PA/SI Addendum

Fort Riley Off-post Private Well Investigations of Per- and Polyfluoroalkyl Substances (PFAS)

January 2023

Contract No.: W912DR-18-D-0004
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Prepared For:

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Executive Summary

The United States Army (Army) is performing Preliminary Assessments (PAs) and Site Inspections (SIs) on the current or potential historical use of per-and polyfluoroalkyl substances (PFAS) at Army installations nationwide. These efforts were completed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), National Oil and Hazardous Substances Pollution Contingency Plan, and Army/Department of Defense policy and guidance.

The SI sampling at Fort Riley's Marshall Army Airfield detected perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) in groundwater where an analysis of hydrological modeling identified possible impacts to off-post drinking water wells. To evaluate possible PFOS/PFOA impacts from Marshall Army Airfield to off-post drinking water sources, the Army conducted off-post sampling at private drinking water wells that appeared to be hydrologically connected to groundwater beneath Marshall Army Airfield based on historical particle tracking investigations (United States Geological Survey [USGS] 2000).

Sampling of 23 off-post drinking water wells identified one location exceeding the 2016 United States Environmental Protection Agency's (EPA) lifetime Health Advisory (HA) level for PFOS and PFOA of 70 ng/L (parts per trillion (ppt)) individually or combined if both are detected in drinking water. The Army has initiated a response action to provide bottled water to the affected location and a CERCLA Remedial Investigation (RI) to further delineate the nature and extent of the PFAS release and evaluate the risks posed to human health from the release.

Background

The purpose of this Preliminary Assessment/Site Inspection (PA/SI) Addendum is to document analytical results and findings in response to the separate investigation of perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) in off-post drinking water potentially associated with past operations at the Marshall Army Airfield (MAAF) at Fort Riley, Kansas. This addendum, while documenting the separate off-post investigation, serves to supplement the PA/SI report prepared by Arcadis U.S., Inc. (Arcadis) in 2022 (Arcadis 2022).

The United States Army (Army) is currently conducting a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) PA/SI to assess potential impacts from per- and polyfluoroalkyl substances (PFAS) at Fort Riley. PFOS and PFOA are two chemicals included in the larger class of PFAS. Concentrations of PFOS and PFOA in groundwater exceeded the 2016 United States Environmental Protection Agency's (EPA) lifetime Health Advisory (HA) level for drinking water at the MAAF on Fort Riley, Kansas. These MAAF areas of potential interest (AOPIs) are in the southeast portion of the installation near the installation boundary and are adjacent to the Kansas River. Due to the exceedance of the HA for PFOA and PFOS, the close proximity of the AOPIs to the installation boundary, and the potential for groundwater emanating from these AOPIs to affect downgradient off-post receptors, the Army identified the need for this off-post drinking water addendum.

The MAAF is located within the Kansas River Valley and the groundwater from this area flows in the alluvial aquifer of the Kansas River. Groundwater in the alluvial aquifer of the Kansas River generally flows down the Kansas River Valley to the northeast, but flow paths can vary based on the water stage of the Kansas River. Public water supply wells and domestic supply wells are screened in the alluvial aquifer of the Kansas River.

To identify potential potable wells that were downgradient of the eastern / southeastern installation boundary, an off-post well survey was completed using available information from the Kansas Geological Survey online Water Well Completion Records Database. After reviewing available groundwater modeling reports (United States Geological Survey [USGS] 2000) and particle tracking information contained therein, numerous wells were identified for possible sampling as part of this effort. The Fort Riley installation team confirmed 50 parcels downgradient of the boundary. For ground-truthing, well records were obtained from the Kansas Geologic Survey to determine which parcels potentially had private wells. A secondary review of the county's database was also used to identify wells of potential concern. Fort Riley personnel then sent questionnaires to parcel owners about any wells on the premises and asked for access permission to sample their wells. After review of the questionnaires and permission slips, 23 drinking water wells were sampled in coordination with Kansas Department of Health and the Environment (KDHE).

The off-post drinking water sampling took place in October and December 2020. A total of 23 primary off-post samples were collected with associated quality control as part of the off-post receptor evaluation (**Figure 2**). Locations of the individual wells sampled are not shown in this report to protect the privacy of the residential homeowners. Quality control samples included four duplicates, five matrix spikes, and six field blanks.

Sampling Plan
Drinking water samples were collected in accordance with available Army and EPA guidance for sampling PFAS in potable water. Unlined high density polyethylene bottles were used to sample unfiltered outdoor spigots, wells, or hose bibs. Water was purged to the ground for approximately 3 minutes before sampling. New nitrile gloves were used for each individual sample collection. Once collected the samples were placed in a sealed Ziploc® bag. Properly labeled samples were then placed on ice to keep the samples temperature between 0 and 4 degrees Celsius.

Eurofins Lancaster Laboratories Environmental laboratory was used to analyze samples collected within this study. PFAS analysis was conducted in accordance with United States Environmental Protection Agency drinking water Method 537.1.

Detections and Exceedances
Four of the 23 drinking water samples collected had detections of PFOS and/or PFOA, while 19 samples were non-detect for all PFAS compounds. In the four samples with PFOS detections, concentrations ranged from 0.45 nanograms per liter (ng/L) to 18 ng/L. In the three samples with PFOA detections, concentrations ranged from 0.58 ng/L to 110 ng/L. One residential sample had concentrations of PFOS and PFOA combined that exceeded the HA, with a combined concentration of 128 ng/L PFOA and PFOS. The other three samples with detections of PFOS and/or PFOA, had concentrations lower than the 2016 HA. All sampling results were shared with EPA, the KDHE, and the respective well owners. **Table 1** provides a summary of PFOS and PFOA data results for all samples collected.

Data Validation
Each laboratory data package/sample delivery group underwent Stage 3 and Stage 4 data validation in accordance with Department of Defense (DoD) Quality Systems Manual 5.1.1 (DoD 2018). Based on the data usability summary report, the drinking water samples collected were found to be acceptable and usable for the SI evaluation with the qualifications documented in the data usability summary report (**Attachment 1**), no results were rejected. All results are considered valid and usable. The results that were qualified as estimated during validation are less than or well above the limit of quantitation of 2 ng/L. Therefore, this data is usable for evaluation against the project screening level. The data is of sufficient quality to meet the objectives and requirements of the project. Qualifiers for data shown on figures are defined in the notes of the figures.

Subsequent Actions
Following completion of the drinking water sampling, bottled water was provided as an alternative drinking water source for the one location where concentrations of PFOS and PFOA exceeded 70 ng/L. In addition, a Time Critical Removal Action (TCRA) Memorandum (Arcadis, 2021) documented the Army's decision to mitigate exposure. The Army has initiated a CERCLA Remedial Investigation (RI) to further delineate the nature and extent of the PFAS release and evaluate the risks posed to human health from the release.

Summary
Off-post sampling of residential drinking water wells downgradient of MAAF occurred in October and December of 2020. During the sampling event, 23 parent samples and applicable quality

assurance/quality control samples were collected, analyzed and validated. Four of the 23 samples had a detection of PFOS and/or PFOA, with one of the four detections above the HA. Bottled water was provided as an alternative drinking water source, and the TCRA water provision was documented in an Action Memorandum.

References

Arcadis. 2022. Final Preliminary Assessment and Site Inspection of Per- and Polyfluoroalkyl Substances, Fort Riley, Kansas. January.

Arcadis. 2021. Time Critical Removal Action For Fort Riley, Kansas. October.

DoD. 2018. Quality Systems Manual, Version 5.1.1, 2018. February.

OSD. 2021. Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program. September.

United States Environmental Protection Agency. 2016. Lifetime Health Advisories and Health Effects Support Documents for Perfluorooctanoic Acid and Perfluorooctane Sulfonate. EPA-HQ-OW-2014-0138; FRL-9946-91-OW. Federal Register/ Vol. 81. No. 101. May 25

Unites States Geological Survey (USGS). 2000. Characterization and Simulation of Ground-Water Flow in the Kansas River Valley at Fort Riley, Kansas, 1990-98.

Figure 1: AOPI Overview and OSD Risk Screening Level Exceedances

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Riley, KS

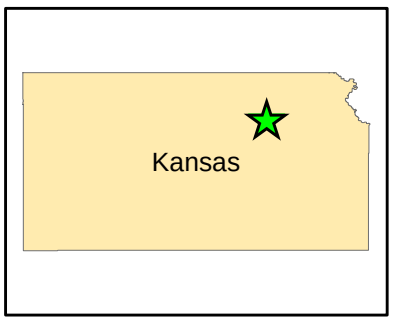
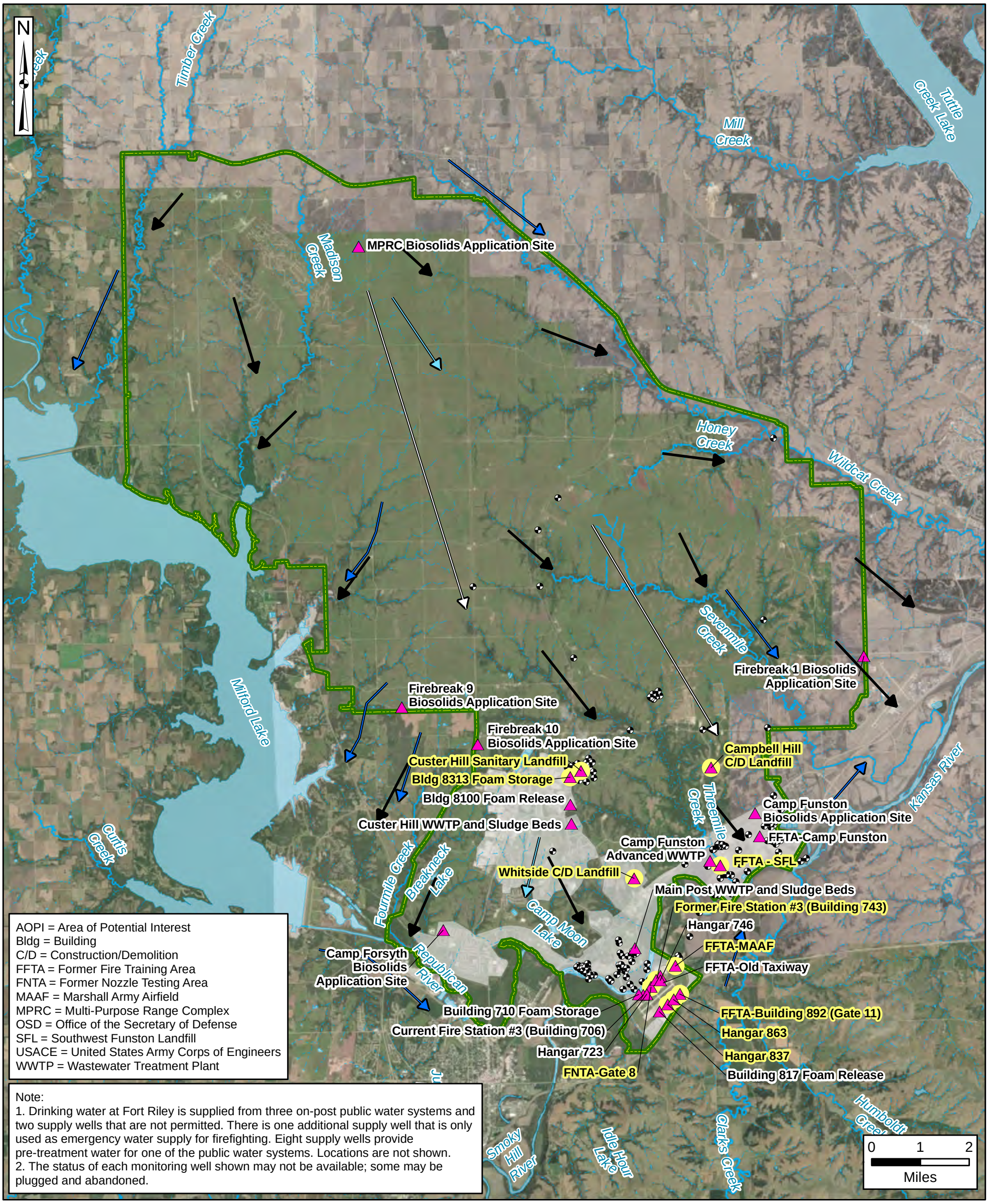


Figure 1
AOPI Overview and OSD Risk Screening Level Exceedances



AOPI = Area of Potential Interest
Bldg = Building
C/D = Construction/Demolition
FFTA = Former Fire Training Area
FNTA = Former Nozzle Testing Area
MAAF = Marshall Army Airfield
MPRC = Multi-Purpose Range Complex
OSD = Office of the Secretary of Defense
SFL = Southwest Funston Landfill
USACE = United States Army Corps of Engineers
WWTP = Wastewater Treatment Plant

Note:
1. Drinking water at Fort Riley is supplied from three on-post public water systems and two supply wells that are not permitted. There is one additional supply well that is only used as emergency water supply for firefighting. Eight supply wells provide pre-treatment water for one of the public water systems. Locations are not shown.
2. The status of each monitoring well shown may not be available; some may be plugged and abandoned.

- Installation Boundary
- Cantonment Area
- River/Stream (Perennial)
- Stream (Ephemeral/Intermittent)
- Water Body
- AOPI
- AOPI with OSD Risk Screening Level Exceedance (OSD. 2021)
- Surface Water Flow Direction
- Alluvial Groundwater Flow Direction
- Upper Bedrock Groundwater Flow Direction
- Direction of Downgradient Supply Wells
- Monitoring Well

Data Sources:
EDR Well Data, 2018
KGS Well Data, 2019
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

Figure 2: Off-Post Sampling Area

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Riley, KS

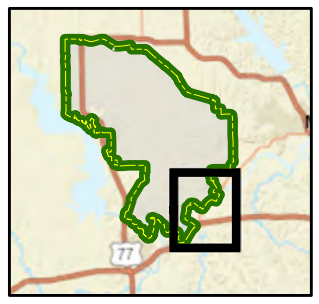


Figure 2
Off-Post Sampling Area

N

Campbell Hill C/D Landfill
Camp Funston Biosolids Application Site
Camp Funston Former FTA
Camp Funston Advanced WWTP
FFTA - SFL
Camp Whitside C/D Landfill
Main Post WWTP and Sludge Beds
FFTA - MAAF
Former Fire Station #3 (Bldg 743)
Old Taxiway
Bldg 746 - Hangar
Gate 8 at MAAF
Bldg 723 - Hangar
FFTA - Building 892, Gate 11
Bldg 863 Hangar
Bldg 837 Hangar
Bldg 710 - Foam Storage
Current Fire Station #3 (Bldg 706)
Bldg 817 - Foam Release
Sevenmile Creek
Kansas River
Threemile Creek
Clarks Creek
Humboldt Creek

0 0.25 0.5
Miles

AOPI = area of potential interest
FFTA = Former Fire Training Area
MAAF = Marshall Army Airfield
OSD = Office of the Secretary of Defense
SFL = Southwest Funston Landfill
WWC5 = Water Well Completion Records
WWTP = wastewater treatment plant

Installation Boundary
River/Stream (Perennial)
Stream (Ephemeral/Intermittent)
Water Body
Surface Water Flow Direction
Approximate Groundwater Flow Direction
Off Post Sampling Area
AOPI
AOPI with OSD Risk Screening Level Exceedance (OSD. 2021)

Data Sources:
EDR Well Data, 2018
KGS Well Data, 2019
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

Table 1: Analytical Data Results

Off-Post Evaluation							
Sample ID	Sample Date	Sample Type	Matrix	Perfluorooctane sulfonic acid (PFOS) ng/L	Qual	Perfluorooctanoic acid (PFOA) ng/L	Qual
FTRI-OPR-A-102220	10/22/2020	N	Drinking Water	1.8	U	1.8	U
FTRI-OPR-B-102220	10/22/2020	N	Drinking Water	1.7	U	1.7	U
FTRI-OPR-C-102820	10/22/2020	N	Drinking Water	1.7	U	1.7	U
FTRI-OPR-D-102220	10/22/2020	N	Drinking Water	1.7	U	1.7	U
FTRI-OPR-E-102220	10/22/2020	N	Drinking Water	1.7	U	1.7	U
FTRI-OPR-F-102220	10/22/2020	N	Drinking Water	**1.2**	J	**0.58**	J
FTRI-OPR-G-102220	10/22/2020	N	Drinking Water	1.7	U	1.7	U
FTRI-FD-1-102220*	10/22/2020	FD	Drinking Water	1.7	U	1.7	U
FTRI-OPR-H-102320	10/23/2020	N	Drinking Water	1.8	U	1.8	U
FTRI-OPR-I-102320	10/23/2020	N	Drinking Water	1.8	U	1.8	U
FTRI-OPR-J-102320	10/23/2020	N	Drinking Water	1.8	U	1.8	U
FTRI-OPR-K-102320	10/23/2020	N	Drinking Water	1.8	U	1.8	U
FTRI-OPR-L-102320	10/23/2020	N	Drinking Water	1.8	U	1.8	U
FTRI-OPR-M-102420	10/24/2020	N	Drinking Water	1.8	U	1.8	U
FTRI-OPR-N-102420	10/24/2020	N	Drinking Water	1.7	U	1.7	U
FTRI-OPR-O-102420	10/24/2020	N	Drinking Water	1.8	U	1.8	U
FTRI-OPR-P-102820	10/28/2020	N	Drinking Water	1.7	U	1.7	U
FTRI-OPR-Q-102820	10/28/2020	N	Drinking Water	**0.45**	J	1.7	U
FTRI-FD-2-102220**	10/28/2020	FD	Drinking Water	1.7	U	1.7	U
FTRI-OPR-R-102820	10/28/2020	N	Drinking Water	1.8	U	1.8	U
FTRI-OPR-S-102820	10/28/2020	N	Drinking Water	1.7	U	1.7	U
FTRI-OPR-T-102820	10/28/2020	N	Drinking Water	1.8	U	1.8	U
FTRI-OPR-U-102820	10/28/2020	N	Drinking Water	1.8	U	1.8	U
FTRI-OPR-V-121620	12/16/2020	N	Drinking Water	**18**		**110**	
FTRI-DUP-3-121620***	12/16/2020	FD	Drinking Water	**16**		**85**	
FTRI-OPR-W-121620	12/16/2020	N	Drinking Water	**16**		**3.1**	

Notes:

1. Bolded values indicate the result was detected greater than the limit of detection
2. Grey shaded values indicate the result was detected greater than the 2016 USEPA lifetime Health Advisory (HA)

* Duplicate sample collected from FTRI-OPR-G-102220
** Duplicate sample collected from FTRI-ORP-Q-102820
*** Duplicate sample collected from FTRI-ORP-V-121620

Acronyms/Abbreviations:

FD = field duplicate sample
ID = identification
N = primary sample
ng/L = nanograms per liter (parts per trillion)

Qualifier	Description
J	The analyte was positively identified; however the associated numerical value is an estimated concentration only
U	The analyte was analyzed for but the result was not detected above thelimit of quantitation (LOQ).

Attachment 1: Data Usability Summary Report

USACE Baltimore PFAS PA/SI
Fort Riley

DATA USABILITY SUMMARY REPORT

2020 Potable Water Sampling Event

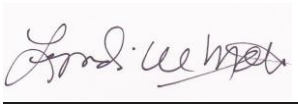
March 9, 2021

DATA USABILITY SUMMARY REPORT

2020 Potable Water Sampling Event

Prepared for:

U.S. Army Environmental Command
U.S. Army Corps of Engineers Baltimore District
Fort Riley, Kansas



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Contract W912DR-13-D-0019

Arcadis Project: 30001993.3BR20

Date: March 9, 2021

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Table 1. Data Usability Summary Table

ATTACHMENTS

Laboratory Analytical Reports
Data Validation Reports

ACRONYMS AND ABBREVIATIONS

%D	percent difference
%R	percent recovery
Arcadis	Arcadis U.S., Inc.
DoD	Department of Defense
DUA	data usability assessment
DUSR	data usability summary report
EIS	extracted internal standards
ELAP	Environmental Laboratory Accreditation Program
ELLE	Eurofins Lancaster Laboratories Environmental
ICV/CCV	initial calibration verification/continuing calibration verification
LCS/LCSD	laboratory control sample/laboratory control sample duplicate
LOQ	limit of quantitation
MS/MSD	matrix spike/matrix spike duplicate
NELAP	National Environmental Laboratory Accreditation Program
PFAS	per/polyfluoroalkyl substances
PQAPP	Programmatic Uniform Federal Policy-Quality Assurance Project Plan
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality System Manual
RPD	relative percent difference
SDG	sample delivery group
USDOD	United States Department of Defense
USEPA	United States Environmental Protection Agency

EXECUTIVE SUMMARY

This Data Usability Summary Report (DUSR) for Fort Riley located in Kansas for the 2020 Drinking Water sampling event describes the findings of the data review and validation and is provided to document the quality of the analytical data used for project decisions. A Data Usability Summary Table at the end of this DUSR lists the data that was qualified and the reason for qualification. The 2020 Potable Water data set from Fort Riley met project requirements and all results are considered valid and usable.

Only the sample locations associated with this site and sampling event in the associated laboratory data packages and data validation reports are addressed in this report. The text below adds details where further discussion is warranted. The project-specific sampling and analysis, overall quality control (QC), and quality assurance protocols are presented in the Final Programmatic Uniform Federal Policy-Quality Assurance Project Plan (PQAPP Arcadis 2019), and the Uniform Federal Policy-Quality Assurance Project Plan Addendum for Fort Riley, Kansas (QAPP Addendum Arcadis 2020).

Samples were shipped to Eurofins Lancaster Laboratories Environmental (ELLE) located in Lancaster, Pennsylvania for analysis. ELLE is a United States Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) and National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory. The analytical sample delivery groups (SDGs) and associated Arcadis validation reports are listed in the table below. Summaries of the sample IDs and their associated laboratory IDs, SDGs, sampling dates, and analyses performed are provided in the laboratory reports and data validation reports.

In accordance with the project PQAPP data review requirements, Stage 3, and 10 percent Stage 4 validation of the analytical data was performed by Arcadis project chemists that are independent of the project team. The validation was performed in accordance with the guidelines and control criteria specified in the following documents:

USDOD. Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1.1 February 2018.

USDOD. DoD General Data Validation Guidelines, November 2019.

Final Programmatic Uniform Federal Policy-Quality Assurance Project Plan (PQAPP Arcadis 2019).

USEPA Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537, EPA 910-R-18-001, November 2018.

The laboratory data packages and validation reports that were reviewed for this DUSR are listed below.

Sample Delivery Groups (SDG)	Validation Report	Matrix	Parameters	Validation Level
410-18432-1	39022R	Potable Water	PFAS by EPA 537 version 1.1	Stage 3: 12 field samples; 1 field duplicate Stage 4: 2 field samples
410-18975-1	39015R	Potable Water	PFAS by EPA 537 version 1.1	Stage 3: 6 field samples; 1 field duplicate Stage 4: 1 field samples

Sample Delivery Groups (SDG)	Validation Report	Matrix	Parameters	Validation Level
410-24471-1	39785R	Potable Water	PFAS by EPA 537 version 1.1	Stage 3: 1 field samples, 1 field duplicate Stage 4: 1 field samples

PRECISION

Precision is expressed as a relative percent difference (RPD) between the results of replicate sample analyses: sample duplicates, laboratory control sample duplicates (LCSDs), and matrix spike duplicates (MSDs). The RPD limit for LCSDs and MSDs is 30 percent. Field duplicates were collected at a frequency of 5 percent. Unless documented below or in the Data Usability Summary table, the RPD between the parent samples and associated field duplicates were within acceptable limits of 35 percent for water matrix and 50 percent for soil matrix.

Potable water sample FTRI-OPR-G-102220 was identified as the parent sample to field duplicate FTRI-FD-1-102220. The evaluation of the parent sample and field duplicate indicate precision was within criteria of less than 35% RPD.

Potable water sample FTRI-OPR-Q-102820 was identified as the parent sample to field duplicate FTRI-FD-2-102820. The evaluation of the parent sample and field duplicate indicate precision was within criteria of less than 35% RPD.

Potable water sample FTRI-OPR-V-121620 was identified as the parent sample to field duplicate FTRI-OPR-DUP-3-121620. The evaluation of the parent sample and field duplicate indicate precision was within criteria of less than 35% RPD except for perfluoroheptanoic acid. The RPD for perfluoroheptanoic acid was 42.4 percent. Since other detected PFAS compounds were within the field duplicate control limits, the cause for the discrepancy is unknown. The perfluoroheptanoic acid results were qualified as estimated for the parent sample and field duplicate.

