.88 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 94 | 50-150 |
| 13C2_6:2FTS | | 93 | 50-150 |
| 13C2_8:2FTS | | 99 | 50-150 |
| 13C2_PFDoA | | 90 | 50-150 |
| 13C2_PFTeDA | | 89 | 50-150 |
| 13C3_PFBS | | 102 | 50-150 |
| 13C3_PFHxS | | 96 | 50-150 |
| 13C3-HFPO-DA | | 97 | 50-150 |
| 13C4_PFBA | | 92 | 50-150 |
| 13C4_PFHpA | | 100 | 50-150 |
| 13C5_PFHxA | | 92 | 50-150 |
| 13C5_PFPeA | | 92 | 50-150 |
| 13C6_PFDA | | 100 | 50-150 |
| 13C7_PFUdA | | 102 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YE03032-007**

Description: **TRIP BLANK** Matrix: **Aqueous**

Date Sampled: **05/02/2023 1320** Project Name: **Racer PNC**

Date Received: **05/03/2023** Project Number: **30167840.00030**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 50-150 |
| 13C8_PFOS | | 91 | 50-150 |
| 13C8_PFOSA | | 93 | 50-150 |
| 13C9_PFNA | | 94 | 50-150 |
| d5-EtFOSAA | | 92 | 50-150 |
| d3-MeFOSAA | | 94 | 50-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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Racer

# DATA REVIEW

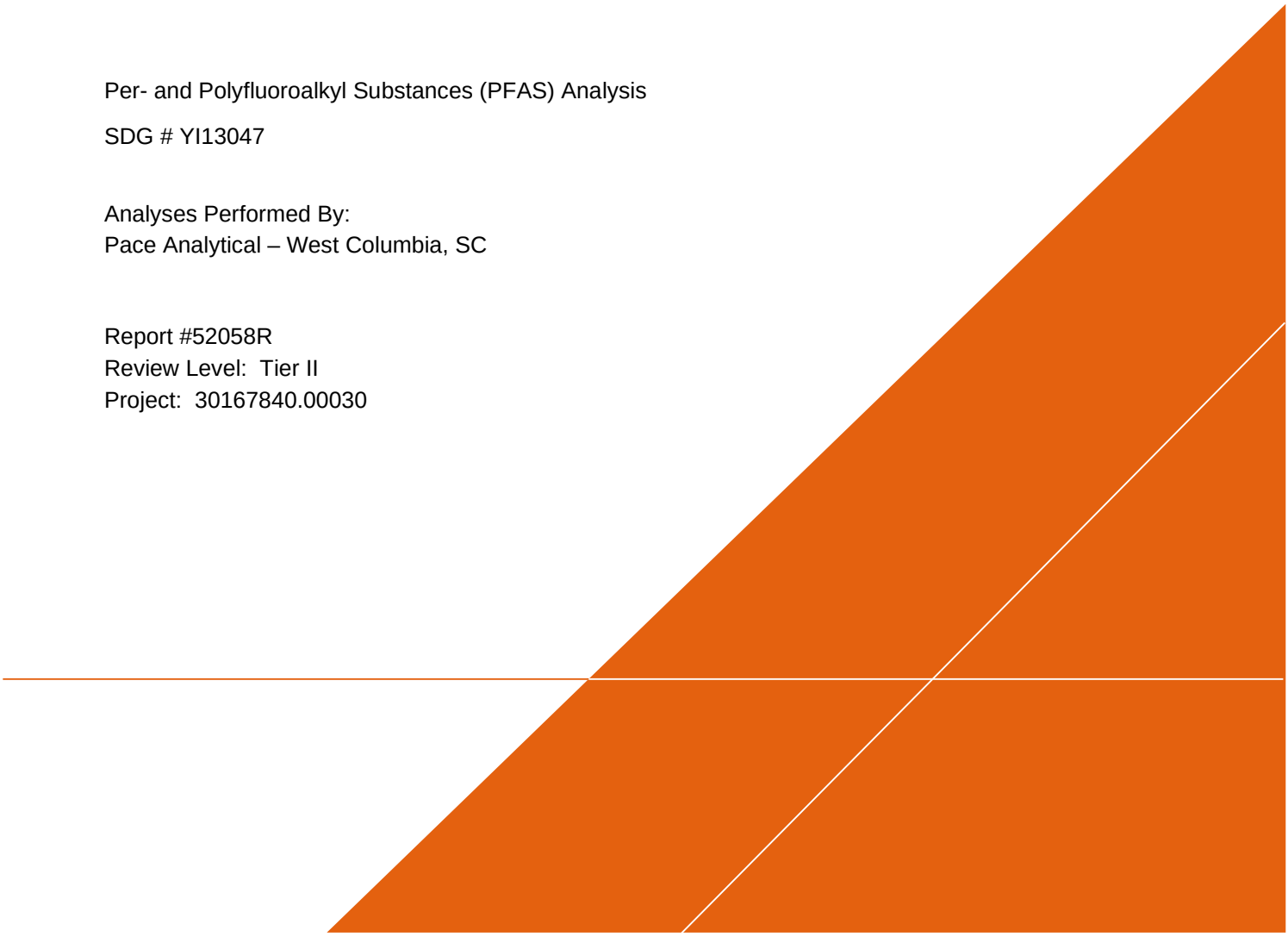
## Pontiac North Campus, MI

Per- and Polyfluoroalkyl Substances (PFAS) Analysis

SDG # YI13047

Analyses Performed By:
Pace Analytical – West Columbia, SC

Report #52058R
Review Level: Tier II
Project: 30167840.00030



# SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #YI13047 for samples collected in association with the Racer PNC, MI Site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

| Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | PFAS | SVOC | PCB | MET | MISC |
| MWF16-25_GW | YI13047-1 | Water | 09/12/23 | | X | | | | |
| Trip Blank | YI13047-2 | Water | 09/12/23 | | X | | | | |
| MWF16-26_GW | YI13047-3 | Water | 09/12/23 | | X | | | | |
| MW-05-18_GW | YI13047-4 | Water | 09/12/23 | | X | | | | |
| MW-02-17_GW | YI13047-5 | Water | 09/12/23 | | X | | | | |
| MWF12-02R_GW | YI13047-6 | Water | 09/12/23 | | X | | | | |
| MWOS-09R_GW | YI13047-7 | Water | 09/12/23 | | X | | | | |
| MWF7-02_GW | YI13047-8 | Water | 09/12/23 | | X | | | | |
| MWF15-01_GW | YI13047-9 | Water | 09/12/23 | | X | | | | |
| MWF16-23_GW | YI13047-10 | Water | 09/12/23 | | X | | | | |
| MWOS-10_GW | YI13047-11 | Water | 09/12/23 | | X | | | | |
| EB-03 | YI13047-12 | Water | 09/12/23 | | X | | | | |

## ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

| Items Reviewed | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| 1. Sample receipt condition | | X | | X | |
| 2. Requested analyses and sample results | | X | | X | |
| 3. Master tracking list | | X | | X | |
| 4. Methods of analysis | | X | | X | |
| 5. Reporting limits | | X | | X | |
| 6. Sample collection date | | X | | X | |
| 7. Laboratory sample received date | | X | | X | |
| 8. Sample preservation verification (as applicable) | | X | | X | |
| 9. Sample preparation/extraction/analysis dates | | X | | X | |
| 10. Fully executed Chain-of-Custody (COC) form | | X | | X | |
| 11. Narrative summary of QA or sample problems provided | | X | | X | |
| 12. Data Package Completeness and Compliance | | X | | X | |

Note:
QA - Quality Assurance

## ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency Method 537 Modified. Data were reviewed in accordance with the method specified criteria, USEPA National Functional Guidelines NFG for Organic Superfund Methods Data Review, EPA-540-R-20-005 (November 2020), with reference to the historical (USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999, as appropriate).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

## PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ANALYSIS

### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

| Method | Matrix | Holding Time | Preservation |
|---|---|---|---|
| USEPA modified Method 537 | Water | 28 days to extraction; 28 days from extraction to analysis | Cool to <6 °C |

All samples were initially analyzed within the specified holding time criteria.

### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, field, and equipment blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Equipment blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

### 3. Extracted Internal Standard (EIS)/Surrogate Compounds

Labeled standards must be added to all field samples and QC samples prior to extraction. EIS recoveries must be within the laboratory-established acceptance limits of ICAL midpoint standard area or area measured in the initial CCV on days when ICAL not performed.

Samples associated with EIS exhibited acceptable recoveries with the exceptions noted in the table.

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWF16-25_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| MW-05-18_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| MW-02-17_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| MWF12-02R_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWF12-02R_GW | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| MWOS-09R_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| MWF7-02_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| MWF15-01_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| MWF16-23_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| MWOS-10_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |

The criteria used to evaluate the EIS recoveries are presented in the following table. In the case of an EIS deviation, the sample results associated with the EIS are qualified as documented in the table below.

| Control Limit | Sample Result | Qualification |
|---|---|---|
| < the lower control limit (LL) but > 20% | Non-detect | UJ |
| | Detect | J |
| > the upper control limit (UL) | Non-detect | No Action |
| | Detect | J |
| < 20% | Non-detect | R |
| | Detect | J |

## 4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within 50-150%. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within 30%.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD performed on sample MWF12-02R_GW exhibited recoveries and RPDs within the control limits.

## 5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

## 6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for soil matrices.

A field duplicate was not included in the data package.

## 7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

## DATA VALIDATION CHECKLIST FOR PFAs

| PFAs: USEPA modified Method 537 | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| **LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)** | | | | | |
| **Tier II Validation** | | | | | |
| Holding times | | X | | X | |
| Reporting limits (units) | | X | | X | |
| Blanks | | | | | |
| A. Method blanks | | X | | X | |
| B. Equipment blanks | | X | | X | |
| C. Trip blanks | | X | | X | |
| Laboratory Control Sample (LCS) %R | | X | | X | |
| Laboratory Control Sample Duplicate(LCSD) %R | X | | | | X |
| LCS/LCSD Precision (RPD) | X | | | | X |
| Matrix Spike (MS) %R | | X | | X | |
| Matrix Spike Duplicate (MSD) %R | | X | | X | |
| MS/MSD Precision (RPD) | | X | | X | |
| Field Duplicate (RPD) | X | | | | X |
| Extracted Internal Standards (EIS) Recoveries | | X | X | | |
| Dilution Factor | | X | | X | |
| Moisture Content | X | | | | X |

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE: 

DATE: December 18, 2023

PEER REVIEW: Joseph C. Houser

DATE: December 19, 2023

# CHAIN OF CUSTODY

# CORRECTED SAMPLE ANALYSIS DATA SHEETS

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www.pacelabs.com

**Number** 149979

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Alexis.crisp@arcadis.com, tiffany.linder@arcadis.com | Telephone No. / E-mail: tiffany linder, Alexis Crisp | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Sommer Guy | Analysis (Attach list if more space is needed): Report EGLE 26 compounds | Page 1 of 3 |
| City: Novi; State: MI; Zip Code: 48377 | Printed Name: Sommer Guy | | Lot # Bar Code: YI13047 |
| Project Name: Racer PNC | | | |

| Project No. 30167840.00031 | P.O. No. | | Grab/Composite | Matrix: Aqueous, Solid, Non-Aqueous | No of Containers by Preservative Type: Unpres, H2SO4, HNO3, HCl, NaOH, ZnAc/NaOH, Other | Analysis: Method 537.1 mod. with isotope dilution per QSM 5.1 | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|
| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | | | | | |
| MWF16-25_GW-091223 | 9/12/23 | 1417 | G | X | 2 | X | |
| triplblank | 9/12/23 | 1400 | G | X | 1 | X | triplblank |
| MWF16-26_GW-091223 | 9/12/23 | 1525 | G | X | 2 | X | |
| MW-05-18_GW-091223 | 9/12/23 | 1642 | G | X | 2 | X | |

| Turn Around Time Required (Prior lab approval required for expedited TAT.) | Sample Disposal | Possible Hazard Identification | QC Requirements (Specify) |
|---|---|---|---|
| ☒ Standard ☐ Rush (Specify) | ☐ Return to Client ☒ Disposal by Lab | ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown | |

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Guy | 9/12/23 | 1800 | 1. Received by: FedEx | 9/12/23 | 1806 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | Date 9/13/23 | Time 0650 | 4. Laboratory received by: CJH | Date 9/12/23 | Time 0650 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack — Receipt Temp 1.3 °C — Temp Blank ☐ Y ☐N

FedEx CJH

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: MEG03N2-01



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www.pacelabs.com

**Number** 149978

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Tiffany Linder Mundt CHSP | Telephone No. / E-mail: tiffany.linder@arcadis.us Alexis.Crisp@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Garrett Link | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds | Page 2 of 3 |
| City: Novi / State: MI / Zip Code: 48377 | Printed Name: | | |
| Project Name: Racer PNC | | | |

| Project No. | P.O. No. | | Grab/Composite | Matrix | | | | No of Containers by Preservative Type | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | | Aqueous | Solid | Wipe / Assay | Other | Unpres. | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Field Filtered | 537 Mod. w/ Isotope dilution for PFOA & PFOS | | Remarks / Cooler I.D. |
| 30167840.00031 | | | | | | | | | | | | | | | | | YI13047 |
| MW-02-17_GW-091223 | 9/12/23 | 11:40 | G | X | | | | X | | | | | | | X | | |
| MWP12-02R_GW-091223 | 9/12/23 | 14:35 | G | X | | | | X | | | | | | | X | | EGLE MS/MSD |
| MW05-09R_GW-091223 | 9/12/23 | 16:35 | G | X | | | | X | | | | | | | X | | |

Turn Around Time Required (Prior lab approval required for expedited TAT.): ☒ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify):

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Jennifer Hay | 9/12/23 | 1800 | 1. Received by: FedEx | 9/12/23 | 1800 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FEDEX | Date: 9/13/23 | Time: 0850 | 4. Laboratory received by: Ch Hy | Date: 9/14/23 | Time: 0850 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle): (Yes) No Ice Pack
Receipt Temp: 1.3 °C
Temp Blank: ☐ Y ☐ N

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: MECC3N2-01



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**Number** 149976

ARCADIS

| | | | |
|---|---|---|---|
| Client: 28550 Cabot Dr #500 | Report to Contact: Tiffany Linder, Alexis Crisp | Telephone No. / E-mail: Alexis.crisp@arcadis.com, tiffany.linder@arcadis.com | Quote No. |
| Address: Arcadis | Sampler's Signature: x Lottie Jay | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds | Page 3 of 3 |
| City: Novi; State: MI; Zip Code: 48377 | Printed Name: | | |
| Project Name: Racer PNC | | | YI13047 |
| Project No.: 30167840.00031 | P.O. No. | | KES2 |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Matrix: Grab/Composite | Aqueous | Solid | Non-Aqueous | No of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Methanol | Method 537 mod. with isotope dilution per DSHS | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWF7-02_GW-091223 | 9/12/23 | 1125 | G | 2 | | | 2 | | | | | | | X | |
| MWF15-01_GW-091223 | | 1330 | G | 2 | | | 2 | | | | | | | X | |
| MWF16-23_GW-091223 | | 1505 | G | 2 | | | 2 | | | | | | | X | |
| MW05-10-GW-091223 | | 1700 | G | 2 | | | 2 | | | | | | | X | |
| EB-03-GW-091223 | | 1129 | G | 1 | | | 1 | | | | | | | X | |

Turn Around Time Required (Prior lab approval required for expedited TAT): ☒ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Lottie Jay | 9/12/23 | 1800 | 1. Received by: FedEx | 9/12/23 | 1800 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | Date 9/13/23 | Time 0850 | 4. Laboratory received by | Date 9/13/23 | Time 0850 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on Ice (Circle) (Yes) No — Ice Pack — Receipt Temp. 1.3 °C — Temp Blank ☐ Yes ☐ No

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: MF002N2-01



PACE ANALYTICAL SERVICES, LLC

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-001**

Description: **MWF16-25_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1417** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/28/2023 1643 | ARC2 | 09/19/2023 1753 | 85183 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.0 | 0.48 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.0 | 0.66 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.0 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 8.0 | 2.0 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 8.0 | 0.87 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.0 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.0 | 0.48 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.0 | 0.75 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.0 | 0.93 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **12** | | **4.0** | **0.41** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.0 | 0.78 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.0 | 0.50 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.0 | 0.71 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.0 | 0.61 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **10** | | **4.0** | **0.59** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **22** | | **4.0** | **0.55** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **13** | | **4.0** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.0 | 0.52 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.0 | 0.47 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **8.0** | | **4.0** | **0.45** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **13** | | **4.0** | **0.69** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.0 | 0.46 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **20** | | **4.0** | **0.83** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **9.2** | | **4.0** | **0.54** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.0 | 0.60 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.53 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.63 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.0 | 2.0 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 203 | 25-150 |
| 13C2_6:2FTS | N | 151 | 25-150 |
| 13C2_8:2FTS | | 98 | 25-150 |
| 13C2_PFDoA | | 88 | 25-150 |
| 13C2_PFTeDA | | 81 | 25-150 |
| 13C3_PFBS | | 115 | 25-150 |
| 13C3_PFHxS | | 112 | 25-150 |
| 13C3-HFPO-DA | | 105 | 25-150 |
| 13C4_PFBA | | 95 | 25-150 |
| 13C4_PFHpA | | 112 | 25-150 |
| 13C5_PFHxA | | 118 | 25-150 |
| 13C5_PFPeA | | 117 | 25-150 |
| 13C6_PFDA | | 111 | 25-150 |
| 13C7_PFUdA | | 100 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-001**

Description: **MWF16-25_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1417** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 136 | 25-150 |
| 13C8_PFOS | | 114 | 25-150 |
| 13C8_PFOSA | | 100 | 10-150 |
| 13C9_PFNA | | 106 | 25-150 |
| d5-EtFOSAA | | 105 | 25-150 |
| d3-MeFOSAA | | 109 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-002**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1400** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/28/2023 1654 | ARC2 | 09/19/2023 1753 | 85183 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 0.61 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.4 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.4 | 0.81 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 0.70 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.7 | 0.38 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.72 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.46 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.66 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.57 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.7 | 0.51 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.44 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.7 | 0.41 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.7 | 0.64 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.43 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.7 | 0.77 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.50 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.58 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.7 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 98 | 25-150 |
| 13C2_6:2FTS | | 99 | 25-150 |
| 13C2_8:2FTS | | 85 | 25-150 |
| 13C2_PFDoA | | 85 | 25-150 |
| 13C2_PFTeDA | | 81 | 25-150 |
| 13C3_PFBS | | 92 | 25-150 |
| 13C3_PFHxS | | 95 | 25-150 |
| 13C3-HFPO-DA | | 91 | 25-150 |
| 13C4_PFBA | | 100 | 25-150 |
| 13C4_PFHpA | | 96 | 25-150 |
| 13C5_PFHxA | | 97 | 25-150 |
| 13C5_PFPeA | | 97 | 25-150 |
| 13C6_PFDA | | 84 | 25-150 |
| 13C7_PFUdA | | 81 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-002**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1400** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 105 | 25-150 |
| 13C8_PFOS | | 90 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 |
| 13C9_PFNA | | 88 | 25-150 |
| d5-EtFOSAA | | 88 | 25-150 |
| d3-MeFOSAA | | 96 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-003**

Description: **MWF16-26_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1525** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1700 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.0 | 0.48 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.0 | 0.67 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.0 | 1.6 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **8.4** | | **8.0** | **2.0** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 8.0 | 0.88 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.0 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.0 | 0.49 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.0 | 0.75 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.0 | 0.94 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **17** | | **4.0** | **0.42** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.0 | 0.78 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **0.98** | **J** | **4.0** | **0.50** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.0 | 0.71 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.0 | 0.62 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **11** | | **4.0** | **0.60** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **21** | | **4.0** | **0.55** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **11** | | **4.0** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.0 | 0.53 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.0 | 0.47 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **5.8** | | **4.0** | **0.45** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **22** | | **4.0** | **0.69** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.0 | 0.46 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **34** | | **4.0** | **0.83** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **24** | | **4.0** | **0.55** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.0 | 0.60 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.53 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.63 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **2.0** | **J** | **4.0** | **2.0** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 149 | 25-150 |
| 13C2_6:2FTS | | 110 | 25-150 |
| 13C2_8:2FTS | | 92 | 25-150 |
| 13C2_PFDoA | | 76 | 25-150 |
| 13C2_PFTeDA | | 87 | 25-150 |
| 13C3_PFBS | | 97 | 25-150 |
| 13C3_PFHxS | | 88 | 25-150 |
| 13C3-HFPO-DA | | 87 | 25-150 |
| 13C4_PFBA | | 76 | 25-150 |
| 13C4_PFHpA | | 89 | 25-150 |
| 13C5_PFHxA | | 98 | 25-150 |
| 13C5_PFPeA | | 100 | 25-150 |
| 13C6_PFDA | | 93 | 25-150 |
| 13C7_PFUdA | | 85 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-003**

Description: **MWF16-26_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1525** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 91 | 25-150 |
| 13C8_PFOS | | 83 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 |
| d5-EtFOSAA | | 85 | 25-150 |
| d3-MeFOSAA | | 83 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-004**

Description: **MW-05-18_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1642** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/28/2023 1715 | ARC2 | 09/19/2023 1753 | 85183 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.5 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.5 | 0.62 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.5 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.5 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | ~~Q~~ | 7.5 | 0.82 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.5 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.5 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.5 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.5 | 0.88 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **7.4** | | **3.8** | **0.39** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.73 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.47 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.67 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **5.2** | | **3.8** | **0.56** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **7.0** | | **3.8** | **0.52** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **15** | | **3.8** | **0.57** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **5.7** | | **3.8** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **11** | | **3.8** | **0.65** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **5.3** | | **3.8** | **0.78** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **9.3** | | **3.8** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 219 | 25-150 |
| 13C2_6:2FTS | | 124 | 25-150 |
| 13C2_8:2FTS | | 83 | 25-150 |
| 13C2_PFDoA | | 87 | 25-150 |
| 13C2_PFTeDA | | 74 | 25-150 |
| 13C3_PFBS | | 87 | 25-150 |
| 13C3_PFHxS | | 94 | 25-150 |
| 13C3-HFPO-DA | | 75 | 25-150 |
| 13C4_PFBA | | 74 | 25-150 |
| 13C4_PFHpA | | 91 | 25-150 |
| 13C5_PFHxA | | 93 | 25-150 |
| 13C5_PFPeA | | 84 | 25-150 |
| 13C6_PFDA | | 79 | 25-150 |
| 13C7_PFUdA | | 82 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-004**

Description: **MW-05-18_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1642** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 95 | 25-150 |
| 13C8_PFOS | | 94 | 25-150 |
| 13C8_PFOSA | | 94 | 10-150 |
| 13C9_PFNA | | 98 | 25-150 |
| d5-EtFOSAA | | 87 | 25-150 |
| d3-MeFOSAA | | 87 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-005**

Description: **MW-02-17_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1110** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/28/2023 1726 | ARC2 | 09/19/2023 1753 | 85183 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.7 | 0.40 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.7 | 0.56 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.7 | 1.3 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 6.7 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.7 | 0.73 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.7 | 1.7 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.7 | 0.41 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.7 | 0.63 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.7 | 0.78 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **7.4** | | **3.4** | **0.35** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.4 | 0.65 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.4 | 0.42 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.4 | 0.60 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.4 | 0.51 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **5.5** | | **3.4** | **0.50** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **9.3** | | **3.4** | **0.46** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **16** | | **3.4** | **0.50** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.4 | 0.44 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.4 | 0.40 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **4.9** | | **3.4** | **0.37** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **8.3** | | **3.4** | **0.58** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.4 | 0.39 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **5.9** | | **3.4** | **0.69** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **7.7** | | **3.4** | **0.46** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.4 | 0.50 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.44 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.52 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.4 | 1.7 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 262 | 25-150 |
| 13C2_6:2FTS | N | 176 | 25-150 |
| 13C2_8:2FTS | | 99 | 25-150 |
| 13C2_PFDoA | | 82 | 25-150 |
| 13C2_PFTeDA | | 73 | 25-150 |
| 13C3_PFBS | | 96 | 25-150 |
| 13C3_PFHxS | | 98 | 25-150 |
| 13C3-HFPO-DA | | 82 | 25-150 |
| 13C4_PFBA | | 69 | 25-150 |
| 13C4_PFHpA | | 99 | 25-150 |
| 13C5_PFHxA | | 100 | 25-150 |
| 13C5_PFPeA | | 88 | 25-150 |
| 13C6_PFDA | | 97 | 25-150 |
| 13C7_PFUdA | | 81 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-005**

Description: **MW-02-17_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1110** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 113 | 25-150 |
| 13C8_PFOS | | 99 | 25-150 |
| 13C8_PFOSA | | 96 | 10-150 |
| 13C9_PFNA | | 108 | 25-150 |
| d5-EtFOSAA | | 92 | 25-150 |
| d3-MeFOSAA | | 91 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-006**

Description: **MWF12-02R_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1435** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/28/2023 1736 | ARC2 | 09/19/2023 1753 | 85183 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 0.57 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.9 | 0.75 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 0.65 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 0.80 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.9** | | **3.4** | **0.36** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.4 | 0.67 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.4 | 0.43 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.4 | 0.61 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.4 | 0.53 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.4 | 0.51 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **4.6** | | **3.4** | **0.48** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **20** | | **3.4** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.4 | 0.45 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.4 | 0.41 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **3.5** | | **3.4** | **0.39** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **8.9** | | **3.4** | **0.59** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.4 | 0.40 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **9.6** | | **3.4** | **0.71** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **11** | | **3.4** | **0.47** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.4 | 0.52 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.54 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **9.0** | | **3.4** | **1.7** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 241 | 25-150 |
| 13C2_6:2FTS | N | 194 | 25-150 |
| 13C2_8:2FTS | | 86 | 25-150 |
| 13C2_PFDoA | | 71 | 25-150 |
| 13C2_PFTeDA | | 61 | 25-150 |
| 13C3_PFBS | | 63 | 25-150 |
| 13C3_PFHxS | | 69 | 25-150 |
| 13C3-HFPO-DA | | 49 | 25-150 |
| 13C4_PFBA | | 35 | 25-150 |
| 13C4_PFHpA | | 57 | 25-150 |
| 13C5_PFHxA | | 62 | 25-150 |
| 13C5_PFPeA | | 51 | 25-150 |
| 13C6_PFDA | | 70 | 25-150 |
| 13C7_PFUdA | | 65 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-006**

Description: **MWF12-02R_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1435** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 73 | 25-150 |
| 13C8_PFOS | | 66 | 25-150 |
| 13C8_PFOSA | | 62 | 10-150 |
| 13C9_PFNA | | 79 | 25-150 |
| d5-EtFOSAA | | 73 | 25-150 |
| d3-MeFOSAA | | 75 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-007**