ACCURACY

Accuracy is demonstrated by recovery of target analytes from fortified blank and sample matrices, LCS/LCSDs and MS/MSDs, respectively. The recovery of target analytes from fortified samples is compared to acceptance criteria as listed in EPA method 537. In addition, Stage 4 validation of initial and continuing calibration results provide information on analytical accuracy. Unless documented below or in the Data Usability Summary table, the recoveries of LCS, MS/MSD, and surrogates, and calibration criteria, were within acceptable limits. The surrogate control limits are method specified of 70 to 130 percent recovery.

REPRESENTATIVENESS

Representativeness is the degree to which sample data accurately and precisely represent site conditions and is dependent on sampling and analytical variability and the variability (or homogeneity) of the site itself. The use of the prescribed field and laboratory analytical methods with associated holding times and preservation requirements are intended to provide representative data.

All samples were collected and submitted for analysis in accordance with the procedures and sampling plan specified in the site QAPP and field SOPs. Analysis of samples was in accordance with the USACE PFAS PA/SI PQAPP, EPA method 537 version 1.1, and laboratory SOPs. All hold times were met.

SENSITIVITY

Sensitivity describes the relationship between the laboratory quantitation limits and the project action limits. Reported laboratory quantitation limits are compared to the project detection limits to ensure that the analytical methods are capable of quantifying target analytes to a level that would satisfy DQOs.

The limit of quantitation (LOQ) of 2 µg/L for potable water was met for all samples except FTRI-OPR-V-121620. The LOQ was slightly elevated at 2.1 µg/L where the LOQ is corrected for the sample extraction volume of 242 mls. A sample volume of 250 mls is needed to meet the LOQ of 2 µg/L. There is no effect on the data since seven PFAS compounds were detected for sample FTRI-OPR-V-121620.

COMPLETENESS

The completeness for this data set met the criteria of 90 percent for both analytical and field completeness. No results were rejected.

CONCLUSIONS

The overall assessment of the field samples, QA/QC data review by manual validation of the 2020 Potable Water data set from Fort Riley met project requirements and completeness goals. Based upon the Stage 3 and Stage 4 data validation, all results are considered valid and usable.

The results that were qualified as estimated during validation are less than or well above the project screening level of 2 µg/L. Therefore, this data is usable for evaluation against the project screening level.

DATA USABILITY SUMMARY TABLE

DATA USABILITY SUMMARY TABLE
Fort Riley; 2020 Potable Water Sampling Event

Sample Locations	Compound	Qualifier	Reason
FTRI-OPR-F-102220	Perfluorohexanoic acid Perfluorooctanoic acid Perfluorooctanesulfonic acid	J	Surrogates %R; high bias
FTRI-OPR-V-121620 FTRI-OPR-DUP-3-121620	Perfluoroheptanoic acid	J	Field duplicate RPD
FTRI-OPR-W-121620	Perfluorobutanesulfonic acid Perflurohexanesulfonic acid	J-	MS %R; low bias

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however, the reported concentration is estimated due to non-conformances discovered during data validation.

J+ (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however, the reported concentration is estimated due to non-conformances discovered during data validation. Result may be biased high.

J- (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however, the reported concentration is estimated due to non-conformances discovered during data validation. Result may be biased low.

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however, the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

LEVEL 2 LABORATORY ANALYTICAL REPORTS

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins Lancaster Laboratories Env, LLC
2425 New Holland Pike
Lancaster, PA 17601
Tel: (717)656-2300

Laboratory Job ID: 410-18432-1
Client Project/Site: Fort Riley

For:
ARCADIS U.S., Inc.
630 Plaza Drive
Suite 200
Highlands Ranch, Colorado 80129

Attn: Kevin Engle

Authorized for release by:
11/10/2020 12:53:19 PM

Stephen Gordon, Senior Project Manager
(412)525-0071
stephengordon@eurofinsus.com

Analytical test results meet all requirements of the associated regulatory program (e.g., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis. Data qualifiers are applied to note exceptions. Noncompliant quality control (QC) is further explained in narrative comments.
· QC results that exceed the upper limits and are associated with non-detect samples are qualified but further narration is not required since the bias is high and does not change a non-detect result. Further narration is also not required with QC blank detection when the associated sample concentration is non-detect or more than ten times the level in the blank.
· Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD is performed, unless otherwise specified in the method.
· Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.
Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Measurement uncertainty values, as applicable, are available upon request.

Test results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" and tested in the laboratory are not performed within 15 minutes of collection.

This report shall not be reproduced except in full, without the written approval of the laboratory.

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Stephen Gordon
Senior Project Manager
11/10/2020 12:53:19 PM

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Definitions/Glossary

Client: ARCADIS U.S., Inc.
Job ID: 410-18432-1
Project/Site: Fort Riley

Qualifiers

LCMS

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
M	Manual integrated compound.
XH	Surrogate recovery is above control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 410-18432-1

Laboratory: Eurofins Lancaster Laboratories Env, LLC

Narrative

Job Narrative
410-18432-1

Receipt
The samples were received on 10/27/2020 10:16 AM; the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 0.3°C and 1.4°C

Receipt Exceptions
The following sample(s) was listed on the Chain of Custody (COC); however, no sample(s) was received
FTRI-OPR-C

LCMS
Method 537.1_DW: The surrogate recoveries were outside QC acceptance limits for the following sample: FTRI-OPR-F-102220 (410-18432-5). The following action was taken: The sample was re-extracted within the required holding time and the surrogate recoveries were within QC acceptance limits. However the recovery for several target analytes in the laboratory control sample were outside of QC acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley

Job ID: 410-18432-1

Client Sample ID: FTRI-OPR-A-102220 — Lab Sample ID: 410-18432-1

No Detections.

Client Sample ID: FTRI-OPR-B-102220 — Lab Sample ID: 410-18432-2

No Detections.

Client Sample ID: FTRI-OPR-D-102220 — Lab Sample ID: 410-18432-3

No Detections.

Client Sample ID: FTRI-OPR-E-102220 — Lab Sample ID: 410-18432-4

No Detections.

Client Sample ID: FTRI-OPR-F-102220 — Lab Sample ID: 410-18432-5

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid	0.46	J	1.7	1.2	0.41	ng/L	1		EPA 537.1	Total/NA
Perfluorooctanoic acid	0.58	J M	1.7	1.2	0.41	ng/L	1		EPA 537.1	Total/NA
Perfluorooctanesulfonic acid	1.2	J	1.7	1.2	0.41	ng/L	1		EPA 537.1	Total/NA

Client Sample ID: FTRI-OPR-G-102220 — Lab Sample ID: 410-18432-6

No Detections.

Client Sample ID: FTRI-FD-1-102220 — Lab Sample ID: 410-18432-7

No Detections.

Client Sample ID: FTRI-FB-1-102220 — Lab Sample ID: 410-18432-8

No Detections.

Client Sample ID: FTRI-OPR-H-102320 — Lab Sample ID: 410-18432-9

No Detections.

Client Sample ID: FTRI-OPR-I-102320 — Lab Sample ID: 410-18432-10

No Detections.

Client Sample ID: FTRI-OPR-J-102320 — Lab Sample ID: 410-18432-11

No Detections.

Client Sample ID: FTRI-OPR-K-102320 — Lab Sample ID: 410-18432-12

No Detections.

Client Sample ID: FTRI-OPR-L-102320 — Lab Sample ID: 410-18432-13

No Detections.

Client Sample ID: FTRI-FB-2-102320 — Lab Sample ID: 410-18432-14

No Detections.

Client Sample ID: FTRI-OPR-M-102420 — Lab Sample ID: 410-18432-15

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Lancaster Laboratories Env, LLC

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley

Job ID: 410-18432-1

Client Sample ID: FTRI-OPR-N-102420 — Lab Sample ID: 410-18432-16

No Detections.

Client Sample ID: FTRI-OPR-O-102420 — Lab Sample ID: 410-18432-17

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid	0.46	J	1.8	1.3	0.44	ng/L	1		EPA 537.1	Total/NA

Client Sample ID: FTRI-FB-3-102420 — Lab Sample ID: 410-18432-18

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: FTRI-OPR-A-102220

Lab Sample ID: 410-18432-1

Date Collected: 10/22/20 08:30

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*94*		*70 - 130*	*11/04/20 08:39*	*11/05/20 14:58*	*1*
13C2 PFDA	*89*		*70 - 130*	*11/04/20 08:39*	*11/05/20 14:58*	*1*
13C2 PFHxA	*97*		*70 - 130*	*11/04/20 08:39*	*11/05/20 14:58*	*1*
13C3 HFPO-DA	*102*		*70 - 130*	*11/04/20 08:39*	*11/05/20 14:58*	*1*

Client Sample ID: FTRI-OPR-B-102220

Lab Sample ID: 410-18432-2

Date Collected: 10/22/20 09:23

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
NEtFOSAA	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
NMeFOSAA	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*92*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:10*	*1*
13C2 PFDA	*90*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:10*	*1*
13C2 PFHxA	*95*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:10*	*1*
13C3 HFPO-DA	*103*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:10*	*1*

Client Sample ID: FTRI-OPR-D-102220

Lab Sample ID: 410-18432-3

Date Collected: 10/22/20 10:03

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
NEtFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
NMeFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*100*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:21*	*1*
13C2 PFDA	*92*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:21*	*1*
13C2 PFHxA	*100*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:21*	*1*
13C3 HFPO-DA	*108*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:21*	*1*

Client Sample ID: FTRI-OPR-E-102220

Lab Sample ID: 410-18432-4

Date Collected: 10/22/20 10:42

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
NEtFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
NMeFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*91*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:33*	*1*
13C2 PFDA	*90*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:33*	*1*
13C2 PFHxA	*94*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:33*	*1*
13C3 HFPO-DA	*104*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:33*	*1*

Client Sample ID: FTRI-OPR-F-102220

Lab Sample ID: 410-18432-5

Date Collected: 10/22/20 11:06

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	**0.46**	**J**	1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluoroheptanoic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorooctanoic acid	**0.58**	**J M**	1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorononanoic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorodecanoic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorotridecanoic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorotetradecanoic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorobutanesulfonic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorohexanesulfonic acid	<1.2	M	1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorooctanesulfonic acid	**1.2**	**J**	1.7	1.2	0.41	ng/L		11/05/20 15:44	1
NEtFOSAA	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
NMeFOSAA	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluoroundecanoic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorododecanoic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*142*	*XH*	*70 - 130*	*11/04/20 08:39*	*11/05/20 15:44*	*1*
13C2 PFDA	*133*	*XH*	*70 - 130*	*11/04/20 08:39*	*11/05/20 15:44*	*1*
13C2 PFHxA	*139*	*XH*	*70 - 130*	*11/04/20 08:39*	*11/05/20 15:44*	*1*
13C3 HFPO-DA	*154*	*XH*	*70 - 130*	*11/04/20 08:39*	*11/05/20 15:44*	*1*

Client Sample ID: FTRI-OPR-G-102220

Lab Sample ID: 410-18432-6

Date Collected: 10/22/20 13:08

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorohexanesulfonic acid	<1.3	M	1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
NEtFOSAA	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
NMeFOSAA	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*87*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:56*	*1*
13C2 PFDA	*86*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:56*	*1*
13C2 PFHxA	*92*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:56*	*1*
13C3 HFPO-DA	*101*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:56*	*1*

Client Sample ID: FTRI-FD-1-102220

Lab Sample ID: 410-18432-7

Date Collected: 10/22/20 00:00

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
NEtFOSAA	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
NMeFOSAA	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*93*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:08*	*1*
13C2 PFDA	*93*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:08*	*1*
13C2 PFHxA	*100*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:08*	*1*
13C3 HFPO-DA	*109*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:08*	*1*

Client Sample ID: FTRI-FB-1-102220

Lab Sample ID: 410-18432-8

Date Collected: 10/22/20 13:15

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*101*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:19*	*1*
13C2 PFDA	*97*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:19*	*1*
13C2 PFHxA	*106*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:19*	*1*
13C3 HFPO-DA	*111*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:19*	*1*

Client Sample ID: FTRI-OPR-H-102320

Lab Sample ID: 410-18432-9

Date Collected: 10/23/20 08:08

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluoroheptanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorooctanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorononanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorodecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorotridecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorotetradecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorobutanesulfonic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorohexanesulfonic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorooctanesulfonic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
NEtFOSAA	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
NMeFOSAA	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluoroundecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorododecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*94*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:31*	*1*
13C2 PFDA	*86*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:31*	*1*
13C2 PFHxA	*96*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:31*	*1*
13C3 HFPO-DA	*102*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:31*	*1*

Client Sample ID: FTRI-OPR-I-102320

Lab Sample ID: 410-18432-10

Date Collected: 10/23/20 08:55

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluoroheptanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorooctanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorononanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorodecanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorotridecanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorotetradecanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorobutanesulfonic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorohexanesulfonic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorooctanesulfonic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
NEtFOSAA	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
NMeFOSAA	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluoroundecanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorododecanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*103*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:42*	*1*
13C2 PFDA	*97*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:42*	*1*
13C2 PFHxA	*110*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:42*	*1*
13C3 HFPO-DA	*117*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:42*	*1*

Client Sample ID: FTRI-OPR-J-102320

Lab Sample ID: 410-18432-11

Date Collected: 10/23/20 14:18

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
NEtFOSAA	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
NMeFOSAA	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*98*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:05*	*1*
13C2 PFDA	*93*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:05*	*1*
13C2 PFHxA	*106*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:05*	*1*
13C3 HFPO-DA	*115*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:05*	*1*

Client Sample ID: FTRI-OPR-K-102320

Lab Sample ID: 410-18432-12

Date Collected: 10/23/20 14:45

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluoroheptanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorooctanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorononanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorodecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorotridecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorotetradecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorobutanesulfonic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorohexanesulfonic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorooctanesulfonic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
NEtFOSAA	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
NMeFOSAA	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluoroundecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorododecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*96*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:17*	*1*
13C2 PFDA	*88*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:17*	*1*
13C2 PFHxA	*97*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:17*	*1*
13C3 HFPO-DA	*105*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:17*	*1*

Client Sample ID: FTRI-OPR-L-102320

Lab Sample ID: 410-18432-13

Date Collected: 10/23/20 16:37

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
NEtFOSAA	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
NMeFOSAA	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*95*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:29*	*1*
13C2 PFDA	*87*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:29*	*1*
13C2 PFHxA	*94*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:29*	*1*
13C3 HFPO-DA	*104*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:29*	*1*

Client Sample ID: FTRI-FB-2-102320

Lab Sample ID: 410-18432-14

Date Collected: 10/23/20 13:30

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*90*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:41*	*1*
13C2 PFDA	*87*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:41*	*1*
13C2 PFHxA	*92*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:41*	*1*
13C3 HFPO-DA	*97*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:41*	*1*

Client Sample ID: FTRI-OPR-M-102420

Lab Sample ID: 410-18432-15

Date Collected: 10/24/20 13:15

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*94*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:53*	*1*
13C2 PFDA	*87*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:53*	*1*
13C2 PFHxA	*96*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:53*	*1*
13C3 HFPO-DA	*105*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:53*	*1*

Client Sample ID: FTRI-OPR-N-102420

Lab Sample ID: 410-18432-16

Date Collected: 10/24/20 13:38

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
NEtFOSAA	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
NMeFOSAA	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*95*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:04*	*1*
13C2 PFDA	*89*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:04*	*1*
13C2 PFHxA	*101*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:04*	*1*
13C3 HFPO-DA	*108*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:04*	*1*

Client Sample ID: FTRI-OPR-O-102420

Lab Sample ID: 410-18432-17

Date Collected: 10/24/20 14:00

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	**0.46**	**J**	1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*94*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:16*	*1*
13C2 PFDA	*87*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:16*	*1*
13C2 PFHxA	*95*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:16*	*1*
13C3 HFPO-DA	*103*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:16*	*1*

Client Sample ID: FTRI-FB-3-102420

Lab Sample ID: 410-18432-18

Date Collected: 10/24/20 13:00

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
NEtFOSAA	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
NMeFOSAA	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*93*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:28*	*1*
13C2 PFDA	*82*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:28*	*1*
13C2 PFHxA	*100*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:28*	*1*
13C3 HFPO-DA	*104*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:28*	*1*

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley

Job ID: 410-18432-1

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Matrix: Drinking Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		d5NEFOS	PFDA	PFHxA	HFPODA
Lab Sample ID	Client Sample ID	(70-130)	(70-130)	(70-130)	(70-130)
410-18432-1	FTRI-OPR-A-102220	94	89	97	102
410-18432-2	FTRI-OPR-B-102220	92	90	95	103
410-18432-3	FTRI-OPR-D-102220	100	92	100	108
410-18432-4	FTRI-OPR-E-102220	91	90	94	104
410-18432-5	FTRI-OPR-F-102220	142 XH	133 XH	139 XH	154 XH
410-18432-6	FTRI-OPR-G-102220	87	86	92	101
410-18432-7	FTRI-FD-1-102220	93	93	100	109
410-18432-8	FTRI-FB-1-102220	101	97	106	111
410-18432-9	FTRI-OPR-H-102320	94	86	96	102
410-18432-10	FTRI-OPR-I-102320	103	97	110	117
410-18432-11	FTRI-OPR-J-102320	98	93	106	115
410-18432-12	FTRI-OPR-K-102320	96	88	97	105
410-18432-13	FTRI-OPR-L-102320	95	87	94	104
410-18432-14	FTRI-FB-2-102320	90	87	92	97
410-18432-15	FTRI-OPR-M-102420	94	87	96	105
410-18432-16	FTRI-OPR-N-102420	95	89	101	108
410-18432-17	FTRI-OPR-O-102420	94	87	95	103
410-18432-18	FTRI-FB-3-102420	93	82	100	104
LCS 410-61997/2-A	Lab Control Sample	100	90	101	103
LCSD 410-61997/3-A	Lab Control Sample Dup	92	88	100	100
LLCS 410-61997/4-A	Lab Control Sample	95	86	97	102
MB 410-61997/1-A	Method Blank	96	85	93	98

Surrogate Legend

d5NEFOS = d5-NEtFOSAA
PFDA = 13C2 PFDA
PFHxA = 13C2 PFHxA
HFPODA = 13C3 HFPO-DA

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley

Job ID: 410-18432-1

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Lab Sample ID: MB 410-61997/1-A
Matrix: Drinking Water
Analysis Batch: 62634

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 61997

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/05/20 14:10	1
Perfluoroheptanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/05/20 14:10	1
Perfluorooctanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/05/20 14:10	1
Perfluorononanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/05/20 14:10	1
Perfluorodecanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/05/20 14:10	1
Perfluorotridecanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/05/20 14:10	1
Perfluorotetradecanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/05/20 14:10	1
Perfluorobutanesulfonic acid	<1.5		2.0	1.5	0.50	ng/L		11/05/20 14:10	1
Perfluorohexanesulfonic acid	<1.5		2.0	1.5	0.50	ng/L		11/05/20 14:10	1
Perfluorooctanesulfonic acid	<1.5		2.0	1.5	0.50	ng/L		11/05/20 14:10	1
NEtFOSAA	<1.5		2.0	1.5	0.50	ng/L		11/05/20 14:10	1
NMeFOSAA	<1.5		2.0	1.5	0.50	ng/L		11/05/20 14:10	1
Perfluoroundecanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/05/20 14:10	1
Perfluorododecanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/05/20 14:10	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*96*		*70 - 130*	*11/04/20 08:39*	*11/05/20 14:10*	*1*
13C2 PFDA	*85*		*70 - 130*	*11/04/20 08:39*	*11/05/20 14:10*	*1*
13C2 PFHxA	*93*		*70 - 130*	*11/04/20 08:39*	*11/05/20 14:10*	*1*
13C3 HFPO-DA	*98*		*70 - 130*	*11/04/20 08:39*	*11/05/20 14:10*	*1*

Lab Sample ID: LCS 410-61997/2-A
Matrix: Drinking Water
Analysis Batch: 62634

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 61997

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid	20.5	22.7		ng/L		111	70 - 130
Perfluoroheptanoic acid	20.5	21.9		ng/L		107	70 - 130
Perfluorooctanoic acid	20.5	22.2		ng/L		109	70 - 130
Perfluorononanoic acid	20.5	21.1		ng/L		103	70 - 130
Perfluorodecanoic acid	20.5	20.2		ng/L		99	70 - 130
Perfluorotridecanoic acid	20.5	20.3		ng/L		99	70 - 130
Perfluorotetradecanoic acid	20.5	21.4		ng/L		104	70 - 130
Perfluorobutanesulfonic acid	18.1	20.7		ng/L		114	70 - 130
Perfluorohexanesulfonic acid	18.7	19.7		ng/L		106	70 - 130
Perfluorooctanesulfonic acid	19.0	20.5	M	ng/L		108	70 - 130
NEtFOSAA	20.5	21.6		ng/L		105	70 - 130
NMeFOSAA	20.5	21.4		ng/L		105	70 - 130
Perfluoroundecanoic acid	20.5	22.1		ng/L		108	70 - 130
Perfluorododecanoic acid	20.5	21.1		ng/L		103	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
d5-NEtFOSAA	*100*		*70 - 130*
13C2 PFDA	*90*		*70 - 130*
13C2 PFHxA	*101*		*70 - 130*
13C3 HFPO-DA	*103*		*70 - 130*

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018 (Continued)

Lab Sample ID: LCSD 410-61997/3-A
Matrix: Drinking Water
Analysis Batch: 62634

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 61997

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid			20.5	22.6		ng/L		110	70 - 130	0	30
Perfluoroheptanoic acid			20.5	21.6		ng/L		106	70 - 130	1	30
Perfluorooctanoic acid			20.5	22.0		ng/L		107	70 - 130	1	30
Perfluorononanoic acid			20.5	21.2		ng/L		104	70 - 130	1	30
Perfluorodecanoic acid			20.5	20.1		ng/L		98	70 - 130	1	30
Perfluorotridecanoic acid			20.5	20.2		ng/L		99	70 - 130	1	30
Perfluorotetradecanoic acid			20.5	21.2		ng/L		104	70 - 130	1	30
Perfluorobutanesulfonic acid			18.1	20.3		ng/L		112	70 - 130	2	30
Perfluorohexanesulfonic acid			18.7	19.5		ng/L		104	70 - 130	1	30
Perfluorooctanesulfonic acid			19.0	20.0	M	ng/L		106	70 - 130	3	30
NEtFOSAA			20.5	20.7		ng/L		101	70 - 130	4	30
NMeFOSAA			20.5	20.7		ng/L		101	70 - 130	4	30
Perfluoroundecanoic acid			20.5	21.4		ng/L		104	70 - 130	3	30
Perfluorododecanoic acid			20.5	20.7		ng/L		101	70 - 130	2	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
d5-NEtFOSAA	*92*		*70 - 130*
13C2 PFDA	*88*		*70 - 130*
13C2 PFHxA	*100*		*70 - 130*
13C3 HFPO-DA	*100*		*70 - 130*

Lab Sample ID: LLCS 410-61997/4-A
Matrix: Drinking Water
Analysis Batch: 62634

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 61997

Analyte			Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid			1.92	2.29		ng/L		119	50 - 150
Perfluoroheptanoic acid			1.92	2.15		ng/L		112	50 - 150
Perfluorooctanoic acid			1.92	2.35		ng/L		122	50 - 150
Perfluorononanoic acid			1.92	2.14		ng/L		111	50 - 150
Perfluorodecanoic acid			1.92	2.04		ng/L		106	50 - 150
Perfluorotridecanoic acid			1.92	2.12		ng/L		110	50 - 150
Perfluorotetradecanoic acid			1.92	2.14		ng/L		111	50 - 150
Perfluorobutanesulfonic acid			1.70	2.11		ng/L		124	50 - 150
Perfluorohexanesulfonic acid			1.75	2.04		ng/L		117	50 - 150
Perfluorooctanesulfonic acid			1.78	2.17		ng/L		122	50 - 150
NEtFOSAA			1.92	2.33		ng/L		121	50 - 150
NMeFOSAA			1.92	2.14		ng/L		112	50 - 150
Perfluoroundecanoic acid			1.92	2.22		ng/L		116	50 - 150
Perfluorododecanoic acid			1.92	2.13		ng/L		111	50 - 150

Surrogate	*LLCS %Recovery*	*LLCS Qualifier*	*Limits*
d5-NEtFOSAA	*95*		*70 - 130*
13C2 PFDA	*86*		*70 - 130*
13C2 PFHxA	*97*		*70 - 130*
13C3 HFPO-DA	*102*		*70 - 130*

LCMS

Prep Batch: 59884

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-18432-5 - RE	FTRI-OPR-F-102220	Total/NA	Drinking Water	EPA 537.1	
MB 410-59884/1-A	Method Blank	Total/NA	Drinking Water	EPA 537.1	
LCS 410-59884/2-A	Lab Control Sample	Total/NA	Drinking Water	EPA 537.1	
LCSD 410-59884/3-A	Lab Control Sample Dup	Total/NA	Drinking Water	EPA 537.1	