Description: **MWOS-09R_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1635** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1711 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.0 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.0 | 0.58 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.0 | 1.4 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **3.5** | **J** | **7.0** | **1.7** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND ~~Q~~ | | 7.0 | 0.76 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.0 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.0 | 0.65 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.0 | 0.81 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **6.3** | | **3.5** | **0.36** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.68 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.43 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.62 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.53 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **5.0** | | **3.5** | **0.52** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **10** | | **3.5** | **0.48** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **9.8** | | **3.5** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **10** | | **3.5** | **0.39** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **11** | | **3.5** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.40 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **19** | | **3.5** | **0.72** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **11** | | **3.5** | **0.47** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.5 | 1.7 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 214 | 25-150 |
| 13C2_6:2FTS | | 130 | 25-150 |
| 13C2_8:2FTS | | 97 | 25-150 |
| 13C2_PFDoA | | 76 | 25-150 |
| 13C2_PFTeDA | | 83 | 25-150 |
| 13C3_PFBS | | 97 | 25-150 |
| 13C3_PFHxS | | 89 | 25-150 |
| 13C3-HFPO-DA | | 88 | 25-150 |
| 13C4_PFBA | | 63 | 25-150 |
| 13C4_PFHpA | | 82 | 25-150 |
| 13C5_PFHxA | | 97 | 25-150 |
| 13C5_PFPeA | | 91 | 25-150 |
| 13C6_PFDA | | 87 | 25-150 |
| 13C7_PFUdA | | 79 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-007**

Description: **MWOS-09R_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1635** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 98 | 25-150 |
| 13C8_PFOS | | 88 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 |
| 13C9_PFNA | | 93 | 25-150 |
| d5-EtFOSAA | | 85 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-008**

Description: **MWF7-02_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1125** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1721 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.4 | 0.51 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.4 | 0.70 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.4 | 1.7 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **4.9** | **J** | **8.4** | **2.1** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 8.4 | 0.92 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.4 | 2.2 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.4 | 0.51 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.4 | 0.79 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.4 | 0.98 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **7.0** | | **4.2** | **0.44** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.2 | 0.82 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **1.6** | **J** | **4.2** | **0.53** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.2 | 0.75 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.2 | 0.65 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **6.0** | | **4.2** | **0.63** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **16** | | **4.2** | **0.58** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **15** | | **4.2** | **0.63** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.2 | 0.55 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.2 | 0.50 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **8.9** | | **4.2** | **0.47** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **16** | | **4.2** | **0.73** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.2 | 0.49 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **50** | | **4.2** | **0.87** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **9.6** | | **4.2** | **0.57** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.2 | 0.63 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.2 | 0.56 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.2 | 0.66 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **12** | | **4.2** | **2.1** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 261 | 25-150 |
| 13C2_6:2FTS | N | 159 | 25-150 |
| 13C2_8:2FTS | | 101 | 25-150 |
| 13C2_PFDoA | | 77 | 25-150 |
| 13C2_PFTeDA | | 87 | 25-150 |
| 13C3_PFBS | | 89 | 25-150 |
| 13C3_PFHxS | | 87 | 25-150 |
| 13C3-HFPO-DA | | 71 | 25-150 |
| 13C4_PFBA | | 51 | 25-150 |
| 13C4_PFHpA | | 78 | 25-150 |
| 13C5_PFHxA | | 97 | 25-150 |
| 13C5_PFPeA | | 75 | 25-150 |
| 13C6_PFDA | | 91 | 25-150 |
| 13C7_PFUdA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-008**

Description: **MWF7-02_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1125** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 25-150 |
| 13C8_PFOS | | 88 | 25-150 |
| 13C8_PFOSA | | 90 | 10-150 |
| 13C9_PFNA | | 95 | 25-150 |
| d5-EtFOSAA | | 88 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-009**

Description: **MWF15-01_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1330** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1732 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.9 | 0.48 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.9 | 0.66 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.9 | 1.6 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **4.7** | **JQ** | **7.9** | **2.0** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.9 | 0.86 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.9 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.9 | 0.48 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.9 | 0.74 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.9 | 0.92 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **5.9** | | **4.0** | **0.41** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.0 | 0.77 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **0.96** | **J** | **4.0** | **0.49** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.0 | 0.70 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.0 | 0.61 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **5.8** | | **4.0** | **0.59** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **13** | | **4.0** | **0.55** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **10** | | **4.0** | **0.59** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.0 | 0.52 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.0 | 0.47 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **5.2** | | **4.0** | **0.44** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **7.8** | | **4.0** | **0.68** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.0 | 0.46 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **11** | | **4.0** | **0.82** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **7.3** | | **4.0** | **0.54** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.0 | 0.59 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.52 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.62 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **17** | | **4.0** | **2.0** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 269 | 25-150 |
| 13C2_6:2FTS | N | 177 | 25-150 |
| 13C2_8:2FTS | | 93 | 25-150 |
| 13C2_PFDoA | | 73 | 25-150 |
| 13C2_PFTeDA | | 75 | 25-150 |
| 13C3_PFBS | | 94 | 25-150 |
| 13C3_PFHxS | | 93 | 25-150 |
| 13C3-HFPO-DA | | 77 | 25-150 |
| 13C4_PFBA | | 65 | 25-150 |
| 13C4_PFHpA | | 82 | 25-150 |
| 13C5_PFHxA | | 100 | 25-150 |
| 13C5_PFPeA | | 87 | 25-150 |
| 13C6_PFDA | | 91 | 25-150 |
| 13C7_PFUdA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-009**

Description: **MWF15-01_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1330** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 103 | 25-150 |
| 13C8_PFOS | | 90 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 |
| 13C9_PFNA | | 100 | 25-150 |
| d5-EtFOSAA | | 86 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-010**

Description: **MWF16-23_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1505** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/28/2023 1705 | ARC2 | 09/19/2023 1753 | 85183 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 9.1 | 0.55 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 9.1 | 0.76 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 9.1 | 1.8 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **7.8** | **J** | **9.1** | **2.3** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | ~~Q~~ | 9.1 | 1.0 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 9.1 | 2.4 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 9.1 | 0.55 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 9.1 | 0.86 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 9.1 | 1.1 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **4.8** | | **4.6** | **0.47** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.6 | 0.57 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.6 | 0.81 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.6 | 0.70 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **2.5** | **J** | **4.6** | **0.68** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **8.0** | | **4.6** | **0.63** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **13** | | **4.6** | **0.68** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.6 | 0.60 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.6 | 0.54 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **5.5** | | **4.6** | **0.51** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **9.3** | | **4.6** | **0.79** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.6 | 0.53 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **19** | | **4.6** | **0.95** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **7.1** | | **4.6** | **0.62** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.6 | 0.68 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.6 | 0.60 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.6 | 0.71 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.6 | 2.3 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 247 | 25-150 |
| 13C2_6:2FTS | | 129 | 25-150 |
| 13C2_8:2FTS | | 89 | 25-150 |
| 13C2_PFDoA | | 84 | 25-150 |
| 13C2_PFTeDA | | 72 | 25-150 |
| 13C3_PFBS | | 85 | 25-150 |
| 13C3_PFHxS | | 93 | 25-150 |
| 13C3-HFPO-DA | | 77 | 25-150 |
| 13C4_PFBA | | 54 | 25-150 |
| 13C4_PFHpA | | 94 | 25-150 |
| 13C5_PFHxA | | 89 | 25-150 |
| 13C5_PFPeA | | 79 | 25-150 |
| 13C6_PFDA | | 86 | 25-150 |
| 13C7_PFUdA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-010**

Description: **MWF16-23_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1505** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 100 | 25-150 |
| 13C8_PFOS | | 93 | 25-150 |
| 13C8_PFOSA | | 85 | 10-150 |
| 13C9_PFNA | | 92 | 25-150 |
| d5-EtFOSAA | | 94 | 25-150 |
| d3-MeFOSAA | | 93 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-011**

Description: **MWOS-10_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1700** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1742 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.8 | 0.53 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.8 | 0.73 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.8 | 1.8 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **3.0** | **J** | **8.8** | **2.2** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | ~~Q~~ | 8.8 | 0.97 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.8 | 2.3 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.8 | 0.53 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.8 | 0.83 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.8 | 1.0 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **7.5** | | **4.4** | **0.46** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.4 | 0.55 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.4 | 0.79 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.4 | 0.68 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **5.0** | | **4.4** | **0.66** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **13** | | **4.4** | **0.61** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **14** | | **4.4** | **0.66** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.4 | 0.58 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.4 | 0.52 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **11** | | **4.4** | **0.49** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **15** | | **4.4** | **0.76** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.4 | 0.51 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **10** | | **4.4** | **0.92** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **14** | | **4.4** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.4 | 0.66 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.4 | 0.58 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.4 | 0.69 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.4 | 2.2 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 162 | 25-150 |
| 13C2_6:2FTS | | 113 | 25-150 |
| 13C2_8:2FTS | | 90 | 25-150 |
| 13C2_PFDoA | | 74 | 25-150 |
| 13C2_PFTeDA | | 86 | 25-150 |
| 13C3_PFBS | | 101 | 25-150 |
| 13C3_PFHxS | | 90 | 25-150 |
| 13C3-HFPO-DA | | 89 | 25-150 |
| 13C4_PFBA | | 68 | 25-150 |
| 13C4_PFHpA | | 83 | 25-150 |
| 13C5_PFHxA | | 96 | 25-150 |
| 13C5_PFPeA | | 97 | 25-150 |
| 13C6_PFDA | | 84 | 25-150 |
| 13C7_PFUdA | | 82 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-011**

Description: **MWOS-10_GW-091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1700** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 92 | 25-150 |
| 13C8_PFOS | | 88 | 25-150 |
| 13C8_PFOSA | | 86 | 10-150 |
| 13C9_PFNA | | 90 | 25-150 |
| d5-EtFOSAA | | 81 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI13047-012**

Description: **EB-03_091223** Matrix: **Aqueous**

Date Sampled: **09/12/2023 1129** Project Name: **RACER PNC**

Date Received: **09/13/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1753 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.1 | 0.49 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.1 | 0.67 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.1 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 8.1 | 2.0 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 8.1 | 0.89 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.1 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.1 | 0.49 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.1 | 0.76 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.1 | 0.95 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 4.1 | 0.42 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.1 | 0.79 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.1 | 0.51 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.1 | 0.72 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.1 | 0.62 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 4.1 | 0.60 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 4.1 | 0.56 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 4.1 | 0.61 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.1 | 0.53 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.1 | 0.48 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 4.1 | 0.45 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 4.1 | 0.70 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.1 | 0.47 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 4.1 | 0.84 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 4.1 | 0.55 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.1 | 0.61 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.1 | 0.54 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.1 | 0.64 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 4.1 | 2.0 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 93 | 25-150 |
| 13C2_6:2FTS | | 92 | 25-150 |
| 13C2_8:2FTS | | 81 | 25-150 |
| 13C2_PFDoA | | 72 | 25-150 |
| 13C2_PFTeDA | | 83 | 25-150 |
| 13C3_PFBS | | 88 | 25-150 |
| 13C3_PFHxS | | 84 | 25-150 |
| 13C3-HFPO-DA | | 79 | 25-150 |
| 13C4_PFBA | | 92 | 25-150 |
| 13C4_PFHpA | | 85 | 25-150 |
| 13C5_PFHxA | | 89 | 25-150 |
| 13C5_PFPeA | | 86 | 25-150 |
| 13C6_PFDA | | 87 | 25-150 |
| 13C7_PFUdA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

| | | | |
|---|---|---|---|
| Client: **Arcadis U.S., Inc.** | | Laboratory ID: **YI13047-012** |
| Description: **EB-03_091223** | | Matrix: **Aqueous** |
| Date Sampled: **09/12/2023 1129** | Project Name: **RACER PNC** | |
| Date Received: **09/13/2023** | Project Number: **30167840.00031** | |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 88 | 25-150 |
| 13C8_PFOS | | 83 | 25-150 |
| 13C8_PFOSA | | 79 | 10-150 |
| 13C9_PFNA | | 82 | 25-150 |
| d5-EtFOSAA | | 84 | 25-150 |
| d3-MeFOSAA | | 80 | 25-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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Racer

# DATA REVIEW

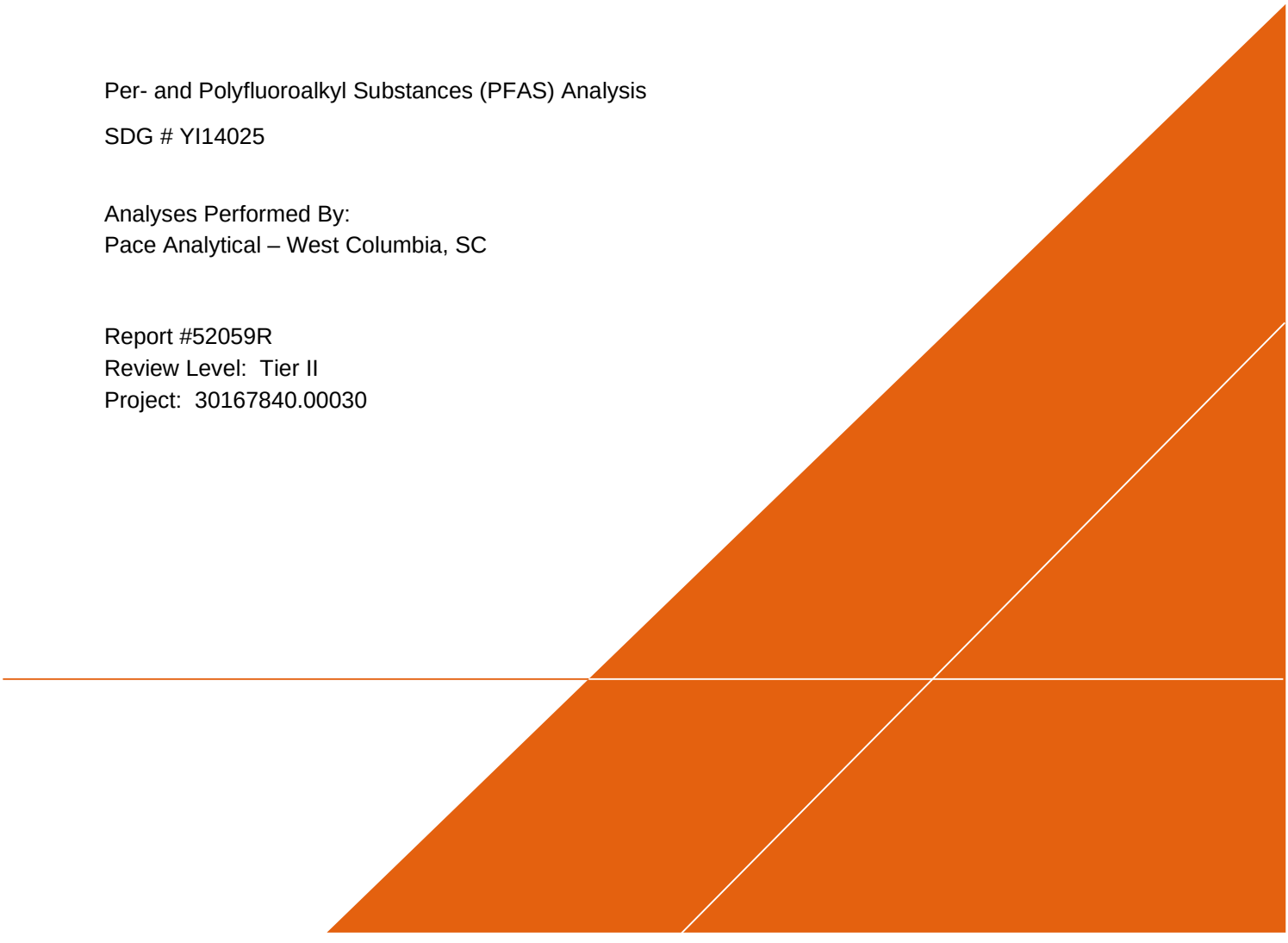
## Pontiac North Campus, MI

Per- and Polyfluoroalkyl Substances (PFAS) Analysis

SDG # YI14025

Analyses Performed By:
Pace Analytical – West Columbia, SC

Report #52059R
Review Level: Tier II
Project: 30167840.00030



# SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #YI14025 for samples collected in association with the Racer PNC, MI Site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

| Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | PFAS | SVOC | PCB | MET | MISC |
| MWOS-03_GW | YI14025-1 | Water | 09/13/23 | | X | | | | |
| EB-01 | YI14025-2 | Water | 09/13/23 | | X | | | | |
| Trip Blank | YI14025-3 | Water | 09/13/23 | | X | | | | |
| MWOS-04_GW | YI14025-4 | Water | 09/13/23 | | X | | | | |
| MWOS-01_GW | YI14025-5 | Water | 09/13/23 | | X | | | | |
| MWOS-02_GW | YI14025-6 | Water | 09/13/23 | | X | | | | |
| TW-ROW-03_GW | YI14025-7 | Water | 09/13/23 | | X | | | | |
| TW-ROW-01_GW | YI14025-8 | Water | 09/13/23 | | X | | | | |
| MWW1-06_GW | YI14025-9 | Water | 09/13/23 | | X | | | | |

## ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

| Items Reviewed | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| 1. Sample receipt condition | | X | | X | |
| 2. Requested analyses and sample results | | X | | X | |
| 3. Master tracking list | | X | | X | |
| 4. Methods of analysis | | X | | X | |
| 5. Reporting limits | | X | | X | |
| 6. Sample collection date | | X | | X | |
| 7. Laboratory sample received date | | X | | X | |
| 8. Sample preservation verification (as applicable) | | X | | X | |
| 9. Sample preparation/extraction/analysis dates | | X | | X | |
| 10. Fully executed Chain-of-Custody (COC) form | | X | | X | |
| 11. Narrative summary of QA or sample problems provided | | X | | X | |
| 12. Data Package Completeness and Compliance | | X | | X | |

Note:
QA - Quality Assurance

## ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency Method 537 Modified. Data were reviewed in accordance with the method specified criteria, USEPA National Functional Guidelines NFG for Organic Superfund Methods Data Review, EPA-540-R-20-005 (November 2020), with reference to the historical (USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999, as appropriate).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

## PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ANALYSIS

### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

| Method | Matrix | Holding Time | Preservation |
|---|---|---|---|
| USEPA modified Method 537 | Water | 28 days to extraction; 28 days from extraction to analysis | Cool to <6 °C |

All samples were initially analyzed within the specified holding time criteria.

### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, field, and equipment blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Equipment blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

### 3. Extracted Internal Standard (EIS)/Surrogate Compounds

Labeled standards must be added to all field samples and QC samples prior to extraction. EIS recoveries must be within the laboratory-established acceptance limits of ICAL midpoint standard area or area measured in the initial CCV on days when ICAL not performed.

Samples associated with EIS exhibited acceptable recoveries with the exceptions noted in the table.

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWOS-03_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| MWOS-04_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C4_PFBA | Perfluoro-n-butanoic acid (PFBA) | < the lower control limit (LL) but > 20% |
| MWOS-01_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWOS-02_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| TW-ROW-03_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| TW-ROW-01_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| MWW1-06_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |

The criteria used to evaluate the EIS recoveries are presented in the following table. In the case of an EIS deviation, the sample results associated with the EIS are qualified as documented in the table below.

| Control Limit | Sample Result | Qualification |
|---|---|---|
| < the lower control limit (LL) but > 20% | Non-detect | UJ |
| | Detect | J |
| > the upper control limit (UL) | Non-detect | No Action |
| | Detect | J |
| < 20% | Non-detect | R |
| | Detect | J |

## 4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within 50-150%. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within 30%.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A site-specific MS/MSD was not included in the data package.

## 5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

## 6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for soil matrices.

A field duplicate was not included in the data package.

## 7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

## DATA VALIDATION CHECKLIST FOR PFAs

| PFAs: USEPA modified Method 537 | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| **LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)** | | | | | |
| **Tier II Validation** | | | | | |
| Holding times | | X | | X | |
| Reporting limits (units) | | X | | X | |
| Blanks | | | | | |
| A. Method blanks | | X | | X | |
| B. Equipment blanks | | X | | X | |
| C. Trip blanks | | X | | X | |
| Laboratory Control Sample (LCS) %R | | X | | X | |
| Laboratory Control Sample Duplicate(LCSD) %R | X | | | | X |
| LCS/LCSD Precision (RPD) | X | | | | X |
| Matrix Spike (MS) %R | X | | | | X |
| Matrix Spike Duplicate (MSD) %R | X | | | | X |
| MS/MSD Precision (RPD) | X | | | | X |
| Field Duplicate (RPD) | X | | | | X |
| Extracted Internal Standards (EIS) Recoveries | | X | X | | |
| Dilution Factor | | X | | X | |
| Moisture Content | X | | | | X |

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE: 

DATE: December 18, 2023

PEER REVIEW: Joseph C. Houser

DATE: December 19, 2023

# CHAIN OF CUSTODY

# CORRECTED SAMPLE ANALYSIS DATA SHEETS

Pace Analytical®

**PACE ANALYTICAL SERVICES, LLC**
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Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number 149977**

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Tiffany Linder, Alexis Crisp | Telephone No. / E-mail: Alexis.crisp@arcadis.com, Tiffany.linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Sommer Gray | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds | Page 1 of 1 |
| City: Novi | State: MI | Zip Code: 48377 | Printed Name: Sommer Gray, Lothe Jay Garrett Link | Lot # Bar Code: YI14025 |
| Project Name: Racer PNC | | | | |
| Project No.: 30167840.00031 | P.O. No. | | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab/Composite | Matrix: Aqueous | Solid | Non-Aqueous | No of Containers by Preservative Type: Unpres. | HNO3 | H2SO4 | HCl | NaOH | Na2S2O3 | Field Filtered | Methanol MS with Tentative Compounds OSM 9.1 | Remarks / Locker I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWOS-03_GW-091323 | 9/13/23 | 1043 | G | X | | | 2 | | | | | | | X | |
| EB-01_091323 | 9/13/23 | 1100 | G | X | | | 1 | | | | | | | X | equipment blank |
| tripblank | 9/13/23 | 1105 | G | X | | | 1 | | | | | | | X | tripblank |
| MWOS-04_GW-091323 | 9/13/23 | 1310 | G | X | | | 2 | | | | | | | X | |
| MWOS-01_GW-091323 | 9/13/23 | 1045 | G | X | | | 2 | | | | | | | X | |
| MWOS-02_GW-091323 | 9/13/23 | 1135 | G | X | | | 2 | | | | | | | X | |
| TW-ROW-03_GW-091323 | 9/13/23 | 1215 | G | X | | | 2 | | | | | | | X | |
| TW-ROW-01_GW-091323 | 9/13/23 | 1330 | G | X | | | 2 | | | | | | | X | |
| MWW1-06_GW-091323 | 9/13/23 | 1350 | G | X | | | 2 | | | | | | | X | |

**Turn Around Time Required** (Prior lab approval required for expedited TAT.): ☒ Standard ☐ Rush (Specify)

**Sample Disposal**: ☐ Return to Client ☒ Dispose by Lab

**Possible Hazard Identification**: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

**QC Requirements (Specify)**

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Gray | 9/13/23 | 1715 | 1. Received by: FedEx | 9/13/23 | 1715 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | 9/14/23 | 1250 | 4. Laboratory Received by | 9/14/23 | 1250 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on ice (Circle): (Yes) No Ice Pack — Receipt Temp: 1.0 °C — Temp Blank ☐ Y ☐ N

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: ME00SIN2-01



PACE ANALYTICAL SERVICES, LLC

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-001**

Description: **MWOS-03_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1043** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1804 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.7 | 0.47 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.7 | 0.64 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.7 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.7 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.7 | 0.84 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.7 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.7 | 0.47 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.7 | 0.72 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.7 | 0.90 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.9 | 0.40 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.75 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.48 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.69 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.59 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.57 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.9 | 0.53 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.46 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.9 | 0.43 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.9 | 0.66 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.9 | 0.45 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.9 | 0.80 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.9 | 0.53 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.61 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.9 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 283 | 25-150 |
| 13C2_6:2FTS | N | 217 | 25-150 |
| 13C2_8:2FTS | | 98 | 25-150 |
| 13C2_PFDoA | | 74 | 25-150 |
| 13C2_PFTeDA | | 73 | 25-150 |
| 13C3_PFBS | | 76 | 25-150 |
| 13C3_PFHxS | | 85 | 25-150 |
| 13C3-HFPO-DA | | 64 | 25-150 |
| 13C4_PFBA | | 26 | 25-150 |
| 13C4_PFHpA | | 80 | 25-150 |
| 13C5_PFHxA | | 74 | 25-150 |
| 13C5_PFPeA | | 54 | 25-150 |
| 13C6_PFDA | | 91 | 25-150 |
| 13C7_PFUdA | | 90 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-001**

Description: **MWOS-03_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1043** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 104 | 25-150 |
| 13C8_PFOS | | 90 | 25-150 |
| 13C8_PFOSA | | 92 | 10-150 |
| 13C9_PFNA | | 101 | 25-150 |
| d5-EtFOSAA | | 86 | 25-150 |
| d3-MeFOSAA | | 85 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-002**

Description: **EB-01-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1100** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1814 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.2 | 0.43 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.2 | 0.60 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.2 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.2 | 0.79 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.2 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.2 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.2 | 0.68 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.2 | 0.84 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.37 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.70 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.45 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.64 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.53 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.6 | 0.50 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.40 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.62 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.6 | 0.75 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.49 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.6 | 1.8 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 105 | 25-150 |
| 13C2_6:2FTS | | 98 | 25-150 |
| 13C2_8:2FTS | | 88 | 25-150 |
| 13C2_PFDoA | | 72 | 25-150 |
| 13C2_PFTeDA | | 85 | 25-150 |
| 13C3_PFBS | | 94 | 25-150 |
| 13C3_PFHxS | | 87 | 25-150 |
| 13C3-HFPO-DA | | 82 | 25-150 |
| 13C4_PFBA | | 94 | 25-150 |
| 13C4_PFHpA | | 84 | 25-150 |
| 13C5_PFHxA | | 95 | 25-150 |
| 13C5_PFPeA | | 95 | 25-150 |
| 13C6_PFDA | | 86 | 25-150 |
| 13C7_PFUdA | | 85 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-002**

Description: **EB-01-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1100** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 97 | 25-150 |
| 13C8_PFOS | | 81 | 25-150 |
| 13C8_PFOSA | | 81 | 10-150 |
| 13C9_PFNA | | 85 | 25-150 |
| d5-EtFOSAA | | 87 | 25-150 |
| d3-MeFOSAA | | 80 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-003**