Analysis Batch: 60386

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-18432-5 - RE	FTRI-OPR-F-102220	Total/NA	Drinking Water	EPA 537.1	59884
MB 410-59884/1-A	Method Blank	Total/NA	Drinking Water	EPA 537.1	59884
LCS 410-59884/2-A	Lab Control Sample	Total/NA	Drinking Water	EPA 537.1	59884
LCSD 410-59884/3-A	Lab Control Sample Dup	Total/NA	Drinking Water	EPA 537.1	59884

Prep Batch: 61997

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-18432-1	FTRI-OPR-A-102220	Total/NA	Drinking Water	EPA 537.1	
410-18432-2	FTRI-OPR-B-102220	Total/NA	Drinking Water	EPA 537.1	
410-18432-3	FTRI-OPR-D-102220	Total/NA	Drinking Water	EPA 537.1	
410-18432-4	FTRI-OPR-E-102220	Total/NA	Drinking Water	EPA 537.1	
410-18432-5	FTRI-OPR-F-102220	Total/NA	Drinking Water	EPA 537.1	
410-18432-6	FTRI-OPR-G-102220	Total/NA	Drinking Water	EPA 537.1	
410-18432-7	FTRI-FD-1-102220	Total/NA	Drinking Water	EPA 537.1	
410-18432-8	FTRI-FB-1-102220	Total/NA	Drinking Water	EPA 537.1	
410-18432-9	FTRI-OPR-H-102320	Total/NA	Drinking Water	EPA 537.1	
410-18432-10	FTRI-OPR-I-102320	Total/NA	Drinking Water	EPA 537.1	
410-18432-11	FTRI-OPR-J-102320	Total/NA	Drinking Water	EPA 537.1	
410-18432-12	FTRI-OPR-K-102320	Total/NA	Drinking Water	EPA 537.1	
410-18432-13	FTRI-OPR-L-102320	Total/NA	Drinking Water	EPA 537.1	
410-18432-14	FTRI-FB-2-102320	Total/NA	Drinking Water	EPA 537.1	
410-18432-15	FTRI-OPR-M-102420	Total/NA	Drinking Water	EPA 537.1	
410-18432-16	FTRI-OPR-N-102420	Total/NA	Drinking Water	EPA 537.1	
410-18432-17	FTRI-OPR-O-102420	Total/NA	Drinking Water	EPA 537.1	
410-18432-18	FTRI-FB-3-102420	Total/NA	Drinking Water	EPA 537.1	
MB 410-61997/1-A	Method Blank	Total/NA	Drinking Water	EPA 537.1	
LCS 410-61997/2-A	Lab Control Sample	Total/NA	Drinking Water	EPA 537.1	
LCSD 410-61997/3-A	Lab Control Sample Dup	Total/NA	Drinking Water	EPA 537.1	
LLCS 410-61997/4-A	Lab Control Sample	Total/NA	Drinking Water	EPA 537.1	

Analysis Batch: 62634

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-18432-1	FTRI-OPR-A-102220	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-2	FTRI-OPR-B-102220	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-3	FTRI-OPR-D-102220	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-4	FTRI-OPR-E-102220	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-5	FTRI-OPR-F-102220	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-6	FTRI-OPR-G-102220	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-7	FTRI-FD-1-102220	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-8	FTRI-FB-1-102220	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-9	FTRI-OPR-H-102320	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-10	FTRI-OPR-I-102320	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-11	FTRI-OPR-J-102320	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-12	FTRI-OPR-K-102320	Total/NA	Drinking Water	EPA 537.1	61997

LCMS (Continued)

Analysis Batch: 62634 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-18432-13	FTRI-OPR-L-102320	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-14	FTRI-FB-2-102320	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-15	FTRI-OPR-M-102420	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-16	FTRI-OPR-N-102420	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-17	FTRI-OPR-O-102420	Total/NA	Drinking Water	EPA 537.1	61997
410-18432-18	FTRI-FB-3-102420	Total/NA	Drinking Water	EPA 537.1	61997
MB 410-61997/1-A	Method Blank	Total/NA	Drinking Water	EPA 537.1	61997
LCS 410-61997/2-A	Lab Control Sample	Total/NA	Drinking Water	EPA 537.1	61997
LCSD 410-61997/3-A	Lab Control Sample Dup	Total/NA	Drinking Water	EPA 537.1	61997
LLCS 410-61997/4-A	Lab Control Sample	Total/NA	Drinking Water	EPA 537.1	61997

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley

Job ID: 410-18432-1

Client Sample ID: FTRI-OPR-A-102220
Lab Sample ID: 410-18432-1
Date Collected: 10/22/20 08:30
Matrix: Drinking Water
Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 14:58	Y6ZN	ELLE

Client Sample ID: FTRI-OPR-B-102220
Lab Sample ID: 410-18432-2
Date Collected: 10/22/20 09:23
Matrix: Drinking Water
Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 15:10	Y6ZN	ELLE

Client Sample ID: FTRI-OPR-D-102220
Lab Sample ID: 410-18432-3
Date Collected: 10/22/20 10:03
Matrix: Drinking Water
Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 15:21	Y6ZN	ELLE

Client Sample ID: FTRI-OPR-E-102220
Lab Sample ID: 410-18432-4
Date Collected: 10/22/20 10:42
Matrix: Drinking Water
Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 15:33	Y6ZN	ELLE

Client Sample ID: FTRI-OPR-F-102220
Lab Sample ID: 410-18432-5
Date Collected: 10/22/20 11:06
Matrix: Drinking Water
Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1	RE		59884	10/29/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1	RE	1	60386	10/30/20 13:13	PY4D	ELLE
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 15:44	Y6ZN	ELLE

Client Sample ID: FTRI-OPR-G-102220
Lab Sample ID: 410-18432-6
Date Collected: 10/22/20 13:08
Matrix: Drinking Water
Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 15:56	Y6ZN	ELLE

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley

Job ID: 410-18432-1

Client Sample ID: FTRI-FD-1-102220
Lab Sample ID: 410-18432-7
Date Collected: 10/22/20 00:00
Matrix: Drinking Water
Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 16:08	Y6ZN	ELLE

Client Sample ID: FTRI-FB-1-102220
Lab Sample ID: 410-18432-8
Date Collected: 10/22/20 13:15
Matrix: Drinking Water
Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 16:19	Y6ZN	ELLE

Client Sample ID: FTRI-OPR-H-102320
Lab Sample ID: 410-18432-9
Date Collected: 10/23/20 08:08
Matrix: Drinking Water
Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 16:31	Y6ZN	ELLE

Client Sample ID: FTRI-OPR-I-102320
Lab Sample ID: 410-18432-10
Date Collected: 10/23/20 08:55
Matrix: Drinking Water
Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 16:42	Y6ZN	ELLE

Client Sample ID: FTRI-OPR-J-102320
Lab Sample ID: 410-18432-11
Date Collected: 10/23/20 14:18
Matrix: Drinking Water
Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 17:05	Y6ZN	ELLE

Client Sample ID: FTRI-OPR-K-102320
Lab Sample ID: 410-18432-12
Date Collected: 10/23/20 14:45
Matrix: Drinking Water
Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 17:17	Y6ZN	ELLE

Client Sample ID: FTRI-OPR-L-102320

Lab Sample ID: 410-18432-13

Date Collected: 10/23/20 16:37

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 17:29	Y6ZN	ELLE

Client Sample ID: FTRI-FB-2-102320

Lab Sample ID: 410-18432-14

Date Collected: 10/23/20 13:30

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 17:41	Y6ZN	ELLE

Client Sample ID: FTRI-OPR-M-102420

Lab Sample ID: 410-18432-15

Date Collected: 10/24/20 13:15

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 17:53	Y6ZN	ELLE

Client Sample ID: FTRI-OPR-N-102420

Lab Sample ID: 410-18432-16

Date Collected: 10/24/20 13:38

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 18:04	Y6ZN	ELLE

Client Sample ID: FTRI-OPR-O-102420

Lab Sample ID: 410-18432-17

Date Collected: 10/24/20 14:00

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 18:16	Y6ZN	ELLE

Client Sample ID: FTRI-FB-3-102420

Lab Sample ID: 410-18432-18

Date Collected: 10/24/20 13:00

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			61997	11/04/20 08:39	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	62634	11/05/20 18:28	Y6ZN	ELLE

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Job ID: 410-18432-1
Project/Site: Fort Riley

Laboratory: Eurofins Lancaster Laboratories Env, LLC

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	1.01	11-30-20

Method Summary

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley

Job ID: 410-18432-1

Method	Method Description	Protocol	Laboratory
EPA 537.1	EPA 537.1, Ver 1.0 Nov 2018	EPA	ELLE
EPA 537.1	EPA 537.1, ver. 1.0 Nov. 2018	EPA	ELLE

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley

Job ID: 410-18432-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
410-18432-1	FTRI-OPR-A-102220	Drinking Water	10/22/20 08:30	10/27/20 10:16	
410-18432-2	FTRI-OPR-B-102220	Drinking Water	10/22/20 09:23	10/27/20 10:16	
410-18432-3	FTRI-OPR-D-102220	Drinking Water	10/22/20 10:03	10/27/20 10:16	
410-18432-4	FTRI-OPR-E-102220	Drinking Water	10/22/20 10:42	10/27/20 10:16	
410-18432-5	FTRI-OPR-F-102220	Drinking Water	10/22/20 11:06	10/27/20 10:16	
410-18432-6	FTRI-OPR-G-102220	Drinking Water	10/22/20 13:08	10/27/20 10:16	
410-18432-7	FTRI-FD-1-102220	Drinking Water	10/22/20 00:00	10/27/20 10:16	
410-18432-8	FTRI-FB-1-102220	Drinking Water	10/22/20 13:15	10/27/20 10:16	
410-18432-9	FTRI-OPR-H-102320	Drinking Water	10/23/20 08:08	10/27/20 10:16	
410-18432-10	FTRI-OPR-I-102320	Drinking Water	10/23/20 08:55	10/27/20 10:16	
410-18432-11	FTRI-OPR-J-102320	Drinking Water	10/23/20 14:18	10/27/20 10:16	
410-18432-12	FTRI-OPR-K-102320	Drinking Water	10/23/20 14:45	10/27/20 10:16	
410-18432-13	FTRI-OPR-L-102320	Drinking Water	10/23/20 16:37	10/27/20 10:16	
410-18432-14	FTRI-FB-2-102320	Drinking Water	10/23/20 13:30	10/27/20 10:16	
410-18432-15	FTRI-OPR-M-102420	Drinking Water	10/24/20 13:15	10/27/20 10:16	
410-18432-16	FTRI-OPR-N-102420	Drinking Water	10/24/20 13:38	10/27/20 10:16	
410-18432-17	FTRI-OPR-O-102420	Drinking Water	10/24/20 14:00	10/27/20 10:16	
410-18432-18	FTRI-FB-3-102420	Drinking Water	10/24/20 13:00	10/27/20 10:16	

Environmental Analysis Requ ody

eurofins | Lancaster Laboratories Environmental

For E

Acct. # _____ G

410-18432 Chain of Custody

Kansas City SC #227

COC #613662

Client Information

Client: USACE Baltimore PFAS PA/SI	Acct. #: —
Project Name/#: Fort Riley / 30059933	PWSID #: —
Project Manager: Britt Phillips	P.O. #: 30059933
Sampler: Sandy Conard	Quote #: —
State where samples were collected: Kansas	For Compliance: Yes ☐ No ☒

Sample Identification	Collected Date	Collected Time	Grab	Composite	Matrix: Soil ☐ Sediment ☐ Tissue ☐ / Water: Potable ☒ Ground ☐ NPDES ☐ Surface ☐ / Other:	Total # of Containers	Analysis Requested: PFAS Method 537.1 (Preservation and Filtration Code: D)	Remarks
FTRI-OPR-A-102220	10/22/20	0830	X		X	2		
FTRI-OPR-B-102220		0923	X		X	2		
FTRI-OPR-C-102220		0915	X		X	2		
FTRI-OPR-D-102220		1003	X		X	2		
FTRI-OPR-E-102220		1042	X		X	2		
FTRI-OPR-F-102220		1106	X		X	2		
FTRI-OPR-G-102220		1308	X		X	2		
DUP-1-102220		—	X		X	2		
Field Blank-1-102220	↓	1315	X			2		*Pres included in Lab Provided PFAS Free Water

For Lab Use Only

FSC: _____

SCR#: _____

Preservation Codes

H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 P=H_3PO_4
F=Field Filtered O=Other Trizma

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Requested TAT in business days: _____

E-mail address: Britt.Phillips@arcadis.com, Ted.Walk@arcadis.com, Rebecca.Ingwers@arcadis.com, USACE.PFAS@arcadis.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) | Type VI (Raw Data Only)

Type III (Reduced non-CLP) | NJ DKQP | TX TRRP-13

NYSDEC Category A or B | MA MCP | CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Sandy Conard	10/26/2020	1320	Brian Beck	10-26-20	1320
Brian Beck	10-26-20	1530			
			MR	10/27/20	1016

EDD Required? Yes No

If yes, format: Equis 6

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS _____ FedEx X Other Euro Fins

Temperature upon receipt 1.4/0.3 °C

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The white copy should accompany samples to Eurofins Lancaster Laboratories Environmental. The yellow copy should be retained by the client. 7044 0919

QCM

#227 Kansas City SC

Environmental Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only

Acct. # _____ Group # _____ Sample # _____

#227 Kansas City SCOC # 613661

Client Information

Client: USACE Baltimore PFAS PA/SI	Acct. #: —
Project Name/#: Fort Riley / 30059933	PWSID #: —
Project Manager: Britt Phillips	P.O. #: 30059933
Sampler: Sandy Conard	Quote #: —
State where samples were collected: Kansas	For Compliance: Yes ☐ No ☒

Matrix

Soil ☐ Sediment ☐ Tissue ☐ | Water: Potable ☐ Ground ☒ NPDES ☐ Surface ☐ | Other: ___

Analysis Requested

Preservation and Filtration Codes

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	PFAS Method 537.1
FTRI-OPR-H-102320	10/23/20	0808	X		2	X
FTRI-OPR-I-102320		0855	X		2	X
FTRI-OPR-J-102320		1418	X		2	X
FTRI-OPR-K-102320		1445	X		2	X
FTRI-OPR-L-102320		1637	X		2	X
Field Blank-2-102320	↓	1330	X		2	X

For Lab Use Only

FSC: _____

SCR#: _____

Preservation Codes

H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 P=H_3PO_4
F=Field Filtered O=Other TRIZMA

Remarks

xPres indicated in Lab Provided PFAS free Water

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Requested TAT in business days: _____

E-mail address: Britt.Phillips@arcadis.com, Rebecca.Ingwersen@arcadis.com, TedWall@arcadis.com, USACE.PFAS@arcadis.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) | Type VI (Raw Data Only)

Type III (Reduced non-CLP) | NJ DKQP | TX TRRP-13

NYSDEC Category A or B | MA MCP | CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Sandy Conard	10/26/20	1320	Brian Beck	10-26-20	1320
Brian Beck	10-26-20	1530			
				10/27/20	1016

EDD Required? (Yes) No

If yes, format: Equis 6

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS ____ FedEx ✓ Other Eurofins.

Temperature upon receipt 1.4/0.3 °C

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7044 0919

QCM

#227 Kansas City, SC

Environmental Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only

Acct. # _____ Group # _____ Sample # _____

COC # 613663

Client Information

Client: USACE Baltimore PFAS PA/SI	Acct. #: —
Project Name/#: Fort Riley / 30059933	PWSID #: —
Project Manager: Britt Phillips	P.O. #: 30059933
Sampler: Sandy Conard	Quote #: —
State where samples were collected: Kansas	For Compliance: Yes ☐ No ☒

Sample Identification	Collected Date	Collected Time	Grab	Composite	Matrix: Soil ☐ Sediment ☐ Tissue ☐ / Water: Potable ☒ Ground ☐ NPDES ☐ Surface ☐ / Other:	Total # of Containers	Analysis Requested: Preservation and Filtration Codes: D	PFAS Method 537.1	Remarks
FTRI-OPR-M-102420	10/24/20	1315	X			2		X	
FTRI-OPR-N-102420		1338	X			2		X	
FTRI-OPR-O-102420		1400	X			2		X	
Field Blank-3-102420	↓	1300	X			2		X	*Pres included in Lab Provided PFAS Free Water

For Lab Use Only

FSC: _____

SCR#: _____

Preservation Codes

H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 P=H_3PO_4
F=Field Filtered O=Other Trizma

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Requested TAT in business days: _____

E-mail address: Britt.Phillips@arcadis.com, Ted.Wall@arcadis.com, Rebecca.Ingmers@arcadis.com, USACE.PFAS@arcadis.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) | Type VI (Raw Data Only)

Type III (Reduced non-CLP) | NJ DKQP | TX TRRP-13

NYSDEC Category A or B | MA MCP | CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Sandy Conard	10/26/2020	1320	Brian Beck	10-26-20	1320
Brian Beck	10-26-20	1530			
			NMR	10/27/20	1016

EDD Required? (Yes) No

If yes, format: EQuIS 6

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS _____ FedEx X Other EuroFins

Temperature upon receipt 1.4/0.3 °C

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The white copy should accompany samples to Eurofins Lancaster Laboratories Environmental. The yellow copy should be retained by the client. 7044 0919

CFM

#227 Kansas City 5C

11/10/2020

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 410-18432-1

Login Number: 18432

List Source: Eurofins Lancaster Laboratories Env

List Number: 1

Creator: Colon Martinez, Jessenia C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	N/A	
Is the Field Sampler's name present on COC?	True	
Sample Preservation Verified.	N/A	
Residual Chlorine Checked.	N/A	
Sample custody seals are intact.	N/A	

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ANALYTICAL REPORT

Eurofins Lancaster Laboratories Env, LLC
2425 New Holland Pike
Lancaster, PA 17601
Tel: (717)656-2300

Laboratory Job ID: 410-18975-1
Client Project/Site: Fort Riley / 30059933

For:
ARCADIS U.S., Inc.
630 Plaza Drive
Suite 200
Highlands Ranch, Colorado 80129

Attn: Kevin Engle

Authorized for release by:
11/9/2020 4:42:42 PM

Stephen Gordon, Senior Project Manager
(412)525-0071
stephengordon@eurofinsus.com

Analytical test results meet all requirements of the associated regulatory program (e.g., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis. Data qualifiers are applied to note exceptions. Noncompliant quality control (QC) is further explained in narrative comments.
· QC results that exceed the upper limits and are associated with non-detect samples are qualified but further narration is not required since the bias is high and does not change a non-detect result. Further narration is also not required with QC blank detection when the associated sample concentration is non-detect or more than ten times the level in the blank.
· Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD is performed, unless otherwise specified in the method.
· Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.
Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Measurement uncertainty values, as applicable, are available upon request.

Test results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" and tested in the laboratory are not performed within 15 minutes of collection.

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Stephen Gordon
Senior Project Manager
11/9/2020 4:42:42 PM

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Definitions/Glossary

Client: ARCADIS U.S., Inc.
Job ID: 410-18975-1
Project/Site: Fort Riley / 30059933

Qualifiers

LCMS

Qualifier	Qualifier Description
E	Result exceeded calibration range.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
M	Manual integrated compound.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 410-18975-1

Laboratory: Eurofins Lancaster Laboratories Env, LLC

Narrative

Job Narrative
410-18975-1

Receipt
The samples were received on 10/30/2020 10:54 AM; the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 0.5°C and 0.7°C

Receipt Exceptions
The container label for the following sample did not match the information listed on the Chain-of-Custody (COC): FTRI-MS-102820 (410-18975-3[MS]). The container labels list FTRI-MS-1-102820, while the COC lists FTRI-MS-102820. Entered per COC.

The container label for the following sample did not match the information listed on the Chain-of-Custody (COC): FTRI-MSD-102820 (410-18975-3[MSD]). The container labels list FTRI-MSD-1-102820, while the COC lists FTRI-MSD-102820. Entered per COC.

LCMS
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-18975-1

Client Sample ID: FTRI-OPR-P-102820 — Lab Sample ID: 410-18975-1

No Detections.

Client Sample ID: FTRI-OPR-Q-102820 — Lab Sample ID: 410-18975-2

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid	0.44	J	1.7	1.3	0.44	ng/L	1		EPA 537.1	Total/NA
Perfluorooctanesulfonic acid	0.45	J M	1.7	1.3	0.44	ng/L	1		EPA 537.1	Total/NA

Client Sample ID: FTRI-OPR-R-102820 — Lab Sample ID: 410-18975-3

No Detections.

Client Sample ID: FTRI-OPR-S-102820 — Lab Sample ID: 410-18975-4

No Detections.

Client Sample ID: FTRI-OPR-C-102820 — Lab Sample ID: 410-18975-5

No Detections.

Client Sample ID: FTRI-OPR-T-102820 — Lab Sample ID: 410-18975-6

No Detections.

Client Sample ID: FTRI-OPR-U-102820 — Lab Sample ID: 410-18975-7

No Detections.

Client Sample ID: FTRI-FB-4-102820 — Lab Sample ID: 410-18975-8

No Detections.

Client Sample ID: FTRI-FD-2-102820 — Lab Sample ID: 410-18975-9

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid	0.47	J	1.7	1.3	0.43	ng/L	1		EPA 537.1	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: FTRI-OPR-P-102820

Date Collected: 10/28/20 09:13
Date Received: 10/30/20 10:54

Lab Sample ID: 410-18975-1
Matrix: Drinking Water

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
NEtFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
NMeFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*88*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:32*	*1*
13C2 PFDA	*88*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:32*	*1*
13C2 PFHxA	*93*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:32*	*1*
13C3 HFPO-DA	*93*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:32*	*1*

Client Sample ID: FTRI-OPR-Q-102820

Date Collected: 10/28/20 09:53
Date Received: 10/30/20 10:54

Lab Sample ID: 410-18975-2
Matrix: Drinking Water

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorooctanoic acid	<1.3	M	1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorohexanesulfonic acid	**0.44**	**J**	1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorooctanesulfonic acid	**0.45**	**J M**	1.7	1.3	0.44	ng/L		11/07/20 04:43	1
NEtFOSAA	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
NMeFOSAA	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*82*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:43*	*1*
13C2 PFDA	*73*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:43*	*1*
13C2 PFHxA	*79*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:43*	*1*
13C3 HFPO-DA	*81*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:43*	*1*

Client Sample ID: FTRI-OPR-R-102820

Date Collected: 10/28/20 10:23
Date Received: 10/30/20 10:54

Lab Sample ID: 410-18975-3
Matrix: Drinking Water

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*98*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:55*	*1*
13C2 PFDA	*81*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:55*	*1*
13C2 PFHxA	*92*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:55*	*1*
13C3 HFPO-DA	*98*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:55*	*1*

Client Sample ID: FTRI-OPR-S-102820

Date Collected: 10/28/20 11:08
Date Received: 10/30/20 10:54

Lab Sample ID: 410-18975-4
Matrix: Drinking Water

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
NEtFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
NMeFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*97*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:30*	*1*
13C2 PFDA	*103*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:30*	*1*
13C2 PFHxA	*91*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:30*	*1*
13C3 HFPO-DA	*90*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:30*	*1*

Client Sample ID: FTRI-OPR-C-102820

Lab Sample ID: 410-18975-5

Date Collected: 10/28/20 13:20

Matrix: Drinking Water

Date Received: 10/30/20 10:54

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
NEtFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
NMeFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*97*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:41*	*1*
13C2 PFDA	*93*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:41*	*1*
13C2 PFHxA	*88*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:41*	*1*
13C3 HFPO-DA	*89*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:41*	*1*

Client Sample ID: FTRI-OPR-T-102820

Lab Sample ID: 410-18975-6

Date Collected: 10/28/20 16:10

Matrix: Drinking Water

Date Received: 10/30/20 10:54

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*96*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:53*	*1*
13C2 PFDA	*91*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:53*	*1*
13C2 PFHxA	*87*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:53*	*1*
13C3 HFPO-DA	*86*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:53*	*1*

Client Sample ID: FTRI-OPR-U-102820

Lab Sample ID: 410-18975-7

Date Collected: 10/28/20 16:20

Matrix: Drinking Water

Date Received: 10/30/20 10:54

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*87*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:04*	*1*
13C2 PFDA	*94*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:04*	*1*
13C2 PFHxA	*90*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:04*	*1*
13C3 HFPO-DA	*88*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:04*	*1*

Client Sample ID: FTRI-FB-4-102820

Lab Sample ID: 410-18975-8

Date Collected: 10/28/20 12:00

Matrix: Drinking Water

Date Received: 10/30/20 10:54

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*100*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:16*	*1*
13C2 PFDA	*99*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:16*	*1*
13C2 PFHxA	*91*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:16*	*1*
13C3 HFPO-DA	*89*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:16*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-18975-1

Client Sample ID: FTRI-FD-2-102820

Date Collected: 10/28/20 00:00
Date Received: 10/30/20 10:54

Lab Sample ID: 410-18975-9

Matrix: Drinking Water

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorooctanoic acid	<1.3	M	1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorooctanesulfonic acid	**0.47**	**J**	1.7	1.3	0.43	ng/L		11/07/20 06:39	1
NEtFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
NMeFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*91*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:39*	*1*
13C2 PFDA	*90*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:39*	*1*
13C2 PFHxA	*90*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:39*	*1*
13C3 HFPO-DA	*88*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:39*	*1*

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-18975-1

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Matrix: Drinking Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	d5NEFOS (70-130)	PFDA (70-130)	PFHxA (70-130)	HFPODA (70-130)
410-18975-1	FTRI-OPR-P-102820	88	88	93	93
410-18975-2	FTRI-OPR-Q-102820	82	73	79	81
410-18975-3	FTRI-OPR-R-102820	98	81	92	98
410-18975-3 MS	FTRI-MS-102820	93	97	94	94
410-18975-3 MSD	FTRI-MSD-102820	90	91	98	97
410-18975-4	FTRI-OPR-S-102820	97	103	91	90
410-18975-5	FTRI-OPR-C-102820	97	93	88	89
410-18975-6	FTRI-OPR-T-102820	96	91	87	86
410-18975-7	FTRI-OPR-U-102820	87	94	90	88
410-18975-8	FTRI-FB-4-102820	100	99	91	89
410-18975-9	FTRI-FD-2-102820	91	90	90	88
LCS 410-62733/2-A	Lab Control Sample	88	93	90	85
MB 410-62733/1-A	Method Blank	94	100	93	87

Surrogate Legend

d5NEFOS = d5-NEtFOSAA
PFDA = 13C2 PFDA
PFHxA = 13C2 PFHxA
HFPODA = 13C3 HFPO-DA

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Lab Sample ID: MB 410-62733/1-A
Matrix: Drinking Water
Analysis Batch: 63199

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 62733

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/07/20 03:56	1
Perfluoroheptanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/07/20 03:56	1
Perfluorooctanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/07/20 03:56	1
Perfluorononanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/07/20 03:56	1
Perfluorodecanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/07/20 03:56	1
Perfluorotridecanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/07/20 03:56	1
Perfluorotetradecanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/07/20 03:56	1
Perfluorobutanesulfonic acid	<1.5		2.0	1.5	0.50	ng/L		11/07/20 03:56	1
Perfluorohexanesulfonic acid	<1.5		2.0	1.5	0.50	ng/L		11/07/20 03:56	1
Perfluorooctanesulfonic acid	<1.5		2.0	1.5	0.50	ng/L		11/07/20 03:56	1
NEtFOSAA	<1.5		2.0	1.5	0.50	ng/L		11/07/20 03:56	1
NMeFOSAA	<1.5		2.0	1.5	0.50	ng/L		11/07/20 03:56	1
Perfluoroundecanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/07/20 03:56	1
Perfluorododecanoic acid	<1.5		2.0	1.5	0.50	ng/L		11/07/20 03:56	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*94*		*70 - 130*	*11/05/20 17:43*	*11/07/20 03:56*	*1*
13C2 PFDA	*100*		*70 - 130*	*11/05/20 17:43*	*11/07/20 03:56*	*1*
13C2 PFHxA	*93*		*70 - 130*	*11/05/20 17:43*	*11/07/20 03:56*	*1*
13C3 HFPO-DA	*87*		*70 - 130*	*11/05/20 17:43*	*11/07/20 03:56*	*1*

Lab Sample ID: LCS 410-62733/2-A
Matrix: Drinking Water
Analysis Batch: 63199

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 62733

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid	80.0	82.0	E	ng/L		103	70 - 130
Perfluoroheptanoic acid	80.0	80.3	E	ng/L		100	70 - 130
Perfluorooctanoic acid	80.0	85.1	E	ng/L		106	70 - 130
Perfluorononanoic acid	80.0	88.0	E	ng/L		110	70 - 130
Perfluorodecanoic acid	80.0	87.0	E	ng/L		109	70 - 130
Perfluorotridecanoic acid	80.0	86.0	E	ng/L		107	70 - 130
Perfluorotetradecanoic acid	80.0	90.5	E	ng/L		113	70 - 130
Perfluorobutanesulfonic acid	70.8	75.9	E	ng/L		107	70 - 130
Perfluorohexanesulfonic acid	73.0	77.6	E	ng/L		106	70 - 130
Perfluorooctanesulfonic acid	74.0	80.2	E M	ng/L		108	70 - 130
NEtFOSAA	80.0	74.4		ng/L		93	70 - 130
NMeFOSAA	80.0	84.1	E	ng/L		105	70 - 130
Perfluoroundecanoic acid	80.0	84.9	E	ng/L		106	70 - 130
Perfluorododecanoic acid	80.0	87.3	E	ng/L		109	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
d5-NEtFOSAA	*88*		*70 - 130*
13C2 PFDA	*93*		*70 - 130*
13C2 PFHxA	*90*		*70 - 130*
13C3 HFPO-DA	*85*		*70 - 130*

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018 (Continued)

Lab Sample ID: 410-18975-3 MS
Matrix: Drinking Water
Analysis Batch: 63199

Client Sample ID: FTRI-MS-102820
Prep Type: Total/NA
Prep Batch: 62733

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid	<1.3		69.7	75.6	E	ng/L		109	70 - 130
Perfluoroheptanoic acid	<1.3		69.7	74.5	E	ng/L		107	70 - 130
Perfluorooctanoic acid	<1.3		69.7	75.9	E	ng/L		109	70 - 130
Perfluorononanoic acid	<1.3		69.7	74.4	E	ng/L		107	70 - 130
Perfluorodecanoic acid	<1.3		69.7	79.6	E	ng/L		114	70 - 130
Perfluorotridecanoic acid	<1.3		69.7	61.4		ng/L		88	70 - 130
Perfluorotetradecanoic acid	<1.3		69.7	74.7	E	ng/L		107	70 - 130
Perfluorobutanesulfonic acid	<1.3		61.7	68.8	E	ng/L		112	70 - 130
Perfluorohexanesulfonic acid	<1.3		63.5	68.5	E	ng/L		108	70 - 130
Perfluorooctanesulfonic acid	<1.3		64.5	68.8	E M	ng/L		107	70 - 130
NEtFOSAA	<1.3		69.7	68.1		ng/L		98	70 - 130
NMeFOSAA	<1.3		69.7	75.1	E	ng/L		108	70 - 130
Perfluoroundecanoic acid	<1.3		69.7	77.4	E	ng/L		111	70 - 130
Perfluorododecanoic acid	<1.3		69.7	76.1	E	ng/L		109	70 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
d5-NEtFOSAA	*93*		*70 - 130*
13C2 PFDA	*97*		*70 - 130*
13C2 PFHxA	*94*		*70 - 130*
13C3 HFPO-DA	*94*		*70 - 130*

Lab Sample ID: 410-18975-3 MSD
Matrix: Drinking Water
Analysis Batch: 63199

Client Sample ID: FTRI-MSD-102820
Prep Type: Total/NA
Prep Batch: 62733

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid	<1.3		71.8	82.2	E	ng/L		115	70 - 130	8	30
Perfluoroheptanoic acid	<1.3		71.8	77.6	E	ng/L		108	70 - 130	4	30
Perfluorooctanoic acid	<1.3		71.8	78.0	E	ng/L		109	70 - 130	3	30
Perfluorononanoic acid	<1.3		71.8	80.9	E	ng/L		113	70 - 130	8	30
Perfluorodecanoic acid	<1.3		71.8	77.6	E	ng/L		108	70 - 130	3	30
Perfluorotridecanoic acid	<1.3		71.8	68.8		ng/L		96	70 - 130	11	30
Perfluorotetradecanoic acid	<1.3		71.8	71.1		ng/L		99	70 - 130	5	30
Perfluorobutanesulfonic acid	<1.3		63.5	74.7	E	ng/L		118	70 - 130	8	30
Perfluorohexanesulfonic acid	<1.3		65.4	72.5	E	ng/L		111	70 - 130	6	30
Perfluorooctanesulfonic acid	<1.3		66.4	73.5	E	ng/L		111	70 - 130	7	30
NEtFOSAA	<1.3		71.8	70.2		ng/L		98	70 - 130	3	30
NMeFOSAA	<1.3		71.8	78.0	E	ng/L		109	70 - 130	4	30
Perfluoroundecanoic acid	<1.3		71.8	72.6	E	ng/L		101	70 - 130	6	30
Perfluorododecanoic acid	<1.3		71.8	75.2	E	ng/L		105	70 - 130	1	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
d5-NEtFOSAA	*90*		*70 - 130*
13C2 PFDA	*91*		*70 - 130*
13C2 PFHxA	*98*		*70 - 130*
13C3 HFPO-DA	*97*		*70 - 130*

LCMS

Prep Batch: 62733

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-18975-1	FTRI-OPR-P-102820	Total/NA	Drinking Water	EPA 537.1	
410-18975-2	FTRI-OPR-Q-102820	Total/NA	Drinking Water	EPA 537.1	
410-18975-3	FTRI-OPR-R-102820	Total/NA	Drinking Water	EPA 537.1	
410-18975-4	FTRI-OPR-S-102820	Total/NA	Drinking Water	EPA 537.1	
410-18975-5	FTRI-OPR-C-102820	Total/NA	Drinking Water	EPA 537.1	
410-18975-6	FTRI-OPR-T-102820	Total/NA	Drinking Water	EPA 537.1	
410-18975-7	FTRI-OPR-U-102820	Total/NA	Drinking Water	EPA 537.1	
410-18975-8	FTRI-FB-4-102820	Total/NA	Drinking Water	EPA 537.1	
410-18975-9	FTRI-FD-2-102820	Total/NA	Drinking Water	EPA 537.1	
MB 410-62733/1-A	Method Blank	Total/NA	Drinking Water	EPA 537.1	
LCS 410-62733/2-A	Lab Control Sample	Total/NA	Drinking Water	EPA 537.1	
410-18975-3 MS	FTRI-MS-102820	Total/NA	Drinking Water	EPA 537.1	
410-18975-3 MSD	FTRI-MSD-102820	Total/NA	Drinking Water	EPA 537.1	

Analysis Batch: 63199

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-18975-1	FTRI-OPR-P-102820	Total/NA	Drinking Water	EPA 537.1	62733
410-18975-2	FTRI-OPR-Q-102820	Total/NA	Drinking Water	EPA 537.1	62733
410-18975-3	FTRI-OPR-R-102820	Total/NA	Drinking Water	EPA 537.1	62733
410-18975-4	FTRI-OPR-S-102820	Total/NA	Drinking Water	EPA 537.1	62733
410-18975-5	FTRI-OPR-C-102820	Total/NA	Drinking Water	EPA 537.1	62733
410-18975-6	FTRI-OPR-T-102820	Total/NA	Drinking Water	EPA 537.1	62733
410-18975-7	FTRI-OPR-U-102820	Total/NA	Drinking Water	EPA 537.1	62733
410-18975-8	FTRI-FB-4-102820	Total/NA	Drinking Water	EPA 537.1	62733
410-18975-9	FTRI-FD-2-102820	Total/NA	Drinking Water	EPA 537.1	62733
MB 410-62733/1-A	Method Blank	Total/NA	Drinking Water	EPA 537.1	62733
LCS 410-62733/2-A	Lab Control Sample	Total/NA	Drinking Water	EPA 537.1	62733
410-18975-3 MS	FTRI-MS-102820	Total/NA	Drinking Water	EPA 537.1	62733
410-18975-3 MSD	FTRI-MSD-102820	Total/NA	Drinking Water	EPA 537.1	62733

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-18975-1

Client Sample ID: FTRI-OPR-P-102820
Lab Sample ID: 410-18975-1
Date Collected: 10/28/20 09:13
Matrix: Drinking Water
Date Received: 10/30/20 10:54

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			62733	11/05/20 17:43	QLP7	ELLE
Total/NA	Analysis	EPA 537.1		1	63199	11/07/20 04:32	DCS9	ELLE

Client Sample ID: FTRI-OPR-Q-102820
Lab Sample ID: 410-18975-2
Date Collected: 10/28/20 09:53
Matrix: Drinking Water
Date Received: 10/30/20 10:54

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			62733	11/05/20 17:43	QLP7	ELLE
Total/NA	Analysis	EPA 537.1		1	63199	11/07/20 04:43	DCS9	ELLE

Client Sample ID: FTRI-OPR-R-102820
Lab Sample ID: 410-18975-3
Date Collected: 10/28/20 10:23
Matrix: Drinking Water
Date Received: 10/30/20 10:54

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			62733	11/05/20 17:43	QLP7	ELLE
Total/NA	Analysis	EPA 537.1		1	63199	11/07/20 04:55	DCS9	ELLE

Client Sample ID: FTRI-OPR-S-102820
Lab Sample ID: 410-18975-4
Date Collected: 10/28/20 11:08
Matrix: Drinking Water
Date Received: 10/30/20 10:54

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			62733	11/05/20 17:43	QLP7	ELLE
Total/NA	Analysis	EPA 537.1		1	63199	11/07/20 05:30	DCS9	ELLE

Client Sample ID: FTRI-OPR-C-102820
Lab Sample ID: 410-18975-5
Date Collected: 10/28/20 13:20
Matrix: Drinking Water
Date Received: 10/30/20 10:54

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			62733	11/05/20 17:43	QLP7	ELLE
Total/NA	Analysis	EPA 537.1		1	63199	11/07/20 05:41	DCS9	ELLE

Client Sample ID: FTRI-OPR-T-102820
Lab Sample ID: 410-18975-6
Date Collected: 10/28/20 16:10
Matrix: Drinking Water
Date Received: 10/30/20 10:54

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			62733	11/05/20 17:43	QLP7	ELLE
Total/NA	Analysis	EPA 537.1		1	63199	11/07/20 05:53	DCS9	ELLE

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-18975-1

Client Sample ID: FTRI-OPR-U-102820

Lab Sample ID: 410-18975-7

Date Collected: 10/28/20 16:20

Matrix: Drinking Water

Date Received: 10/30/20 10:54

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			62733	11/05/20 17:43	QLP7	ELLE
Total/NA	Analysis	EPA 537.1		1	63199	11/07/20 06:04	DCS9	ELLE

Client Sample ID: FTRI-FB-4-102820

Lab Sample ID: 410-18975-8

Date Collected: 10/28/20 12:00

Matrix: Drinking Water

Date Received: 10/30/20 10:54

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			62733	11/05/20 17:43	QLP7	ELLE
Total/NA	Analysis	EPA 537.1		1	63199	11/07/20 06:16	DCS9	ELLE

Client Sample ID: FTRI-FD-2-102820

Lab Sample ID: 410-18975-9

Date Collected: 10/28/20 00:00

Matrix: Drinking Water

Date Received: 10/30/20 10:54

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			62733	11/05/20 17:43	QLP7	ELLE
Total/NA	Analysis	EPA 537.1		1	63199	11/07/20 06:39	DCS9	ELLE

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Job ID: 410-18975-1
Project/Site: Fort Riley / 30059933

Laboratory: Eurofins Lancaster Laboratories Env, LLC

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	1.01	11-30-20

Method Summary

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-18975-1

Method	Method Description	Protocol	Laboratory
EPA 537.1	EPA 537.1, Ver 1.0 Nov 2018	EPA	ELLE
EPA 537.1	EPA 537.1, ver. 1.0 Nov. 2018	EPA	ELLE

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-18975-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
410-18975-1	FTRI-OPR-P-102820	Drinking Water	10/28/20 09:13	10/30/20 10:54	
410-18975-2	FTRI-OPR-Q-102820	Drinking Water	10/28/20 09:53	10/30/20 10:54	
410-18975-3	FTRI-OPR-R-102820	Drinking Water	10/28/20 10:23	10/30/20 10:54	
410-18975-4	FTRI-OPR-S-102820	Drinking Water	10/28/20 11:08	10/30/20 10:54	
410-18975-5	FTRI-OPR-C-102820	Drinking Water	10/28/20 13:20	10/30/20 10:54	
410-18975-6	FTRI-OPR-T-102820	Drinking Water	10/28/20 16:10	10/30/20 10:54	
410-18975-7	FTRI-OPR-U-102820	Drinking Water	10/28/20 16:20	10/30/20 10:54	
410-18975-8	FTRI-FB-4-102820	Drinking Water	10/28/20 12:00	10/30/20 10:54	
410-18975-9	FTRI-FD-2-102820	Drinking Water	10/28/20 00:00	10/30/20 10:54	

Environmental Ana ain of Custody

eurofins | Lancaster Laboratories Environmental

410-18975 Chain of Custody

boratories Environmental use only #227 Kansas City SC

Sample # _____

COC # 613659

Client Information

Client: USACE Baltimore PFAS PA/SI	Acct. #: —
Project Name/#: Fort Riley / 30059933	PWSID #: —
Project Manager: Britt Phillips	P.O. #: 30059933
Sampler: Sandy Conard	Quote #: —
State where samples were collected: Kansas	For Compliance: Yes ☐ No ☒

For Lab Use Only
FSC: _____
SCR#: _____

Preservation Codes
H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 P=H_3PO_4
F=Field Filtered O=Other Trizma

Remarks
Page 1 of 2

Sample Identification	Collected Date	Collected Time	Grab	Composite	Matrix: Soil ☐ Sediment ☐ Tissue ☐	Water: Potable ☒ Ground ☐ NPDES ☐ Surface ☐	Other:	Total # of Containers	Analysis Requested: Preservation and Filtration Codes: O	PFAS Method 537.1
FTRI-OPR-P-102820	10-28-2020	0913	X			X		2		X
FTRI-OPR-Q-102820		0953	X			X		2		X
FTRI-OPR-R-102820		1023	X			X		2		X
FTRI-MS-102820		1023	X			X		2		X
FTRI-MSD-102820		1023	X			X		2		X
FTRI-OPR-S-102820		1108	X			X		2		X
FTRI-OPR-C-102820		1320	X			X		2		X
FTRI-OPR-T-102820		1610	X			X		2		X
FTRI-OPR-U-102820		1620	X			X		2		X
FTRI-Field Blank-4-102820	↓	1200	X					2		X

* Pres included in lab Provided PFAS Free Water

Turnaround Time (TAT) Requested (please circle)
Standard Rush
(Rush TAT is subject to laboratory approval and surcharge.)

Requested TAT in business days:
E-mail address: Britt.Phillips@arcadis.com, Ted.Wall@arcadis.com, Rebecca.Ingwers@arcadis.com, USACE.PFAS@arcadis.com

Data Package Options (circle if required)
Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)
Type III (Reduced non-CLP) NJ DKQP TX TRRP-13
NYSDEC Category A or B MA MCP CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Sandy Conard	10-29-2020	1425	Brian Beck	10-29-20	1425
Brian Beck	10-29-20	1505			
			CM Wall	10/30/20	10:54

EDD Required? (Yes) No
If yes, format: EQuIS 6

Site-Specific QC (MS/MSD/Dup)? (Yes) No
(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS _____ FedEx _____ Other EuroFins

Temperature upon receipt 0.5 / °C 0.7

Environmental Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only

Acct. # _____ Group # _____ Sample # _____ #227 Kansas City SC COC #613658

Client Information

Client: USACE Baltimore PFAS PA/SI	Acct. #: —
Project Name/#: Fort Riley / 30059933	PWSID #: —
Project Manager: Britt Phillips	P.O. #: 30059933
Sampler: Sandy Conard	Quote #: —
State where samples were collected: Kansas	For Compliance: Yes ☐ No ☒

Matrix

Soil ☐ Sediment ☐ Tissue ☐ | Water: Potable ☒ Ground ☐ NPDES ☐ Surface ☐ | Other: ___

Analysis Requested

Preservation and Filtration Codes

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	P	PFAS Method 537.1
FTRI-OPR-DUP-2-102820	10-28-2020	—	X		2	X	X

For Lab Use Only

FSC: _____

SCR#: _____

Preservation Codes

H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 P=H_3PO_4
F=Field Filtered O=Other Trizma

Remarks

Page 2 of 2

Turnaround Time (TAT) Requested (please circle)

(Standard) Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Requested TAT in business days: _____

E-mail address: Britt.Phillips@arcadis.com, Ted.Wall@arcadis.com, Rebecca.Ingwers@arcadis.com, USACE.PFAS@arcadis.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) | Type VI (Raw Data Only)

Type III (Reduced non-CLP) | NJ DKQP | TX TRRP-13

NYSDEC Category A or B | MA MCP | CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Sandy Conard	10-29-2020	1425	Brian Beck	10-29-20	1425
Brian Beck	10-29-20	1525			
			CM Wus	10/30/20	10:54

EDD Required? (Yes) No

If yes, format: Equis 6

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS _____ FedEx _____ Other Euro Fins

Temperature upon receipt 0.5 / °C 0.7

Eurofins Lancaster Laboratories Environmental, LLC • 2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • FOR HELP COMPLETING FORM CHECK OUT https://www.eurofinsus.com/coc

The white copy should accompany samples to Eurofins Lancaster Laboratories Environmental. The yellow copy should be retained by the client.

7044 0919

JR

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 410-18975-1

Login Number: 18975
List Number: 1
Creator: Rivera-Santa, Julissa

List Source: Eurofins Lancaster Laboratories Env

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	False	IDs on containers do not match the COC. Logged in per COC.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	N/A	
Is the Field Sampler's name present on COC?	True	
Sample Preservation Verified.	N/A	
Residual Chlorine Checked.	N/A	
Sample custody seals are intact.	N/A	

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ANALYTICAL REPORT

Eurofins Lancaster Laboratories Env, LLC
2425 New Holland Pike
Lancaster, PA 17601
Tel: (717)656-2300

Laboratory Job ID: 410-24471-1
Client Project/Site: Fort Riley / 30059933

For:
ARCADIS U.S., Inc.
630 Plaza Drive
Suite 200
Highlands Ranch, Colorado 80129

Attn: Kevin Engle

Authorized for release by:
1/5/2021 10:02:47 AM

Stephen Gordon, Senior Project Manager
(412)525-0071
Stephen.Gordon@eurofinset.com

Analytical test results meet all requirements of the associated regulatory program (e.g., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis. Data qualifiers are applied to note exceptions. Noncompliant quality control (QC) is further explained in narrative comments.
· QC results that exceed the upper limits and are associated with non-detect samples are qualified but further narration is not required since the bias is high and does not change a non-detect result. Further narration is also not required with QC blank detection when the associated sample concentration is non-detect or more than ten times the level in the blank.
· Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD is performed, unless otherwise specified in the method.
· Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.
Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Measurement uncertainty values, as applicable, are available upon request.

Test results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" and tested in the laboratory are not performed within 15 minutes of collection.