Description: **trip blank** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1105** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1825 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.8 | 0.65 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.8 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.8 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.8 | 0.85 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.8 | 0.73 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.8 | 0.91 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.9 | 0.40 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.76 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.49 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.69 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.60 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.9 | 0.54 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.46 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.9 | 0.44 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.9 | 0.67 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.9 | 0.45 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.9 | 0.81 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.9 | 0.53 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.52 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.61 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.9 | 2.0 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 94 | 25-150 |
| 13C2_6:2FTS | | 102 | 25-150 |
| 13C2_8:2FTS | | 82 | 25-150 |
| 13C2_PFDoA | | 75 | 25-150 |
| 13C2_PFTeDA | | 85 | 25-150 |
| 13C3_PFBS | | 93 | 25-150 |
| 13C3_PFHxS | | 90 | 25-150 |
| 13C3-HFPO-DA | | 90 | 25-150 |
| 13C4_PFBA | | 92 | 25-150 |
| 13C4_PFHpA | | 84 | 25-150 |
| 13C5_PFHxA | | 92 | 25-150 |
| 13C5_PFPeA | | 97 | 25-150 |
| 13C6_PFDA | | 90 | 25-150 |
| 13C7_PFUdA | | 87 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-003**

Description: **trip blank** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1105** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 95 | 25-150 |
| 13C8_PFOS | | 86 | 25-150 |
| 13C8_PFOSA | | 91 | 10-150 |
| 13C9_PFNA | | 93 | 25-150 |
| d5-EtFOSAA | | 94 | 25-150 |
| d3-MeFOSAA | | 82 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-004**

Description: **MWOS-04_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1310** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1857 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 0.61 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.4 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.4 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.4 | 0.81 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 0.70 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 0.86 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.7 | 0.38 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.72 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.46 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.66 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.57 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.7 | 0.51 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | Q UJ | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.44 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.7 | 0.41 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.7 | 0.64 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.43 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.7 | 0.77 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.50 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.58 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.7 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 231 | 25-150 |
| 13C2_6:2FTS | N | 224 | 25-150 |
| 13C2_8:2FTS | | 108 | 25-150 |
| 13C2_PFDoA | | 67 | 25-150 |
| 13C2_PFTeDA | | 73 | 25-150 |
| 13C3_PFBS | | 80 | 25-150 |
| 13C3_PFHxS | | 83 | 25-150 |
| 13C3-HFPO-DA | | 56 | 25-150 |
| 13C4_PFBA | N | 21 | 25-150 |
| 13C4_PFHpA | | 60 | 25-150 |
| 13C5_PFHxA | | 55 | 25-150 |
| 13C5_PFPeA | | 40 | 25-150 |
| 13C6_PFDA | | 93 | 25-150 |
| 13C7_PFUdA | | 81 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-004**

Description: **MWOS-04_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1310** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 95 | 25-150 |
| 13C8_PFOS | | 80 | 25-150 |
| 13C8_PFOSA | | 84 | 10-150 |
| 13C9_PFNA | | 98 | 25-150 |
| d5-EtFOSAA | | 80 | 25-150 |
| d3-MeFOSAA | | 87 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-005**

Description: **MWOS-01_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1045** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1907 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.0 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.0 | 0.58 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.0 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.0 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.0 | 0.76 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.0 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.0 | 0.66 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.0 | 0.81 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **18** | | **3.5** | **0.36** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.68 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.44 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.62 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **2.2** | **J** | **3.5** | **0.48** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **14** | | **3.5** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **1.8** | **J** | **3.5** | **0.39** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **3.3** | **J** | **3.5** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.40 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **3.8** | | **3.5** | **0.72** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **5.7** | | **3.5** | **0.48** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.55 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **7.8** | | **3.5** | **1.7** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 224 | 25-150 |
| 13C2_6:2FTS | | 135 | 25-150 |
| 13C2_8:2FTS | | 91 | 25-150 |
| 13C2_PFDoA | | 75 | 25-150 |
| 13C2_PFTeDA | | 84 | 25-150 |
| 13C3_PFBS | | 87 | 25-150 |
| 13C3_PFHxS | | 81 | 25-150 |
| 13C3-HFPO-DA | | 75 | 25-150 |
| 13C4_PFBA | | 52 | 25-150 |
| 13C4_PFHpA | | 88 | 25-150 |
| 13C5_PFHxA | | 66 | 25-150 |
| 13C5_PFPeA | | 83 | 25-150 |
| 13C6_PFDA | | 88 | 25-150 |
| 13C7_PFUdA | | 88 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-005**

Description: **MWOS-01_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1045** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 91 | 25-150 |
| 13C8_PFOS | | 74 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 |
| d5-EtFOSAA | | 85 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-006**

Description: **MWOS-02_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1135** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1918 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.0 | 0.48 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.0 | 0.66 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.0 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 8.0 | 2.0 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 8.0 | 0.88 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.0 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.0 | 0.48 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.0 | 0.75 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.0 | 0.93 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **4.3** | | **4.0** | **0.42** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.0 | 0.78 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.0 | 0.50 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.0 | 0.71 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.0 | 0.61 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **1.6** | **J** | **4.0** | **0.60** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **6.8** | | **4.0** | **0.55** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **7.9** | | **4.0** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.0 | 0.53 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.0 | 0.47 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **1.5** | **J** | **4.0** | **0.45** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **2.9** | **J** | **4.0** | **0.69** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.0 | 0.46 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **7.0** | | **4.0** | **0.83** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **2.5** | **J** | **4.0** | **0.55** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.0 | 0.60 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.53 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.0 | 0.63 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **9.5** | | **4.0** | **2.0** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 276 | 25-150 |
| 13C2_6:2FTS | N | 157 | 25-150 |
| 13C2_8:2FTS | | 92 | 25-150 |
| 13C2_PFDoA | | 69 | 25-150 |
| 13C2_PFTeDA | | 73 | 25-150 |
| 13C3_PFBS | | 94 | 25-150 |
| 13C3_PFHxS | | 85 | 25-150 |
| 13C3-HFPO-DA | | 69 | 25-150 |
| 13C4_PFBA | | 56 | 25-150 |
| 13C4_PFHpA | | 79 | 25-150 |
| 13C5_PFHxA | | 88 | 25-150 |
| 13C5_PFPeA | | 78 | 25-150 |
| 13C6_PFDA | | 89 | 25-150 |
| 13C7_PFUdA | | 83 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-006**

Description: **MWOS-02_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1135** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 96 | 25-150 |
| 13C8_PFOS | | 83 | 25-150 |
| 13C8_PFOSA | | 88 | 10-150 |
| 13C9_PFNA | | 97 | 25-150 |
| d5-EtFOSAA | | 83 | 25-150 |
| d3-MeFOSAA | | 80 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-007**

Description: **TW-ROW-03_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1215** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1928 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 0.57 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.4 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **2.1** | **JQ** | **6.9** | **1.7** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.9 | 0.76 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 0.65 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 0.81 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **4.8** | | **3.5** | **0.36** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.67 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **0.95** | **J** | **3.5** | **0.43** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.62 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.53 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **1.3** | **J** | **3.5** | **0.51** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **6.3** | | **3.5** | **0.48** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **12** | | **3.5** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **1.7** | **J** | **3.5** | **0.39** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **4.1** | | **3.5** | **0.60** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **0.74** | **J** | **3.5** | **0.40** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **5.8** | | **3.5** | **0.72** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **4.5** | | **3.5** | **0.47** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **36** | | **3.5** | **1.7** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 266 | 25-150 |
| 13C2_6:2FTS | N | 219 | 25-150 |
| 13C2_8:2FTS | | 130 | 25-150 |
| 13C2_PFDoA | | 72 | 25-150 |
| 13C2_PFTeDA | | 66 | 25-150 |
| 13C3_PFBS | | 84 | 25-150 |
| 13C3_PFHxS | | 82 | 25-150 |
| 13C3-HFPO-DA | | 58 | 25-150 |
| 13C4_PFBA | | 32 | 25-150 |
| 13C4_PFHpA | | 72 | 25-150 |
| 13C5_PFHxA | | 84 | 25-150 |
| 13C5_PFPeA | | 61 | 25-150 |
| 13C6_PFDA | | 93 | 25-150 |
| 13C7_PFUdA | | 85 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-007**

Description: **TW-ROW-03_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1215** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 94 | 25-150 |
| 13C8_PFOS | | 80 | 25-150 |
| 13C8_PFOSA | | 82 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 |
| d5-EtFOSAA | | 91 | 25-150 |
| d3-MeFOSAA | | 88 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-008**

Description: **TW-ROW-01_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1330** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1939 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 0.41 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 0.57 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.9 | 0.75 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 0.41 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 0.64 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 0.80 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.4 | 0.36 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.4 | 0.67 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **0.88** | **J** | **3.4** | **0.43** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.4 | 0.61 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.4 | 0.53 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.4 | 0.51 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **3.5** | | **3.4** | **0.47** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **8.6** | | **3.4** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.4 | 0.45 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.4 | 0.40 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **2.1** | **J** | **3.4** | **0.38** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **4.2** | | **3.4** | **0.59** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.4 | 0.40 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **5.5** | | **3.4** | **0.71** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.4 | 0.47 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.4 | 0.51 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.45 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.4 | 0.54 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **12** | | **3.4** | **1.7** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 328 | 25-150 |
| 13C2_6:2FTS | N | 215 | 25-150 |
| 13C2_8:2FTS | | 105 | 25-150 |
| 13C2_PFDoA | | 65 | 25-150 |
| 13C2_PFTeDA | | 63 | 25-150 |
| 13C3_PFBS | | 81 | 25-150 |
| 13C3_PFHxS | | 80 | 25-150 |
| 13C3-HFPO-DA | | 57 | 25-150 |
| 13C4_PFBA | | 31 | 25-150 |
| 13C4_PFHpA | | 66 | 25-150 |
| 13C5_PFHxA | | 72 | 25-150 |
| 13C5_PFPeA | | 60 | 25-150 |
| 13C6_PFDA | | 83 | 25-150 |
| 13C7_PFUdA | | 77 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-008**

Description: **TW-ROW-01_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1330** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 93 | 25-150 |
| 13C8_PFOS | | 72 | 25-150 |
| 13C8_PFOSA | | 80 | 10-150 |
| 13C9_PFNA | | 84 | 25-150 |
| d5-EtFOSAA | | 74 | 25-150 |
| d3-MeFOSAA | | 77 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-009**

Description: **MWW1-06_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1350** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 1950 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 8.2 | 0.50 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 8.2 | 0.68 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 8.2 | 1.7 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **16** | | **8.2** | **2.1** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 8.2 | 0.90 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 8.2 | 2.1 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 8.2 | 0.50 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 8.2 | 0.77 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 8.2 | 0.96 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **2.7** | **J** | **4.1** | **0.43** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 4.1 | 0.80 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 4.1 | 0.51 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 4.1 | 0.73 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 4.1 | 0.63 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 4.1 | 0.61 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **0.96** | **J** | **4.1** | **0.57** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **6.1** | | **4.1** | **0.62** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 4.1 | 0.54 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 4.1 | 0.49 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **1.3** | **J** | **4.1** | **0.46** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **1.3** | **J** | **4.1** | **0.71** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 4.1 | 0.48 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **6.8** | | **4.1** | **0.85** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **0.92** | **J** | **4.1** | **0.56** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 4.1 | 0.62 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 4.1 | 0.54 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 4.1 | 0.64 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **22** | | **4.1** | **2.1** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 205 | 25-150 |
| 13C2_6:2FTS | | 140 | 25-150 |
| 13C2_8:2FTS | | 104 | 25-150 |
| 13C2_PFDoA | | 70 | 25-150 |
| 13C2_PFTeDA | | 71 | 25-150 |
| 13C3_PFBS | | 101 | 25-150 |
| 13C3_PFHxS | | 89 | 25-150 |
| 13C3-HFPO-DA | | 79 | 25-150 |
| 13C4_PFBA | | 68 | 25-150 |
| 13C4_PFHpA | | 87 | 25-150 |
| 13C5_PFHxA | | 100 | 25-150 |
| 13C5_PFPeA | | 89 | 25-150 |
| 13C6_PFDA | | 89 | 25-150 |
| 13C7_PFUdA | | 85 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI14025-009**

Description: **MWW1-06_GW-091323** Matrix: **Aqueous**

Date Sampled: **09/13/2023 1350** Project Name: **RACER PNC**

Date Received: **09/14/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 98 | 25-150 |
| 13C8_PFOS | | 84 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 |
| 13C9_PFNA | | 97 | 25-150 |
| d5-EtFOSAA | | 82 | 25-150 |
| d3-MeFOSAA | | 87 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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Racer

# DATA REVIEW

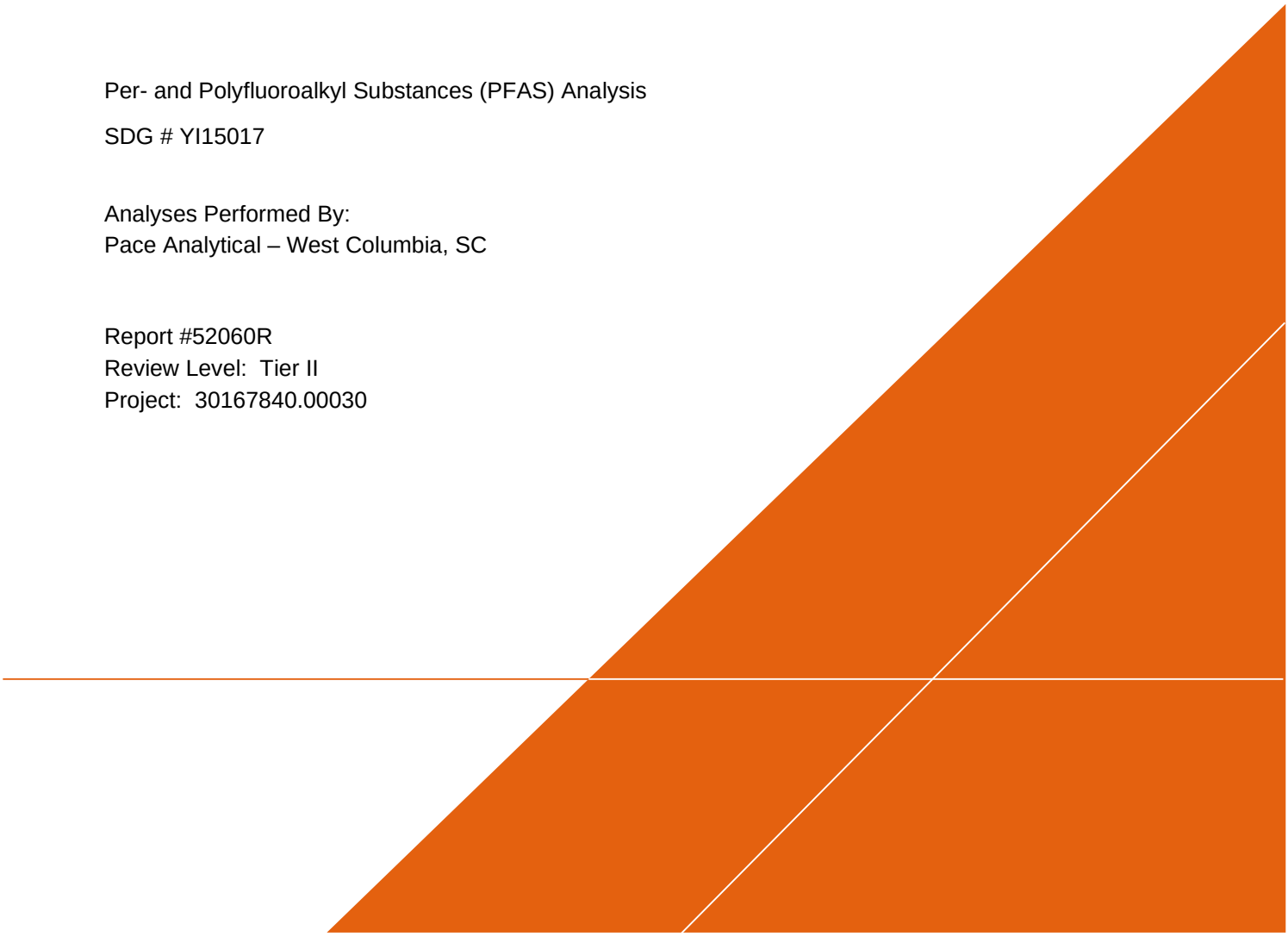
## Pontiac North Campus, MI

Per- and Polyfluoroalkyl Substances (PFAS) Analysis

SDG # YI15017

Analyses Performed By:
Pace Analytical – West Columbia, SC

Report #52060R
Review Level: Tier II
Project: 30167840.00030



# SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #YI15017 for samples collected in association with the Racer PNC, MI Site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

| Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | PFAS | SVOC | PCB | MET | MISC |
| MWM30-01_GW | YI15017-1 | Water | 09/14/23 | | X | | | | |
| EB-04 | YI15017-2 | Water | 09/14/23 | | X | | | | |
| Trip Blank | YI15017-3 | Water | 09/14/23 | | X | | | | |
| MWM5-03_GW | YI15017-4 | Water | 09/14/23 | | X | | | | |
| DUP-02_GW | YI15017-5 | Water | 09/14/23 | MWM5-03_GW | X | | | | |

## ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

| Items Reviewed | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| 1. Sample receipt condition | | X | | X | |
| 2. Requested analyses and sample results | | X | | X | |
| 3. Master tracking list | | X | | X | |
| 4. Methods of analysis | | X | | X | |
| 5. Reporting limits | | X | | X | |
| 6. Sample collection date | | X | | X | |
| 7. Laboratory sample received date | | X | | X | |
| 8. Sample preservation verification (as applicable) | | X | | X | |
| 9. Sample preparation/extraction/analysis dates | | X | | X | |
| 10. Fully executed Chain-of-Custody (COC) form | | X | | X | |
| 11. Narrative summary of QA or sample problems provided | | X | | X | |
| 12. Data Package Completeness and Compliance | | X | | X | |

Note:
QA - Quality Assurance

## ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency Method 537 Modified. Data were reviewed in accordance with the method specified criteria, USEPA National Functional Guidelines NFG for Organic Superfund Methods Data Review, EPA-540-R-20-005 (November 2020), with reference to the historical (USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999, as appropriate).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

## PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ANALYSIS

### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

| Method | Matrix | Holding Time | Preservation |
|---|---|---|---|
| USEPA modified Method 537 | Water | 28 days to extraction; 28 days from extraction to analysis | Cool to <6 °C |

All samples were initially analyzed within the specified holding time criteria.

### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, field, and equipment blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Equipment blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

### 3. Extracted Internal Standard (EIS)/Surrogate Compounds

Labeled standards must be added to all field samples and QC samples prior to extraction. EIS recoveries must be within the laboratory-established acceptance limits of ICAL midpoint standard area or area measured in the initial CCV on days when ICAL not performed.

Samples associated with EIS exhibited acceptable recoveries with the exceptions noted in the table.

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWM30-01_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| | 13C4_PFBA | Perfluoro-n-butanoic acid (PFBA) | <20% |
| MWM5-03_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| DUP-02_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |

The criteria used to evaluate the EIS recoveries are presented in the following table. In the case of an EIS deviation, the sample results associated with the EIS are qualified as documented in the table below.

| Control Limit | Sample Result | Qualification |
|---|---|---|
| < the lower control limit (LL) but > 20% | Non-detect | UJ |
| | Detect | J |
| > the upper control limit (UL) | Non-detect | No Action |
| | Detect | J |
| < 20% | Non-detect | R |
| | Detect | J |

## 4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within 50-150%. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within 30%.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A site-specific MS/MSD was not included in the data package.

## 5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

## 6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

| Sample ID/Duplicate ID | Compound | Sample Result | Duplicate Result | RPD |
|---|---|---|---|---|
| MWM5-03_GW / DUP-02_GW | Perfluorobutanesulfonic acid (PFBS) | 3.7 U | 2.8 J | AC |
| | Perfluorohexanesulfonic acid (PFHxS) | 1.8 J | 1.5 J | AC |
| | Perfluorobutanoic acid (PFBA) | 2.5 J | 3.4 J | AC |
| | Perfluoroheptanoic acid (PFHpA) | 0.57 J | 0.70 J | AC |
| | Perfluorooctanoic acid (PFOA) | 3.7 U | 1.3 J | AC |

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

## 7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

## DATA VALIDATION CHECKLIST FOR PFAs

| PFAs: USEPA modified Method 537 | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| **LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)** | | | | | |
| **Tier II Validation** | | | | | |
| Holding times | | X | | X | |
| Reporting limits (units) | | X | | X | |
| Blanks | | | | | |
| A. Method blanks | | X | | X | |
| B. Equipment blanks | | X | | X | |
| C. Trip blanks | | X | | X | |
| Laboratory Control Sample (LCS) %R | | X | | X | |
| Laboratory Control Sample Duplicate(LCSD) %R | X | | | | X |
| LCS/LCSD Precision (RPD) | X | | | | X |
| Matrix Spike (MS) %R | X | | | | X |
| Matrix Spike Duplicate (MSD) %R | X | | | | X |
| MS/MSD Precision (RPD) | X | | | | X |
| Field Duplicate (RPD) | | X | | X | |
| Extracted Internal Standards (EIS) Recoveries | | X | X | | |
| Dilution Factor | | X | | X | |
| Moisture Content | X | | | | X |

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE: 

DATE: December 18, 2023

PEER REVIEW: Joseph C. Houser

DATE: December 19, 2023

# CHAIN OF CUSTODY

# CORRECTED SAMPLE ANALYSIS DATA SHEETS

Pace Analytical®

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Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Tiffany Linder, Alexis Crisp | Telephone No. / E-mail: Alexis.crisp@arcadis.com, tiffany.linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Sommer Guy | Analysis (Attach list if more space is needed): Report CoLE 28 Compounds | Page 1 of 2 |
| City: Novi | State: MI Zip Code: 48377 | Printed Name: Sommer Guy | |
| Project Name: Racer PNC | | | YI15017 |
| Project No.: 30167840.00031 | P.O. No. | | KES2 |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab (G) C-Composite | Matrix: Aqueous | Matrix: Solid | Matrix: Non-Aqueous | No. of Containers by Preservative Type: Unpres | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Methanol | Methyl 537 mod. with Isotope dilution PFAS 533 PFAS | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWM30-01_GW-091423 | 9/14/23 | 1425 | G | X | | | 2 | | | | | | | X | |
| EB-04_091423 | 9/14/23 | 1450 | G | X | | | 1 | | | | | | | X | equipment blank |
| tripblank | 9/14/23 | 1455 | G | X | | | 1 | | | | | | | X | tripblank |

| | | | | | |
|---|---|---|---|---|---|
| Turn Around Time Required (Prior lab approval required for expedited TAT.): ☑ Standard ☐ Rush (Specify) | Sample Disposal: ☐ Return to Client ☒ Disposal by Lab | Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown | | QC Requirements (Specify) | |
| 1. Relinquished by: Sommer Guy | Date: 9/14/23 | Time: 1700 | 1. Received by: FedEx | Date: 9/14/23 | Time: 1700 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | Date: 9.15.23 | Time: 1030 | 4. Laboratory received by: Karen Weems | Date: 9.15.23 | Time: 1030 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack
Receipt Temp: 4.0 °C
Temp Blank: Y ☐ N



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ARCADIS US

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www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: US ARCADIS | Report to Contact: Alexis Crisp | Telephone No. / E-mail: Alexis.crisp@arcadis.com | Quote No. |
| Address: US 28550 Cabot Dr #500 Novi | Sampler's Signature: x | Analysis (Attach list if more space is needed): Report Chlate 28 Compounds | Page 2 of 2 |
| City: Novi / State: MI / Zip Code: 48377 | Printed Name: Lottie Jay | | |
| Project Name: Racer PNC | | | |
| Project No.: 30167840.00031.SG | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab / Composite | Matrix: Aqueous | Matrix: Soil | Matrix: Non-Aqueous | No. of Containers by Preservative Type: Unpres. | HCl | HNO3 | H2SO4 | NaOH | Na2S2O3 | Field Filtered | Method 537 mod. with isotope dilution per QSM 5.1 | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWMS-03_GW-091423 | 9/14/23 | 1435 | G | X | | | 2 | | | | | | | X | |
| DUP-02-GW-091423 | " | — | G | X | | | 2 | | | | | | | X | |

Y115017

KBS2

| Turn Around Time Required (Prior lab approval required for expedited TAT.) | Sample Disposal | Possible Hazard Identification | QC Requirements (Specify) |
|---|---|---|---|
| ☐ Standard ☐ Rush (Specify) | ☐ Return to Client ☑ Disposal by Lab | ☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown | |

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Lottie Jay/Lottie | 9/14/23 | 1525 | 1. Received by: Jonnmen | 9/14/23 | 1525 |
| 2. Relinquished by: Jonnmen | 9/14/23 | 1700 | 2. Received by: FedEx | 9/14/23 | 1700 |
| 3. Relinquished by: | Date | Time | 3. Received by: | Date | Time |
| 4. Relinquished by: Fedex | 9.15.23 | 1030 | 4. Laboratory received by: Keyon Mercer | 9.15.23 | 1030 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack Receipt Temp. 4.0 °C Temp Blank ☑ Y ☐ N

PACE ANALYTICAL SERVICES, LLC

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-001**

Description: **MWM30-01_GW-091423** Matrix: **Aqueous**

Date Sampled: **09/14/2023 1425** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/21/2023 1842 | ARC2 | 09/20/2023 2104 | 85336 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.1 | 0.43 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.1 | 0.59 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.1 | 1.4 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **37** | **Q** J | **7.1** | **1.8** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.1 | 0.77 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.1 | 0.43 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.1 | 0.66 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.1 | 0.82 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.5 | 0.37 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.69 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.44 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.63 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **2.6** | **J** | **3.5** | **0.53** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **12** | | **3.5** | **0.49** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | Q | 3.5 | 0.53 | ng/L | 1 R |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.42 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **16** | | **3.5** | **0.40** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **23** | | **3.5** | **0.61** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **54** | | **3.5** | **0.73** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **21** | | **3.5** | **0.48** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.53 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.47 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.55 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.5 | 1.8 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 177 | 25-150 |
| 13C2_6:2FTS | N | 300 | 25-150 |
| 13C2_8:2FTS | N | 213 | 25-150 |
| 13C2_PFDoA | | 95 | 25-150 |
| 13C2_PFTeDA | | 92 | 25-150 |
| 13C3_PFBS | | 71 | 25-150 |
| 13C3_PFHxS | | 87 | 25-150 |
| 13C3-HFPO-DA | | 44 | 25-150 |
| 13C4_PFBA | N | 19 | 25-150 |
| 13C4_PFHpA | | 55 | 25-150 |
| 13C5_PFHxA | | 43 | 25-150 |
| 13C5_PFPeA | | 32 | 25-150 |
| 13C6_PFDA | | 105 | 25-150 |
| 13C7_PFUdA | | 94 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-001**

Description: **MWM30-01_GW-091423** Matrix: **Aqueous**

Date Sampled: **09/14/2023 1425** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 82 | 25-150 |
| 13C8_PFOS | | 88 | 25-150 |
| 13C8_PFOSA | | 83 | 10-150 |
| 13C9_PFNA | | 89 | 25-150 |
| d5-EtFOSAA | | 111 | 25-150 |
| d3-MeFOSAA | | 107 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-002**

Description: **EB-04_091423** Matrix: **Aqueous**

Date Sampled: **09/14/2023 1450** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/21/2023 1853 | ARC2 | 09/20/2023 2104 | 85336 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.8 | 0.65 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.8 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.8 | 0.85 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.8 | 0.73 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.8 | 0.91 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.9 | 0.41 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.76 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.49 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.70 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.60 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.9 | 0.54 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.9 | 0.59 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.46 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.9 | 0.44 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.9 | 0.67 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.9 | 0.45 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.9 | 0.81 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.9 | 0.53 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.59 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.52 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.61 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.9 | 2.0 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 99 | 25-150 |
| 13C2_6:2FTS | | 139 | 25-150 |
| 13C2_8:2FTS | | 94 | 25-150 |
| 13C2_PFDoA | | 99 | 25-150 |
| 13C2_PFTeDA | | 91 | 25-150 |
| 13C3_PFBS | | 111 | 25-150 |
| 13C3_PFHxS | | 100 | 25-150 |
| 13C3-HFPO-DA | | 101 | 25-150 |
| 13C4_PFBA | | 103 | 25-150 |
| 13C4_PFHpA | | 101 | 25-150 |
| 13C5_PFHxA | | 98 | 25-150 |
| 13C5_PFPeA | | 96 | 25-150 |
| 13C6_PFDA | | 99 | 25-150 |
| 13C7_PFUdA | | 91 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

| | | | |
|---|---|---|---|
| Client: **Arcadis U.S., Inc.** | | Laboratory ID: **YI15017-002** |
| Description: **EB-04_091423** | | Matrix: **Aqueous** |
| Date Sampled: **09/14/2023 1450** | Project Name: **RACER PNC** | |
| Date Received: **09/15/2023** | Project Number: **30167840.00031** | |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 106 | 25-150 |
| 13C8_PFOS | | 96 | 25-150 |
| 13C8_PFOSA | | 90 | 10-150 |
| 13C9_PFNA | | 98 | 25-150 |
| d5-EtFOSAA | | 90 | 25-150 |
| d3-MeFOSAA | | 88 | 25-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-003**

Description: **trip blank** Matrix: **Aqueous**

Date Sampled: **09/14/2023 1455** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/21/2023 1903 | ARC2 | 09/20/2023 2104 | 85336 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.6 | 0.63 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.6 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.6 | 0.83 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.6 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.6 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.6 | 0.88 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.8 | 0.39 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.74 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.47 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.67 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.45 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.8 | 0.42 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.8 | 0.65 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.8 | 0.79 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 96 | 25-150 |
| 13C2_6:2FTS | | 121 | 25-150 |
| 13C2_8:2FTS | | 93 | 25-150 |
| 13C2_PFDoA | | 97 | 25-150 |
| 13C2_PFTeDA | | 95 | 25-150 |
| 13C3_PFBS | | 104 | 25-150 |
| 13C3_PFHxS | | 102 | 25-150 |
| 13C3-HFPO-DA | | 94 | 25-150 |
| 13C4_PFBA | | 105 | 25-150 |
| 13C4_PFHpA | | 105 | 25-150 |
| 13C5_PFHxA | | 96 | 25-150 |
| 13C5_PFPeA | | 99 | 25-150 |
| 13C6_PFDA | | 99 | 25-150 |
| 13C7_PFUdA | | 102 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-003**

Description: **trip blank** Matrix: **Aqueous**

Date Sampled: **09/14/2023 1455** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 109 | 25-150 |
| 13C8_PFOS | | 101 | 25-150 |
| 13C8_PFOSA | | 90 | 10-150 |
| 13C9_PFNA | | 104 | 25-150 |
| d5-EtFOSAA | | 100 | 25-150 |
| d3-MeFOSAA | | 95 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-004**

Description: **MWM5-03_GW-091423** Matrix: **Aqueous**

Date Sampled: **09/14/2023 1435** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/21/2023 1935 | ARC2 | 09/20/2023 2104 | 85336 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 0.62 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.4 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.4 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.4 | 0.81 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 0.70 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 0.87 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.7 | 0.39 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.72 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.46 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.66 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.57 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **1.8** | **J** | **3.7** | **0.51** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **2.5** | **J** | **3.7** | **0.56** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.44 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **0.57** | **J** | **3.7** | **0.42** | **ng/L** | **1** |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.7 | 0.64 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.43 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.7 | 0.77 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.51 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.58 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.7 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 291 | 25-150 |
| 13C2_6:2FTS | N | 193 | 25-150 |
| 13C2_8:2FTS | | 91 | 25-150 |
| 13C2_PFDoA | | 81 | 25-150 |
| 13C2_PFTeDA | | 73 | 25-150 |
| 13C3_PFBS | | 93 | 25-150 |
| 13C3_PFHxS | | 94 | 25-150 |
| 13C3-HFPO-DA | | 63 | 25-150 |
| 13C4_PFBA | | 39 | 25-150 |
| 13C4_PFHpA | | 90 | 25-150 |
| 13C5_PFHxA | | 87 | 25-150 |
| 13C5_PFPeA | | 66 | 25-150 |
| 13C6_PFDA | | 97 | 25-150 |
| 13C7_PFUdA | | 90 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

| | | | |
|---|---|---|---|
| Client: **Arcadis U.S., Inc.** | | Laboratory ID: **YI15017-004** |
| Description: **MWM5-03_GW-091423** | | Matrix: **Aqueous** |
| Date Sampled: **09/14/2023 1435** | Project Name: **RACER PNC** | |
| Date Received: **09/15/2023** | Project Number: **30167840.00031** | |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 114 | 25-150 |
| 13C8_PFOS | | 93 | 25-150 |
| 13C8_PFOSA | | 90 | 10-150 |
| 13C9_PFNA | | 100 | 25-150 |
| d5-EtFOSAA | | 85 | 25-150 |
| d3-MeFOSAA | | 85 | 25-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-005**

Description: **DUP-02_GW-091423** Matrix: **Aqueous**

Date Sampled: **09/14/2023** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/21/2023 1946 | ARC2 | 09/20/2023 2104 | 85336 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.6 | 0.63 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.6 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.6 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.6 | 0.83 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.6 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.6 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.6 | 0.89 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **2.8** | **J** | **3.8** | **0.39** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.74 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.47 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.68 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **1.5** | **J** | **3.8** | **0.52** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **3.4** | **J** | **3.8** | **0.57** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.45 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **0.70** | **J** | **3.8** | **0.43** | **ng/L** | **1** |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.8 | 0.65 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **1.3** | **J** | **3.8** | **0.79** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.60 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 280 | 25-150 |
| 13C2_6:2FTS | N | 191 | 25-150 |
| 13C2_8:2FTS | | 96 | 25-150 |
| 13C2_PFDoA | | 79 | 25-150 |
| 13C2_PFTeDA | | 71 | 25-150 |
| 13C3_PFBS | | 96 | 25-150 |
| 13C3_PFHxS | | 101 | 25-150 |
| 13C3-HFPO-DA | | 68 | 25-150 |
| 13C4_PFBA | | 41 | 25-150 |
| 13C4_PFHpA | | 88 | 25-150 |
| 13C5_PFHxA | | 85 | 25-150 |
| 13C5_PFPeA | | 64 | 25-150 |
| 13C6_PFDA | | 92 | 25-150 |
| 13C7_PFUdA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI15017-005**

Description: **DUP-02_GW-091423** Matrix: **Aqueous**

Date Sampled: **09/14/2023** Project Name: **RACER PNC**

Date Received: **09/15/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 114 | 25-150 |
| 13C8_PFOS | | 93 | 25-150 |
| 13C8_PFOSA | | 85 | 10-150 |
| 13C9_PFNA | | 100 | 25-150 |
| d5-EtFOSAA | | 81 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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Racer

# DATA REVIEW

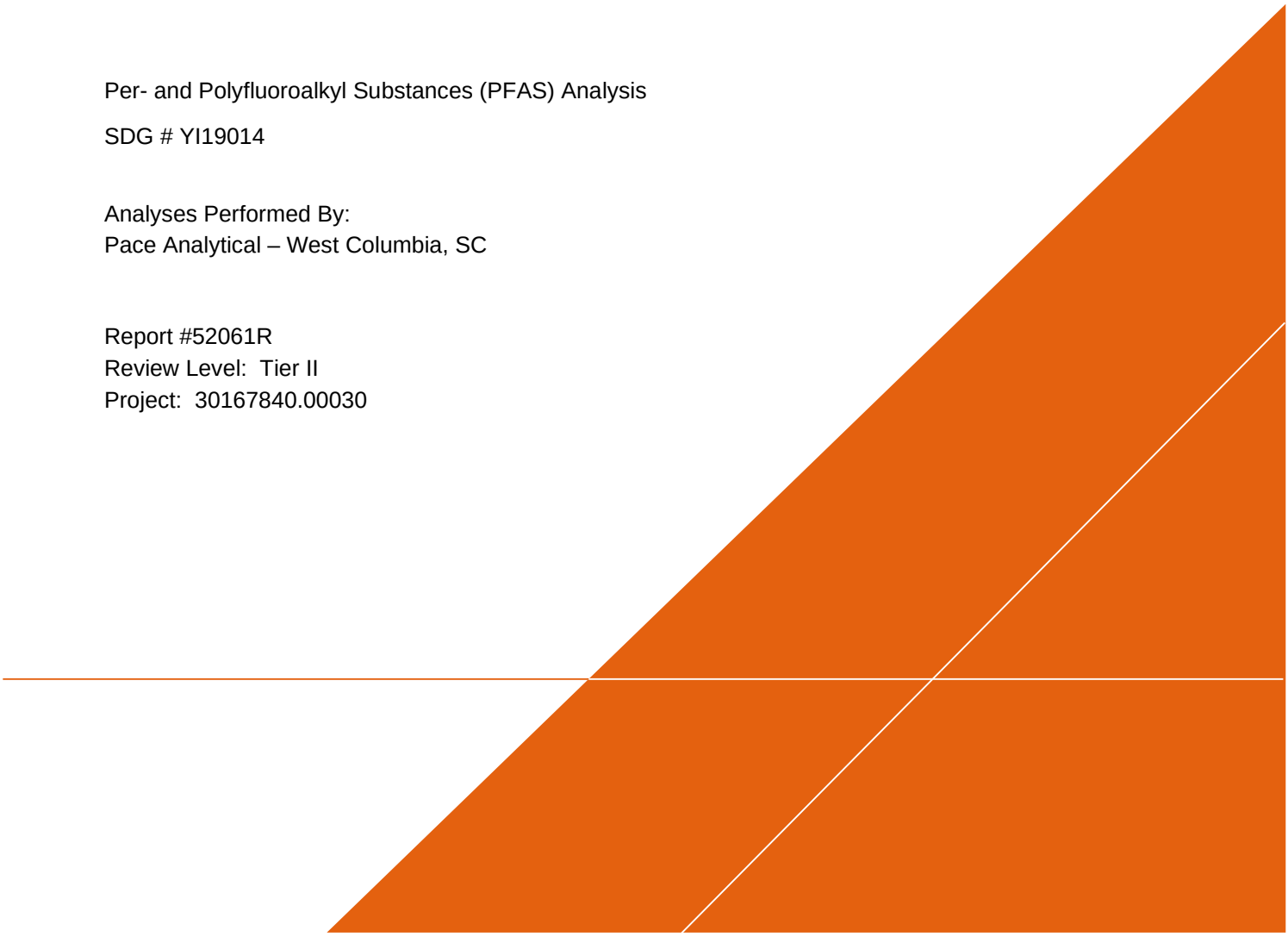
## Pontiac North Campus, MI

Per- and Polyfluoroalkyl Substances (PFAS) Analysis

SDG # YI19014

Analyses Performed By:
Pace Analytical – West Columbia, SC

Report #52061R
Review Level: Tier II
Project: 30167840.00030



# SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #YI19014 for samples collected in association with the Racer PNC, MI Site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

| Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | PFAS | SVOC | PCB | MET | MISC |
| PZF17-05_GW | YI19014-1 | Water | 09/15/23 | | X | | | | |
| EB-05 | YI19014-2 | Water | 09/15/23 | | X | | | | |
| TRIP BLANK | YI19014-3 | Water | 09/15/23 | | X | | | | |
| MWF16-12_GW | YI19014-4 | Water | 09/15/23 | | X | | | | |
| MWW10-SEN01 | YI19014-5 | Water | 09/15/23 | | X | | | | |
| TW-01-03_GW | YI19014-6 | Water | 09/15/23 | | X | | | | |
| EB-02 | YI19014-7 | Water | 09/15/23 | | X | | | | |
| MW-01-17_GW | YI19014-8 | Water | 09/15/23 | | X | | | | |
| DUP-03_GW | YI19014-9 | Water | 09/15/23 | MW-01-17_GW | X | | | | |
| MWF16-06_GW | YI19014-10 | Water | 09/15/23 | | X | | | | |
| MWF16-18_GW | YI19014-11 | Water | 09/15/23 | | X | | | | |
| MWW10-03_GW | YI19014-12 | Water | 09/15/23 | | X | | | | |
| MWW1-04_GW | YI19014-13 | Water | 09/15/23 | | X | | | | |
| MWW10-04_GW | YI19014-14 | Water | 09/15/23 | | X | | | | |
| DUP-01_GW | YI19014-15 | Water | 09/15/23 | MWW10-04_GW | X | | | | |

## ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

| Items Reviewed | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| 1. Sample receipt condition | | X | | X | |
| 2. Requested analyses and sample results | | X | | X | |
| 3. Master tracking list | | X | | X | |
| 4. Methods of analysis | | X | | X | |
| 5. Reporting limits | | X | | X | |
| 6. Sample collection date | | X | | X | |
| 7. Laboratory sample received date | | X | | X | |
| 8. Sample preservation verification (as applicable) | | X | | X | |
| 9. Sample preparation/extraction/analysis dates | | X | | X | |
| 10. Fully executed Chain-of-Custody (COC) form | | X | | X | |
| 11. Narrative summary of QA or sample problems provided | | X | | X | |
| 12. Data Package Completeness and Compliance | | X | | X | |

Note:
QA - Quality Assurance

## ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency Method 537 Modified. Data were reviewed in accordance with the method specified criteria, USEPA National Functional Guidelines NFG for Organic Superfund Methods Data Review, EPA-540-R-20-005 (November 2020), with reference to the historical (USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999, as appropriate).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

## PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ANALYSIS

### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

| Method | Matrix | Holding Time | Preservation |
|---|---|---|---|
| USEPA modified Method 537 | Water | 28 days to extraction; 28 days from extraction to analysis | Cool to <6 °C |

All samples were initially analyzed within the specified holding time criteria.

### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, field, and equipment blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Equipment blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

### 3. Extracted Internal Standard (EIS)/Surrogate Compounds

Labeled standards must be added to all field samples and QC samples prior to extraction. EIS recoveries must be within the laboratory-established acceptance limits of ICAL midpoint standard area or area measured in the initial CCV on days when ICAL not performed.

Samples associated with EIS exhibited acceptable recoveries with the exceptions noted in the table.

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWF16-12_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| MMW10-SEN01 | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| | 13C4_PFBA | Perfluoro-n-butanoic acid (PFBA) | < the lower control limit (LL) but > 20% |

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| TW-01-03_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| | 13C4_PFBA | Perfluoro-n-butanoic acid (PFBA) | <20% |
| MW-01-17_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| | 13C4_PFBA | Perfluoro-n-butanoic acid (PFBA) | < the lower control limit (LL) but > 20% |
| DUP-03_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| | 13C4_PFBA | Perfluoro-n-butanoic acid (PFBA) | < the lower control limit (LL) but > 20% |
| MWF16-06_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| MWF16-18_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| MMW10-03_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| MMW1-04_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MMW1-04_GW | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| MMW10-04_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| DUP-01_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |

The criteria used to evaluate the EIS recoveries are presented in the following table. In the case of an EIS deviation, the sample results associated with the EIS are qualified as documented in the table below.

| Control Limit | Sample Result | Qualification |
|---|---|---|
| < the lower control limit (LL) but > 20% | Non-detect | UJ |
| | Detect | J |
| > the upper control limit (UL) | Non-detect | No Action |
| | Detect | J |
| < 20% | Non-detect | R |
| | Detect | J |

## 4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within 50-150%. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within 30%.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A site-specific MS/MSD was not included in the data package.

## 5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

## 6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for soil matrices.

| Sample ID/Duplicate ID | Compound | Sample Result | Duplicate Result | RPD |
|---|---|---|---|---|
| MW-01-17_GW / DUP-03_GW | Perfluorobutanesulfonic acid (PFBS) | 7.0 | 4.9 | AC |
| | Perfluoropentanesulfonic acid (PFPeS) | 3.4 J | 3.7 U | AC |
| | Perfluorohexanesulfonic acid (PFHxS) | 13 | 13 | 0.0% |
| | Perfluorobutanoic acid (PFBA) | 18 | 3.7 U | NC |
| | Perfluoroheptanoic acid (PFHpA) | 5.7 | 6 | AC |
| | Perfluorohexanoic acid (PFHxA) | 9.2 | 9.6 | AC |
| | Perfluorononanoic acid (PFNA) | 0.67 J | 0.72 J | AC |
| | Perfluorooctanoic acid (PFOA) | 14 | 13 | AC |
| | Perfluorooctane sulfonic acid (PFOS) | 13 | 14 | AC |
| MWW10-04_GW / DUP-01_GW | Perfluorohexanesulfonic acid (PFHxS) | 5.7 | 5.0 | AC |
| | Perfluorobutanoic acid (PFBA) | 8.3 J | 40 U | AC |
| | Perfluorodecanoic acid (PFDA) | 0.94 J | 1.1 J | AC |
| | Perfluoroheptanoic acid (PFHpA) | 11 | 14 | AC |
| | Perfluorohexanoic acid (PFHxA) | 18 | 15 | AC |
| | Perfluorononanoic acid (PFNA) | 16 | 15 | AC |
| | Perfluorooctanoic acid (PFOA) | 45 | 45 | 0.0% |
| | Perfluoropentanoic acid (PFPeA) | 15 | 15 | 0.0% |
| | Perfluorooctane sulfonic acid (PFOS) | 48 | 47 | 2.1% |

Notes:

AC Acceptable

NC Non-compliant

The compound PFBA associated with sample locations MW-01-17_GW and DUP-03_GW exhibited a field duplicate RPD greater than the control limit. The associated sample results from sample locations for the listed analyte were qualified as estimated.

## 7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

## DATA VALIDATION CHECKLIST FOR PFAs

| PFAs: USEPA modified Method 537 | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| **LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)** | | | | | |
| **Tier II Validation** | | | | | |
| Holding times | | X | | X | |
| Reporting limits (units) | | X | | X | |
| Blanks | | | | | |
| A. Method blanks | | X | | X | |
| B. Equipment blanks | | X | | X | |
| C. Trip blanks | | X | | X | |
| Laboratory Control Sample (LCS) %R | | X | | X | |
| Laboratory Control Sample Duplicate(LCSD) %R | X | | | | X |
| LCS/LCSD Precision (RPD) | X | | | | X |
| Matrix Spike (MS) %R | X | | | | X |
| Matrix Spike Duplicate (MSD) %R | X | | | | X |
| MS/MSD Precision (RPD) | X | | | | X |
| Field Duplicate (RPD) | | X | X | | |
| Extracted Internal Standards (EIS) Recoveries | | X | X | | |
| Dilution Factor | | X | | X | |
| Moisture Content | X | | | | X |

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE: 

DATE: December 18, 2023

PEER REVIEW: Joseph C. Houser

DATE: December 19, 2023

# CHAIN OF CUSTODY

# CORRECTED SAMPLE ANALYSIS DATA SHEETS

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Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: Aradis | Report to Contact: Alexis Crisp | Telephone No. / E-mail: alexis.crisp@aradas.com Diana.linder@aradas.com | Quote No. |
| Address: 29550 Cabot Dr Suite #500 | Sampler's Signature: Samantha Szpaichler | Analysis (Attach list if more space is needed): Full Report EGLE 28 compounds | Page 1 of 4 |
| City: Novi | State: MI Zip Code: 48377 | | |
| Project Name: Ralph Pine | Printed Name: Samantha Szpaichler | | |
| Project No.: 30167840.00031 | P.O. No.: 30167840.00031 | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Sample Type (G=Grab C=Comp) | Matrix: Aqueous | Matrix: Solid | Matrix: Non-Aqueous | No of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Field Filtered | PFAS Analysis Required by DOD Lab? | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PZE17-05_GW-091523 | 9/15/23 | 1304 | G | 2 | | | 2 | | | | | | N | X | |
| EB-05_091523 | 9/15/23 | 1610 | G | 1 | | | 1 | | | | | | N | X | equipment blank |
| Trip Blank | 9/16/23 | 1000 | G | 1 | | | 1 | | | | | | N | X | trip blank |
| MWF16-12_GW-091823 | 9/18/23 | 1100 | G | 2 | | | 2 | | | | | | N | X | |
| MWW10-SEN01_GW-091823 | 9/18/23 | 1340 | G | 2 | | | 2 | | | | | | N | X | |
| ~~FB-10-01_GW-091823~~ SS | ~~9/18/23~~ | | G | 2 | | | 2 | | | | | | N | X | |

Turn Around Time Required (Prior lab approval required for expedited TAT): ☑ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☑ Disposal by Lab

Possible Hazard Identification: ☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Samantha Szpaichler / Aradis | 9/15/23 | 1510 | 1. Received by: Tammera Ely | 9/15/23 | 1510 |
| 2. Relinquished by: Tammera Ely | 9/18/23 | 1645 | 2. Received by: FedEx | 9/18/23 | 1645 |
| 3. Relinquished by: | Date | Time | 3. Received by: | Date | Time |
| 4. Relinquished by: FedEx | 9/18/23 | 1805 | 4. Laboratory received by: | 9/19/23 | 0805 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle) (Yes) No Ice Pack: Receipt Temp: 1.7 °C
Temp Blank: ☑ Y ☐ N

YI19014

KES2

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Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Alexis Crisp, Tiffany Linder | Telephone No. / E-mail: Alexis.crisp@arcadis.com, Tiffany.Linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: Jammer Guy | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds | Page 2 of 4 |
| City: Novi / State: MI / Zip Code: 48377 | Printed Name: Jammer Guy | | YI19014 |
| Project Name: Racer PNC | | | |
| Project No.: 30167840.00031 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab / Composite | Matrix: Aqueous | Matrix: Solid | Matrix: Non-Aqueous | No. of Containers by Preservative Type: Unpres. | HCl | HNO3 | H2SO4 | NaOH | Na2S2O3 | Field Filtered | Method 537.1 mod. with isotope dilution per WSP | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW-01-03_GW-091823 | 9/18/23 | 1125 | G | X | | | 2 | | | | | | | X | |
| EB-02_091823 | 9/18/23 | 1135 | G | X | | | 1 | | | | | | | X | equipment blank |
| MW-01-17_GW-091823 | 9/18/23 | 1425 | G | X | | | 2 | | | | | | | X | |
| DUP-03_GW-091823 | 9/18/23 | — | G | X | | | 2 | | | | | | | X | |

**Turn Around Time Required** (Prior lab approval required for expedited TAT.): ☒ Standard ☐ Rush (Specify)

**Sample Disposal**: ☐ Return to Client ☒ Disposal by Lab

**Possible Hazard Identification**: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

**QC Requirements (Specify)**

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Jammer Guy | 9/18/23 | 1645 | 1. Received by: FedEx | 9/18/23 | 1645 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | 9/19/23 | 1005 | 4. Laboratory received by | 9/16/23 | 1005 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on Ice (Circle): Yes / No — Ice Pack — Receipt Temp. 1.7 °C — Temp Blank: ☒ Y ☐ N



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www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: ARCADIS | Report to Contact: Alexis Crisp | Telephone No. / E-mail: tiffany.linder@arcadis.com; alexis.crisp@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr. #500 | Sampler's Signature: Garrett Link | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds | Page 3 of 4 |
| City: Nov. State: MI Zip Code: 48377 | Printed Name: Garrett Link | | YI19014 |
| Project Name: Pontiac North Campus (RACER) | | | IKES2 |
| Project No.: 30167840.00031 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab/Composite | Matrix: Aqueous | Matrix: Solid | Matrix: Non-aqueous | No. of Containers by Preservative Type: Unpres | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Field Filtered | (MS/MSD, 537 w/ isotope dilution per ASMS.1) | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~MWF16-12_GW-091523~~ | ~~9/15/23~~ | | G | X | | | X | | | | | | | | |
| MWF16-06_GW-091523 | 9/15/23 | 13:00 | G | 2 | | | 2 | | | | | | | X | |
| MWF16-18_GW-091523 | 9/15/23 | 14:20 | G | 2 | | | 2 | | | | | | | X | |

| Turn Around Time Required (Prior lab approval required for expedited TAT.) | Sample Disposal | Possible Hazard Identification | QC Requirements (Specify) |
|---|---|---|---|
| ☑ Standard ☐ Rush (Specify) | ☐ Return to Client ☑ Disposal by Lab | ☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown | |

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Garrett Link | 9/15/23 | 15:00 | 1. Received by: Arcadis | 9/15/23 | 1500 |
| 2. Relinquished by: Arcadis | 9/18/23 | 1510 | 2. Received by: Jennifer Eby | 9/18/23 | 1510 |
| 3. Relinquished by: Jennifer Eby | 9/18/23 | 1645 | 3. Received by: FedEx | 9/18/23 | 1645 |
| 4. Relinquished by: FedEx | 9/19/23 | 1005 | 4. Laboratory received by: | 9/19/23 | 1005 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack
Receipt Temp 1.7 °C
Temp Blank ☑ Y ☐ N



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**Number** 150049

| | | | |
|---|---|---|---|
| Client: ARCADIS | Report to Contact: Lexi Crisp | Telephone No. / E-mail: tiffany.linder@arcadis.com; alexis.crisp@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Lotte Jay | Analysis (Attach list if more space is needed): Report EGLE 28 (compound) | Page 4 of 4 |
| City: NOVI | State: MI | Zip Code: 48377 | |
| Project Name: Racer PNC | Printed Name: Lottie Jay | | YI19014 |
| Project No.: 30167840.00031 | P.O. No. | | KF52 |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab / Composite | Matrix: Aqueous | Matrix: Solid | Matrix: Other | No. of Containers by Preservative Type: Unpres. | HNO3 | H2SO4 | HCl | NaOH | Na2S2O3 | Field Filtered | Method 537 mod with isotope dilution per QSM 5.1 | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWW10-03_GW-091523 | 9/15/23 | 1250 | G | X | | | 2 | | | | | | | X | |
| MWW1-04_GW-091523 | | 1540 | G | X | | | 2 | | | | | | | X | |
| MWW10-04_GW-091523 | | 1130 | G | X | | | 2 | | | | | | | X | |
| DUP-01_GW-091523 | | — | G | X | | | 2 | | | | | | | X | |