This report shall not be reproduced except in full, without the written approval of the laboratory.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied, except as otherwise agreed. We disclaim any other warranties, expressed or implied, including a warranty of fitness for particular purpose and warranty of merchantability. In no event shall Eurofins Lancaster Laboratories Environmental, LLC be liable for indirect, special, consequential, or incidental damages including, but not limited to, damages for loss of profit or goodwill regardless of (A) the negligence (either sole or concurrent) of Eurofins Lancaster Laboratories Environmental and (B) whether Eurofins Lancaster Laboratories Environmental has been informed of the possibility of such damages. We accept no legal responsibility for the purposes for which the client uses the test results. Except as otherwise agreed, no purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

Stephen Gordon
Senior Project Manager
1/5/2021 10:02:47 AM

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Definitions/Glossary

Client: ARCADIS U.S., Inc.
Job ID: 410-24471-1
Project/Site: Fort Riley / 30059933

Qualifiers

LCMS

Qualifier	Qualifier Description
D	The reported value is from a dilution.
E	Result exceeded calibration range.
FL	MS and/or MSD recovery below control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
M	Manual integrated compound.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 410-24471-1

Laboratory: Eurofins Lancaster Laboratories Env, LLC

Narrative

Job Narrative
410-24471-1

Receipt
The samples were received on 12/18/2020 3:21 PM; the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.5°C

LCMS
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-24471-1

Client Sample ID: FTRI-OPR-V-121620 — Lab Sample ID: 410-24471-1

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid	40		2.1	1.5	0.52	ng/L	1		EPA 537.1	Total/NA
Perfluorononanoic acid	0.68	J	2.1	1.5	0.52	ng/L	1		EPA 537.1	Total/NA
Perfluorobutanesulfonic acid	61		2.1	1.5	0.52	ng/L	1		EPA 537.1	Total/NA
Perfluorooctanesulfonic acid	18	M	2.1	1.5	0.52	ng/L	1		EPA 537.1	Total/NA
Perfluorohexanoic acid - DL	160	D	21	15	5.2	ng/L	10		EPA 537.1	Total/NA
Perfluorooctanoic acid - DL	110	D M	21	15	5.2	ng/L	10		EPA 537.1	Total/NA
Perfluorohexanesulfonic acid - DL	230	D	21	15	5.2	ng/L	10		EPA 537.1	Total/NA

Client Sample ID: FTRI-OPR-W-121620 — Lab Sample ID: 410-24471-2

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid	22		1.8	1.3	0.45	ng/L	1		EPA 537.1	Total/NA
Perfluoroheptanoic acid	3.9		1.8	1.3	0.45	ng/L	1		EPA 537.1	Total/NA
Perfluorooctanoic acid	3.1	M	1.8	1.3	0.45	ng/L	1		EPA 537.1	Total/NA
Perfluorobutanesulfonic acid	6.7	FL	1.8	1.3	0.45	ng/L	1		EPA 537.1	Total/NA
Perfluorohexanesulfonic acid	31	FL	1.8	1.3	0.45	ng/L	1		EPA 537.1	Total/NA
Perfluorooctanesulfonic acid	16	M	1.8	1.3	0.45	ng/L	1		EPA 537.1	Total/NA

Client Sample ID: FTRI-OPR-DUP-3-121620 — Lab Sample ID: 410-24471-3

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid	26		1.8	1.4	0.45	ng/L	1		EPA 537.1	Total/NA
Perfluorononanoic acid	0.47	J	1.8	1.4	0.45	ng/L	1		EPA 537.1	Total/NA
Perfluorobutanesulfonic acid	56		1.8	1.4	0.45	ng/L	1		EPA 537.1	Total/NA
Perfluorooctanesulfonic acid	16	M	1.8	1.4	0.45	ng/L	1		EPA 537.1	Total/NA
Perfluorohexanoic acid - DL	120	D	18	14	4.5	ng/L	10		EPA 537.1	Total/NA
Perfluorooctanoic acid - DL	85	D M	18	14	4.5	ng/L	10		EPA 537.1	Total/NA
Perfluorohexanesulfonic acid - DL	170	D	18	14	4.5	ng/L	10		EPA 537.1	Total/NA

Client Sample ID: FTRI-Field Blank-5-121620 — Lab Sample ID: 410-24471-4

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Lancaster Laboratories Env, LLC

Client Sample ID: FTRI-OPR-V-121620

Lab Sample ID: 410-24471-1

Date Collected: 12/16/20 14:41

Matrix: Drinking Water

Date Received: 12/18/20 15:21

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluoroheptanoic acid	**40**		2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluorononanoic acid	**0.68**	**J**	2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluorodecanoic acid	<1.5		2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluorotridecanoic acid	<1.5		2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluorotetradecanoic acid	<1.5		2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluorobutanesulfonic acid	**61**		2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluorooctanesulfonic acid	**18**	**M**	2.1	1.5	0.52	ng/L		12/22/20 00:47	1
NEtFOSAA	<1.5		2.1	1.5	0.52	ng/L		12/22/20 00:47	1
NMeFOSAA	<1.5		2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluoroundecanoic acid	<1.5		2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluorododecanoic acid	<1.5		2.1	1.5	0.52	ng/L		12/22/20 00:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*99*		*70 - 130*	*12/21/20 06:46*	*12/22/20 00:47*	*1*
13C2 PFDA	*125*		*70 - 130*	*12/21/20 06:46*	*12/22/20 00:47*	*1*
13C2 PFHxA	*114*		*70 - 130*	*12/21/20 06:46*	*12/22/20 00:47*	*1*
13C3 HFPO-DA	*129*		*70 - 130*	*12/21/20 06:46*	*12/22/20 00:47*	*1*

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018 - DL

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	**160**	**D**	21	15	5.2	ng/L		12/23/20 15:30	10
Perfluorooctanoic acid	**110**	**D M**	21	15	5.2	ng/L		12/23/20 15:30	10
Perfluorohexanesulfonic acid	**230**	**D**	21	15	5.2	ng/L		12/23/20 15:30	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*91*		*70 - 130*	*12/21/20 06:46*	*12/23/20 15:30*	*10*
13C2 PFDA	*92*		*70 - 130*	*12/21/20 06:46*	*12/23/20 15:30*	*10*
13C2 PFHxA	*98*		*70 - 130*	*12/21/20 06:46*	*12/23/20 15:30*	*10*
13C3 HFPO-DA	*93*		*70 - 130*	*12/21/20 06:46*	*12/23/20 15:30*	*10*

Client Sample ID: FTRI-OPR-W-121620

Lab Sample ID: 410-24471-2

Date Collected: 12/16/20 15:04

Matrix: Drinking Water

Date Received: 12/18/20 15:21

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	**22**		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluoroheptanoic acid	**3.9**		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorooctanoic acid	**3.1**	**M**	1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorobutanesulfonic acid	**6.7**	**FL**	1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorohexanesulfonic acid	**31**	**FL**	1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorooctanesulfonic acid	**16**	**M**	1.8	1.3	0.45	ng/L		12/31/20 09:24	1
NEtFOSAA	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
NMeFOSAA	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1

Client Sample ID: FTRI-OPR-W-121620

Lab Sample ID: 410-24471-2

Date Collected: 12/16/20 15:04

Matrix: Drinking Water

Date Received: 12/18/20 15:21

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*75*		*70 - 130*	*12/29/20 19:14*	*12/31/20 09:24*	*1*
13C2 PFDA	*84*		*70 - 130*	*12/29/20 19:14*	*12/31/20 09:24*	*1*
13C2 PFHxA	*74*		*70 - 130*	*12/29/20 19:14*	*12/31/20 09:24*	*1*
13C3 HFPO-DA	*78*		*70 - 130*	*12/29/20 19:14*	*12/31/20 09:24*	*1*

Client Sample ID: FTRI-OPR-DUP-3-121620

Lab Sample ID: 410-24471-3

Date Collected: 12/16/20 00:00

Matrix: Drinking Water

Date Received: 12/18/20 15:21

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluoroheptanoic acid	**26**		1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluorononanoic acid	**0.47**	**J**	1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluorodecanoic acid	<1.4		1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluorotridecanoic acid	<1.4		1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluorotetradecanoic acid	<1.4		1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluorobutanesulfonic acid	**56**		1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluorooctanesulfonic acid	**16**	**M**	1.8	1.4	0.45	ng/L		12/31/20 09:58	1
NEtFOSAA	<1.4		1.8	1.4	0.45	ng/L		12/31/20 09:58	1
NMeFOSAA	<1.4		1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluoroundecanoic acid	<1.4		1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluorododecanoic acid	<1.4		1.8	1.4	0.45	ng/L		12/31/20 09:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*77*		*70 - 130*	*12/29/20 19:14*	*12/31/20 09:58*	*1*
13C2 PFDA	*99*		*70 - 130*	*12/29/20 19:14*	*12/31/20 09:58*	*1*
13C2 PFHxA	*82*		*70 - 130*	*12/29/20 19:14*	*12/31/20 09:58*	*1*
13C3 HFPO-DA	*91*		*70 - 130*	*12/29/20 19:14*	*12/31/20 09:58*	*1*

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018 - DL

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	**120**	**D**	18	14	4.5	ng/L		01/04/21 15:07	10
Perfluorooctanoic acid	**85**	**D M**	18	14	4.5	ng/L		01/04/21 15:07	10
Perfluorohexanesulfonic acid	**170**	**D**	18	14	4.5	ng/L		01/04/21 15:07	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*92*		*70 - 130*	*12/29/20 19:14*	*01/04/21 15:07*	*10*
13C2 PFDA	*91*		*70 - 130*	*12/29/20 19:14*	*01/04/21 15:07*	*10*
13C2 PFHxA	*93*		*70 - 130*	*12/29/20 19:14*	*01/04/21 15:07*	*10*
13C3 HFPO-DA	*95*		*70 - 130*	*12/29/20 19:14*	*01/04/21 15:07*	*10*

Client Sample ID: FTRI-Field Blank-5-121620

Lab Sample ID: 410-24471-4

Date Collected: 12/16/20 15:30

Matrix: Drinking Water

Date Received: 12/18/20 15:21

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-24471-1

Client Sample ID: FTRI-Field Blank-5-121620
Date Collected: 12/16/20 15:30
Date Received: 12/18/20 15:21

Lab Sample ID: 410-24471-4
Matrix: Drinking Water

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018 (Continued)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
NEtFOSAA	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
NMeFOSAA	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*86*		*70 - 130*	*12/29/20 19:14*	*12/31/20 10:10*	*1*
13C2 PFDA	*96*		*70 - 130*	*12/29/20 19:14*	*12/31/20 10:10*	*1*
13C2 PFHxA	*85*		*70 - 130*	*12/29/20 19:14*	*12/31/20 10:10*	*1*
13C3 HFPO-DA	*88*		*70 - 130*	*12/29/20 19:14*	*12/31/20 10:10*	*1*

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-24471-1

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Matrix: Drinking Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		d5NEFOS	PFDA	PFHxA	HFPODA
Lab Sample ID	Client Sample ID	(70-130)	(70-130)	(70-130)	(70-130)
410-24471-1	FTRI-OPR-V-121620	99	125	114	129
410-24471-1 - DL	FTRI-OPR-V-121620	91	92	98	93
410-24471-2	FTRI-OPR-W-121620	75	84	74	78
410-24471-2 MS	FTRI-MS-121620	82	94	83	86
410-24471-2 MSD	FTRI-MSD-121620	89	97	86	86
410-24471-3	FTRI-OPR-DUP-3-121620	77	99	82	91
410-24471-3 - DL	FTRI-OPR-DUP-3-121620	92	91	93	95
410-24471-4	FTRI-Field Blank-5-121620	86	96	85	88
LCS 410-78673/2-A	Lab Control Sample	83	101	103	111
LCS 410-80789/2-A	Lab Control Sample	73	93	84	87
MB 410-78673/1-A	Method Blank	85	98	93	100
MB 410-80789/1-A	Method Blank	75	91	79	87

Surrogate Legend

d5NEFOS = d5-NEtFOSAA
PFDA = 13C2 PFDA
PFHxA = 13C2 PFHxA
HFPODA = 13C3 HFPO-DA

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Lab Sample ID: MB 410-78673/1-A
Matrix: Drinking Water
Analysis Batch: 78813

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 78673

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/21/20 20:46	1
Perfluoroheptanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/21/20 20:46	1
Perfluorooctanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/21/20 20:46	1
Perfluorononanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/21/20 20:46	1
Perfluorodecanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/21/20 20:46	1
Perfluorotridecanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/21/20 20:46	1
Perfluorotetradecanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/21/20 20:46	1
Perfluorobutanesulfonic acid	<1.5		2.0	1.5	0.50	ng/L		12/21/20 20:46	1
Perfluorohexanesulfonic acid	<1.5		2.0	1.5	0.50	ng/L		12/21/20 20:46	1
Perfluorooctanesulfonic acid	<1.5		2.0	1.5	0.50	ng/L		12/21/20 20:46	1
NEtFOSAA	<1.5		2.0	1.5	0.50	ng/L		12/21/20 20:46	1
NMeFOSAA	<1.5		2.0	1.5	0.50	ng/L		12/21/20 20:46	1
Perfluoroundecanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/21/20 20:46	1
Perfluorododecanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/21/20 20:46	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*85*		*70 - 130*	*12/21/20 06:46*	*12/21/20 20:46*	*1*
13C2 PFDA	*98*		*70 - 130*	*12/21/20 06:46*	*12/21/20 20:46*	*1*
13C2 PFHxA	*93*		*70 - 130*	*12/21/20 06:46*	*12/21/20 20:46*	*1*
13C3 HFPO-DA	*100*		*70 - 130*	*12/21/20 06:46*	*12/21/20 20:46*	*1*

Lab Sample ID: LCS 410-78673/2-A
Matrix: Drinking Water
Analysis Batch: 78813

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 78673

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid	80.0	92.7	E	ng/L		116	70 - 130
Perfluoroheptanoic acid	80.0	94.9	E	ng/L		119	70 - 130
Perfluorooctanoic acid	80.0	91.5	E	ng/L		114	70 - 130
Perfluorononanoic acid	80.0	99.0	E	ng/L		124	70 - 130
Perfluorodecanoic acid	80.0	91.7	E	ng/L		115	70 - 130
Perfluorotridecanoic acid	80.0	88.1	E	ng/L		110	70 - 130
Perfluorotetradecanoic acid	80.0	92.8	E	ng/L		116	70 - 130
Perfluorobutanesulfonic acid	70.8	66.2		ng/L		94	70 - 130
Perfluorohexanesulfonic acid	73.0	75.9	E M	ng/L		104	70 - 130
Perfluorooctanesulfonic acid	74.0	76.9	E M	ng/L		104	70 - 130
NEtFOSAA	80.0	78.1		ng/L		98	70 - 130
NMeFOSAA	80.0	77.4		ng/L		97	70 - 130
Perfluoroundecanoic acid	80.0	92.9	E	ng/L		116	70 - 130
Perfluorododecanoic acid	80.0	88.7	E	ng/L		111	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
d5-NEtFOSAA	*83*		*70 - 130*
13C2 PFDA	*101*		*70 - 130*
13C2 PFHxA	*103*		*70 - 130*
13C3 HFPO-DA	*111*		*70 - 130*

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018 (Continued)

Lab Sample ID: MB 410-80789/1-A
Matrix: Drinking Water
Analysis Batch: 81295

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 80789

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/31/20 08:50	1
Perfluoroheptanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/31/20 08:50	1
Perfluorooctanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/31/20 08:50	1
Perfluorononanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/31/20 08:50	1
Perfluorodecanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/31/20 08:50	1
Perfluorotridecanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/31/20 08:50	1
Perfluorotetradecanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/31/20 08:50	1
Perfluorobutanesulfonic acid	<1.5		2.0	1.5	0.50	ng/L		12/31/20 08:50	1
Perfluorohexanesulfonic acid	<1.5		2.0	1.5	0.50	ng/L		12/31/20 08:50	1
Perfluorooctanesulfonic acid	<1.5		2.0	1.5	0.50	ng/L		12/31/20 08:50	1
NEtFOSAA	<1.5		2.0	1.5	0.50	ng/L		12/31/20 08:50	1
NMeFOSAA	<1.5		2.0	1.5	0.50	ng/L		12/31/20 08:50	1
Perfluoroundecanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/31/20 08:50	1
Perfluorododecanoic acid	<1.5		2.0	1.5	0.50	ng/L		12/31/20 08:50	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*75*		*70 - 130*	*12/29/20 19:14*	*12/31/20 08:50*	*1*
13C2 PFDA	*91*		*70 - 130*	*12/29/20 19:14*	*12/31/20 08:50*	*1*
13C2 PFHxA	*79*		*70 - 130*	*12/29/20 19:14*	*12/31/20 08:50*	*1*
13C3 HFPO-DA	*87*		*70 - 130*	*12/29/20 19:14*	*12/31/20 08:50*	*1*

Lab Sample ID: LCS 410-80789/2-A
Matrix: Drinking Water
Analysis Batch: 81295

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 80789

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid	20.5	15.7		ng/L		76	70 - 130
Perfluoroheptanoic acid	20.5	16.2		ng/L		79	70 - 130
Perfluorooctanoic acid	20.5	16.1		ng/L		79	70 - 130
Perfluorononanoic acid	20.5	18.1		ng/L		88	70 - 130
Perfluorodecanoic acid	20.5	17.7		ng/L		86	70 - 130
Perfluorotridecanoic acid	20.5	16.7		ng/L		82	70 - 130
Perfluorotetradecanoic acid	20.5	17.1		ng/L		84	70 - 130
Perfluorobutanesulfonic acid	18.1	13.3		ng/L		73	70 - 130
Perfluorohexanesulfonic acid	18.7	14.4	M	ng/L		77	70 - 130
Perfluorooctanesulfonic acid	19.0	14.7	M	ng/L		77	70 - 130
NEtFOSAA	20.5	14.4		ng/L		70	70 - 130
NMeFOSAA	20.5	16.2		ng/L		79	70 - 130
Perfluoroundecanoic acid	20.5	17.3		ng/L		85	70 - 130
Perfluorododecanoic acid	20.5	17.3		ng/L		84	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
d5-NEtFOSAA	*73*		*70 - 130*
13C2 PFDA	*93*		*70 - 130*
13C2 PFHxA	*84*		*70 - 130*
13C3 HFPO-DA	*87*		*70 - 130*

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018 (Continued)

Lab Sample ID: 410-24471-2 MS
Matrix: Drinking Water
Analysis Batch: 81295

Client Sample ID: FTRI-MS-121620
Prep Type: Total/NA
Prep Batch: 80789

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid	22		18.5	37.0		ng/L		84	70 - 130
Perfluoroheptanoic acid	3.9		18.5	18.4		ng/L		78	70 - 130
Perfluorooctanoic acid	3.1	M	18.5	17.7	M	ng/L		79	70 - 130
Perfluorononanoic acid	<1.3		18.5	17.1		ng/L		93	70 - 130
Perfluorodecanoic acid	<1.3		18.5	16.4		ng/L		89	70 - 130
Perfluorotridecanoic acid	<1.3		18.5	16.2		ng/L		87	70 - 130
Perfluorotetradecanoic acid	<1.3		18.5	15.7		ng/L		85	70 - 130
Perfluorobutanesulfonic acid	6.7	FL	16.3	18.1	FL	ng/L		69	70 - 130
Perfluorohexanesulfonic acid	31	FL	16.8	42.4	FL	ng/L		68	70 - 130
Perfluorooctanesulfonic acid	16	M	17.1	29.1	M	ng/L		74	70 - 130
NEtFOSAA	<1.3		18.5	14.9		ng/L		81	70 - 130
NMeFOSAA	<1.3		18.5	15.0		ng/L		82	70 - 130
Perfluoroundecanoic acid	<1.3		18.5	16.5		ng/L		89	70 - 130
Perfluorododecanoic acid	<1.3		18.5	16.4		ng/L		89	70 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
d5-NEtFOSAA	*82*		*70 - 130*
13C2 PFDA	*94*		*70 - 130*
13C2 PFHxA	*83*		*70 - 130*
13C3 HFPO-DA	*86*		*70 - 130*

Lab Sample ID: 410-24471-2 MSD
Matrix: Drinking Water
Analysis Batch: 81295

Client Sample ID: FTRI-MSD-121620
Prep Type: Total/NA
Prep Batch: 80789

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid	22		18.4	36.2		ng/L		80	70 - 130	2	30
Perfluoroheptanoic acid	3.9		18.4	18.5		ng/L		79	70 - 130	0	30
Perfluorooctanoic acid	3.1	M	18.4	18.4	M	ng/L		83	70 - 130	4	30
Perfluorononanoic acid	<1.3		18.4	17.6		ng/L		96	70 - 130	3	30
Perfluorodecanoic acid	<1.3		18.4	17.3		ng/L		94	70 - 130	5	30
Perfluorotridecanoic acid	<1.3		18.4	16.8		ng/L		92	70 - 130	4	30
Perfluorotetradecanoic acid	<1.3		18.4	16.4		ng/L		89	70 - 130	4	30
Perfluorobutanesulfonic acid	6.7	FL	16.3	18.8		ng/L		74	70 - 130	4	30
Perfluorohexanesulfonic acid	31	FL	16.8	43.0		ng/L		72	70 - 130	1	30
Perfluorooctanesulfonic acid	16	M	17.0	30.1	M	ng/L		80	70 - 130	3	30
NEtFOSAA	<1.3		18.4	15.3		ng/L		83	70 - 130	3	30
NMeFOSAA	<1.3		18.4	15.6		ng/L		85	70 - 130	3	30
Perfluoroundecanoic acid	<1.3		18.4	17.1		ng/L		93	70 - 130	4	30
Perfluorododecanoic acid	<1.3		18.4	17.2		ng/L		93	70 - 130	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
d5-NEtFOSAA	*89*		*70 - 130*
13C2 PFDA	*97*		*70 - 130*
13C2 PFHxA	*86*		*70 - 130*
13C3 HFPO-DA	*86*		*70 - 130*

LCMS

Prep Batch: 78673

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-24471-1	FTRI-OPR-V-121620	Total/NA	Drinking Water	EPA 537.1	
410-24471-1 - DL	FTRI-OPR-V-121620	Total/NA	Drinking Water	EPA 537.1	
MB 410-78673/1-A	Method Blank	Total/NA	Drinking Water	EPA 537.1	
LCS 410-78673/2-A	Lab Control Sample	Total/NA	Drinking Water	EPA 537.1	

Analysis Batch: 78813

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-24471-1	FTRI-OPR-V-121620	Total/NA	Drinking Water	EPA 537.1	78673
MB 410-78673/1-A	Method Blank	Total/NA	Drinking Water	EPA 537.1	78673
LCS 410-78673/2-A	Lab Control Sample	Total/NA	Drinking Water	EPA 537.1	78673

Analysis Batch: 79638

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-24471-1 - DL	FTRI-OPR-V-121620	Total/NA	Drinking Water	EPA 537.1	78673

Prep Batch: 80789

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-24471-2	FTRI-OPR-W-121620	Total/NA	Drinking Water	EPA 537.1	
410-24471-3	FTRI-OPR-DUP-3-121620	Total/NA	Drinking Water	EPA 537.1	
410-24471-3 - DL	FTRI-OPR-DUP-3-121620	Total/NA	Drinking Water	EPA 537.1	
410-24471-4	FTRI-Field Blank-5-121620	Total/NA	Drinking Water	EPA 537.1	
MB 410-80789/1-A	Method Blank	Total/NA	Drinking Water	EPA 537.1	
LCS 410-80789/2-A	Lab Control Sample	Total/NA	Drinking Water	EPA 537.1	
410-24471-2 MS	FTRI-MS-121620	Total/NA	Drinking Water	EPA 537.1	
410-24471-2 MSD	FTRI-MSD-121620	Total/NA	Drinking Water	EPA 537.1	

Analysis Batch: 81295

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-24471-2	FTRI-OPR-W-121620	Total/NA	Drinking Water	EPA 537.1	80789
410-24471-3	FTRI-OPR-DUP-3-121620	Total/NA	Drinking Water	EPA 537.1	80789
410-24471-4	FTRI-Field Blank-5-121620	Total/NA	Drinking Water	EPA 537.1	80789
MB 410-80789/1-A	Method Blank	Total/NA	Drinking Water	EPA 537.1	80789
LCS 410-80789/2-A	Lab Control Sample	Total/NA	Drinking Water	EPA 537.1	80789
410-24471-2 MS	FTRI-MS-121620	Total/NA	Drinking Water	EPA 537.1	80789
410-24471-2 MSD	FTRI-MSD-121620	Total/NA	Drinking Water	EPA 537.1	80789

Analysis Batch: 81818

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-24471-3 - DL	FTRI-OPR-DUP-3-121620	Total/NA	Drinking Water	EPA 537.1	80789

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-24471-1

Client Sample ID: FTRI-OPR-V-121620

Lab Sample ID: 410-24471-1

Date Collected: 12/16/20 14:41

Matrix: Drinking Water

Date Received: 12/18/20 15:21

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			78673	12/21/20 06:46	RDL8	ELLE
Total/NA	Analysis	EPA 537.1		1	78813	12/22/20 00:47	PY4D	ELLE
Total/NA	Prep	EPA 537.1	DL		78673	12/21/20 06:46	RDL8	ELLE
Total/NA	Analysis	EPA 537.1	DL	10	79638	12/23/20 15:30	VK3G	ELLE

Client Sample ID: FTRI-OPR-W-121620

Lab Sample ID: 410-24471-2

Date Collected: 12/16/20 15:04

Matrix: Drinking Water

Date Received: 12/18/20 15:21

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			80789	12/29/20 19:14	QLP7	ELLE
Total/NA	Analysis	EPA 537.1		1	81295	12/31/20 09:24	DCS9	ELLE

Client Sample ID: FTRI-OPR-DUP-3-121620

Lab Sample ID: 410-24471-3

Date Collected: 12/16/20 00:00

Matrix: Drinking Water

Date Received: 12/18/20 15:21

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			80789	12/29/20 19:14	QLP7	ELLE
Total/NA	Analysis	EPA 537.1		1	81295	12/31/20 09:58	DCS9	ELLE
Total/NA	Prep	EPA 537.1	DL		80789	12/29/20 19:14	QLP7	ELLE
Total/NA	Analysis	EPA 537.1	DL	10	81818	01/04/21 15:07	Y6ZN	ELLE

Client Sample ID: FTRI-Field Blank-5-121620

Lab Sample ID: 410-24471-4

Date Collected: 12/16/20 15:30

Matrix: Drinking Water

Date Received: 12/18/20 15:21

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	EPA 537.1			80789	12/29/20 19:14	QLP7	ELLE
Total/NA	Analysis	EPA 537.1		1	81295	12/31/20 10:10	DCS9	ELLE