**Turn Around Time Required** (Prior lab approval required for expedited TAT.): ☒ Standard ☐ Rush (Specify)

**Sample Disposal**: ☐ Return to Client ☒ Disposal by Lab

**Possible Hazard Identification**: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

**QC Requirements (Specify)**

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Lottie Jay | 9/15/23 | 1628 | 1. Received by: Arcadis | 9/15/23 | 1628 |
| 2. Relinquished by: Arcadis | 9/18/23 | 1510 | 2. Received by: Jammel Day | 9/18/23 | 1510 |
| 3. Relinquished by: Jammel Day | 9/19/23 | 1645 | 3. Received by: FedEx | 9/19/23 | 1645 |
| 4. Relinquished by: FedEx | 9/19/23 | 1685 | 4. Laboratory received by: [signature] | 9/19/23 | 1685 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on Ice (Circle): (Yes) No Ice Pack — Receipt Temp. 1.7 °C — Temp Blank ☒ ☐ N

PACE ANALYTICAL SERVICES, LLC

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-001**

Description: **PZF17-05_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1304** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/29/2023 2329 | ARC2 | 09/27/2023 1602 | 85922 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 0.62 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.4 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.4 | 0.81 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 0.70 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 0.87 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **0.67** | **J** | **3.7** | **0.39** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.72 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.46 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.66 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.57 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.7 | 0.51 | ng/L | 1 |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **1.1** | **J** | **3.7** | **0.56** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.44 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.7 | 0.42 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.7 | 0.64 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.43 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.7 | 0.77 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.51 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.58 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.7 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 116 | 25-150 |
| 13C2_6:2FTS | | 95 | 25-150 |
| 13C2_8:2FTS | | 81 | 25-150 |
| 13C2_PFDoA | | 73 | 25-150 |
| 13C2_PFTeDA | | 83 | 25-150 |
| 13C3_PFBS | | 93 | 25-150 |
| 13C3_PFHxS | | 84 | 25-150 |
| 13C3-HFPO-DA | | 92 | 25-150 |
| 13C4_PFBA | | 80 | 25-150 |
| 13C4_PFHpA | | 87 | 25-150 |
| 13C5_PFHxA | | 93 | 25-150 |
| 13C5_PFPeA | | 92 | 25-150 |
| 13C6_PFDA | | 80 | 25-150 |
| 13C7_PFUdA | | 82 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-001**

Description: **PZF17-05_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1304** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 89 | 25-150 |
| 13C8_PFOS | | 84 | 25-150 |
| 13C8_PFOSA | | 79 | 10-150 |
| 13C9_PFNA | | 90 | 25-150 |
| d5-EtFOSAA | | 85 | 25-150 |
| d3-MeFOSAA | | 83 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-002**

Description: **EB-05_091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1610** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/29/2023 2339 | ARC2 | 09/27/2023 1602 | 85922 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.6 | 0.63 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.6 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.6 | 0.83 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.6 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.6 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.6 | 0.88 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.8 | 0.39 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.74 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.47 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.67 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.45 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.8 | 0.42 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.8 | 0.65 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.8 | 0.78 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.51 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 117 | 25-150 |
| 13C2_6:2FTS | | 139 | 25-150 |
| 13C2_8:2FTS | | 105 | 25-150 |
| 13C2_PFDoA | | 102 | 25-150 |
| 13C2_PFTeDA | | 105 | 25-150 |
| 13C3_PFBS | | 111 | 25-150 |
| 13C3_PFHxS | | 100 | 25-150 |
| 13C3-HFPO-DA | | 106 | 25-150 |
| 13C4_PFBA | | 108 | 25-150 |
| 13C4_PFHpA | | 110 | 25-150 |
| 13C5_PFHxA | | 112 | 25-150 |
| 13C5_PFPeA | | 112 | 25-150 |
| 13C6_PFDA | | 108 | 25-150 |
| 13C7_PFUdA | | 103 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-002**

Description: **EB-05_091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1610** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 116 | 25-150 |
| 13C8_PFOS | | 112 | 25-150 |
| 13C8_PFOSA | | 98 | 10-150 |
| 13C9_PFNA | | 114 | 25-150 |
| d5-EtFOSAA | | 106 | 25-150 |
| d3-MeFOSAA | | 107 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-003**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/16/2023 1000** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/29/2023 2350 | ARC2 | 09/27/2023 1602 | 85922 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.2 | 0.43 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.2 | 0.59 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.2 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.2 | 0.78 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.2 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.2 | 0.43 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.2 | 0.67 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.2 | 0.83 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.37 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.70 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.45 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.64 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.53 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.6 | 0.49 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.40 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.61 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.41 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.6 | 0.74 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.49 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.6 | 1.8 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 88 | 25-150 |
| 13C2_6:2FTS | | 94 | 25-150 |
| 13C2_8:2FTS | | 83 | 25-150 |
| 13C2_PFDoA | | 78 | 25-150 |
| 13C2_PFTeDA | | 88 | 25-150 |
| 13C3_PFBS | | 91 | 25-150 |
| 13C3_PFHxS | | 85 | 25-150 |
| 13C3-HFPO-DA | | 93 | 25-150 |
| 13C4_PFBA | | 91 | 25-150 |
| 13C4_PFHpA | | 90 | 25-150 |
| 13C5_PFHxA | | 94 | 25-150 |
| 13C5_PFPeA | | 87 | 25-150 |
| 13C6_PFDA | | 90 | 25-150 |
| 13C7_PFUdA | | 91 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-003**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/16/2023 1000** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 92 | 25-150 |
| 13C8_PFOS | | 85 | 25-150 |
| 13C8_PFOSA | | 81 | 10-150 |
| 13C9_PFNA | | 93 | 25-150 |
| d5-EtFOSAA | | 90 | 25-150 |
| d3-MeFOSAA | | 82 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-004**

Description: **MWF16-12_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1100** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0032 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.8 | 0.64 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.8 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.8 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.8 | 0.85 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| **N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)** | **2991-50-6** | **PFAS by ID SOP** | **1.4** | **J** | **7.8** | **0.73** | **ng/L** | **1** |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.8 | 0.91 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.9 | 0.40 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.76 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **1.8** | **J** | **3.9** | **0.48** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.69 | ng/L | 1 |
| **Perfluoro-1-octanesulfonamide (PFOSA)** | **754-91-6** | **PFAS by ID SOP** | **3.5** | **J** | **3.9** | **0.60** | **ng/L** | **1** |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **3.4** | **J** | **3.9** | **0.54** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **3.7** | **J** | **3.9** | **0.58** | **ng/L** | **1** |
| **Perfluoro-n-decanoic acid (PFDA)** | **335-76-2** | **PFAS by ID SOP** | **0.91** | **J** | **3.9** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.46 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **6.0** | | **3.9** | **0.43** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **12** | | **3.9** | **0.67** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **2.2** | **J** | **3.9** | **0.45** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **24** | | **3.9** | **0.81** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **11** | | **3.9** | **0.53** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.61 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **110** | | **3.9** | **1.9** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 256 | 25-150 |
| 13C2_6:2FTS | N | 168 | 25-150 |
| 13C2_8:2FTS | | 119 | 25-150 |
| 13C2_PFDoA | | 91 | 25-150 |
| 13C2_PFTeDA | | 92 | 25-150 |
| 13C3_PFBS | | 94 | 25-150 |
| 13C3_PFHxS | | 94 | 25-150 |
| 13C3-HFPO-DA | | 87 | 25-150 |
| 13C4_PFBA | | 55 | 25-150 |
| 13C4_PFHpA | | 88 | 25-150 |
| 13C5_PFHxA | | 99 | 25-150 |
| 13C5_PFPeA | | 92 | 25-150 |
| 13C6_PFDA | | 102 | 25-150 |
| 13C7_PFUdA | | 101 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-004**

Description: **MWF16-12_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1100** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 105 | 25-150 |
| 13C8_PFOS | | 93 | 25-150 |
| 13C8_PFOSA | | 92 | 10-150 |
| 13C9_PFNA | | 107 | 25-150 |
| d5-EtFOSAA | | 95 | 25-150 |
| d3-MeFOSAA | | 106 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-005**

Description: **MWW10-SEN01-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1340** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0043 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.9 | 0.48 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.9 | 0.65 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.9 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.9 | 2.0 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.9 | 0.86 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.9 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.9 | 0.48 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.9 | 0.74 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.9 | 0.92 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.9 | 0.41 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.77 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.49 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.70 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.60 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.59 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **2.9** | **J** | **3.9** | **0.54** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | ~~Q~~ UJ | 3.9 | 0.59 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.9 | 0.52 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.47 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **3.4** | **J** | **3.9** | **0.44** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **6.0** | | **3.9** | **0.68** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.9 | 0.46 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **8.7** | | **3.9** | **0.82** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.9 | 0.54 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.59 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.52 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.62 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **18** | | **3.9** | **2.0** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 234 | 25-150 |
| 13C2_6:2FTS | N | 298 | 25-150 |
| 13C2_8:2FTS | N | 236 | 25-150 |
| 13C2_PFDoA | | 90 | 25-150 |
| 13C2_PFTeDA | | 86 | 25-150 |
| 13C3_PFBS | | 76 | 25-150 |
| 13C3_PFHxS | | 83 | 25-150 |
| 13C3-HFPO-DA | | 61 | 25-150 |
| 13C4_PFBA | N | 24 | 25-150 |
| 13C4_PFHpA | | 56 | 25-150 |
| 13C5_PFHxA | | 56 | 25-150 |
| 13C5_PFPeA | | 43 | 25-150 |
| 13C6_PFDA | | 99 | 25-150 |
| 13C7_PFUdA | | 103 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-005**

Description: **MWW10-SEN01-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1340** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 83 | 25-150 |
| 13C8_PFOS | | 87 | 25-150 |
| 13C8_PFOSA | | 84 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 |
| d5-EtFOSAA | | 108 | 25-150 |
| d3-MeFOSAA | | 112 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-006**

Description: **TW-01-03_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1125** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0054 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.1 | 0.43 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.1 | 0.59 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.1 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.1 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.1 | 0.78 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.1 | 0.43 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.1 | 0.67 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.1 | 0.83 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.37 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.69 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **3.1** | **J** | **3.6** | **0.44** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.63 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.53 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **19** | | **3.6** | **0.49** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | Q | 3.6 | 0.53 | ng/L | 1 R |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.40 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.61 | ng/L | 1 |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **1.1** | **J** | **3.6** | **0.41** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **21** | | **3.6** | **0.74** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.53 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **150** | | **3.6** | **1.8** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 260 | 25-150 |
| 13C2_6:2FTS | N | 246 | 25-150 |
| 13C2_8:2FTS | N | 249 | 25-150 |
| 13C2_PFDoA | | 63 | 25-150 |
| 13C2_PFTeDA | | 44 | 25-150 |
| 13C3_PFBS | | 70 | 25-150 |
| 13C3_PFHxS | | 62 | 25-150 |
| 13C3-HFPO-DA | | 45 | 25-150 |
| 13C4_PFBA | N | 17 | 25-150 |
| 13C4_PFHpA | | 28 | 25-150 |
| 13C5_PFHxA | | 33 | 25-150 |
| 13C5_PFPeA | | 29 | 25-150 |
| 13C6_PFDA | | 66 | 25-150 |
| 13C7_PFUdA | | 74 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-006**

Description: **TW-01-03_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1125** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 55 | 25-150 |
| 13C8_PFOS | | 71 | 25-150 |
| 13C8_PFOSA | | 35 | 10-150 |
| 13C9_PFNA | | 66 | 25-150 |
| d5-EtFOSAA | | 72 | 25-150 |
| d3-MeFOSAA | | 69 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-007**

Description: **EB-02_091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1135** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0104 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.2 | 0.44 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.2 | 0.60 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.2 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.2 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.2 | 0.79 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.2 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.2 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.2 | 0.68 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.2 | 0.84 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.38 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.70 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.45 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.64 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.6 | 0.50 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.43 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.41 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.62 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.6 | 0.75 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.49 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.57 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.6 | 1.8 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 93 | 25-150 |
| 13C2_6:2FTS | | 80 | 25-150 |
| 13C2_8:2FTS | | 74 | 25-150 |
| 13C2_PFDoA | | 81 | 25-150 |
| 13C2_PFTeDA | | 91 | 25-150 |
| 13C3_PFBS | | 87 | 25-150 |
| 13C3_PFHxS | | 86 | 25-150 |
| 13C3-HFPO-DA | | 86 | 25-150 |
| 13C4_PFBA | | 90 | 25-150 |
| 13C4_PFHpA | | 83 | 25-150 |
| 13C5_PFHxA | | 87 | 25-150 |
| 13C5_PFPeA | | 83 | 25-150 |
| 13C6_PFDA | | 87 | 25-150 |
| 13C7_PFUdA | | 87 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-007**

Description: **EB-02_091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1135** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 92 | 25-150 |
| 13C8_PFOS | | 86 | 25-150 |
| 13C8_PFOSA | | 83 | 10-150 |
| 13C9_PFNA | | 86 | 25-150 |
| d5-EtFOSAA | | 86 | 25-150 |
| d3-MeFOSAA | | 82 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-008**

Description: **MW-01-17_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1425** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0251 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 0.61 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.3 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.3 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.3 | 0.80 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 0.69 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 0.85 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **7.0** | | **3.7** | **0.38** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.71 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.46 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.65 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **3.4** | **J** | **3.7** | **0.54** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **13** | | **3.7** | **0.51** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **18** | **Q J** | **3.7** | **0.55** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.48 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.43 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **5.7** | | **3.7** | **0.41** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **9.2** | | **3.7** | **0.63** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **0.67** | **J** | **3.7** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **14** | | **3.7** | **0.76** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.50 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.57 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **13** | | **3.7** | **1.8** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 220 | 25-150 |
| 13C2_6:2FTS | N | 285 | 25-150 |
| 13C2_8:2FTS | N | 249 | 25-150 |
| 13C2_PFDoA | | 104 | 25-150 |
| 13C2_PFTeDA | | 91 | 25-150 |
| 13C3_PFBS | | 76 | 25-150 |
| 13C3_PFHxS | | 95 | 25-150 |
| 13C3-HFPO-DA | | 59 | 25-150 |
| 13C4_PFBA | N | 21 | 25-150 |
| 13C4_PFHpA | | 64 | 25-150 |
| 13C5_PFHxA | | 61 | 25-150 |
| 13C5_PFPeA | | 40 | 25-150 |
| 13C6_PFDA | | 112 | 25-150 |
| 13C7_PFUdA | | 119 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
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S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-008**

Description: **MW-01-17_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1425** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 101 | 25-150 |
| 13C8_PFOS | | 107 | 25-150 |
| 13C8_PFOSA | | 90 | 10-150 |
| 13C9_PFNA | | 110 | 25-150 |
| d5-EtFOSAA | | 125 | 25-150 |
| d3-MeFOSAA | | 118 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-009**

Description: **DUP-03_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0301 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.4 | 0.62 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.4 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.4 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.4 | 0.81 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.4 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.4 | 0.45 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.4 | 0.70 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.4 | 0.87 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **4.9** | | **3.7** | **0.39** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.72 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.46 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.66 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.57 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **13** | | **3.7** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | Q UJ | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.44 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **6.0** | | **3.7** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **9.6** | | **3.7** | **0.64** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **0.72** | **J** | **3.7** | **0.43** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **13** | | **3.7** | **0.77** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.51 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.49 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.58 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **14** | | **3.7** | **1.9** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 247 | 25-150 |
| 13C2_6:2FTS | N | 317 | 25-150 |
| 13C2_8:2FTS | N | 214 | 25-150 |
| 13C2_PFDoA | | 101 | 25-150 |
| 13C2_PFTeDA | | 85 | 25-150 |
| 13C3_PFBS | | 82 | 25-150 |
| 13C3_PFHxS | | 90 | 25-150 |
| 13C3-HFPO-DA | | 59 | 25-150 |
| 13C4_PFBA | N | 21 | 25-150 |
| 13C4_PFHpA | | 61 | 25-150 |
| 13C5_PFHxA | | 62 | 25-150 |
| 13C5_PFPeA | | 40 | 25-150 |
| 13C6_PFDA | | 111 | 25-150 |
| 13C7_PFUdA | | 113 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-009**

Description: **DUP-03_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 25-150 |
| 13C8_PFOS | | 89 | 25-150 |
| 13C8_PFOSA | | 96 | 10-150 |
| 13C9_PFNA | | 107 | 25-150 |
| d5-EtFOSAA | | 125 | 25-150 |
| d3-MeFOSAA | | 116 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-010**

Description: **MWF16-06_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1300** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0312 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 0.57 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.9 | 0.76 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 0.65 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 0.81 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **4.2** | | **3.5** | **0.36** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.67 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **5.1** | | **3.5** | **0.43** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.62 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.53 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **4.8** | | **3.5** | **0.51** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **17** | | **3.5** | **0.48** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **9.6** | | **3.5** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.45 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **7.7** | | **3.5** | **0.39** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **14** | | **3.5** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.40 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **40** | | **3.5** | **0.72** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **13** | | **3.5** | **0.47** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **49** | | **3.5** | **1.7** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 201 | 25-150 |
| 13C2_6:2FTS | N | 171 | 25-150 |
| 13C2_8:2FTS | | 102 | 25-150 |
| 13C2_PFDoA | | 95 | 25-150 |
| 13C2_PFTeDA | | 89 | 25-150 |
| 13C3_PFBS | | 94 | 25-150 |
| 13C3_PFHxS | | 99 | 25-150 |
| 13C3-HFPO-DA | | 85 | 25-150 |
| 13C4_PFBA | | 73 | 25-150 |
| 13C4_PFHpA | | 90 | 25-150 |
| 13C5_PFHxA | | 104 | 25-150 |
| 13C5_PFPeA | | 90 | 25-150 |
| 13C6_PFDA | | 103 | 25-150 |
| 13C7_PFUdA | | 89 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-010**

Description: **MWF16-06_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1300** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 110 | 25-150 |
| 13C8_PFOS | | 100 | 25-150 |
| 13C8_PFOSA | | 91 | 10-150 |
| 13C9_PFNA | | 102 | 25-150 |
| d5-EtFOSAA | | 89 | 25-150 |
| d3-MeFOSAA | | 81 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-011**

Description: **MWF16-18_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1420** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0323 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 0.57 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 6.9 | 0.76 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 0.65 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 0.81 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.5 | 0.36 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.67 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.43 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.62 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.53 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.51 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **2.2** | **J** | **3.5** | **0.48** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **10** | | **3.5** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.45 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **3.5** | | **3.5** | **0.39** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **4.2** | | **3.5** | **0.60** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **0.91** | **J** | **3.5** | **0.40** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **12** | | **3.5** | **0.72** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **4.8** | | **3.5** | **0.47** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **13** | | **3.5** | **1.7** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 299 | 25-150 |
| 13C2_6:2FTS | N | 231 | 25-150 |
| 13C2_8:2FTS | | 128 | 25-150 |
| 13C2_PFDoA | | 94 | 25-150 |
| 13C2_PFTeDA | | 87 | 25-150 |
| 13C3_PFBS | | 91 | 25-150 |
| 13C3_PFHxS | | 100 | 25-150 |
| 13C3-HFPO-DA | | 65 | 25-150 |
| 13C4_PFBA | | 46 | 25-150 |
| 13C4_PFHpA | | 84 | 25-150 |
| 13C5_PFHxA | | 95 | 25-150 |
| 13C5_PFPeA | | 73 | 25-150 |
| 13C6_PFDA | | 105 | 25-150 |
| 13C7_PFUdA | | 98 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-011**

Description: **MWF16-18_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1420** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 107 | 25-150 |
| 13C8_PFOS | | 99 | 25-150 |
| 13C8_PFOSA | | 94 | 10-150 |
| 13C9_PFNA | | 114 | 25-150 |
| d5-EtFOSAA | | 100 | 25-150 |
| d3-MeFOSAA | | 92 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-012**

Description: **MWW10-03_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1250** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0602 | ARC2 | 09/28/2023 2045 | 86111 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.5 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.5 | 0.62 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.5 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.5 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.5 | 0.82 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.5 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.5 | 0.45 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.5 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.5 | 0.88 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **12** | | **3.8** | **0.39** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.73 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **1.6** | **J** | **3.8** | **0.47** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.67 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **15** | | **3.8** | **0.56** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **44** | | **3.8** | **0.52** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **21** | | **3.8** | **0.56** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **30** | | **3.8** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **29** | | **3.8** | **0.65** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.43 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **50** | | **3.8** | **0.78** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **27** | | **3.8** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 234 | 25-150 |
| 13C2_6:2FTS | N | 304 | 25-150 |
| 13C2_8:2FTS | N | 167 | 25-150 |
| 13C2_PFDoA | | 100 | 25-150 |
| 13C2_PFTeDA | | 94 | 25-150 |
| 13C3_PFBS | | 84 | 25-150 |
| 13C3_PFHxS | | 89 | 25-150 |
| 13C3-HFPO-DA | | 57 | 25-150 |
| 13C4_PFBA | | 27 | 25-150 |
| 13C4_PFHpA | | 59 | 25-150 |
| 13C5_PFHxA | | 64 | 25-150 |
| 13C5_PFPeA | | 45 | 25-150 |
| 13C6_PFDA | | 109 | 25-150 |
| 13C7_PFUdA | | 98 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-012**

Description: **MWW10-03_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1250** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 88 | 25-150 |
| 13C8_PFOS | | 97 | 25-150 |
| 13C8_PFOSA | | 95 | 10-150 |
| 13C9_PFNA | | 103 | 25-150 |
| d5-EtFOSAA | | 105 | 25-150 |
| d3-MeFOSAA | | 101 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-013**

Description: **MWW1-04_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1540** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0333 | ARC2 | 09/28/2023 2045 | 86111 |
| 2 | SOP SPE | PFAS by ID SOP | 1 | 10/11/2023 0146 | OMNS | 10/03/2023 1731 | 86454 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.8 | 0.64 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.8 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.8 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.8 | 0.85 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.8 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.8 | 0.47 | ng/L | 1 |
| **N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)** | **2991-50-6** | **PFAS by ID SOP** | **15** | | **7.8** | **0.73** | **ng/L** | **1** |
| **N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)** | **2355-31-9** | **PFAS by ID SOP** | **1.0** | **J** | **7.8** | **0.90** | **ng/L** | **1** |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.9 | 0.40 | ng/L | 1 |
| **Perfluoro-1-decanesulfonic acid (PFDS)** | **335-77-3** | **PFAS by ID SOP** | **0.88** | **J** | **3.9** | **0.76** | **ng/L** | **1** |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.48 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.69 | ng/L | 1 |
| **Perfluoro-1-octanesulfonamide (PFOSA)** | **754-91-6** | **PFAS by ID SOP** | **1.7** | **J** | **3.9** | **0.59** | **ng/L** | **1** |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **4.5** | | **3.9** | **0.54** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 40 | 6.0 | ng/L | 2 |
| **Perfluoro-n-decanoic acid (PFDA)** | **335-76-2** | **PFAS by ID SOP** | **0.87** | **J** | **3.9** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.46 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **3.1** | **J** | **3.9** | **0.43** | **ng/L** | **1** |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.9 | 0.67 | ng/L | 1 |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **1.3** | **J** | **3.9** | **0.45** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **6.8** | | **3.9** | **0.80** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **5.2** | | **3.9** | **0.53** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.61 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **130** | | **3.9** | **1.9** | **ng/L** | **1** |

| Surrogate | Run 1 Q | Run 1 % Recovery | Run 1 Acceptance Limits | Run 2 Q | Run 2 % Recovery | Run 2 Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C2_4:2FTS | N | 275 | 25-150 | N | 268 | 25-150 |
| 13C2_6:2FTS | N | 335 | 25-150 | N | 174 | 25-150 |
| 13C2_8:2FTS | N | 293 | 25-150 | | 108 | 25-150 |
| 13C2_PFDoA | | 106 | 25-150 | | 93 | 25-150 |
| 13C2_PFTeDA | | 88 | 25-150 | | 88 | 25-150 |
| 13C3_PFBS | | 89 | 25-150 | | 97 | 25-150 |
| 13C3_PFHxS | | 88 | 25-150 | | 96 | 25-150 |
| 13C3-HFPO-DA | | 58 | 25-150 | | 75 | 25-150 |
| 13C4_PFBA | N | 4.0 | 25-150 | | 84 | 25-150 |
| 13C4_PFHpA | | 59 | 25-150 | | 88 | 25-150 |
| 13C5_PFHxA | | 76 | 25-150 | | 93 | 25-150 |
| 13C5_PFPeA | | 29 | 25-150 | | 99 | 25-150 |
| 13C6_PFDA | | 102 | 25-150 | | 88 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-013**

Description: **MWW1-04_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1540** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C7_PFUdA | | 108 | 25-150 | | 101 | 25-150 |
| 13C8_PFOA | | 87 | 25-150 | | 97 | 25-150 |
| 13C8_PFOS | | 95 | 25-150 | | 98 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 | | 95 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 | | 106 | 25-150 |
| d5-EtFOSAA | | 127 | 25-150 | | 94 | 25-150 |
| d3-MeFOSAA | | 115 | 25-150 | | 97 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-014**

Description: **MWW10-04_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1130** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0344 | ARC2 | 09/28/2023 2045 | 86111 |
| 2 | SOP SPE | PFAS by ID SOP | 1 | 10/11/2023 0156 | OMNS | 10/03/2023 1731 | 86454 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.7 | 0.47 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.7 | 0.64 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.7 | 1.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.7 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.7 | 0.85 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.7 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.7 | 0.47 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.7 | 0.73 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.7 | 0.90 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.9 | 0.40 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.75 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.48 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.69 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.59 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.57 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **5.7** | | **3.9** | **0.53** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **8.3** | **J** | **40** | **6.0** | **ng/L** | **2** |
| **Perfluoro-n-decanoic acid (PFDA)** | **335-76-2** | **PFAS by ID SOP** | **0.94** | **J** | **3.9** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.46 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **11** | | **3.9** | **0.43** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **18** | | **3.9** | **0.67** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **16** | | **3.9** | **0.45** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **45** | | **3.9** | **0.80** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **15** | | **3.9** | **0.53** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.61 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **48** | | **3.9** | **1.9** | **ng/L** | **1** |

| Surrogate | Run 1 Q | Run 1 % Recovery | Run 1 Acceptance Limits | Run 2 Q | Run 2 % Recovery | Run 2 Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C2_4:2FTS | N | 236 | 25-150 | N | 251 | 25-150 |
| 13C2_6:2FTS | N | 298 | 25-150 | N | 161 | 25-150 |
| 13C2_8:2FTS | N | 241 | 25-150 | | 106 | 25-150 |
| 13C2_PFDoA | | 100 | 25-150 | | 84 | 25-150 |
| 13C2_PFTeDA | | 91 | 25-150 | | 84 | 25-150 |
| 13C3_PFBS | | 73 | 25-150 | | 93 | 25-150 |
| 13C3_PFHxS | | 83 | 25-150 | | 90 | 25-150 |
| 13C3-HFPO-DA | | 47 | 25-150 | | 70 | 25-150 |
| 13C4_PFBA | N | 22 | 25-150 | | 75 | 25-150 |
| 13C4_PFHpA | | 54 | 25-150 | | 85 | 25-150 |
| 13C5_PFHxA | | 53 | 25-150 | | 88 | 25-150 |
| 13C5_PFPeA | | 35 | 25-150 | | 92 | 25-150 |
| 13C6_PFDA | | 97 | 25-150 | | 90 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-014**