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-24471-1

Laboratory: Eurofins Lancaster Laboratories Env, LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska	State	PA00009	06-30-21
Alaska (UST)	State	17-027	01-31-21
Arizona	State	AZ0780	03-12-21
Arkansas DEQ	State	19-053-0	08-09-21
California	State	2792	01-31-21
Colorado	State	PA00009	06-30-21
Connecticut	State	PH-0746	06-30-21
Delaware (DW)	State	N/A	01-31-21
Florida	NELAP	E87997	07-01-21
Hawaii	State	N/A	01-31-21
Illinois	NELAP	004559	01-31-21
Iowa	State	361	03-02-22
Kansas	NELAP	E-10151	10-31-21
Louisiana	NELAP	02055	06-30-21
Maine	State	2019012	03-12-21
Maryland	State	100	06-30-21
Massachusetts	State	M-PA009	06-30-21
Michigan	State	9930	01-31-21
Minnesota	NELAP	042-999-487	12-31-21
Missouri	State	450	01-31-22
Montana (DW)	State	0098	01-01-22
Nebraska	State	NE-OS-32-17	01-31-20 *
Nevada	State	PA000092019-3	07-31-21
New Hampshire	NELAP	273019	01-10-21
New Jersey	NELAP	PA011	06-30-21
New York	NELAP	10670	04-01-21
North Carolina (DW)	State	42705	07-31-21
North Dakota	State	R-205	01-31-20 *
Oklahoma	NELAP	R-205	02-01-21
Oregon	NELAP	PA200001-018	09-12-21
PALA	Canada	1978	05-08-21
Pennsylvania	NELAP	36-00037	01-31-22
South Carolina	State	89002002	01-31-21
Tennessee	State	02838	01-31-21
Texas	NELAP	T104704194-20-38	08-31-21
Utah	NELAP	PA000092019-16	02-28-21
Vermont	State	VT - 36037	10-29-21
Virginia	NELAP	10561	06-14-21
Washington	State	C457	04-11-21
West Virginia DEP	State	055	01-01-22
Wyoming	State	8TMS-L	01-07-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-24471-1

Method	Method Description	Protocol	Laboratory
EPA 537.1	EPA 537.1, Ver 1.0 Nov 2018	EPA	ELLE
EPA 537.1	EPA 537.1, ver. 1.0 Nov. 2018	EPA	ELLE

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-24471-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
410-24471-1	FTRI-OPR-V-121620	Drinking Water	12/16/20 14:41	12/18/20 15:21	
410-24471-2	FTRI-OPR-W-121620	Drinking Water	12/16/20 15:04	12/18/20 15:21	
410-24471-3	FTRI-OPR-DUP-3-121620	Drinking Water	12/16/20 00:00	12/18/20 15:21	
410-24471-4	FTRI-Field Blank-5-121620	Drinking Water	12/16/20 15:30	12/18/20 15:21	

Environmental Analysis Request/Chain of

eurofins | Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Envi

Acct. # _____ Group # _____ Sample #

410-24471 Chain of Custody

COC # 613657

Client Information

Client: USACE Baltimore PFAS PA/SI	Acct. #: —
Project Name/#: Fort Riley / 30059933	PWSID #:
Project Manager: Britt Phillips	P.O. #: 30059933
Sampler: Sandy Conard	Quote #: —
State where samples were collected: Kansas	For Compliance: Yes ☐ No ☒

Matrix

Soil ☐ Sediment ☐ Tissue ☐ | Water: Potable ☐ Ground ☒ NPDES ☐ Surface ☐ | Other:

Analysis Requested

Preservation and Filtration Codes

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	PFAS Method 537.1
✓ FTRI-OPR-V-121620	12/16/20	1441	X		2	X
✓ FTRI-OPR-W-121620	1	1504	X		2	X
✓ FTRI-MS-121620		1504	X		2	X
✓ FTRI-MSD-121620	↓	1504	X		2	X
✓ FTRI-OPR-DUP-3-121620	12/16/20	—	X		2	X
✓ FTRI-Field Blank-5-121620	12/16/20	1530	X		2	X

For Lab Use Only

FSC: _____

SCR#: 269092

Preservation Codes

H=HCl	T=Thiosulfate
N=HNO_3	B=NaOH
S=H_2SO_4	P=H_3PO_4
F=Field Filtered	O=Other

Remarks

#227

~~Kansas City SC~~

~~* Pres included in Lab provided PFAS Free Water~~ SC

Turnaround Time (TAT) Requested (please circle)

Standard | Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Requested TAT in business days: _____

E-mail address: Britt.Phillips@arcadis.com, Ted.Wall@arcadis.com, Rebecca.Ingwers@arcadis.com, USACE.PFAS@arcadis.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP)	Type VI (Raw Data Only)	
Type III (Reduced non-CLP)	NJ DKQP	TX TRRP-13
NYSDEC Category A or B	MA MCP	CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Ian T. Nutt	12-16-20	1210	Sandy Conard	12-18-2020	1500
Sandy Conard	12-17-2020	1145	Britt Black	12-18-20	1150

EDD Required? (Yes) No

If yes, format: EQuIS

Site-Specific QC (MS/MSD/Dup)? (Yes) No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS ____ FedEx ____ Other Euro Fins

Temperature upon receipt 0.5 °C

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

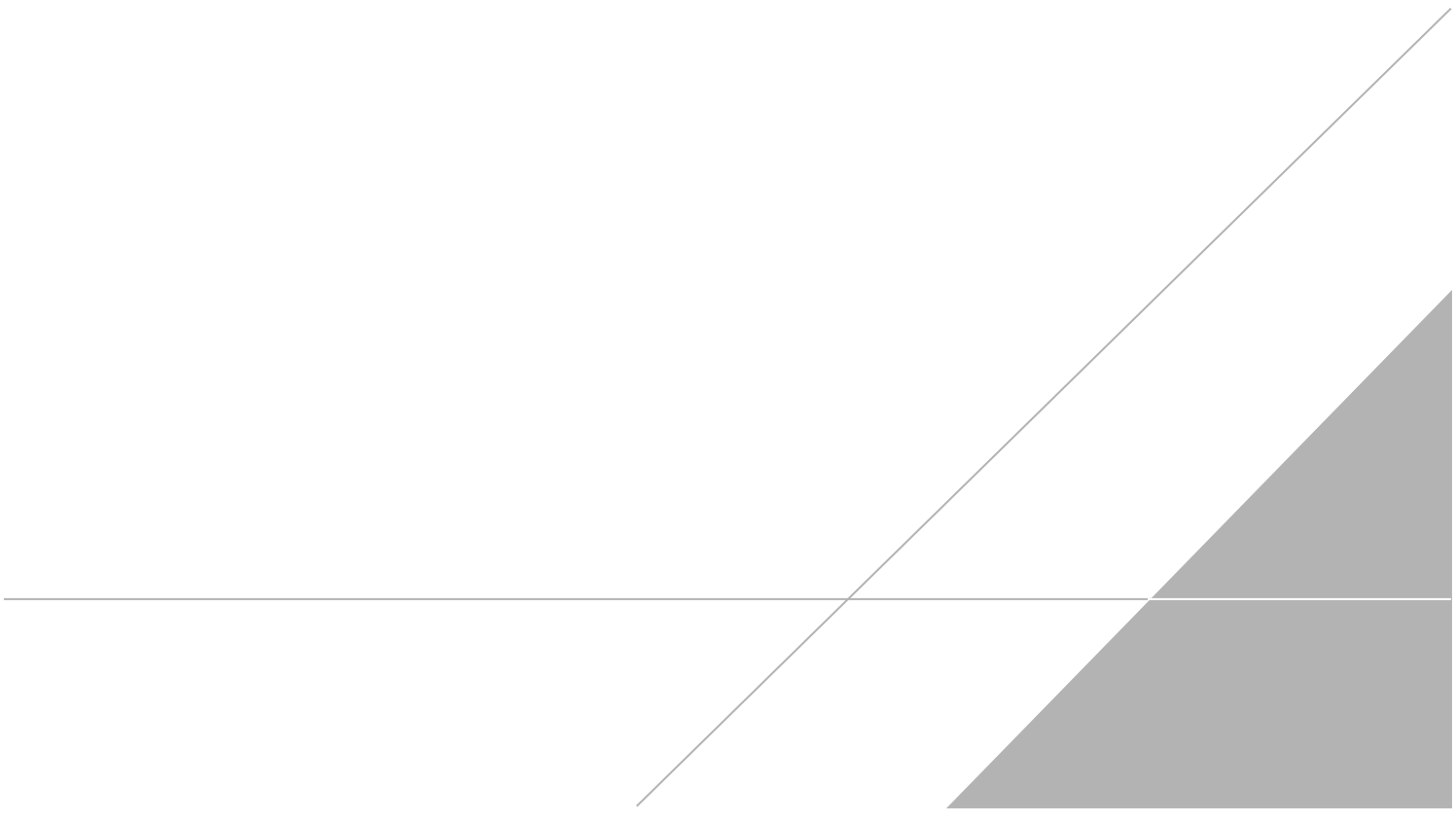
Job Number: 410-24471-1

Login Number: 24471
List Number: 1
Creator: Sanchez, Melvin E

List Source: Eurofins Lancaster Laboratories Env

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	N/A	
Is the Field Sampler's name present on COC?	True	
Sample Preservation Verified.	N/A	
Residual Chlorine Checked.	N/A	
Sample custody seals are intact.	N/A	

DATA VALIDATION REPORTS



ARCADIS Design & Consultancy for natural and built assets

Fort Riley PFAS PA/SI

DATA REVIEW

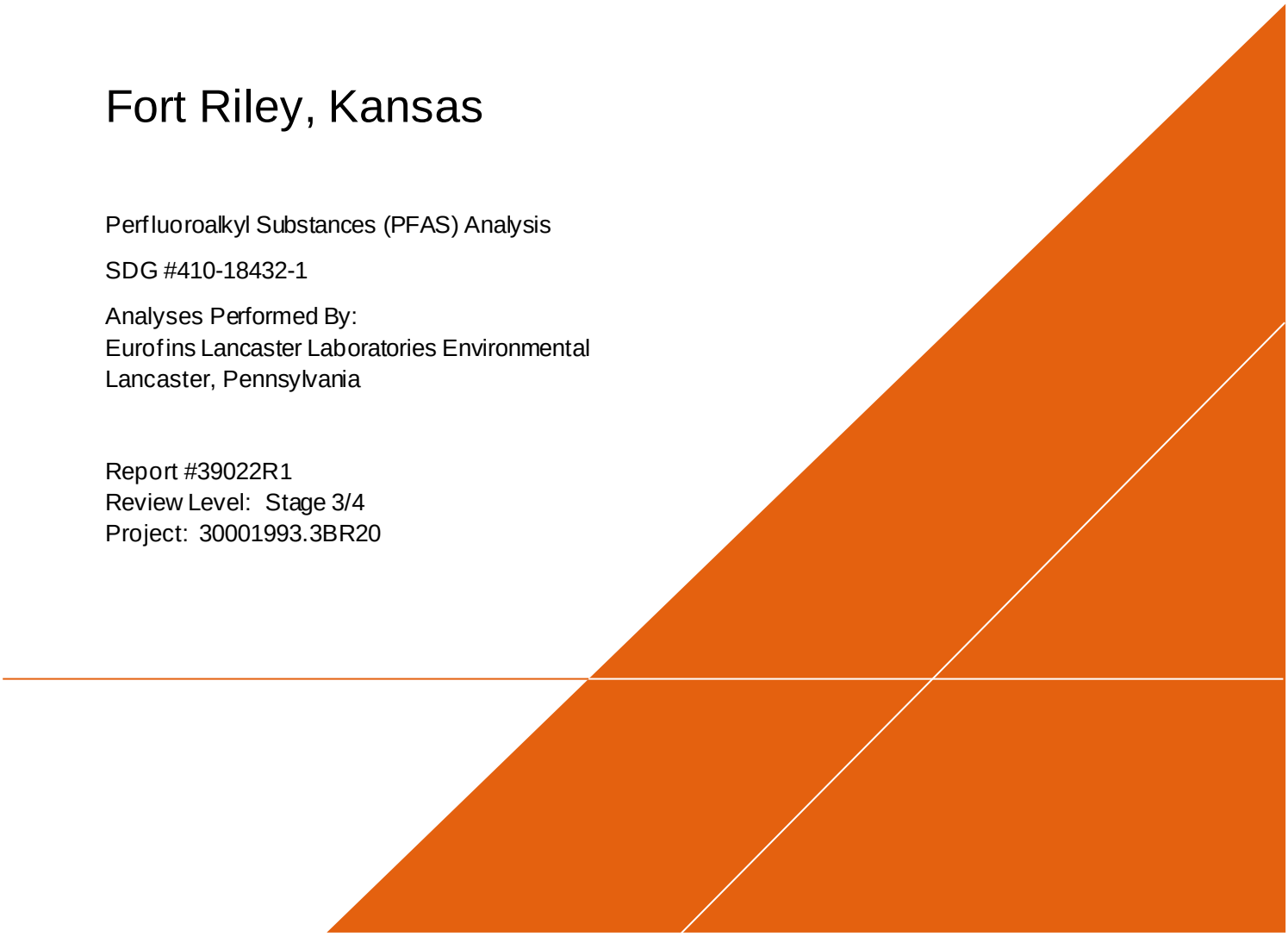
Fort Riley, Kansas

Perfluoroalkyl Substances (PFAS) Analysis

SDG #410-18432-1

Analyses Performed By:
Eurofins Lancaster Laboratories Environmental
Lancaster, Pennsylvania

Report #39022R1
Review Level: Stage 3/4
Project: 30001993.3BR20



SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # 410-18432-1 for samples collected in association with the Fort Riley Site. The review was conducted as a Stage 3/4 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	TOC	MISC
FTRI-OPR-A-102220	410-18432-1	Drinking Water	10/22/2020		X		
FTRI-OPR-B-102220	410-18432-2	Drinking Water	10/22/2020		X		
FTRI-OPR-D-102220	410-18432-3	Drinking Water	10/22/2020		X		
FTRI-OPR-E-102220	410-18432-4	Drinking Water	10/22/2020		X		
FTRI-OPR-F-102220	410-18432-5	Drinking Water	10/22/2020		X		
FTRI-OPR-G-102220	410-18432-6	Drinking Water	10/22/2020		X		
FTRI-FD-1-102220	410-18432-7	Drinking Water	10/22/2020	FTRI-OPR-G-102220	X		
FTRI-FB-1-102220	410-18432-8	Drinking Water	10/22/2020		X		
FTRI-OPR-H-102320	410-18432-9	Drinking Water	10/23/2020		X		
FTRI-OPR-I-102320	410-18432-10	Drinking Water	10/23/2020		X		
FTRI-OPR-J-102320	410-18432-11	Drinking Water	10/23/2020		X		
FTRI-OPR-K-102320	410-18432-12	Drinking Water	10/23/2020		X		
FTRI-OPR-L-102320	410-18432-13	Drinking Water	10/23/2020		X		
FTRI-FB-2-102320	410-18432-14	Drinking Water	10/23/2020		X		
FTRI-OPR-M-102420	410-18432-15	Drinking Water	10/24/2020		X		
FTRI-OPR-N-102420	410-18432-16	Drinking Water	10/24/2020		X		
FTRI-OPR-O-102420	410-18432-17	Drinking Water	10/24/2020		X		
FTRI-FB-3-102420	410-18432-18	Drinking Water	10/24/2020		X		

Note:

1. Stage 4 validation was performed on sample locations FTRI-OPR-F-102220 and FTRI-OPR-O-102420.

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) method 537 version 1.1 for drinking water. Data were reviewed in accordance with USEPA Method 537, ELLE SOP T-PFAS-WI25232, USEPA Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537, EPA 910-R-18-001, November 2018, Department of Defense (DoD) Quality Systems Manual (QSM) 5.1.1 and 5.3, DoD General Data Validation Guidelines, November 2019, and Final Programmatic Uniform Federal Policy-Quality Assurance Project Plan USAEC PFAS PA/SI Active Army Installations, October 2019 (Arcadis).

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:

- Concentration (C) Qualifiers

  U The analyte was not detected and was reported as less than the LOD. The LOD has been adjusted for any dilution or concentration of the sample.

  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 reported result was an estimated value with an unknown bias.

  J+ The result was an estimated quantity, but the result may be biased high.

  J- The result was an estimated quantity, but the result may be biased low.

  UJ The analyte was not detected and was reported as less than the LOD. However, the associated numerical value is approximate.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  X The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

A 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.

PERFLUOROALKYL SUBSTANCES (PFAS) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
USEPA 537 Version 1.1	Drinking Water	14 days to extraction; 28 days from extraction to analysis	Trizma. Cool to <10 °C for first 48 hours.

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, instrument, and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Instrument blanks measure carryover in the instrument from one sample to another. Method blanks measure laboratory contamination. Equipment rinse 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 is calculated for QA blanks containing concentrations greater than the 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. Mass Calibration

Mass calibration and system performance were acceptable.

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The percent relative standard deviation (%RSD) of the response factors (RF) must be less than 20%, or for linear calibration, $r^2 \geq 0.99$. Analytes must be within 70-130% of their true value for each calibration standard.

All compounds associated with initial calibration were within the control limits.

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit of 30%.

All compounds associated with CCV %D were within control limits.

4.3 Instrument Sensitivity Check (ISC)

The ISC concentration must be at the LOQ. All target compounds associated with the ISC must exhibit a percent recovery (%R) of 50 to 150%.

All compounds associated with ISC recoveries were within control limits.

4.4 Ion Transitions

Quantitation of analytes must use the ion transitions documented in DoD QSM 5.3 Table B-15.

The ion transitions were as specified in DoD QSM 5.3.

5. Isotopically labeled Standards

5.1 Surrogates (Extracted Internal Standards)

Labeled standards must be added to all field samples and QC samples prior to extraction. The surrogate recoveries associated with EPA method 537 version 1.1 must be within 70% to 130% of the true value.

Sample locations associated with surrogate exhibiting recoveries outside of the control limits are presented in the following table.

Sample Locations	Surrogate	%R	RE %R
FTRI-OPR-F-102220	d5-NEtFOSAA	> 130%	AC
	13C2-PFDA		
	13C2 PFHxA		

The criteria used to evaluate the surrogate recoveries are presented in the following table. In the case of a surrogate deviation, the sample results associated with the surrogates are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> 130%	Non-detect	No Action
	Detect	J
< 70% but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J

The re-extracted analysis of sample location FTRI-OPR-F-102220 was performed due to surrogate failures in the initial analysis. However, the associated LCS for the re-extracted analysis exhibited low recoveries. Therefore, results for this sample will be reported from the initial analysis.

5.2 Injection Internal Standards

Injection internal standards must be added to the aliquot of sample dilutions, QC samples, and standards just prior to analysis. Peak areas must be within -50% to +50% of the area measured in the ICAL midpoint standard. On days when ICAL is not performed, the peak areas must be within -50% to +50% of the peak area measured in daily initial CCV.

All internal standard responses were within control limits.

6. 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 the EPA method 537 version 1.1 specified acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must be
≤ 30%.

A MS/MSD was not performed on a sample location associated with this SDG.

7. Laboratory Control Sample/ Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within EPA method 537 version 1.1 acceptance limits of 70 to 130%.

Sample locations associated with LCS/LCSD analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery
FTRI-OPR-F-102220 RE	All target PFAS compounds	< 70% but >10%

The re-extracted analysis of sample location FTRI-OPR-F-102220 was performed due to surrogate failures in the initial analysis. However, the associated LCS for the re-extracted analysis exhibited low recoveries. Therefore, results for this sample will be reported from the initial analysis.

8. 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 35% for water matrices and 50% for soils 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 LOQ, a control limit of two times the LOQ is applied for water matrices and three time the LOQ for soil matrices.

Results for field duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
FTRI-OPR-G-102220/ FTRI-FD-1-102220	All target PFAS compounds	1.3 U	1.3 U	AC

Notes:
AC Acceptable

The calculated results between the parent sample and field duplicate were acceptable.

9. Compound Identification

PFC analytes are identified by using the compound's ion abundance ratios, signal-to-noise values, and relative retention times.

All identified compounds met method criteria.

10. 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: EPA 537 Version 1.1	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)					
Stage 2 Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
C. Field 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	
Surrogate %R		X	X		
Injection Internal Standard %R		X		X	
Dilution Factor		X		X	
Moisture Content	X				X
Stage 3/4 Validation					
Instrument tune and performance check		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X		X	
Instrument sensitivity check		X		X	
Ion transitions used		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	

PFAS: EPA 537 Version 1.1	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)					
D. Transcription/calculations acceptable		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

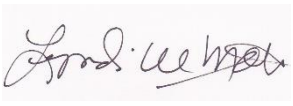
%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Lyndi Mott, Arcadis

SIGNATURE: 

DATE: November 13, 2020

PEER REVIEW: Jeffrey L. Davin, Arcadis

DATE: November 16, 2020

Stage 3 / 4
PFAS Calibration Standards %D

SDG #: 410-18432-1 Date: 11/13/2020
Lab: Eurofins Lancaster Page: 1
Project: Ft Riley PFAS PA/SI Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

PFOA 11/04/2020 Calibration Page 337 and 393 of 410-18432-1

Cal Conc	Std Area	IS Area	13C2-PFOA IS Conc	Area Ratio	Slope	Calc Amount	Tvalue	Calculated % D	Reported % D	
0.5	239582	5483254	10	0.043693	0.9088	0.480781	0.5	-3.844	-3.8	MATCH
1	478181	5671772	10	0.084309	0.9088	0.927695	1	-7.230	-7.2	MATCH
2.5	1216404	5559123	10	0.218812	0.9088	2.407705	2.5	-3.692	-3.7	MATCH
5	2487713	5534021	10	0.449531	0.9088	4.946422	5	-1.072	-1.1	MATCH
20	10064747	5472310	10	1.839214	0.9088	20.23783	20	1.189	1.2	MATCH

Concentration ng/L = (Peak area ratio/Slope) x DF x IS concentration

Stage 3 / 4
PFAS ICV CCV Standards %D

SDG #: 410-18432-1 Date: 11/13/2020
Lab: Eurofins Lancaster Page: 2
Project: Ft Riley PFAS PA/SI Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

CCVLIS 410-62634/1 11/05/2020 13:59 Page 453 of 410-18432-1

Analyte	Analyte Area	IS Area	IS Conc	Area Ratio	Slope	Calc Amount	Tvalue	Calculated % D	Reported % D	
PFHxA	165415	4597548	10	0.035979	0.716	0.502499	0.5	0.500	0.5	Match
PFOA	206443	4597548	10	0.044903	0.9088	0.494089	0.5	-1.182	-1.2	Match
PFOS	115134	7162558	28.68	0.016074	0.9544	0.483041	0.463	4.329	4.4	Match

Concentration ng/L = (Peak area ratio/Slope) x DF x IS concentration

Stage 3 / 4
PFAS LCS

SDG #: 410-18432-1 Date: 11/13/2020
Lab: Eurofins Lancaster Page: 3
Project: Ft Riley PFAS PA/SI Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

LCS ID	LCS 410-61997
ANALYTE	PFOS
REPORTED LCS %R	109
REPORTED LCSD %R	107
REPORTED RPD	1

Page 140 and 142 of 410-18432-1

$$\%R = \frac{100 * \text{LCS Concentration}}{\text{LCS TV}}$$

$$RPD = \frac{100 * |\text{LCS \%R} - \text{LCSD \%R}|}{\text{Average of LCS LCSD \%R}}$$

LCS Concentration	22.2	LCS %R	108.29	MATCH
LCSD Concentration	22.0	LCSD %R	107.32	MATCH
LCS TV	20.5	RPD	0.90	MATCH
LCSD TV	20.5			

Stage 3 / 4
PFAS Sample Concentration

SDG #: 410-18432-1 Date: 11/13/2020
Lab: Eurofins Lancaster Page: 4
Project: Ft Riley PFAS PA/SI Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

FTRI-OPR-F-102220 Lab ID: 410-18432-5 Page 185 of SDG 410-18432-1
FV= 1ml

Analyte	Analyte Area	IS Area	IS Conc	Area Ratio	Slope	Calculated Amount ng/ml	Sample Volume mls	Calculated ng/L	Reported Value ng/L	
PFHxA	40524	4054552	10	0.009995	0.716	0.1396	301.5	0.46	0.46 J	Match
PFOA	64380	4054552	10	0.015878	0.9088	0.1747	301.5	0.58	0.58 J	Match
PFOS	75400	6299868	28.68	0.011969	0.9544	0.3597	301.5	1.19	1.2 J	Match

FTRI-OPR-F-102220 Lab ID: 410-18432-17 Page 260 of SDG 410-18432-1
FV= 1ml

Analyte	Analyte Area	IS Area	IS Conc	Area Ratio	Slope	Calculated Amount ng/ml	Sample Volume mls	Calculated ng/L	Reported Value ng/L	
PFHxA	38909	4218188	10	0.009224	0.716	0.1288	282.2	0.46	0.46 J	Match