Description: **MWW10-04_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023 1130** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C7_PFUdA | | 107 | 25-150 | | 96 | 25-150 |
| 13C8_PFOA | | 79 | 25-150 | | 95 | 25-150 |
| 13C8_PFOS | | 88 | 25-150 | | 99 | 25-150 |
| 13C8_PFOSA | | 73 | 10-150 | | 90 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 | | 99 | 25-150 |
| d5-EtFOSAA | | 110 | 25-150 | | 87 | 25-150 |
| d3-MeFOSAA | | 105 | 25-150 | | 90 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-015**

Description: **DUP-01_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/30/2023 0354 | ARC2 | 09/28/2023 2045 | 86111 |
| 2 | SOP SPE | PFAS by ID SOP | 1 | 10/11/2023 0207 | OMNS | 10/03/2023 1731 | 86454 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.5 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.5 | 0.62 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.5 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.5 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.5 | 0.82 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.5 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.5 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.5 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.8 | 0.39 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.73 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.47 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.67 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **5.0** | | **3.8** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 40 | 6.0 | ng/L | 2 |
| **Perfluoro-n-decanoic acid (PFDA)** | **335-76-2** | **PFAS by ID SOP** | **1.1** | **J** | **3.8** | **0.49** | **ng/L** | **1** |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **14** | | **3.8** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **15** | | **3.8** | **0.65** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **15** | | **3.8** | **0.43** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **45** | | **3.8** | **0.78** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **15** | | **3.8** | **0.51** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **47** | | **3.8** | **1.9** | **ng/L** | **1** |

| Surrogate | Run 1 Q | Run 1 % Recovery | Run 1 Acceptance Limits | Run 2 Q | Run 2 % Recovery | Run 2 Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C2_4:2FTS | N | 232 | 25-150 | N | 278 | 25-150 |
| 13C2_6:2FTS | N | 300 | 25-150 | N | 181 | 25-150 |
| 13C2_8:2FTS | N | 236 | 25-150 | | 103 | 25-150 |
| 13C2_PFDoA | | 98 | 25-150 | | 84 | 25-150 |
| 13C2_PFTeDA | | 86 | 25-150 | | 84 | 25-150 |
| 13C3_PFBS | | 74 | 25-150 | | 89 | 25-150 |
| 13C3_PFHxS | | 86 | 25-150 | | 94 | 25-150 |
| 13C3-HFPO-DA | | 54 | 25-150 | | 82 | 25-150 |
| 13C4_PFBA | N | 23 | 25-150 | | 77 | 25-150 |
| 13C4_PFHpA | | 50 | 25-150 | | 89 | 25-150 |
| 13C5_PFHxA | | 56 | 25-150 | | 95 | 25-150 |
| 13C5_PFPeA | | 38 | 25-150 | | 93 | 25-150 |
| 13C6_PFDA | | 101 | 25-150 | | 96 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI19014-015**

Description: **DUP-01_GW-091523** Matrix: **Aqueous**

Date Sampled: **09/15/2023** Project Name: **RACER PNC**

Date Received: **09/19/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C7_PFUdA | | 97 | 25-150 | | 96 | 25-150 |
| 13C8_PFOA | | 76 | 25-150 | | 95 | 25-150 |
| 13C8_PFOS | | 88 | 25-150 | | 96 | 25-150 |
| 13C8_PFOSA | | 74 | 10-150 | | 86 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 | | 104 | 25-150 |
| d5-EtFOSAA | | 110 | 25-150 | | 84 | 25-150 |
| d3-MeFOSAA | | 98 | 25-150 | | 87 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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Racer

# DATA REVIEW

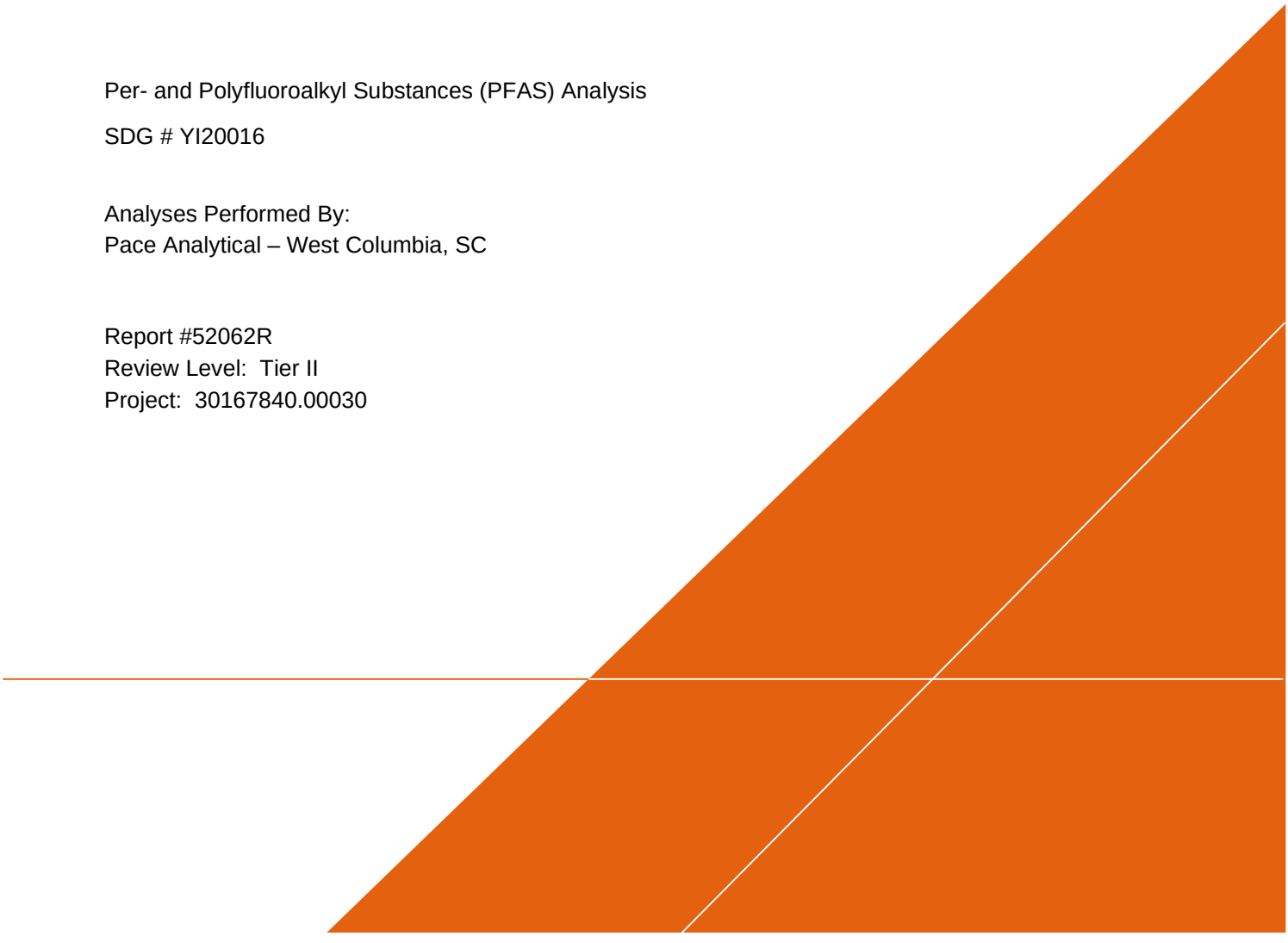
## Pontiac North Campus, MI

Per- and Polyfluoroalkyl Substances (PFAS) Analysis

SDG # YI20016

Analyses Performed By:
Pace Analytical – West Columbia, SC

Report #52062R
Review Level: Tier II
Project: 30167840.00030



# SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #YI20016 for samples collected in association with the Racer PNC, MI Site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

| Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | PFAS | SVOC | PCB | MET | MISC |
| Trip Blank | YI20016-1 | Water | 09/18/23 | | X | | | | |
| MWM16-52_GW | YI20016-2 | Water | 09/19/23 | | X | | | | |
| MWW1-02_GW | YI20016-3 | Water | 09/19/23 | | X | | | | |
| EB-06 | YI20016-4 | Water | 09/19/23 | | X | | | | |
| MWM30-02_GW | YI20016-5 | Water | 09/19/23 | | X | | | | |
| TW-10-01_GW | YI20016-6 | Water | 09/18/23 | | X | | | | |

## ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

| Items Reviewed | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| 1. Sample receipt condition | | X | | X | |
| 2. Requested analyses and sample results | | X | | X | |
| 3. Master tracking list | | X | | X | |
| 4. Methods of analysis | | X | | X | |
| 5. Reporting limits | | X | | X | |
| 6. Sample collection date | | X | | X | |
| 7. Laboratory sample received date | | X | | X | |
| 8. Sample preservation verification (as applicable) | | X | | X | |
| 9. Sample preparation/extraction/analysis dates | | X | | X | |
| 10. Fully executed Chain-of-Custody (COC) form | | X | | X | |
| 11. Narrative summary of QA or sample problems provided | | X | | X | |
| 12. Data Package Completeness and Compliance | | X | | X | |

Note:
QA - Quality Assurance

## ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency Method 537 Modified. Data were reviewed in accordance with the method specified criteria, USEPA National Functional Guidelines NFG for Organic Superfund Methods Data Review, EPA-540-R-20-005 (November 2020), with reference to the historical (USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999, as appropriate).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

## PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ANALYSIS

### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

| Method | Matrix | Holding Time | Preservation |
|---|---|---|---|
| USEPA modified Method 537 | Water | 28 days to extraction; 28 days from extraction to analysis | Cool to <6 °C |

All samples were initially analyzed within the specified holding time criteria.

### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, field, and equipment blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Equipment blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

### 3. Extracted Internal Standard (EIS)/Surrogate Compounds

Labeled standards must be added to all field samples and QC samples prior to extraction. EIS recoveries must be within the laboratory-established acceptance limits of ICAL midpoint standard area or area measured in the initial CCV on days when ICAL not performed.

Samples associated with EIS exhibited acceptable recoveries with the exceptions noted in the table.

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWM16-52_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| MWW1-02_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| MWM30-02_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| TW-10-01_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C4_PFBA | Perfluoro-n-butanoic acid (PFBA) | <20% |

The criteria used to evaluate the EIS recoveries are presented in the following table. In the case of an EIS deviation, the sample results associated with the EIS are qualified as documented in the table below.

| Control Limit | Sample Result | Qualification |
|---|---|---|
| < the lower control limit (LL) but > 20% | Non-detect | UJ |
| | Detect | J |
| > the upper control limit (UL) | Non-detect | No Action |
| | Detect | J |
| < 20% | Non-detect | R |
| | Detect | J |

## 4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within 50-150%. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within 30%.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD performed on samples MWM16-52_GW and MWM30-02_GW exhibited recoveries and RPDs within the control limits.

A laboratory duplicate was performed on sample TW-10-01_GW. The RPDs for 6:2 FTS, PFPeS, PFHxS, PFHxA, PFOA and PFOS were above the 20% control limit. The parent sample was qualified as estimated for these compounds.

## 5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

## 6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for soil matrices.

A field duplicate was not included in the data package.

## 7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

## DATA VALIDATION CHECKLIST FOR PFAs

| PFAs: USEPA modified Method 537 | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| **LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)** | | | | | |
| **Tier II Validation** | | | | | |
| Holding times | | X | | X | |
| Reporting limits (units) | | X | | X | |
| Blanks | | | | | |
| A. Method blanks | | X | | X | |
| B. Equipment blanks | | X | | X | |
| C. Trip blanks | | X | | X | |
| Laboratory Control Sample (LCS) %R | | X | | X | |
| Laboratory Control Sample Duplicate(LCSD) %R | X | | | | X |
| LCS/LCSD Precision (RPD) | X | | | | X |
| Matrix Spike (MS) %R | | X | | X | |
| Matrix Spike Duplicate (MSD) %R | | X | | X | |
| MS/MSD Precision (RPD) | | X | | X | |
| Field/Lab Duplicate (RPD) | | X | X | | |
| Extracted Internal Standards (EIS) Recoveries | | X | X | | |
| Dilution Factor | | X | | X | |
| Moisture Content | X | | | | X |

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE: 

DATE: December 18, 2023

PEER REVIEW: Joseph C. Houser

DATE: December 19, 2023

# CHAIN OF CUSTODY

# CORRECTED SAMPLE ANALYSIS DATA SHEETS

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www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Alexis Crisp, Tiffany Linder | Telephone No. / E-mail: Alexis.Crisp@arcadis.com, Tiffany.linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Jammer Guy | Analysis (Attach list if more space is needed): Report EGLE 28 compounds | Page 1 of 3 |
| City: Novi; State: MI; Zip Code: 48377 | Printed Name: Jammer Guy | | YI20016 KB52 |
| Project Name: Racer PNC | | | |
| Project No.: 30167840.00031 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab / Composite | Matrix: Aqueous | Matrix: Solid | Matrix: Non-aqueous | No of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Methanol | Method 537 mod, with 150 ppb dilution per QSM 5.1 | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tripblank | 9/18/23 | 1500 | G | X | | | 1 | | | | | | X | | tripblank |
| MWM16-52_GW-091923 | 9/19/23 | 1115 | G | X | | | 6 | | | | | | X | | Run MS/MSD |
| MWWI-02_GW-091923 | 9/19/23 | 1322 | G | X | | | 2 | | | | | | X | | |
| EB-06_091923 | 9/19/23 | 1330 | G | X | | | 1 | | | | | | X | | equipment blank |

| | | | | | | |
|---|---|---|---|---|---|---|
| Turn Around Time Required (Prior lab approval required for expedited TAT.): ☒ Standard ☐ Rush (Specify) | Sample Disposal: ☐ Return to Client ☒ Disposal by Lab | Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown | QC Requirements (Specify) | | | |
| 1. Relinquished by: Jammer Guy | Date: 9/19/23 | Time: 1630 | 1. Received by: FedEx | Date: 9/19/23 | Time: 1630 | |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time | |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time | |
| 4. Relinquished by: fedex | Date: 9.20.23 | Time: 1010 | 4. Laboratory received by: Keegan Williams | Date: 9.20.23 | Time: 1010 | |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on ice (Circle): (Yes) No Ice Pack: Receipt Temp: 3.6 °C Temp Blank: ☐ Y ☒ N

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www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: ARCADIS | Report to Contact: Lexi Crisp | Telephone No. / E-mail: tiffany.linder@arcadis.com alexis.crisp@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: X Lottie Jay | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds | Page 2 of 3 |
| City: NOVI | State: MI | Zip Code: 48377 | Printed Name: Lottie Jay |
| Project Name: Racer PNC | | | |
| Project No.: ~~Racer PNC-LT~~ 30167840.00031 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab/Composite | Matrix: Aqueous | Matrix: Solid | Matrix: Non-Aqueous | No of Containers by Preservative Type: Unpres. | HCSO4 | HNO3 | HCl | NaOH | Soda Ash | Other Preserved | Method 624 + MS/MSD with Isotope dilution per USEPA SOW | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWM30-02-GW-091923 | 9/19/23 | 1120 | G | X | | | 2 | | | | | | | X | |

YI20016

KR32

| Turn Around Time Required (Prior lab approval required for expedited TAT.) | Sample Disposal | Possible Hazard Identification | QC Requirements (Specify) |
|---|---|---|---|
| ☒ Standard ☐ Rush (Specify) | ☐ Return to Client ☒ Disposal by Lab | ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown | |

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Lottie Jay / ARCADIS | 9/19/23 | 1500 | 1. Received by: Jennifer Kay | 9/19/23 | 1500 |
| 2. Relinquished by: Jennifer Kay | 9/19/23 | 1630 | 2. Received by: Fed Ex | 9/19/23 | 1630 |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by | 9.20.2023 | 1010 | 4. Laboratory received by: Kelizeth Guerrero | 9.20.23 | 10:10 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack | Receipt Temp. 3.1 °C | Temp Blank ☐ Y ☒N



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www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: Aradis | Report to Contact: Alexis Crisp | Telephone No. / E-mail: alexis.crisp@aradis.com; tiffany.binder@aradis.com | Quote No. |
| Address: 28550 Cabot Dr Suite #500 | Sampler's Signature: X | Analysis (Attach list if more space is needed) | Page 3 of 3 |
| City: Novi | State: MI Zip Code: 48377 | Printed Name: Samantha Szpanier | YI20016 |
| Project Name: Ruler PJC | | | |
| Project No.: 30167840.00031 | P.O. No.: 30167840.00031 | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Sample Temperature | Matrix: Aqueous | Matrix: Solid | Matrix: Non-aqueous | No. of Containers by Preservation Type: Unpres. | HNO3 | H2SO4 | HCl | NaOH | Na2S2O3 | Field Filtered | PFAS Method 537.1 / Isotope Dilution Analysis | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW-10-01, GW-091823 | 9/18/23 | 1515 | 6 | X | | | 2 | | | | | | N | X | |

**Turn Around Time Required (Prior lab approval required for expedited TAT.)**
☑ Standard ☐ Rush (Specify)

**Sample Disposal**
☐ Return to Client ☑ Disposal by Lab

**Possible Hazard Identification**
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

**QC Requirements (Specify)**

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Samantha Szpanier / Aradis | 9/19/23 | 1520 | 1. Received by: | 9/19/23 | 1520 |
| 2. Relinquished by: | 9/19/23 | 1630 | 2. Received by: FedEx | 9/19/23 | 1630 |
| 3. Relinquished by: | Date | Time | 3. Received by: | Date | Time |
| 4. Relinquished by: Fedex | 9.20.23 | 1010 | 4. Laboratory received by: | 9.20.23 | 1010 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack — Receipt Temp: 3.6 °C — Temp Blank ☐ Y (N)



PACE ANALYTICAL SERVICES, LLC

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-001**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1500** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 2000 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.6 | 0.63 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.6 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.6 | 0.83 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.6 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.6 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.6 | 0.89 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.8 | 0.39 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.74 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.47 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.68 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.45 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.8 | 0.42 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.8 | 0.65 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.8 | 0.79 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 91 | 25-150 |
| 13C2_6:2FTS | | 123 | 25-150 |
| 13C2_8:2FTS | | 90 | 25-150 |
| 13C2_PFDoA | | 74 | 25-150 |
| 13C2_PFTeDA | | 84 | 25-150 |
| 13C3_PFBS | | 93 | 25-150 |
| 13C3_PFHxS | | 84 | 25-150 |
| 13C3-HFPO-DA | | 89 | 25-150 |
| 13C4_PFBA | | 94 | 25-150 |
| 13C4_PFHpA | | 85 | 25-150 |
| 13C5_PFHxA | | 99 | 25-150 |
| 13C5_PFPeA | | 92 | 25-150 |
| 13C6_PFDA | | 80 | 25-150 |
| 13C7_PFUdA | | 79 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-001**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1500** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 91 | 25-150 |
| 13C8_PFOS | | 77 | 25-150 |
| 13C8_PFOSA | | 78 | 10-150 |
| 13C9_PFNA | | 85 | 25-150 |
| d5-EtFOSAA | | 86 | 25-150 |
| d3-MeFOSAA | | 77 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-002**

Description: **MWM16-52_GW-091923** Matrix: **Aqueous**

Date Sampled: **09/19/2023 1115** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/22/2023 2011 | ARC2 | 09/21/2023 1602 | 85388 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 80 | 4.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 80 | 6.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 80 | 16 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **28** | **JQ** | **80** | **20** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 80 | 8.7 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 80 | 21 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 80 | 4.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 80 | 7.5 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 80 | 9.3 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 40 | 4.1 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 40 | 7.8 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 40 | 5.0 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 40 | 7.1 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 40 | 6.1 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 40 | 5.9 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **25** | **J** | **40** | **5.5** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 40 | 6.0 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 40 | 5.2 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 40 | 4.7 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **8.6** | **J** | **40** | **4.5** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **12** | **J** | **40** | **6.9** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 40 | 4.6 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **21** | **J** | **40** | **8.3** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 40 | 5.4 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 40 | 6.0 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 40 | 5.3 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 40 | 6.3 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **65** | | **40** | **20** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 327 | 25-150 |
| 13C2_6:2FTS | N | 246 | 25-150 |
| 13C2_8:2FTS | N | 151 | 25-150 |
| 13C2_PFDoA | | 82 | 25-150 |
| 13C2_PFTeDA | | 82 | 25-150 |
| 13C3_PFBS | | 91 | 25-150 |
| 13C3_PFHxS | | 83 | 25-150 |
| 13C3-HFPO-DA | | 61 | 25-150 |
| 13C4_PFBA | | 72 | 25-150 |
| 13C4_PFHpA | | 72 | 25-150 |
| 13C5_PFHxA | | 90 | 25-150 |
| 13C5_PFPeA | | 80 | 25-150 |
| 13C6_PFDA | | 89 | 25-150 |
| 13C7_PFUdA | | 90 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-002**

Description: **MWM16-52_GW-091923** Matrix: **Aqueous**

Date Sampled: **09/19/2023 1115** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 92 | 25-150 |
| 13C8_PFOS | | 78 | 25-150 |
| 13C8_PFOSA | | 87 | 10-150 |
| 13C9_PFNA | | 90 | 25-150 |
| d5-EtFOSAA | | 97 | 25-150 |
| d3-MeFOSAA | | 90 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
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L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-003**

Description: **MWW1-02_GW-091923** Matrix: **Aqueous**

Date Sampled: **09/19/2023 1322** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/29/2023 1800 | ARC2 | 09/21/2023 1924 | 85448 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 80 | 4.8 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 80 | 6.6 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 80 | 16 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 80 | 8.7 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 80 | 21 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 80 | 4.8 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 80 | 7.5 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 80 | 9.3 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 40 | 4.1 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 40 | 7.8 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 40 | 5.0 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 40 | 7.1 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 40 | 6.1 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 40 | 5.9 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **15** | **J** | **40** | **5.5** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **43** | | **40** | **6.0** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 40 | 5.2 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 40 | 4.7 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 40 | 4.5 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 40 | 6.9 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 40 | 4.6 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **15** | **J** | **40** | **8.3** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 40 | 5.4 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 40 | 6.0 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 40 | 5.3 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 40 | 6.3 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **66** | | **40** | **20** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 242 | 25-150 |
| 13C2_6:2FTS | | 137 | 25-150 |
| 13C2_8:2FTS | | 105 | 25-150 |
| 13C2_PFDoA | | 97 | 25-150 |
| 13C2_PFTeDA | | 97 | 25-150 |
| 13C3_PFBS | | 96 | 25-150 |
| 13C3_PFHxS | | 93 | 25-150 |
| 13C3-HFPO-DA | | 91 | 25-150 |
| 13C4_PFBA | | 78 | 25-150 |
| 13C4_PFHpA | | 94 | 25-150 |
| 13C5_PFHxA | | 114 | 25-150 |
| 13C5_PFPeA | | 93 | 25-150 |
| 13C6_PFDA | | 123 | 25-150 |
| 13C7_PFUdA | | 94 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-003**

Description: **MWW1-02_GW-091923** Matrix: **Aqueous**

Date Sampled: **09/19/2023 1322** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 106 | 25-150 |
| 13C8_PFOS | | 93 | 25-150 |
| 13C8_PFOSA | | 98 | 10-150 |
| 13C9_PFNA | | 111 | 25-150 |
| d5-EtFOSAA | | 96 | 25-150 |
| d3-MeFOSAA | | 97 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-004**

Description: **EB-06_091923** Matrix: **Aqueous**

Date Sampled: **09/19/2023 1330** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/29/2023 1811 | ARC2 | 09/21/2023 1924 | 85448 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.6 | 0.63 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.6 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.6 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.6 | 0.83 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.6 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.6 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.6 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.6 | 0.88 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.8 | 0.39 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.74 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.8 | 0.47 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.67 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.45 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.8 | 0.42 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.8 | 0.65 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.8 | 0.79 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.57 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.8 | 1.9 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 104 | 25-150 |
| 13C2_6:2FTS | | 113 | 25-150 |
| 13C2_8:2FTS | | 105 | 25-150 |
| 13C2_PFDoA | | 98 | 25-150 |
| 13C2_PFTeDA | | 102 | 25-150 |
| 13C3_PFBS | | 103 | 25-150 |
| 13C3_PFHxS | | 102 | 25-150 |
| 13C3-HFPO-DA | | 104 | 25-150 |
| 13C4_PFBA | | 102 | 25-150 |
| 13C4_PFHpA | | 99 | 25-150 |
| 13C5_PFHxA | | 107 | 25-150 |
| 13C5_PFPeA | | 101 | 25-150 |
| 13C6_PFDA | | 105 | 25-150 |
| 13C7_PFUdA | | 98 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

| | | | |
|---|---|---|---|
| Client: **Arcadis U.S., Inc.** | | Laboratory ID: **YI20016-004** |
| Description: **EB-06_091923** | | Matrix: **Aqueous** |
| Date Sampled: **09/19/2023 1330** | Project Name: **RACER PNC** | |
| Date Received: **09/20/2023** | Project Number: **30167840.00031** | |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 107 | 25-150 |
| 13C8_PFOS | | 98 | 25-150 |
| 13C8_PFOSA | | 96 | 10-150 |
| 13C9_PFNA | | 112 | 25-150 |
| d5-EtFOSAA | | 99 | 25-150 |
| d3-MeFOSAA | | 103 | 25-150 |

| | | | | |
|---|---|---|---|---|
| LOQ = Limit of Quantitation | B = Detected in the method blank | E = Quantitation of compound exceeded the calibration range | DL = Detection Limit | Q = Surrogate failure |
| ND = Not detected at or above the DL | N = Recovery is out of criteria | P = The RPD between two GC columns exceeds 40% | J = Estimated result < LOQ and ≥ DL | L = LCS/LCSD failure |
| H = Out of holding time | W = Reported on wet weight basis | | | S = MS/MSD failure |