Concentration ng/ml = (Peak area ratio/Slope) x DF x IS concentration
Concentration ng/L = concentration ng/ml / (sample volume/1000)

Stage 3 / 4
PFAS Surrogate

SDG #:	410-18432-1	Date:	11/13/2020
Lab:	Eurofins Lancaster	Page:	5
Project:	Ft Riley PFAS PA/SI	Validated by:	LWM

Method: EPA modified 537 per DoD QSM 5.3

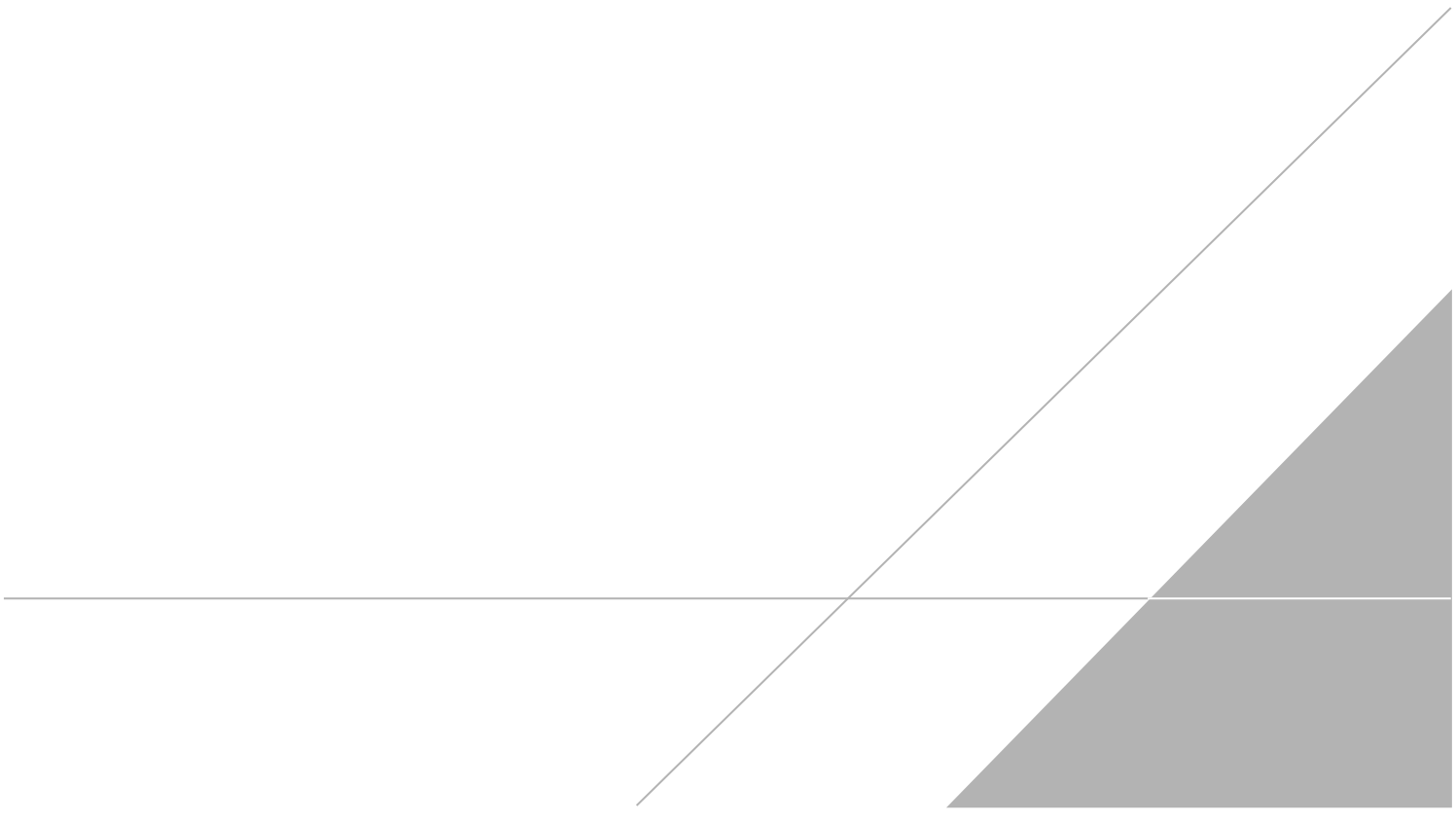
FTRI-OPR-F-102220 Lab ID: 410-18432-5 Page 185 of SDG 410-18432-1

Surrogate	13C2-PFHxA
REPORTED %R	139

$$\%R = \frac{100 * \text{Surr Concentration}}{\text{Surr TV}}$$

Surr Concentration	13.9	
Surr TV	10.0	
%R	139.0	MATCH

POST-VALIDATION CHAIN OF CUSTODY AND SAMPLE ANALYSIS DATA SHEETS



Environmental Analysis Requ ody

eurofins | Lancaster Laboratories Environmental

For E

Acct. # _____ G

410-18432 Chain of Custody

Kansas City SC #227

COC #613662

Client Information

Client: USACE Baltimore PFAS PA/SI	Acct. #: —
Project Name/#: Fort Riley / 30059933	PWSID #: —
Project Manager: Britt Phillips	P.O. #: 30059933
Sampler: Sandy Conard	Quote #: —
State where samples were collected: Kansas	For Compliance: Yes ☐ No ☒

Sample Identification	Collected Date	Collected Time	Grab	Composite	Matrix: Soil ☐ Sediment ☐ Tissue ☐ / Water: Potable ☒ Ground ☐ NPDES ☐ Surface ☐ / Other:	Total # of Containers	Analysis Requested: PFAS Method 537.1 (Preservation and Filtration Code: D)	Remarks
FTRI-OPR-A-102220	10/22/20	0830	X		X	2		
FTRI-OPR-B-102220		0923	X		X	2		
FTRI-OPR-C-102220		0915	X		X	2		
FTRI-OPR-D-102220		1003	X		X	2		
FTRI-OPR-E-102220		1042	X		X	2		
FTRI-OPR-F-102220		1106	X		X	2		
FTRI-OPR-G-102220		1308	X		X	2		
DUP-1-102220		—	X		X	2		
Field Blank-1-102220	↓	1315	X			2		*Pres included in Lab Provided PFAS Free Water

For Lab Use Only

FSC: _____

SCR#: _____

Preservation Codes

H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 P=H_3PO_4
F=Field Filtered O=Other Trizma

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Requested TAT in business days: _____

E-mail address: Britt.Phillips@arcadis.com, Ted.Walk@arcadis.com, Rebecca.Ingwers@arcadis.com, USACE.PFAS@arcadis.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) | Type VI (Raw Data Only)

Type III (Reduced non-CLP) | NJ DKQP | TX TRRP-13

NYSDEC Category A or B | MA MCP | CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Sandy Conard	10/26/2020	1320	Brian Beck	10-26-20	1320
Brian Beck	10-26-20	1530			
			MR	10/27/20	1016

EDD Required? Yes No

If yes, format: Equis 6

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS _____ FedEx X Other Euro Fins

Temperature upon receipt 1.4/0.3 °C

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QCM

#227 Kansas City SC

Environmental Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only

Acct. # _____ Group # _____ Sample # _____

#227 Kansas City SCOC # 613661

Client Information

Client: USACE Baltimore PFAS PA/SI	Acct. #: —
Project Name/#: Fort Riley / 30059933	PWSID #: —
Project Manager: Britt Phillips	P.O. #: 30059933
Sampler: Sandy Conard	Quote #: —
State where samples were collected: Kansas	For Compliance: Yes ☐ No ☒

Matrix

Soil ☐ Sediment ☐ Tissue ☐ | Water: Potable ☐ Ground ☒ NPDES ☐ Surface ☐ | Other: ___

Analysis Requested

Preservation and Filtration Codes

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	PFAS Method 537.1
FTRI-OPR-H-102320	10/23/20	0808	X		2	X
FTRI-OPR-I-102320		0855	X		2	X
FTRI-OPR-J-102320		1418	X		2	X
FTRI-OPR-K-102320		1445	X		2	X
FTRI-OPR-L-102320		1637	X		2	X
Field Blank-2-102320	↓	1330	X		2	X

For Lab Use Only

FSC: _____

SCR#: _____

Preservation Codes

H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 P=H_3PO_4
F=Field Filtered O=Other TRIZMA

Remarks

xPres indicated in Lab Provided PFAS free Water

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Requested TAT in business days: _____

E-mail address: Britt.Phillips@arcadis.com, Rebecca.Ingwersen@arcadis.com, TedWall@arcadis.com, USACE.PFAS@arcadis.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) | Type VI (Raw Data Only)

Type III (Reduced non-CLP) | NJ DKQP | TX TRRP-13

NYSDEC Category A or B | MA MCP | CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Sandy Conard	10/26/20	1320	Brian Beck	10-26-20	1320
Brian Beck	10-26-20	1530			
				10/27/20	1016

EDD Required? (Yes) No

If yes, format: Equis 6

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS ____ FedEx ✓ Other Eurofins.

Temperature upon receipt 1.4/0.3 °C

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7044 0919

QCM

#227 Kansas City, SC

Environmental Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only

Acct. # _____ Group # _____ Sample # _____

COC # 613663

Client Information

Client: USACE Baltimore PFAS PA/SI	Acct. #: —
Project Name/#: Fort Riley / 30059933	PWSID #: —
Project Manager: Britt Phillips	P.O. #: 30059933
Sampler: Sandy Conard	Quote #: —
State where samples were collected: Kansas	For Compliance: Yes ☐ No ☒

Sample Identification	Collected Date	Collected Time	Grab	Composite	Matrix: Soil ☐ Sediment ☐ Tissue ☐ / Water: Potable ☒ Ground ☐ NPDES ☐ Surface ☐ / Other:	Total # of Containers	Analysis Requested: Preservation and Filtration Codes: D	PFAS Method 537.1	Remarks
FTRI-OPR-M-102420	10/24/20	1315	X			2		X	
FTRI-OPR-N-102420		1338	X			2		X	
FTRI-OPR-O-102420		1400	X			2		X	
Field Blank-3-102420	↓	1300	X			2		X	*Pres included in Lab Provided PFAS Free Water

For Lab Use Only

FSC: _____

SCR#: _____

Preservation Codes

H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 P=H_3PO_4
F=Field Filtered O=Other Trizma

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Requested TAT in business days: _____

E-mail address: Britt.Phillips@arcadis.com, Ted.Wall@arcadis.com, Rebecca.Ingmers@arcadis.com, USACE.PFAS@arcadis.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) | Type VI (Raw Data Only)

Type III (Reduced non-CLP) | NJ DKQP | TX TRRP-13

NYSDEC Category A or B | MA MCP | CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Sandy Conard	10/26/2020	1320	Brian Beck	10-26-20	1320
Brian Beck	10-26-20	1530			
			NMR	10/27/20	1016

EDD Required? (Yes) No

If yes, format: EQuIS 6

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS _____ FedEx X Other EuroFins

Temperature upon receipt 1.4/0.3 °C

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The white copy should accompany samples to Eurofins Lancaster Laboratories Environmental. The yellow copy should be retained by the client. 7044 0919

CFM

#227 Kansas City 5C

11/10/2020

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 410-18432-1

Login Number: 18432

List Source: Eurofins Lancaster Laboratories Env

List Number: 1

Creator: Colon Martinez, Jessenia C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	N/A	
Is the Field Sampler's name present on COC?	True	
Sample Preservation Verified.	N/A	
Residual Chlorine Checked.	N/A	
Sample custody seals are intact.	N/A	

Definitions/Glossary

Client: ARCADIS U.S., Inc.
Job ID: 410-18432-1
Project/Site: Fort Riley

Qualifiers

LCMS

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
M	Manual integrated compound.
XH	Surrogate recovery is above control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client Sample ID: FTRI-OPR-A-102220

Lab Sample ID: 410-18432-1

Date Collected: 10/22/20 08:30

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 14:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*94*		*70 - 130*	*11/04/20 08:39*	*11/05/20 14:58*	*1*
13C2 PFDA	*89*		*70 - 130*	*11/04/20 08:39*	*11/05/20 14:58*	*1*
13C2 PFHxA	*97*		*70 - 130*	*11/04/20 08:39*	*11/05/20 14:58*	*1*
13C3 HFPO-DA	*102*		*70 - 130*	*11/04/20 08:39*	*11/05/20 14:58*	*1*

Client Sample ID: FTRI-OPR-B-102220

Lab Sample ID: 410-18432-2

Date Collected: 10/22/20 09:23

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
NEtFOSAA	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
NMeFOSAA	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 15:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*92*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:10*	*1*
13C2 PFDA	*90*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:10*	*1*
13C2 PFHxA	*95*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:10*	*1*
13C3 HFPO-DA	*103*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:10*	*1*

Client Sample ID: FTRI-OPR-D-102220

Lab Sample ID: 410-18432-3

Date Collected: 10/22/20 10:03

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
NEtFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
NMeFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*100*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:21*	*1*
13C2 PFDA	*92*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:21*	*1*
13C2 PFHxA	*100*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:21*	*1*
13C3 HFPO-DA	*108*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:21*	*1*

Client Sample ID: FTRI-OPR-E-102220

Lab Sample ID: 410-18432-4

Date Collected: 10/22/20 10:42

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
NEtFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
NMeFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/05/20 15:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*91*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:33*	*1*
13C2 PFDA	*90*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:33*	*1*
13C2 PFHxA	*94*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:33*	*1*
13C3 HFPO-DA	*104*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:33*	*1*

Client Sample ID: FTRI-OPR-F-102220

Lab Sample ID: 410-18432-5

Date Collected: 10/22/20 11:06

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	**0.46**	**J**	1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluoroheptanoic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorooctanoic acid	**0.58**	**J M**	1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorononanoic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorodecanoic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorotridecanoic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorotetradecanoic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorobutanesulfonic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorohexanesulfonic acid	<1.2	M	1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorooctanesulfonic acid	**1.2**	**J**	1.7	1.2	0.41	ng/L		11/05/20 15:44	1
NEtFOSAA	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
NMeFOSAA	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluoroundecanoic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1
Perfluorododecanoic acid	<1.2		1.7	1.2	0.41	ng/L		11/05/20 15:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*142*	*XH*	*70 - 130*	*11/04/20 08:39*	*11/05/20 15:44*	*1*
13C2 PFDA	*133*	*XH*	*70 - 130*	*11/04/20 08:39*	*11/05/20 15:44*	*1*
13C2 PFHxA	*139*	*XH*	*70 - 130*	*11/04/20 08:39*	*11/05/20 15:44*	*1*
13C3 HFPO-DA	*154*	*XH*	*70 - 130*	*11/04/20 08:39*	*11/05/20 15:44*	*1*

Client Sample ID: FTRI-OPR-G-102220

Lab Sample ID: 410-18432-6

Date Collected: 10/22/20 13:08

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorohexanesulfonic acid	<1.3	M	1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
NEtFOSAA	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
NMeFOSAA	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/05/20 15:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*87*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:56*	*1*
13C2 PFDA	*86*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:56*	*1*
13C2 PFHxA	*92*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:56*	*1*
13C3 HFPO-DA	*101*		*70 - 130*	*11/04/20 08:39*	*11/05/20 15:56*	*1*

Client Sample ID: FTRI-FD-1-102220

Lab Sample ID: 410-18432-7

Date Collected: 10/22/20 00:00

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
NEtFOSAA	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
NMeFOSAA	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 16:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*93*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:08*	*1*
13C2 PFDA	*93*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:08*	*1*
13C2 PFHxA	*100*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:08*	*1*
13C3 HFPO-DA	*109*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:08*	*1*

Client Sample ID: FTRI-FB-1-102220

Lab Sample ID: 410-18432-8

Date Collected: 10/22/20 13:15

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 16:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*101*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:19*	*1*
13C2 PFDA	*97*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:19*	*1*
13C2 PFHxA	*106*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:19*	*1*
13C3 HFPO-DA	*111*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:19*	*1*

Client Sample ID: FTRI-OPR-H-102320

Lab Sample ID: 410-18432-9

Date Collected: 10/23/20 08:08

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluoroheptanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorooctanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorononanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorodecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorotridecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorotetradecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorobutanesulfonic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorohexanesulfonic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorooctanesulfonic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
NEtFOSAA	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
NMeFOSAA	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluoroundecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1
Perfluorododecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 16:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*94*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:31*	*1*
13C2 PFDA	*86*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:31*	*1*
13C2 PFHxA	*96*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:31*	*1*
13C3 HFPO-DA	*102*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:31*	*1*

Client Sample ID: FTRI-OPR-I-102320

Lab Sample ID: 410-18432-10

Date Collected: 10/23/20 08:55

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluoroheptanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorooctanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorononanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorodecanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorotridecanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorotetradecanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorobutanesulfonic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorohexanesulfonic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorooctanesulfonic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
NEtFOSAA	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
NMeFOSAA	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluoroundecanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1
Perfluorododecanoic acid	<1.4		1.8	1.4	0.46	ng/L		11/05/20 16:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*103*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:42*	*1*
13C2 PFDA	*97*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:42*	*1*
13C2 PFHxA	*110*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:42*	*1*
13C3 HFPO-DA	*117*		*70 - 130*	*11/04/20 08:39*	*11/05/20 16:42*	*1*

Client Sample ID: FTRI-OPR-J-102320

Lab Sample ID: 410-18432-11

Date Collected: 10/23/20 14:18

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
NEtFOSAA	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
NMeFOSAA	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*98*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:05*	*1*
13C2 PFDA	*93*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:05*	*1*
13C2 PFHxA	*106*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:05*	*1*
13C3 HFPO-DA	*115*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:05*	*1*

Client Sample ID: FTRI-OPR-K-102320

Lab Sample ID: 410-18432-12

Date Collected: 10/23/20 14:45

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluoroheptanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorooctanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorononanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorodecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorotridecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorotetradecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorobutanesulfonic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorohexanesulfonic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorooctanesulfonic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
NEtFOSAA	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
NMeFOSAA	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluoroundecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1
Perfluorododecanoic acid	<1.4		1.8	1.4	0.45	ng/L		11/05/20 17:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*96*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:17*	*1*
13C2 PFDA	*88*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:17*	*1*
13C2 PFHxA	*97*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:17*	*1*
13C3 HFPO-DA	*105*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:17*	*1*

Client Sample ID: FTRI-OPR-L-102320

Lab Sample ID: 410-18432-13

Date Collected: 10/23/20 16:37

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
NEtFOSAA	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
NMeFOSAA	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 17:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*95*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:29*	*1*
13C2 PFDA	*87*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:29*	*1*
13C2 PFHxA	*94*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:29*	*1*
13C3 HFPO-DA	*104*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:29*	*1*

Client Sample ID: FTRI-FB-2-102320

Lab Sample ID: 410-18432-14

Date Collected: 10/23/20 13:30

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*90*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:41*	*1*
13C2 PFDA	*87*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:41*	*1*
13C2 PFHxA	*92*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:41*	*1*
13C3 HFPO-DA	*97*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:41*	*1*

Client Sample ID: FTRI-OPR-M-102420

Lab Sample ID: 410-18432-15

Date Collected: 10/24/20 13:15

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 17:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*94*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:53*	*1*
13C2 PFDA	*87*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:53*	*1*
13C2 PFHxA	*96*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:53*	*1*
13C3 HFPO-DA	*105*		*70 - 130*	*11/04/20 08:39*	*11/05/20 17:53*	*1*

Client Sample ID: FTRI-OPR-N-102420

Lab Sample ID: 410-18432-16

Date Collected: 10/24/20 13:38

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
NEtFOSAA	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
NMeFOSAA	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.42	ng/L		11/05/20 18:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*95*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:04*	*1*
13C2 PFDA	*89*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:04*	*1*
13C2 PFHxA	*101*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:04*	*1*
13C3 HFPO-DA	*108*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:04*	*1*

Client Sample ID: FTRI-OPR-O-102420

Lab Sample ID: 410-18432-17

Date Collected: 10/24/20 14:00

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	**0.46**	**J**	1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/05/20 18:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*94*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:16*	*1*
13C2 PFDA	*87*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:16*	*1*
13C2 PFHxA	*95*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:16*	*1*
13C3 HFPO-DA	*103*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:16*	*1*

Client Sample ID: FTRI-FB-3-102420

Lab Sample ID: 410-18432-18

Date Collected: 10/24/20 13:00

Matrix: Drinking Water

Date Received: 10/27/20 10:16

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
NEtFOSAA	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
NMeFOSAA	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.45	ng/L		11/05/20 18:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*93*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:28*	*1*
13C2 PFDA	*82*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:28*	*1*
13C2 PFHxA	*100*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:28*	*1*
13C3 HFPO-DA	*104*		*70 - 130*	*11/04/20 08:39*	*11/05/20 18:28*	*1*

ARCADIS Design & Consultancy for natural and built assets

Fort Riley PFAS PA/SI

DATA REVIEW

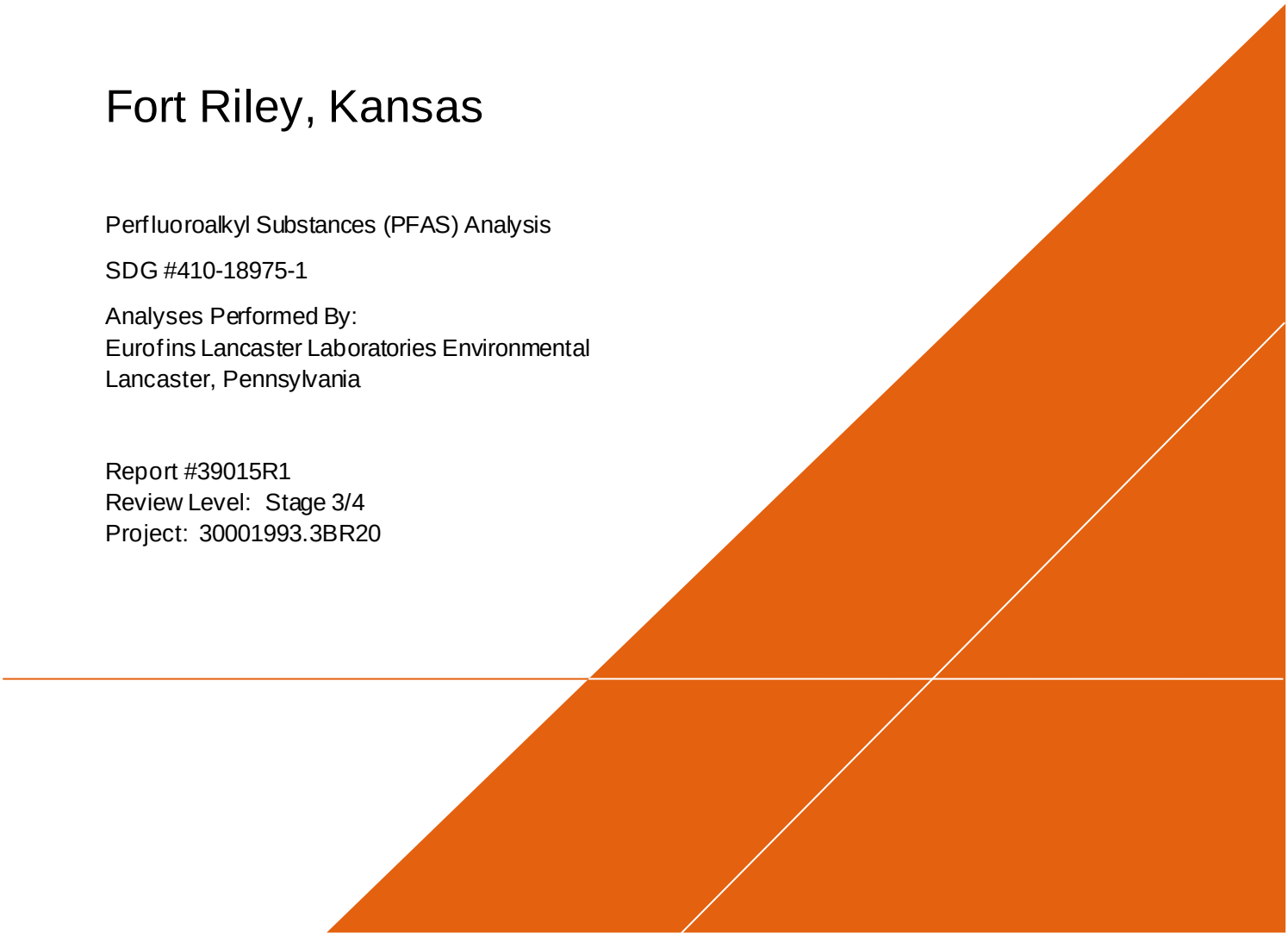
Fort Riley, Kansas

Perfluoroalkyl Substances (PFAS) Analysis

SDG #410-18975-1

Analyses Performed By:
Eurofins Lancaster Laboratories Environmental
Lancaster, Pennsylvania

Report #39015R1
Review Level: Stage 3/4
Project: 30001993.3BR20



SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # 410-18975-1 for samples collected in association with the Fort Riley Site. The review was conducted as a Stage 3/4 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	TOC	MISC
FTRI-OPR-P-102820	410-18975-1	Drinking Water	10/28/2020		X		
FTRI-OPR-Q-102820	410-18975-2	Drinking Water	10/28/2020		X		
FTRI-OPR-R-102820	410-18975-3	Drinking Water	10/28/2020		X		
FTRI-OPR-S-102820	410-18975-4	Drinking Water	10/28/2020		X		
FTRI-OPR-C-102820	410-18975-5	Drinking Water	10/28/2020		X		
FTRI-OPR-T-102820	410-18975-6	Drinking Water	10/28/2020		X		
FTRI-OPR-U-102820	410-18975-7	Drinking Water	10/28/2020		X		
FTRI-FB-4-102820	410-18975-8	Drinking Water	10/28/2020		X		
FTRI-FD-2-102820	410-18975-9	Drinking Water	10/28/2020	FTRI-OPR-Q-102820	X		

Note:

1. Stage 4 validation was performed on sample location FTRI-OPR-Q-102820.
2. Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location FTRI-OPR-R-102820.