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-005**

Description: **MWM30-02_GW-091923** Matrix: **Aqueous**

Date Sampled: **09/19/2023 1120** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/29/2023 1821 | ARC2 | 09/21/2023 1924 | 85448 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.7 | 0.46 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.7 | 0.64 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.7 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.7 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.7 | 0.84 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.7 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.7 | 0.47 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.7 | 0.72 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.7 | 0.90 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **2.9** | **J** | **3.9** | **0.40** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.9 | 0.75 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.9 | 0.48 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.9 | 0.69 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.9 | 0.59 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.9 | 0.57 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **3.3** | **J** | **3.9** | **0.53** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **6.5** | | **3.9** | **0.58** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.9 | 0.45 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **3.3** | **J** | **3.9** | **0.43** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **3.4** | **J** | **3.9** | **0.66** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.9 | 0.44 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **6.7** | | **3.9** | **0.80** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **3.0** | **J** | **3.9** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.9 | 0.58 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.51 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.9 | 0.60 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **3.1** | **J** | **3.9** | **1.9** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 206 | 25-150 |
| 13C2_6:2FTS | N | 154 | 25-150 |
| 13C2_8:2FTS | | 103 | 25-150 |
| 13C2_PFDoA | | 96 | 25-150 |
| 13C2_PFTeDA | | 108 | 25-150 |
| 13C3_PFBS | | 105 | 25-150 |
| 13C3_PFHxS | | 94 | 25-150 |
| 13C3-HFPO-DA | | 102 | 25-150 |
| 13C4_PFBA | | 82 | 25-150 |
| 13C4_PFHpA | | 97 | 25-150 |
| 13C5_PFHxA | | 111 | 25-150 |
| 13C5_PFPeA | | 105 | 25-150 |
| 13C6_PFDA | | 103 | 25-150 |
| 13C7_PFUdA | | 104 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-005**

Description: **MWM30-02_GW-091923** Matrix: **Aqueous**

Date Sampled: **09/19/2023 1120** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 109 | 25-150 |
| 13C8_PFOS | | 106 | 25-150 |
| 13C8_PFOSA | | 97 | 10-150 |
| 13C9_PFNA | | 112 | 25-150 |
| d5-EtFOSAA | | 102 | 25-150 |
| d3-MeFOSAA | | 101 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-006**

Description: **TW-10-01_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1515** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 09/29/2023 1842 | ARC2 | 09/21/2023 1924 | 85448 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.7 | 0.46 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.7 | 0.64 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.7 | 1.5 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **24** | **Q J** | **7.7** | **1.9** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.7 | 0.84 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.7 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.7 | 0.46 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.7 | 0.72 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.7 | 0.89 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **43** | | **3.8** | **0.40** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.75 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **3.1** | **J** | **3.8** | **0.48** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.68 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **13** | **J** | **3.8** | **0.57** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **47** | **J** | **3.8** | **0.53** | **ng/L** | **1** |
| ~~Perfluoro-n-butanoic acid (PFBA)~~ | ~~375-22-4~~ | ~~PFAS by ID SOP~~ | ~~ND~~ | ~~Q~~ | ~~3.8~~ | ~~0.58~~ | ~~ng/L~~ | ~~1~~ R |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.45 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **7.0** | | **3.8** | **0.43** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **45** | **J** | **3.8** | **0.66** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **15** | **J** | **3.8** | **0.80** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.52 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.51 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.60 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **81** | **J** | **3.8** | **1.9** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 219 | 25-150 |
| 13C2_6:2FTS | N | 223 | 25-150 |
| 13C2_8:2FTS | | 107 | 25-150 |
| 13C2_PFDoA | | 70 | 25-150 |
| 13C2_PFTeDA | | 60 | 25-150 |
| 13C3_PFBS | | 74 | 25-150 |
| 13C3_PFHxS | | 79 | 25-150 |
| 13C3-HFPO-DA | | 54 | 25-150 |
| 13C4_PFBA | N | 16 | 25-150 |
| 13C4_PFHpA | | 56 | 25-150 |
| 13C5_PFHxA | | 44 | 25-150 |
| 13C5_PFPeA | | 32 | 25-150 |
| 13C6_PFDA | | 92 | 25-150 |
| 13C7_PFUdA | | 79 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI20016-006**

Description: **TW-10-01_GW-091823** Matrix: **Aqueous**

Date Sampled: **09/18/2023 1515** Project Name: **RACER PNC**

Date Received: **09/20/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 83 | 25-150 |
| 13C8_PFOS | | 84 | 25-150 |
| 13C8_PFOSA | | 88 | 10-150 |
| 13C9_PFNA | | 93 | 25-150 |
| d5-EtFOSAA | | 80 | 25-150 |
| d3-MeFOSAA | | 86 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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Racer

# DATA REVIEW

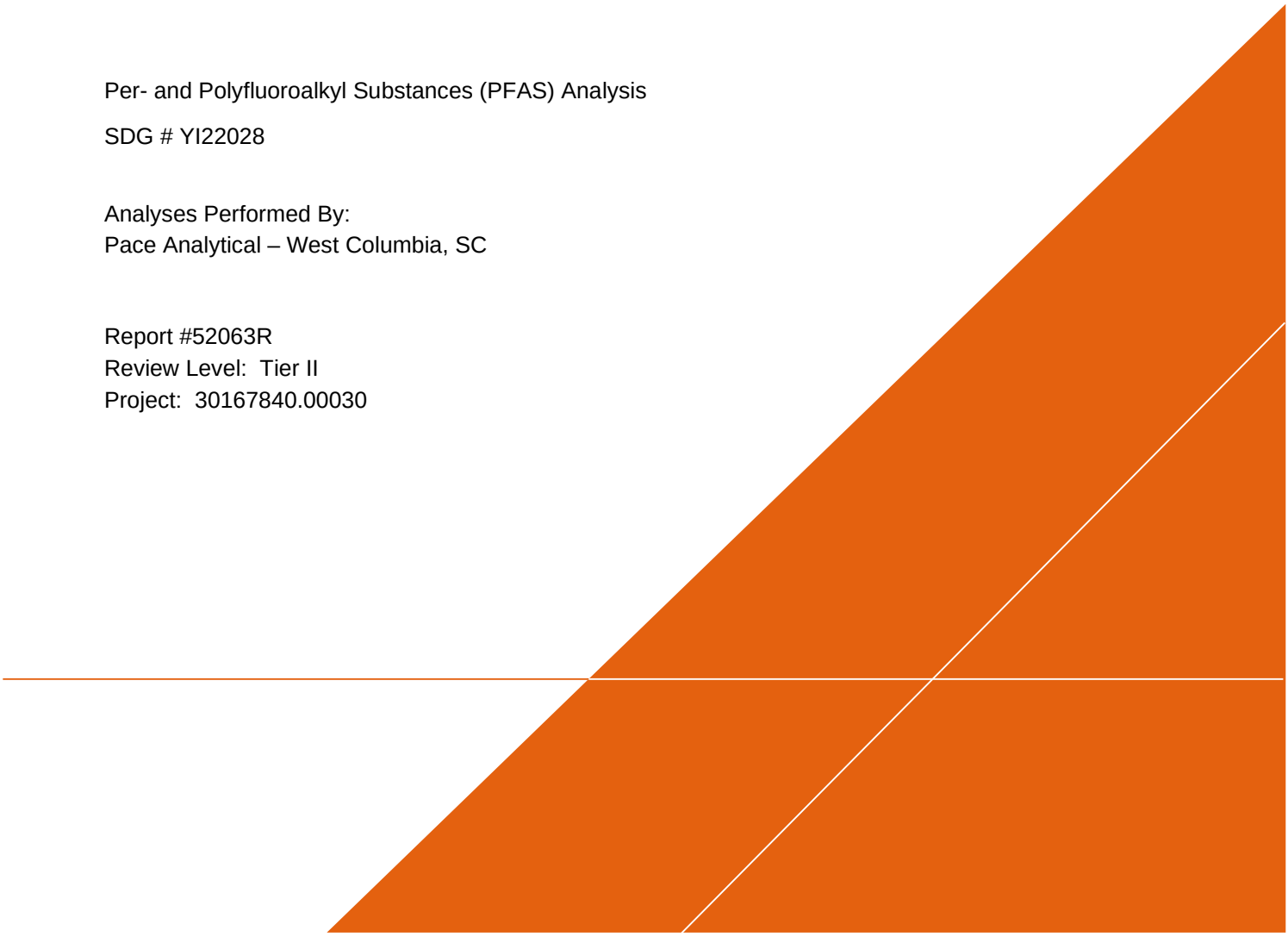
## Pontiac North Campus, MI

Per- and Polyfluoroalkyl Substances (PFAS) Analysis

SDG # YI22028

Analyses Performed By:
Pace Analytical – West Columbia, SC

Report #52063R
Review Level: Tier II
Project: 30167840.00030



# SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #YI22028 for samples collected in association with the Racer PNC, MI Site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

| Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | PFAS | SVOC | PCB | MET | MISC |
| Trip Blank | YI22028-1 | Water | 09/21/23 | | X | | | | |
| MWDP-2R_GW | YI22028-2 | Water | 09/21/23 | | X | | | | |
| EB-07 | YI22028-3 | Water | 09/21/23 | | X | | | | |
| SUMP_GW | YI22028-4 | Water | 09/21/23 | | X | | | | |
| MW-03-17_GW | YI22028-5 | Water | 09/21/23 | | X | | | | |

## ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

| Items Reviewed | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| 1. Sample receipt condition | | X | | X | |
| 2. Requested analyses and sample results | | X | | X | |
| 3. Master tracking list | | X | | X | |
| 4. Methods of analysis | | X | | X | |
| 5. Reporting limits | | X | | X | |
| 6. Sample collection date | | X | | X | |
| 7. Laboratory sample received date | | X | | X | |
| 8. Sample preservation verification (as applicable) | | X | | X | |
| 9. Sample preparation/extraction/analysis dates | | X | | X | |
| 10. Fully executed Chain-of-Custody (COC) form | | X | | X | |
| 11. Narrative summary of QA or sample problems provided | | X | | X | |
| 12. Data Package Completeness and Compliance | | X | | X | |

Note:
QA - Quality Assurance

## ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency Method 537 Modified. Data were reviewed in accordance with the method specified criteria, USEPA National Functional Guidelines NFG for Organic Superfund Methods Data Review, EPA-540-R-20-005 (November 2020), with reference to the historical (USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999, as appropriate).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

## PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ANALYSIS

### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

| Method | Matrix | Holding Time | Preservation |
|---|---|---|---|
| USEPA modified Method 537 | Water | 28 days to extraction; 28 days from extraction to analysis | Cool to <6 °C |

All samples were initially analyzed within the specified holding time criteria.

### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, field, and equipment blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Equipment blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

### 3. Extracted Internal Standard (EIS)/Surrogate Compounds

Labeled standards must be added to all field samples and QC samples prior to extraction. EIS recoveries must be within the laboratory-established acceptance limits of ICAL midpoint standard area or area measured in the initial CCV on days when ICAL not performed.

Samples associated with EIS exhibited acceptable recoveries with the exceptions noted in the table.

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWDP-2R_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| SUMP_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| | 13C4_PFBA | Perfluoro-n-butanoic acid (PFBA) | < the lower control limit (LL) but > 20% |

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MW-03-17_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |

The criteria used to evaluate the EIS recoveries are presented in the following table. In the case of an EIS deviation, the sample results associated with the EIS are qualified as documented in the table below.

| Control Limit | Sample Result | Qualification |
|---|---|---|
| < the lower control limit (LL) but > 20% | Non-detect | UJ |
| | Detect | J |
| > the upper control limit (UL) | Non-detect | No Action |
| | Detect | J |
| < 20% | Non-detect | R |
| | Detect | J |

## 4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within 50-150%. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within 30%.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A site-specific MS/MSD was not included in the data package.

## 5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

## 6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for soil matrices.

A field duplicate was not included in the data package.

## 7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

## DATA VALIDATION CHECKLIST FOR PFAs

| PFAs: USEPA modified Method 537 | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| **LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)** | | | | | |
| **Tier II Validation** | | | | | |
| Holding times | | X | | X | |
| Reporting limits (units) | | X | | X | |
| Blanks | | | | | |
| A. Method blanks | | X | | X | |
| B. Equipment blanks | | X | | X | |
| C. Trip blanks | | X | | X | |
| Laboratory Control Sample (LCS) %R | | X | | X | |
| Laboratory Control Sample Duplicate(LCSD) %R | X | | | | X |
| LCS/LCSD Precision (RPD) | X | | | | X |
| Matrix Spike (MS) %R | X | | | | X |
| Matrix Spike Duplicate (MSD) %R | X | | | | X |
| MS/MSD Precision (RPD) | X | | | | X |
| Field/Lab Duplicate (RPD) | X | | | | X |
| Extracted Internal Standards (EIS) Recoveries | | X | X | | |
| Dilution Factor | | X | | X | |
| Moisture Content | X | | | | X |

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE: 

DATE: December 18, 2023

PEER REVIEW: Joseph C. Houser

DATE: December 19, 2023

# CHAIN OF CUSTODY

# CORRECTED SAMPLE ANALYSIS DATA SHEETS

Pace Analytical®

**PACE ANALYTICAL SERVICES, LLC**
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Alexis Crisp, Tiffany Linder | Telephone No. / E-mail: Alexis.crisp@arcadis.com, tiffany.linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Sommer Guy | Analysis (Attach list if more space is needed): Report EGLE 28 Compounds* | Page 1 of 2 |
| City: Novi | State: MI | Zip Code: 48377 | Printed Name: Sommer Guy |
| Project Name: Racer PNC | | | |
| Project No.: 3116784D.00031 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab G / Composite C | Matrix: Aqueous | Soil | Non-aqueous | No of Containers by Preservative Type: Unpres. | H2SO4 | HNO3 | HCl | NaOH | Na2S2O3 | Field Filtered | Method 537.1 and 533 PFAS Analysis | Remarks / Cooler I.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tripblank | 9/21/23 | 0845 | G | X | | | 1 | | | | | | | X | tripblank |
| MWDP-2R_GW-092123 | 9/21/23 | 0923 | G | X | | | 2 | | | | | | | X | |
| EB-07_092123 | 9/21/23 | 0930 | G | X | | | 1 | | | | | | | X | Equipment blank |
| SUMP_GW-092123 | 9/21/23 | 1010 | G | X | | | 2 | | | | | | | X | |

YI22028

HSSI

Turn Around Time Required (Prior lab approval required for expedited TAT.): ☒ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Guy | 9/21/23 | 1700 | 1. Received by: FedEx | 9/21/23 | 1700 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | 9/22/23 | 1000 | 4. Laboratory received by: Brooke Sapelka | 9/22/23 | 1000 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack
Receipt Temp 1.9 °C
Temp Blank ☐ Y ☒ N

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www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: ARCADIS | Report to Contact: Lexi Crisp | Telephone No. / E-mail: tiffany.linder@arcadis.com; Alexis.crisp@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Lottie Jay | Analysis (Attach list if more space is needed): Report Edit 28 Compounds | Page 2 of 2 |
| City: Novi; State: MI; Zip Code: 48377 | Printed Name: Lottie Jay | | Lot # Bar Code: YI22028 KES2 |
| Project Name: Racer PNC | | | |
| Project No.: 30112891.00031 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | Grab/Composite | Matrix: Aqueous | Solid | Non-Aqueous | No of Containers by Preservative Type: Unpres. | HCl/504 | NaOO | HCl | NaOH | ZnAc NB | Field Filtered | PFAS Analysis List of Analytes per QSM 5.1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-03-17_GW-092123 | 9/21/23 | 1310 | G | X | | | 2 | | | | | | | X |

**Turn Around Time Required (Prior lab approval required for expedited TAT.)**
X Standard ☐ Rush (Specify)

**Sample Disposal**
☐ Return to Client ☐ Disposal by Lab

**Possible Hazard Identification**
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

**QC Requirements (Specify)**

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Lottie Jay | 9/21/23 | 1530 | 1. Received by: Lorraine Guy | 9/21/23 | 1530 |
| 2. Relinquished by: Lorraine Guy | 9/21/23 | 1700 | 2. Received by: Fed Ex | 9/21/23 | 1700 |
| 3. Relinquished by: | Date | Time | 3. Received by: | Date | Time |
| 4. Relinquished by: FedEX | 9/22/23 | 1000 | 4. Laboratory received by: Vincent Esperon | 9/22/23 | 1000 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack — Receipt Temp. 0.9 °C — Temp Blank ☐ Y ☑ N



PACE ANALYTICAL SERVICES, LLC

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-001**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/21/2023 0845** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/03/2023 1815 | ARC2 | 10/01/2023 2059 | 86250 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 0.61 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.3 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.3 | 0.80 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 0.69 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 0.85 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.7 | 0.38 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.7 | 0.71 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.7 | 0.46 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.7 | 0.65 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.7 | 0.56 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.7 | 0.54 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.7 | 0.50 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.7 | 0.48 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.7 | 0.43 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.7 | 0.41 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.7 | 0.63 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.7 | 0.42 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.7 | 0.76 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.7 | 0.50 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.7 | 0.55 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.7 | 0.57 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.7 | 1.8 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 91 | 25-150 |
| 13C2_6:2FTS | | 106 | 25-150 |
| 13C2_8:2FTS | | 76 | 25-150 |
| 13C2_PFDoA | | 91 | 25-150 |
| 13C2_PFTeDA | | 85 | 25-150 |
| 13C3_PFBS | | 90 | 25-150 |
| 13C3_PFHxS | | 95 | 25-150 |
| 13C3-HFPO-DA | | 92 | 25-150 |
| 13C4_PFBA | | 99 | 25-150 |
| 13C4_PFHpA | | 104 | 25-150 |
| 13C5_PFHxA | | 94 | 25-150 |
| 13C5_PFPeA | | 90 | 25-150 |
| 13C6_PFDA | | 92 | 25-150 |
| 13C7_PFUdA | | 85 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-001**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/21/2023 0845** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 97 | 25-150 |
| 13C8_PFOS | | 85 | 25-150 |
| 13C8_PFOSA | | 80 | 10-150 |
| 13C9_PFNA | | 91 | 25-150 |
| d5-EtFOSAA | | 92 | 25-150 |
| d3-MeFOSAA | | 80 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-002**

Description: **MWDP-2R_GW-092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 0923** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/03/2023 1826 | ARC2 | 10/01/2023 2059 | 86250 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.0 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.0 | 0.58 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.0 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.0 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.0 | 0.77 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.0 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.0 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.0 | 0.66 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.0 | 0.82 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **5.3** | | **3.5** | **0.36** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.68 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.44 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.62 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **0.84** | **J** | **3.5** | **0.52** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **2.3** | **J** | **3.5** | **0.48** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **18** | | **3.5** | **0.53** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **1.1** | **J** | **3.5** | **0.39** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **3.5** | | **3.5** | **0.60** | **ng/L** | **1** |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **2.2** | **J** | **3.5** | **0.73** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **3.5** | | **3.5** | **0.48** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.53 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.55 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **4.2** | | **3.5** | **1.8** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 292 | 25-150 |
| 13C2_6:2FTS | N | 180 | 25-150 |
| 13C2_8:2FTS | | 103 | 25-150 |
| 13C2_PFDoA | | 86 | 25-150 |
| 13C2_PFTeDA | | 81 | 25-150 |
| 13C3_PFBS | | 88 | 25-150 |
| 13C3_PFHxS | | 94 | 25-150 |
| 13C3-HFPO-DA | | 69 | 25-150 |
| 13C4_PFBA | | 50 | 25-150 |
| 13C4_PFHpA | | 97 | 25-150 |
| 13C5_PFHxA | | 88 | 25-150 |
| 13C5_PFPeA | | 74 | 25-150 |
| 13C6_PFDA | | 98 | 25-150 |
| 13C7_PFUdA | | 87 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-002**

Description: **MWDP-2R_GW-092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 0923** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 108 | 25-150 |
| 13C8_PFOS | | 96 | 25-150 |
| 13C8_PFOSA | | 90 | 10-150 |
| 13C9_PFNA | | 100 | 25-150 |
| d5-EtFOSAA | | 88 | 25-150 |
| d3-MeFOSAA | | 89 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-003**

Description: **EB-07_092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 0930** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/03/2023 1836 | ARC2 | 10/01/2023 2059 | 86250 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 0.60 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.3 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.3 | 0.80 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 0.68 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 0.85 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.38 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.71 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.45 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.65 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.6 | 0.50 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.43 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.41 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.63 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.6 | 0.76 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.50 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.57 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.6 | 1.8 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 94 | 25-150 |
| 13C2_6:2FTS | | 90 | 25-150 |
| 13C2_8:2FTS | | 84 | 25-150 |
| 13C2_PFDoA | | 95 | 25-150 |
| 13C2_PFTeDA | | 93 | 25-150 |
| 13C3_PFBS | | 96 | 25-150 |
| 13C3_PFHxS | | 99 | 25-150 |
| 13C3-HFPO-DA | | 100 | 25-150 |
| 13C4_PFBA | | 104 | 25-150 |
| 13C4_PFHpA | | 110 | 25-150 |
| 13C5_PFHxA | | 100 | 25-150 |
| 13C5_PFPeA | | 93 | 25-150 |
| 13C6_PFDA | | 97 | 25-150 |
| 13C7_PFUdA | | 88 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-003**

Description: **EB-07_092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 0930** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 25-150 |
| 13C8_PFOS | | 99 | 25-150 |
| 13C8_PFOSA | | 88 | 10-150 |
| 13C9_PFNA | | 88 | 25-150 |
| d5-EtFOSAA | | 94 | 25-150 |
| d3-MeFOSAA | | 89 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-004**

Description: **SUMP_GW-092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 1010** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/03/2023 1847 | ARC2 | 10/01/2023 2059 | 86250 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.5 | 0.45 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.5 | 0.62 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.5 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.5 | 1.9 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.5 | 0.82 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.5 | 2.0 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.5 | 0.45 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.5 | 0.71 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.5 | 0.88 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.8 | 0.39 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.8 | 0.73 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **2.1** | **J** | **3.8** | **0.47** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.8 | 0.67 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.8 | 0.58 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **11** | | **3.8** | **0.52** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | ~~Q~~ UJ | 3.8 | 0.56 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.8 | 0.49 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.8 | 0.44 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **4.4** | | **3.8** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **7.4** | | **3.8** | **0.65** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **0.71** | **J** | **3.8** | **0.43** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **12** | | **3.8** | **0.78** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.8 | 0.51 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.8 | 0.56 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.50 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.8 | 0.59 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **120** | | **3.8** | **1.9** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 268 | 25-150 |
| 13C2_6:2FTS | N | 286 | 25-150 |
| 13C2_8:2FTS | N | 288 | 25-150 |
| 13C2_PFDoA | | 110 | 25-150 |
| 13C2_PFTeDA | | 85 | 25-150 |
| 13C3_PFBS | | 79 | 25-150 |
| 13C3_PFHxS | | 84 | 25-150 |
| 13C3-HFPO-DA | | 57 | 25-150 |
| 13C4_PFBA | N | 20 | 25-150 |
| 13C4_PFHpA | | 62 | 25-150 |
| 13C5_PFHxA | | 57 | 25-150 |
| 13C5_PFPeA | | 39 | 25-150 |
| 13C6_PFDA | | 101 | 25-150 |
| 13C7_PFUdA | | 112 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
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S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-004**

Description: **SUMP_GW-092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 1010** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 86 | 25-150 |
| 13C8_PFOS | | 82 | 25-150 |
| 13C8_PFOSA | | 78 | 10-150 |
| 13C9_PFNA | | 94 | 25-150 |
| d5-EtFOSAA | | 142 | 25-150 |
| d3-MeFOSAA | | 117 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-005**

Description: **MW-03-17_GW-092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 1310** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/03/2023 1858 | ARC2 | 10/01/2023 2059 | 86250 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 0.60 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.3 | 1.5 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **8.0** | **Q J** | **7.3** | **1.8** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.3 | 0.79 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 0.68 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 0.85 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **3.3** | **J** | **3.6** | **0.38** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.71 | ng/L | 1 |
| **Perfluoro-1-heptanesulfonic acid (PFHpS)** | **375-92-8** | **PFAS by ID SOP** | **4.5** | | **3.6** | **0.45** | **ng/L** | **1** |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.65 | ng/L | 1 |
| **Perfluoro-1-octanesulfonamide (PFOSA)** | **754-91-6** | **PFAS by ID SOP** | **1.4** | **J** | **3.6** | **0.56** | **ng/L** | **1** |
| **Perfluoro-1-pentanesulfonic acid (PFPeS)** | **2706-91-4** | **PFAS by ID SOP** | **2.7** | **J** | **3.6** | **0.54** | **ng/L** | **1** |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **32** | | **3.6** | **0.50** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **15** | | **3.6** | **0.54** | **ng/L** | **1** |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.43 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **8.6** | | **3.6** | **0.41** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **14** | | **3.6** | **0.62** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **2.5** | **J** | **3.6** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **20** | | **3.6** | **0.75** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **15** | | **3.6** | **0.49** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.57 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **140** | | **3.6** | **1.8** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 267 | 25-150 |
| 13C2_6:2FTS | N | 249 | 25-150 |
| 13C2_8:2FTS | N | 184 | 25-150 |
| 13C2_PFDoA | | 95 | 25-150 |
| 13C2_PFTeDA | | 77 | 25-150 |
| 13C3_PFBS | | 79 | 25-150 |
| 13C3_PFHxS | | 96 | 25-150 |
| 13C3-HFPO-DA | | 60 | 25-150 |
| 13C4_PFBA | | 33 | 25-150 |
| 13C4_PFHpA | | 79 | 25-150 |
| 13C5_PFHxA | | 73 | 25-150 |
| 13C5_PFPeA | | 54 | 25-150 |
| 13C6_PFDA | | 103 | 25-150 |
| 13C7_PFUdA | | 109 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI22028-005**

Description: **MW-03-17_GW-092123** Matrix: **Aqueous**

Date Sampled: **09/21/2023 1310** Project Name: **RACER PNC**

Date Received: **09/22/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 98 | 25-150 |
| 13C8_PFOS | | 87 | 25-150 |
| 13C8_PFOSA | | 85 | 10-150 |
| 13C9_PFNA | | 108 | 25-150 |
| d5-EtFOSAA | | 112 | 25-150 |
| d3-MeFOSAA | | 119 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

Racer

# DATA REVIEW

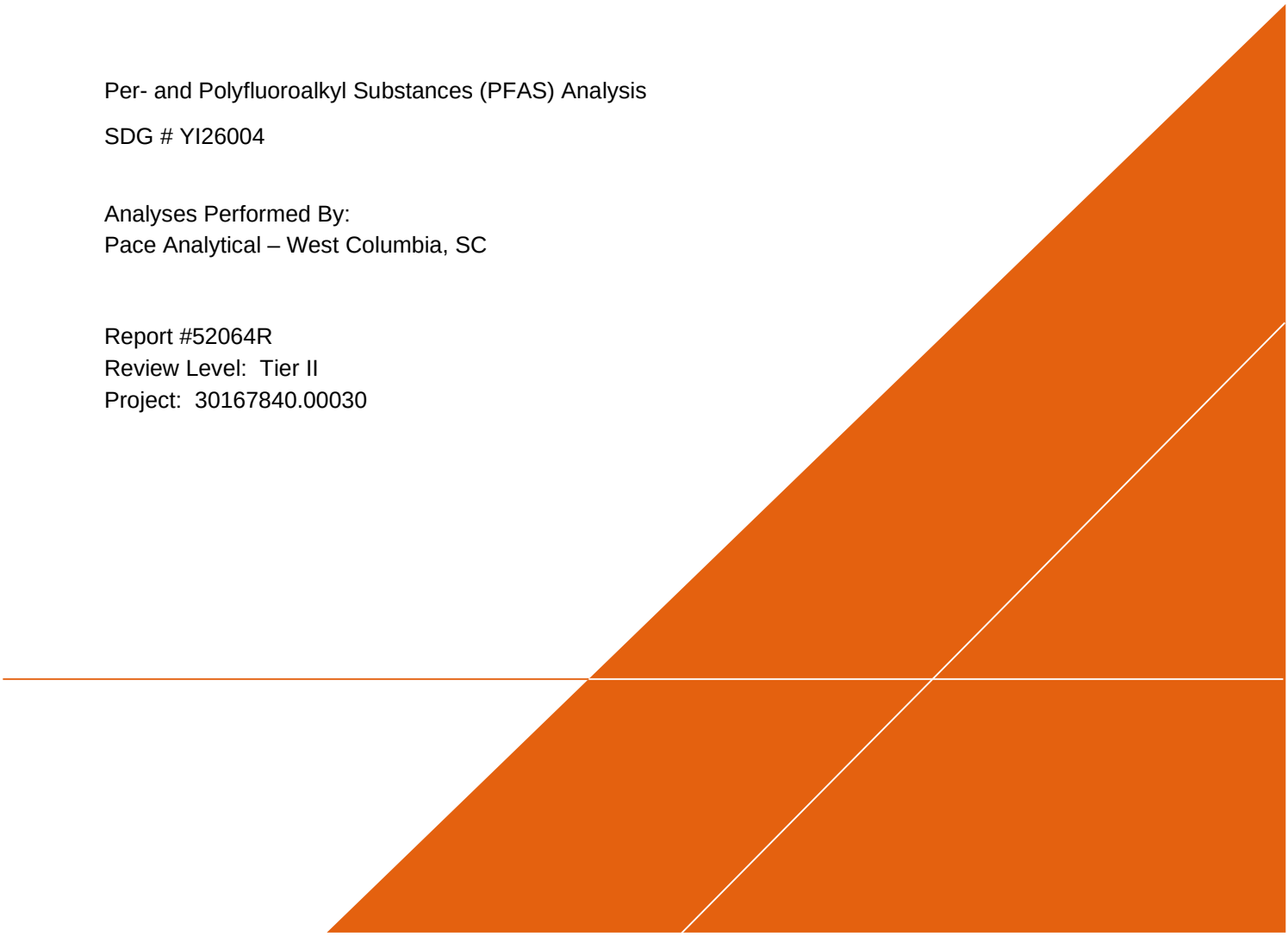
## Pontiac North Campus, MI

Per- and Polyfluoroalkyl Substances (PFAS) Analysis

SDG # YI26004

Analyses Performed By:
Pace Analytical – West Columbia, SC

Report #52064R
Review Level: Tier II
Project: 30167840.00030



# SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #YI26004 for samples collected in association with the Racer PNC, MI Site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets and chain of custody. Analyses were performed on the following samples:

| Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | PFAS | SVOC | PCB | MET | MISC |
| MWM2-28_GW | YI26004-1 | Water | 09/25/23 | | X | | | | |
| EB-08 | YI26004-2 | Water | 09/25/23 | | X | | | | |
| Trip Blank | YI26004-3 | Water | 09/25/23 | | X | | | | |
| MWM2-22_GW | YI26004-4 | Water | 09/25/23 | | X | | | | |
| MW-43-14R_GW | YI26004-5 | Water | 09/25/23 | | X | | | | |

## ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

| Items Reviewed | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| 1. Sample receipt condition | | X | | X | |
| 2. Requested analyses and sample results | | X | | X | |
| 3. Master tracking list | | X | | X | |
| 4. Methods of analysis | | X | | X | |
| 5. Reporting limits | | X | | X | |
| 6. Sample collection date | | X | | X | |
| 7. Laboratory sample received date | | X | | X | |
| 8. Sample preservation verification (as applicable) | | X | | X | |
| 9. Sample preparation/extraction/analysis dates | | X | | X | |
| 10. Fully executed Chain-of-Custody (COC) form | | X | | X | |
| 11. Narrative summary of QA or sample problems provided | | X | | X | |
| 12. Data Package Completeness and Compliance | | X | | X | |

Note:
QA - Quality Assurance

## ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency Method 537 Modified. Data were reviewed in accordance with the method specified criteria, USEPA National Functional Guidelines NFG for Organic Superfund Methods Data Review, EPA-540-R-20-005 (November 2020), with reference to the historical (USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999, as appropriate).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is

that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

## PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ANALYSIS

### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

| Method | Matrix | Holding Time | Preservation |
|---|---|---|---|
| USEPA modified Method 537 | Water | 28 days to extraction; 28 days from extraction to analysis | Cool to <6 °C |

All samples were initially analyzed within the specified holding time criteria.

### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, field, and equipment blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Equipment blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

### 3. Extracted Internal Standard (EIS)/Surrogate Compounds

Labeled standards must be added to all field samples and QC samples prior to extraction. EIS recoveries must be within the laboratory-established acceptance limits of ICAL midpoint standard area or area measured in the initial CCV on days when ICAL not performed.

Samples associated with EIS exhibited acceptable recoveries with the exceptions noted in the table.

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MWM2-28_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |
| | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| MWM2-22_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| MW-43-14R_GW | 13C2_4:2FTS | 1H,1H, 2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | >150 |
| | 13C2_6:2FTS | 1H,1H, 2H,2H-perfluorooctane sulfonic acid (6:2 FTS) | >150 |

| Sample Locations | EIS | Associated Compound | %R |
|---|---|---|---|
| MW-43-14R_GW | 13C2_8:2FTS | 1H,1H, 2H,2H-perfluorodecane sulfonic acid (8:2 FTS) | >150 |
| | 13C4_PFBA | Perfluoro-n-butanoic acid (PFBA) | < the lower control limit (LL) but > 20% |

The criteria used to evaluate the EIS recoveries are presented in the following table. In the case of an EIS deviation, the sample results associated with the EIS are qualified as documented in the table below.

| Control Limit | Sample Result | Qualification |
|---|---|---|
| < the lower control limit (LL) but > 20% | Non-detect | UJ |
| | Detect | J |
| > the upper control limit (UL) | Non-detect | No Action |
| | Detect | J |
| < 20% | Non-detect | R |
| | Detect | J |

### 4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within 50-150%. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within 30%.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A site-specific MS/MSD was not included in the data package.

### 5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

### 6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for soil matrices.

A field duplicate was not included in the data package.

### 7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

## DATA VALIDATION CHECKLIST FOR PFAs

| PFAs: USEPA modified Method 537 | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| **LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)** | | | | | |
| **Tier II Validation** | | | | | |
| Holding times | | X | | X | |
| Reporting limits (units) | | X | | X | |
| Blanks | | | | | |
| A. Method blanks | | X | | X | |
| B. Equipment blanks | | X | | X | |
| C. Trip blanks | | X | | X | |
| Laboratory Control Sample (LCS) %R | | X | | X | |
| Laboratory Control Sample Duplicate(LCSD) %R | X | | | | X |
| LCS/LCSD Precision (RPD) | X | | | | X |
| Matrix Spike (MS) %R | X | | | | X |
| Matrix Spike Duplicate (MSD) %R | X | | | | X |
| MS/MSD Precision (RPD) | X | | | | X |
| Field/Lab Duplicate (RPD) | X | | | | X |
| Extracted Internal Standards (EIS) Recoveries | | X | X | | |
| Dilution Factor | | X | | X | |
| Moisture Content | X | | | | X |

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Rachelle Borne

SIGNATURE: 

DATE: December 18, 2023

PEER REVIEW: Joseph C. Houser

DATE: December 19, 2023

# CHAIN OF CUSTODY

# CORRECTED SAMPLE ANALYSIS DATA SHEETS

Pace Analytical

**PACE ANALYTICAL SERVICES, LLC**
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

**Number** 150049

| | | | |
|---|---|---|---|
| Client: Arcadis | Report to Contact: Alexis Crisp, Tiffany Linder | Telephone No. / E-mail: Alexis.Crisp@arcadis.com; Tiffany.linder@arcadis.com | Quote No. |
| Address: 28550 Cabot Dr #500 | Sampler's Signature: x Sommer Guy | Analysis (Attach list if more space is needed): Report 8610 28 compounds | Page 1 of 1 |
| City: Novi | State: MI | Zip Code: 48377 | Lot # Bar Code: YI26004 |
| Project Name: Racer PNC | Printed Name: Sommer Guy | | |
| Project No.: 30167840.00031 | P.O. No. | | |

| Sample ID / Description (Containers for each sample may be combined on one line.) | Collection Date(s) | Collection Time (Military) | # Grab Composite | Matrix: Aqueous | Soil | Wipe | Air | No. of Containers by Preservative Type: Unpres. | HCl | H2SO4 | HNO3 | NaOH | Na2S2O3 | Ascorbic Acid | Methanol | Volatile Organics 8260D Full List | Lot # Bar Code | KIESZ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MWM2-28_GW-092523 | 9/25/23 | 1020 | G | X | | | | 2 | | | | | | | | X | | | |
| EB-08_092523 | 9/25/23 | 1025 | G | X | | | | 1 | | | | | | | | X | | | equipment blank |
| triplank | 9/25/23 | 0925 | G | X | | | | 1 | | | | | | | | X | | | triplank |
| MWM2-22_GW-092523 | 9/25/23 | 1115 | G | X | | | | 2 | | | | | | | | X | | | |
| MW-43-14R_GW-092523 | 9/25/23 | 1220 | G | X | | | | 2 | | | | | | | | X | | | |

Turn Around Time Required (Prior lab approval required for expedited TAT.): ☒ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished by: Sommer Guy | 9/25/23 | 1630 | 1. Received by: FedEx | 9/25/23 | 1630 |
| 2. Relinquished by | Date | Time | 2. Received by | Date | Time |
| 3. Relinquished by | Date | Time | 3. Received by | Date | Time |
| 4. Relinquished by: FedEx | 9/26/23 | 1030 | 4. Laboratory received by | 9/26/23 | 1036 |

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on ice (Circle): (Yes) No Ice Pack — Receipt Temp: 4.5 °C — Temp Blank: PRESENT

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: ME003NA-01



PACE ANALYTICAL SERVICES, LLC

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-001**

Description: **MWM2-28_GW-092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1020** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/12/2023 0137 | ELC2 | 10/10/2023 2002 | 87060 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 0.60 | ng/L | 1 |
| **1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)** | **39108-34-4** | **PFAS by ID SOP** | **2.0** | **JQ** | **7.3** | **1.5** | **ng/L** | **1** |
| **1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)** | **27619-97-2** | **PFAS by ID SOP** | **3.4** | **JQ** | **7.3** | **1.8** | **ng/L** | **1** |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.3 | 0.80 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 0.68 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 0.85 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.38 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.71 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.45 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.65 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **7.0** | | **3.6** | **0.50** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **16** | | **3.6** | **0.55** | **ng/L** | **1** |
| **Perfluoro-n-decanoic acid (PFDA)** | **335-76-2** | **PFAS by ID SOP** | **2.2** | **J** | **3.6** | **0.48** | **ng/L** | **1** |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.43 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **8.3** | | **3.6** | **0.41** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **18** | | **3.6** | **0.63** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **4.0** | | **3.6** | **0.42** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **16** | | **3.6** | **0.76** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **17** | | **3.6** | **0.50** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.57 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **65** | | **3.6** | **1.8** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 308 | 25-150 |
| 13C2_6:2FTS | N | 341 | 25-150 |
| 13C2_8:2FTS | N | 361 | 25-150 |
| 13C2_PFDoA | | 110 | 25-150 |
| 13C2_PFTeDA | | 111 | 25-150 |
| 13C3_PFBS | | 89 | 25-150 |
| 13C3_PFHxS | | 96 | 25-150 |
| 13C3-HFPO-DA | | 69 | 25-150 |
| 13C4_PFBA | | 37 | 25-150 |
| 13C4_PFHpA | | 77 | 25-150 |
| 13C5_PFHxA | | 72 | 25-150 |
| 13C5_PFPeA | | 56 | 25-150 |
| 13C6_PFDA | | 107 | 25-150 |
| 13C7_PFUdA | | 110 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-001**

Description: **MWM2-28_GW-092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1020** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 25-150 |
| 13C8_PFOS | | 108 | 25-150 |
| 13C8_PFOSA | | 93 | 10-150 |
| 13C9_PFNA | | 104 | 25-150 |
| d5-EtFOSAA | | 118 | 25-150 |
| d3-MeFOSAA | | 128 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
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ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-002**

Description: **EB-08_092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1025** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/12/2023 1517 | ELC2 | 10/10/2023 2002 | 87060 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.3 | 0.60 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 7.3 | 1.5 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 7.3 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 7.3 | 0.79 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.3 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.3 | 0.44 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.3 | 0.68 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.3 | 0.85 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.38 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.71 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.45 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.65 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.6 | 0.50 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.43 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.6 | 0.41 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.63 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.6 | 0.75 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.49 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.57 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.6 | 1.8 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 115 | 25-150 |
| 13C2_6:2FTS | | 122 | 25-150 |
| 13C2_8:2FTS | | 100 | 25-150 |
| 13C2_PFDoA | | 101 | 25-150 |
| 13C2_PFTeDA | | 103 | 25-150 |
| 13C3_PFBS | | 107 | 25-150 |
| 13C3_PFHxS | | 110 | 25-150 |
| 13C3-HFPO-DA | | 96 | 25-150 |
| 13C4_PFBA | | 107 | 25-150 |
| 13C4_PFHpA | | 100 | 25-150 |
| 13C5_PFHxA | | 102 | 25-150 |
| 13C5_PFPeA | | 105 | 25-150 |
| 13C6_PFDA | | 108 | 25-150 |
| 13C7_PFUdA | | 105 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-002**

Description: **EB-08_092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1025** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 113 | 25-150 |
| 13C8_PFOS | | 105 | 25-150 |
| 13C8_PFOSA | | 101 | 10-150 |
| 13C9_PFNA | | 102 | 25-150 |
| d5-EtFOSAA | | 100 | 25-150 |
| d3-MeFOSAA | | 97 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-003**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/25/2023 0925** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/12/2023 1528 | ELC2 | 10/10/2023 2002 | 87060 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 6.9 | 0.57 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 6.9 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 6.9 | 1.7 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | | 6.9 | 0.76 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 6.9 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 6.9 | 0.42 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 6.9 | 0.65 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 6.9 | 0.81 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.5 | 0.36 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.5 | 0.67 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.5 | 0.43 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.5 | 0.62 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.5 | 0.53 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 355-46-4 | PFAS by ID SOP | ND | | 3.5 | 0.48 | ng/L | 1 |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.5 | 0.41 | ng/L | 1 |
| Perfluoro-n-heptanoic acid (PFHpA) | 375-85-9 | PFAS by ID SOP | ND | | 3.5 | 0.39 | ng/L | 1 |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.5 | 0.60 | ng/L | 1 |
| Perfluoro-n-nonanoic acid (PFNA) | 375-95-1 | PFAS by ID SOP | ND | | 3.5 | 0.40 | ng/L | 1 |
| Perfluoro-n-octanoic acid (PFOA) | 335-67-1 | PFAS by ID SOP | ND | | 3.5 | 0.72 | ng/L | 1 |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.5 | 0.47 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.5 | 0.52 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.46 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.5 | 0.54 | ng/L | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 1763-23-1 | PFAS by ID SOP | ND | | 3.5 | 1.7 | ng/L | 1 |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | | 114 | 25-150 |
| 13C2_6:2FTS | | 118 | 25-150 |
| 13C2_8:2FTS | | 88 | 25-150 |
| 13C2_PFDoA | | 92 | 25-150 |
| 13C2_PFTeDA | | 88 | 25-150 |
| 13C3_PFBS | | 101 | 25-150 |
| 13C3_PFHxS | | 104 | 25-150 |
| 13C3-HFPO-DA | | 94 | 25-150 |
| 13C4_PFBA | | 105 | 25-150 |
| 13C4_PFHpA | | 96 | 25-150 |
| 13C5_PFHxA | | 102 | 25-150 |
| 13C5_PFPeA | | 104 | 25-150 |
| 13C6_PFDA | | 98 | 25-150 |
| 13C7_PFUdA | | 95 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-003**

Description: **Trip Blank** Matrix: **Aqueous**

Date Sampled: **09/25/2023 0925** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 99 | 25-150 |
| 13C8_PFOS | | 99 | 25-150 |
| 13C8_PFOSA | | 94 | 10-150 |
| 13C9_PFNA | | 93 | 25-150 |
| d5-EtFOSAA | | 93 | 25-150 |
| d3-MeFOSAA | | 98 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-004**

Description: **MWM2-22_GW-092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1115** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/12/2023 1539 | ELC2 | 10/10/2023 2002 | 87060 |
| 2 | SOP SPE | PFAS by ID SOP | 1 | 10/18/2023 1905 | BWS | 10/17/2023 1806 | 87673 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.2 | 0.43 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.2 | 0.59 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | | 80 | 16 | ng/L | 2 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | | 80 | 20 | ng/L | 2 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.2 | 0.78 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.2 | 1.9 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.2 | 0.43 | ng/L | 1 |
| **N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)** | **2991-50-6** | **PFAS by ID SOP** | **2.0** | **J** | **7.2** | **0.67** | **ng/L** | **1** |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.2 | 0.83 | ng/L | 1 |
| **Perfluoro-1-butanesulfonic acid (PFBS)** | **375-73-5** | **PFAS by ID SOP** | **7.4** | | **3.6** | **0.37** | **ng/L** | **1** |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.70 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.45 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.64 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.53 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **8.7** | | **3.6** | **0.49** | **ng/L** | **1** |
| **Perfluoro-n-butanoic acid (PFBA)** | **375-22-4** | **PFAS by ID SOP** | **28** | | **3.6** | **0.54** | **ng/L** | **1** |
| **Perfluoro-n-decanoic acid (PFDA)** | **335-76-2** | **PFAS by ID SOP** | **1.9** | **J** | **3.6** | **0.47** | **ng/L** | **1** |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **14** | | **3.6** | **0.40** | **ng/L** | **1** |
| **Perfluoro-n-hexanoic acid (PFHxA)** | **307-24-4** | **PFAS by ID SOP** | **28** | | **3.6** | **0.62** | **ng/L** | **1** |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **5.4** | | **3.6** | **0.41** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **26** | | **3.6** | **0.74** | **ng/L** | **1** |
| **Perfluoro-n-pentanoic acid (PFPeA)** | **2706-90-3** | **PFAS by ID SOP** | **27** | | **3.6** | **0.49** | **ng/L** | **1** |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.54 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **95** | | **3.6** | **1.8** | **ng/L** | **1** |

| Surrogate | Run 1 Q | Run 1 % Recovery | Run 1 Acceptance Limits | Run 2 Q | Run 2 % Recovery | Run 2 Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C2_4:2FTS | N | 273 | 25-150 | N | 194 | 25-150 |
| 13C2_6:2FTS | N | 253 | 25-150 | | 145 | 25-150 |
| 13C2_8:2FTS | N | 274 | 25-150 | | 95 | 25-150 |
| 13C2_PFDoA | | 104 | 25-150 | | 108 | 25-150 |
| 13C2_PFTeDA | | 96 | 25-150 | | 106 | 25-150 |
| 13C3_PFBS | | 78 | 25-150 | | 100 | 25-150 |
| 13C3_PFHxS | | 93 | 25-150 | | 103 | 25-150 |
| 13C3-HFPO-DA | | 56 | 25-150 | | 92 | 25-150 |
| 13C4_PFBA | | 29 | 25-150 | | 79 | 25-150 |
| 13C4_PFHpA | | 60 | 25-150 | | 106 | 25-150 |
| 13C5_PFHxA | | 59 | 25-150 | | 111 | 25-150 |
| 13C5_PFPeA | | 42 | 25-150 | | 93 | 25-150 |
| 13C6_PFDA | | 97 | 25-150 | | 98 | 25-150 |

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-004**

Description: **MWM2-22_GW-092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1115** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits | Q | Run 2 % Recovery | Acceptance Limits |
|---|---|---|---|---|---|---|
| 13C7_PFUdA | | 109 | 25-150 | | 110 | 25-150 |
| 13C8_PFOA | | 74 | 25-150 | | 101 | 25-150 |
| 13C8_PFOS | | 99 | 25-150 | | 104 | 25-150 |
| 13C8_PFOSA | | 77 | 10-150 | | 97 | 10-150 |
| 13C9_PFNA | | 85 | 25-150 | | 104 | 25-150 |
| d5-EtFOSAA | | 117 | 25-150 | | 116 | 25-150 |
| d3-MeFOSAA | | 113 | 25-150 | | 111 | 25-150 |

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-005**

Description: **MW-43-14R_GW-092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1220** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Run | Prep Method | Analytical Method | Dilution | Analysis Date | Analyst | Prep Date | Batch |
|---|---|---|---|---|---|---|---|
| 1 | SOP SPE | PFAS by ID SOP | 1 | 10/12/2023 1550 | ELC2 | 10/10/2023 2002 | 87060 |

| Parameter | CAS Number | Analytical Method | Result | Q | LOQ | DL | Units | Run |
|---|---|---|---|---|---|---|---|---|
| 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) | 756426-58-1 | PFAS by ID SOP | ND | | 7.1 | 0.43 | ng/L | 1 |
| 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...) | 763051-92-9 | PFAS by ID SOP | ND | | 7.1 | 0.59 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) | 39108-34-4 | PFAS by ID SOP | ND | Q | 7.1 | 1.4 | ng/L | 1 |
| 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) | 27619-97-2 | PFAS by ID SOP | ND | Q | 7.1 | 1.8 | ng/L | 1 |
| 1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS) | 757124-72-4 | PFAS by ID SOP | ND | Q | 7.1 | 0.78 | ng/L | 1 |
| Hexafluoropropylene oxide dimer acid (GenX) | 13252-13-6 | PFAS by ID SOP | ND | | 7.1 | 1.8 | ng/L | 1 |
| 4,8-dioxa-3H-perfluorononanoic acid (ADONA) | 919005-14-4 | PFAS by ID SOP | ND | | 7.1 | 0.43 | ng/L | 1 |
| N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) | 2991-50-6 | PFAS by ID SOP | ND | | 7.1 | 0.67 | ng/L | 1 |
| N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) | 2355-31-9 | PFAS by ID SOP | ND | | 7.1 | 0.83 | ng/L | 1 |
| Perfluoro-1-butanesulfonic acid (PFBS) | 375-73-5 | PFAS by ID SOP | ND | | 3.6 | 0.37 | ng/L | 1 |
| Perfluoro-1-decanesulfonic acid (PFDS) | 335-77-3 | PFAS by ID SOP | ND | | 3.6 | 0.69 | ng/L | 1 |
| Perfluoro-1-heptanesulfonic acid (PFHpS) | 375-92-8 | PFAS by ID SOP | ND | | 3.6 | 0.44 | ng/L | 1 |
| Perfluoro-1-nonanesulfonic acid (PFNS) | 68259-12-1 | PFAS by ID SOP | ND | | 3.6 | 0.63 | ng/L | 1 |
| Perfluoro-1-octanesulfonamide (PFOSA) | 754-91-6 | PFAS by ID SOP | ND | | 3.6 | 0.55 | ng/L | 1 |
| Perfluoro-1-pentanesulfonic acid (PFPeS) | 2706-91-4 | PFAS by ID SOP | ND | | 3.6 | 0.53 | ng/L | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **355-46-4** | **PFAS by ID SOP** | **16** | | **3.6** | **0.49** | **ng/L** | **1** |
| Perfluoro-n-butanoic acid (PFBA) | 375-22-4 | PFAS by ID SOP | ND | Q UJ | 3.6 | 0.53 | ng/L | 1 |
| Perfluoro-n-decanoic acid (PFDA) | 335-76-2 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-dodecanoic acid (PFDoA) | 307-55-1 | PFAS by ID SOP | ND | | 3.6 | 0.42 | ng/L | 1 |
| **Perfluoro-n-heptanoic acid (PFHpA)** | **375-85-9** | **PFAS by ID SOP** | **4.9** | | **3.6** | **0.40** | **ng/L** | **1** |
| Perfluoro-n-hexanoic acid (PFHxA) | 307-24-4 | PFAS by ID SOP | ND | | 3.6 | 0.61 | ng/L | 1 |
| **Perfluoro-n-nonanoic acid (PFNA)** | **375-95-1** | **PFAS by ID SOP** | **1.0** | **J** | **3.6** | **0.41** | **ng/L** | **1** |
| **Perfluoro-n-octanoic acid (PFOA)** | **335-67-1** | **PFAS by ID SOP** | **12** | | **3.6** | **0.74** | **ng/L** | **1** |
| Perfluoro-n-pentanoic acid (PFPeA) | 2706-90-3 | PFAS by ID SOP | ND | | 3.6 | 0.48 | ng/L | 1 |
| Perfluoro-n-tetradecanoic acid (PFTeDA) | 376-06-7 | PFAS by ID SOP | ND | | 3.6 | 0.53 | ng/L | 1 |
| Perfluoro-n-tridecanoic acid (PFTrDA) | 72629-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.47 | ng/L | 1 |
| Perfluoro-n-undecanoic acid (PFUdA) | 2058-94-8 | PFAS by ID SOP | ND | | 3.6 | 0.56 | ng/L | 1 |
| **Perfluorooctanesulfonic acid (PFOS)** | **1763-23-1** | **PFAS by ID SOP** | **99** | | **3.6** | **1.8** | **ng/L** | **1** |

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C2_4:2FTS | N | 308 | 25-150 |
| 13C2_6:2FTS | N | 229 | 25-150 |
| 13C2_8:2FTS | N | 287 | 25-150 |
| 13C2_PFDoA | | 96 | 25-150 |
| 13C2_PFTeDA | | 72 | 25-150 |
| 13C3_PFBS | | 77 | 25-150 |
| 13C3_PFHxS | | 85 | 25-150 |
| 13C3-HFPO-DA | | 49 | 25-150 |
| 13C4_PFBA | N | 20 | 25-150 |
| 13C4_PFHpA | | 54 | 25-150 |
| 13C5_PFHxA | | 54 | 25-150 |
| 13C5_PFPeA | | 35 | 25-150 |
| 13C6_PFDA | | 99 | 25-150 |
| 13C7_PFUdA | | 100 | 25-150 |

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

# PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **YI26004-005**

Description: **MW-43-14R_GW-092523** Matrix: **Aqueous**

Date Sampled: **09/25/2023 1220** Project Name: **RACER PNC**

Date Received: **09/26/2023** Project Number: **30167840.00031**

| Surrogate | Q | Run 1 % Recovery | Acceptance Limits |
|---|---|---|---|
| 13C8_PFOA | | 69 | 25-150 |
| 13C8_PFOS | | 98 | 25-150 |
| 13C8_PFOSA | | 80 | 10-150 |
| 13C9_PFNA | | 88 | 25-150 |
| d5-EtFOSAA | | 115 | 25-150 |
| d3-MeFOSAA | | 110 | 25-150 |

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B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
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