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) method 537 version 1.1 for drinking water. Data were reviewed in accordance with USEPA Method 537, ELLE SOP T-PFAS-WI25232, USEPA Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537, EPA 910-R-18-001, November 2018, Department of Defense (DoD) Quality Systems Manual (QSM) 5.1.1 and 5.3, DoD General Data Validation Guidelines, November 2019, and Final Programmatic Uniform Federal Policy-Quality Assurance Project Plan USAEC PFAS PA/SI Active Army Installations, October 2019 (Arcadis).

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:

- Concentration (C) Qualifiers

  U The analyte was not detected and was reported as less than the LOD. The LOD has been adjusted for any dilution or concentration of the sample.

  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 reported result was an estimated value with an unknown bias.

  J+ The result was an estimated quantity, but the result may be biased high.

  J- The result was an estimated quantity, but the result may be biased low.

  UJ The analyte was not detected and was reported as less than the LOD. However, the associated numerical value is approximate.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  X The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

A 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.

PERFLUOROALKYL SUBSTANCES (PFAS) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
USEPA 537 Version 1.1	Drinking Water	14 days to extraction; 28 days from extraction to analysis	Trizma. Cool to <10 °C for first 48 hours.

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, instrument, and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Instrument blanks measure carryover in the instrument from one sample to another. Method blanks measure laboratory contamination. Equipment rinse 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 is calculated for QA blanks containing concentrations greater than the 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. Mass Calibration

Mass calibration and system performance were acceptable.

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The percent relative standard deviation (%RSD) of the response factors (RF) must be less than 20%, or for linear calibration, $r^2 \geq 0.99$. Analytes must be within 70-130% of their true value for each calibration standard.

All compounds associated with initial calibration were within the control limits.

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit of 30%.

All compounds associated with CCV %D were within control limits.

4.3 Instrument Sensitivity Check (ISC)

The ISC concentration must be at the LOQ. All target compounds associated with the ISC must exhibit a percent recovery (%R) of 50 to 150%.

All compounds associated with ISC recoveries were within control limits.

4.4 Ion Transitions

Quantitation of analytes must use the ion transitions documented in DoD QSM 5.1 Table B-15.

The ion transitions were as specified in DoD QSM 5.1.

5. Isotopically labeled Standards

5.1 Surrogates (Extracted Internal Standards)

Labeled standards must be added to all field samples and QC samples prior to extraction. The surrogate recoveries associated with EPA method 537 version 1.1 must be within 70% to 130% of the true value.

All surrogate recoveries were within control limits.

5.2 Injection Internal Standards

Injection internal standards must be added to the aliquot of sample dilutions, QC samples, and standards just prior to analysis. Peak areas must be within -50% to +50% of the area measured in the ICAL midpoint standard. On days when ICAL is not performed, the peak areas must be within -50% to +50% of the peak area measured in daily initial CCV.

All internal standard responses were within control limits.

6. 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 the EPA method 537 version 1.1 specified acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must be
≤ 30%.

The MS/MSD analysis performed on sample location FTRI-OPR-R-102820 exhibited recoveries and RPD between recoveries within the control limits.

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within EPA method 537 version 1.1 acceptance limits of 70 to 130%.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

8. 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 35% for water matrices and 50% for soils 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 LOQ, a control limit of two times the LOQ is applied for water matrices and three time the LOQ for soil matrices.

Results for field duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
FTRI-OPR-Q-102820/ FTRI-FD-2-102820	Perfluorohexanesulfonic acid	0.44 J	1.3 U	AC
	Perfluorooctanesulfonic acid	0.45 J	0.47 J	

Notes:
AC Acceptable

The calculated results between the parent sample and field duplicate were acceptable.

9. Compound Identification

PFC analytes are identified by using the compound's ion abundance ratios, signal-to-noise values, and relative retention times.

All identified compounds met method criteria.

10. 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: EPA 537 Version 1.1	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)					
Stage 2 Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
C. Field 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	
Surrogate %R		X		X	
Injection Internal Standard %R		X		X	
Dilution Factor		X		X	
Moisture Content	X				X
Stage 3/4 Validation					
Instrument tune and performance check		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X		X	
Instrument sensitivity check		X		X	
Ion transitions used		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	

PFAS: EPA 537 Version 1.1	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)					
D. Transcription/calculations acceptable		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

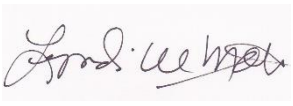
%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Lyndi Mott, Arcadis

SIGNATURE: 

DATE: November 13, 2020

PEER REVIEW: Jeffrey L. Davin, Arcadis

DATE: November 16, 2020

Stage 3 / 4
PFAS Calibration Standards %D

SDG #: 410-18975-1 Date: 11/13/2020
Lab: Eurofins Lancaster Page: 1
Project: Ft Riley PFAS PA/SI Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

PFOS 11/06/2020 Calibration Page 178 of 410-18975-1

Cal Conc	Std Area	IS Area	13C4-PFOS IS Conc	Area Ratio	Slope	Calc Amount	Tvalue	Calculated % D	Reported % D	
0.463	86191	5600917	28.68	0.015389	1.0106	0.43672	0.463	-5.676	-5.6	MATCH
0.926	165430	5280078	28.68	0.031331	1.0106	0.889147	0.926	-3.980	-3.9	MATCH
2.31	431572	5519276	28.68	0.078194	1.0106	2.21907	2.31	-3.936	-4.1	MATCH
4.63	885383	5610165	28.68	0.157818	1.0106	4.478735	4.63	-3.267	-3.2	MATCH
18.5	3676558	5544855	28.68	0.663058	1.0106	18.81703	18.5	1.714	1.7	MATCH

Concentration ng/L = (Peak area ratio/Slope) x DF x IS concentration

Stage 3 / 4
PFAS ICV CCV Standards %D

SDG #: 410-18975-1 Date: 11/13/2020
Lab: Eurofins Lancaster Page: 2
Project: Ft Riley PFAS PA/SI Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

ICV 410-63136 3 11/06/2020 22:18 Page 247 of 410-18975-1

Analyte	Analyte Area	IS Area	IS Conc	Area Ratio	Slope	Calc Amount	Tvalue	Calculated % D	Reported % D	
PFHxS	553369	5762280	28.68	0.096033	1.1431	2.409436	2.36	2.095	1.9	Match
PFOS	445875	5762280	28.68	0.077378	1.0106	2.195931	2.39	-8.120	-8.1	Match

Concentration ng/L = (Peak area ratio/Slope) x DF x IS concentration

Stage 3 / 4
PFAS LCS

SDG #: 410-18975-1 Date: 11/13/2020
Lab: Eurofins Lancaster Page: 3
Project: Ft Riley PFAS PA/SI Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

LCS ID Batch 62733 Page 113 of 410-18975-1
ANALYTE PFOS
REPORTED LCS %R 108
REPORTED LCSD %R NA
REPORTED RPD NA

$$\%R = \frac{100 * \text{LCS Concentration}}{\text{LCS TV}} \qquad RPD = \frac{100 * |\text{LCS \%R} - \text{LCSD \%R}|}{\text{Average of LCS LCSD \%R}}$$

LCS Concentration 80.2 LCS %R 108.3784 MATCH
LCSD Concentration
LCS TV 74
LCSD TV

Stage 3 / 4
PFAS MS/MSD

SDG #: 410-18975-1 Date: 11/13/2020
Lab: Eurofins Lancaster Page: 4
Project: Ft Riley PFAS PA/SI Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

MS/MSD Sample ID	FTRI-OPR-R-102820
ANALYTE	PFOS
REPORTED MS %R	107
REPORTED MSD %R	111
REPORTED RPD	7

Page 114-115 of 410-410-18975-1

$$\%R = \frac{100 * (\text{MS Conc} - \text{Sample Conc})}{\text{MS TV}} \qquad RPD = \frac{100 * |\text{MS \%R} - \text{MSD \%R}|}{\text{Average of MS MSD \%R}}$$

Sample Concentration	1.3 U			
MS Concentration	68.8	MS %R	106.67	MATCH
MSD Concentration	73.5	MSD %R	110.69	MATCH
MS TV	64.5	RPD	6.61	MATCH
MSD TV	66.4			

Stage 3 / 4
PFAS Sample Concentration

SDG #: 410-18975-1 Date: 11/13/2020
Lab: Eurofins Lancaster Page: 5
Project: Ft Riley PFAS PA/SI Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

FTRI-OPR-Q-102820 Lab ID: 410-18975-1 Page 126 of SDG 410-18975-1
FV= 1ml

Analyte	Analyte Area	IS Area	IS Conc	Area Ratio	Slope	Calculated Amount ng/ml	Sample Volume mls	Calculated ng/L	Reported Value ng/L	
PFHxS	25172	5005034	28.68	0.005029	1.1431	0.13	287	0.44	0.44 J	Match
PFOS	22666	5005034	28.68	0.004529	1.0106	0.13	287	0.45	0.45 J	Match

Concentration ng/ml = (Peak area ratio/Slope) x DF x IS concentration
Concentration ng/L = concentration ng/ml / (sample volume/1000)

Stage 3 / 4
PFAS Surrogate

SDG #: 410-18975-1 Date: 11/13/2020
Lab: Eurofins Lancaster Page: 6
Project: Ft Riley PFAS PA/SI Validated by: LWM

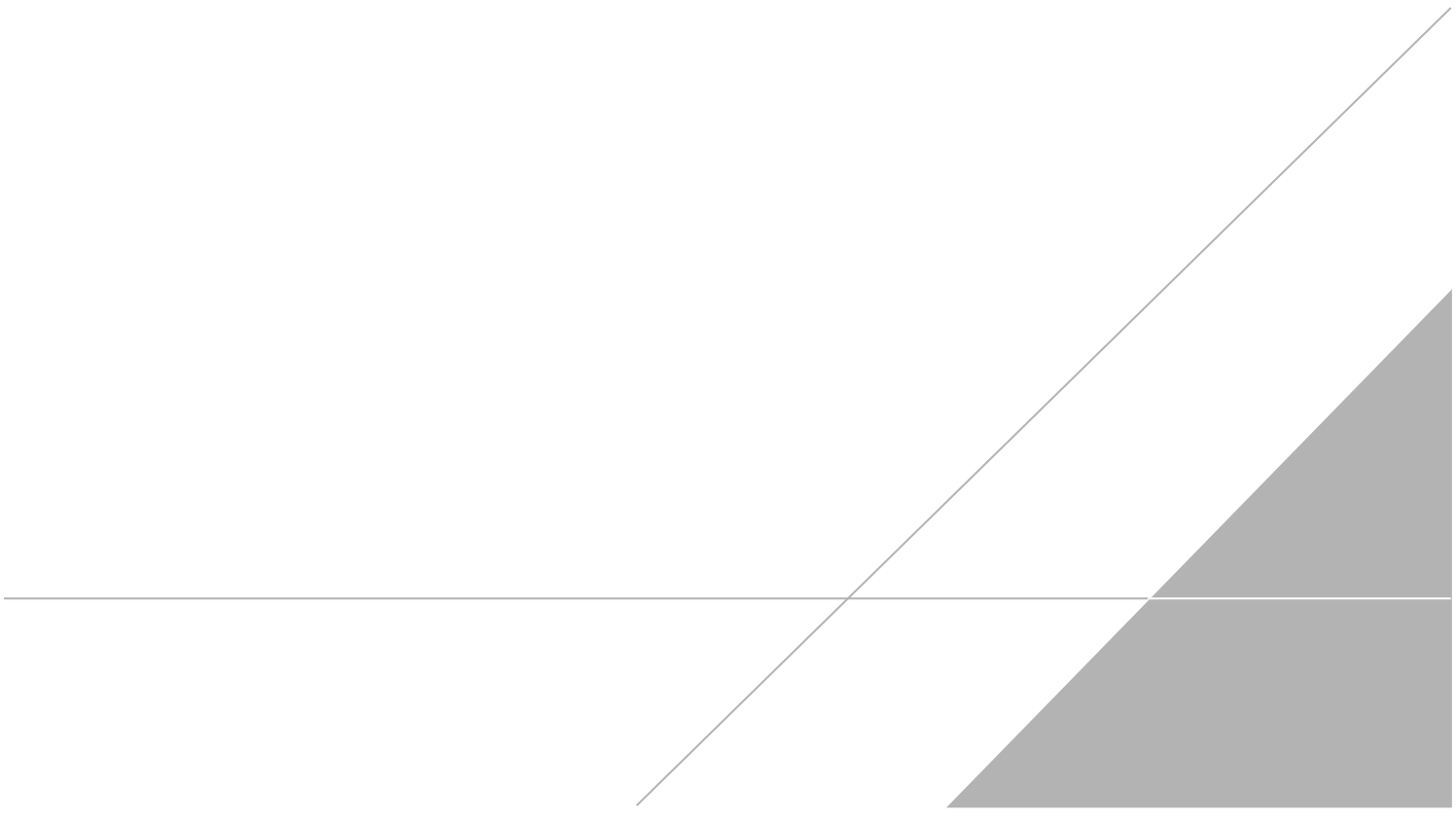
Method: EPA modified 537 per DoD QSM 5.3

FTRI-OPR-Q-102820 Lab ID: 410-18975-1
Surrogate 13C2 PFHxA
REPORTED %R 79

$$\%R = \frac{100 * \text{Surr Concentration}}{\text{Surr TV}}$$

Surr Concentration 7.95
Surr TV 10.0
%R 79.5 MATCH

POST-VALIDATION CHAIN OF CUSTODY AND SAMPLE ANALYSIS DATA SHEETS



Environmental Ana ain of Custody

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410-18975 Chain of Custody

boratories Environmental use only #227 Kansas City SC

Sample # _____

COC # 613659

Client Information

Client: USACE Baltimore PFAS PA/SI	Acct. #: —
Project Name/#: Fort Riley / 30059933	PWSID #: —
Project Manager: Britt Phillips	P.O. #: 30059933
Sampler: Sandy Conard	Quote #: —
State where samples were collected: Kansas	For Compliance: Yes ☐ No ☒

For Lab Use Only
FSC: _____
SCR#: _____

Preservation Codes
H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 P=H_3PO_4
F=Field Filtered O=Other Trizma

Remarks
Page 1 of 2

Sample Identification	Collected Date	Collected Time	Grab	Composite	Matrix: Soil ☐ Sediment ☐ Tissue ☐	Water: Potable ☒ Ground ☐ NPDES ☐ Surface ☐	Other:	Total # of Containers	Analysis Requested: Preservation and Filtration Codes: O	PFAS Method 537.1
FTRI-OPR-P-102820	10-28-2020	0913	X			X		2		X
FTRI-OPR-Q-102820		0953	X			X		2		X
FTRI-OPR-R-102820		1023	X			X		2		X
FTRI-MS-102820		1023	X			X		2		X
FTRI-MSD-102820		1023	X			X		2		X
FTRI-OPR-S-102820		1108	X			X		2		X
FTRI-OPR-C-102820		1320	X			X		2		X
FTRI-OPR-T-102820		1610	X			X		2		X
FTRI-OPR-U-102820		1620	X			X		2		X
FTRI-Field Blank-4-102820	↓	1200	X					2		X

* Pres included in lab Provided PFAS Free Water

Turnaround Time (TAT) Requested (please circle)
Standard Rush
(Rush TAT is subject to laboratory approval and surcharge.)

Requested TAT in business days:
E-mail address: Britt.Phillips@arcadis.com, Ted.Wall@arcadis.com, Rebecca.Ingwers@arcadis.com, USACE.PFAS@arcadis.com

Data Package Options (circle if required)
Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)
Type III (Reduced non-CLP) NJ DKQP TX TRRP-13
NYSDEC Category A or B MA MCP CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Sandy Conard	10-29-2020	1425	Brian Beck	10-29-20	1425
Brian Beck	10-29-20	1505			
			CM Wall	10/30/20	10:54

EDD Required? (Yes) No
If yes, format: EQuIS 6

Site-Specific QC (MS/MSD/Dup)? (Yes) No
(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS _____ FedEx _____ Other EuroFins

Temperature upon receipt 0.5 / °C 0.7

Environmental Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only

Acct. # _____ Group # _____ Sample # _____ #227 Kansas City SC COC #613658

Client Information

Client: USACE Baltimore PFAS PA/SI	Acct. #: —
Project Name/#: Fort Riley / 30059933	PWSID #: —
Project Manager: Britt Phillips	P.O. #: 30059933
Sampler: Sandy Conard	Quote #: —
State where samples were collected: Kansas	For Compliance: Yes ☐ No ☒

Matrix

Soil ☐ Sediment ☐ Tissue ☐ | Water: Potable ☒ Ground ☐ NPDES ☐ Surface ☐ | Other: ___

Analysis Requested

Preservation and Filtration Codes

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	P	PFAS Method 537.1
FTRI-OPR-DUP-2-102820	10-28-2020	—	X		2	X	X

For Lab Use Only

FSC: _____

SCR#: _____

Preservation Codes

H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 P=H_3PO_4
F=Field Filtered O=Other Trizma

Remarks

Page 2 of 2

Turnaround Time (TAT) Requested (please circle)

(Standard) Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Requested TAT in business days: _____

E-mail address: Britt.Phillips@arcadis.com, Ted.Wall@arcadis.com, Rebecca.Ingwers@arcadis.com, USACE.PFAS@arcadis.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) | Type VI (Raw Data Only)

Type III (Reduced non-CLP) | NJ DKQP | TX TRRP-13

NYSDEC Category A or B | MA MCP | CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Sandy Conard	10-29-2020	1425	Brian Beck	10-29-20	1425
Brian Beck	10-29-20	1525			
			CM Wus	10/30/20	10:54

EDD Required? (Yes) No

If yes, format: Equis 6

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS _____ FedEx _____ Other Euro Fins

Temperature upon receipt 0.5 / °C 0.7

Eurofins Lancaster Laboratories Environmental, LLC • 2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • FOR HELP COMPLETING FORM CHECK OUT https://www.eurofinsus.com/coc

The white copy should accompany samples to Eurofins Lancaster Laboratories Environmental. The yellow copy should be retained by the client.

7044 0919

JR

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 410-18975-1

Login Number: 18975
List Number: 1
Creator: Rivera-Santa, Julissa

List Source: Eurofins Lancaster Laboratories Env

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	False	IDs on containers do not match the COC. Logged in per COC.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	N/A	
Is the Field Sampler's name present on COC?	True	
Sample Preservation Verified.	N/A	
Residual Chlorine Checked.	N/A	
Sample custody seals are intact.	N/A	

Definitions/Glossary

Client: ARCADIS U.S., Inc.
Job ID: 410-18975-1
Project/Site: Fort Riley / 30059933

Qualifiers

LCMS

Qualifier	Qualifier Description
E	Result exceeded calibration range.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
M	Manual integrated compound.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client Sample ID: FTRI-OPR-P-102820

Date Collected: 10/28/20 09:13
Date Received: 10/30/20 10:54

Lab Sample ID: 410-18975-1
Matrix: Drinking Water

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
NEtFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
NMeFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 04:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*88*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:32*	*1*
13C2 PFDA	*88*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:32*	*1*
13C2 PFHxA	*93*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:32*	*1*
13C3 HFPO-DA	*93*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:32*	*1*

Client Sample ID: FTRI-OPR-Q-102820

Date Collected: 10/28/20 09:53
Date Received: 10/30/20 10:54

Lab Sample ID: 410-18975-2
Matrix: Drinking Water

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorooctanoic acid	<1.3	M	1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorohexanesulfonic acid	**0.44**	**J**	1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorooctanesulfonic acid	**0.45**	**J M**	1.7	1.3	0.44	ng/L		11/07/20 04:43	1
NEtFOSAA	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
NMeFOSAA	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.44	ng/L		11/07/20 04:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*82*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:43*	*1*
13C2 PFDA	*73*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:43*	*1*
13C2 PFHxA	*79*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:43*	*1*
13C3 HFPO-DA	*81*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:43*	*1*

Client Sample ID: FTRI-OPR-R-102820

Date Collected: 10/28/20 10:23
Date Received: 10/30/20 10:54

Lab Sample ID: 410-18975-3
Matrix: Drinking Water

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 04:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*98*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:55*	*1*
13C2 PFDA	*81*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:55*	*1*
13C2 PFHxA	*92*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:55*	*1*
13C3 HFPO-DA	*98*		*70 - 130*	*11/05/20 17:43*	*11/07/20 04:55*	*1*

Client Sample ID: FTRI-OPR-S-102820

Date Collected: 10/28/20 11:08
Date Received: 10/30/20 10:54

Lab Sample ID: 410-18975-4
Matrix: Drinking Water

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
NEtFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
NMeFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*97*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:30*	*1*
13C2 PFDA	*103*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:30*	*1*
13C2 PFHxA	*91*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:30*	*1*
13C3 HFPO-DA	*90*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:30*	*1*

Client Sample ID: FTRI-OPR-C-102820

Lab Sample ID: 410-18975-5

Date Collected: 10/28/20 13:20

Matrix: Drinking Water

Date Received: 10/30/20 10:54

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorooctanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorooctanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
NEtFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
NMeFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 05:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*97*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:41*	*1*
13C2 PFDA	*93*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:41*	*1*
13C2 PFHxA	*88*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:41*	*1*
13C3 HFPO-DA	*89*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:41*	*1*

Client Sample ID: FTRI-OPR-T-102820

Lab Sample ID: 410-18975-6

Date Collected: 10/28/20 16:10

Matrix: Drinking Water

Date Received: 10/30/20 10:54

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 05:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*96*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:53*	*1*
13C2 PFDA	*91*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:53*	*1*
13C2 PFHxA	*87*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:53*	*1*
13C3 HFPO-DA	*86*		*70 - 130*	*11/05/20 17:43*	*11/07/20 05:53*	*1*

Client Sample ID: FTRI-OPR-U-102820

Lab Sample ID: 410-18975-7

Date Collected: 10/28/20 16:20

Matrix: Drinking Water

Date Received: 10/30/20 10:54

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*87*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:04*	*1*
13C2 PFDA	*94*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:04*	*1*
13C2 PFHxA	*90*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:04*	*1*
13C3 HFPO-DA	*88*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:04*	*1*

Client Sample ID: FTRI-FB-4-102820

Lab Sample ID: 410-18975-8

Date Collected: 10/28/20 12:00

Matrix: Drinking Water

Date Received: 10/30/20 10:54

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
NEtFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
NMeFOSAA	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.44	ng/L		11/07/20 06:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*100*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:16*	*1*
13C2 PFDA	*99*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:16*	*1*
13C2 PFHxA	*91*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:16*	*1*
13C3 HFPO-DA	*89*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:16*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-18975-1

Client Sample ID: FTRI-FD-2-102820

Date Collected: 10/28/20 00:00
Date Received: 10/30/20 10:54

Lab Sample ID: 410-18975-9

Matrix: Drinking Water

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluoroheptanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorooctanoic acid	<1.3	M	1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorononanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorodecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorotridecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorotetradecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorobutanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorohexanesulfonic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorooctanesulfonic acid	**0.47**	**J**	1.7	1.3	0.43	ng/L		11/07/20 06:39	1
NEtFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
NMeFOSAA	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluoroundecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1
Perfluorododecanoic acid	<1.3		1.7	1.3	0.43	ng/L		11/07/20 06:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*91*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:39*	*1*
13C2 PFDA	*90*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:39*	*1*
13C2 PFHxA	*90*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:39*	*1*
13C3 HFPO-DA	*88*		*70 - 130*	*11/05/20 17:43*	*11/07/20 06:39*	*1*

ARCADIS Design & Consultancy for natural and built assets

Fort Riley PFAS PA/SI

DATA REVIEW

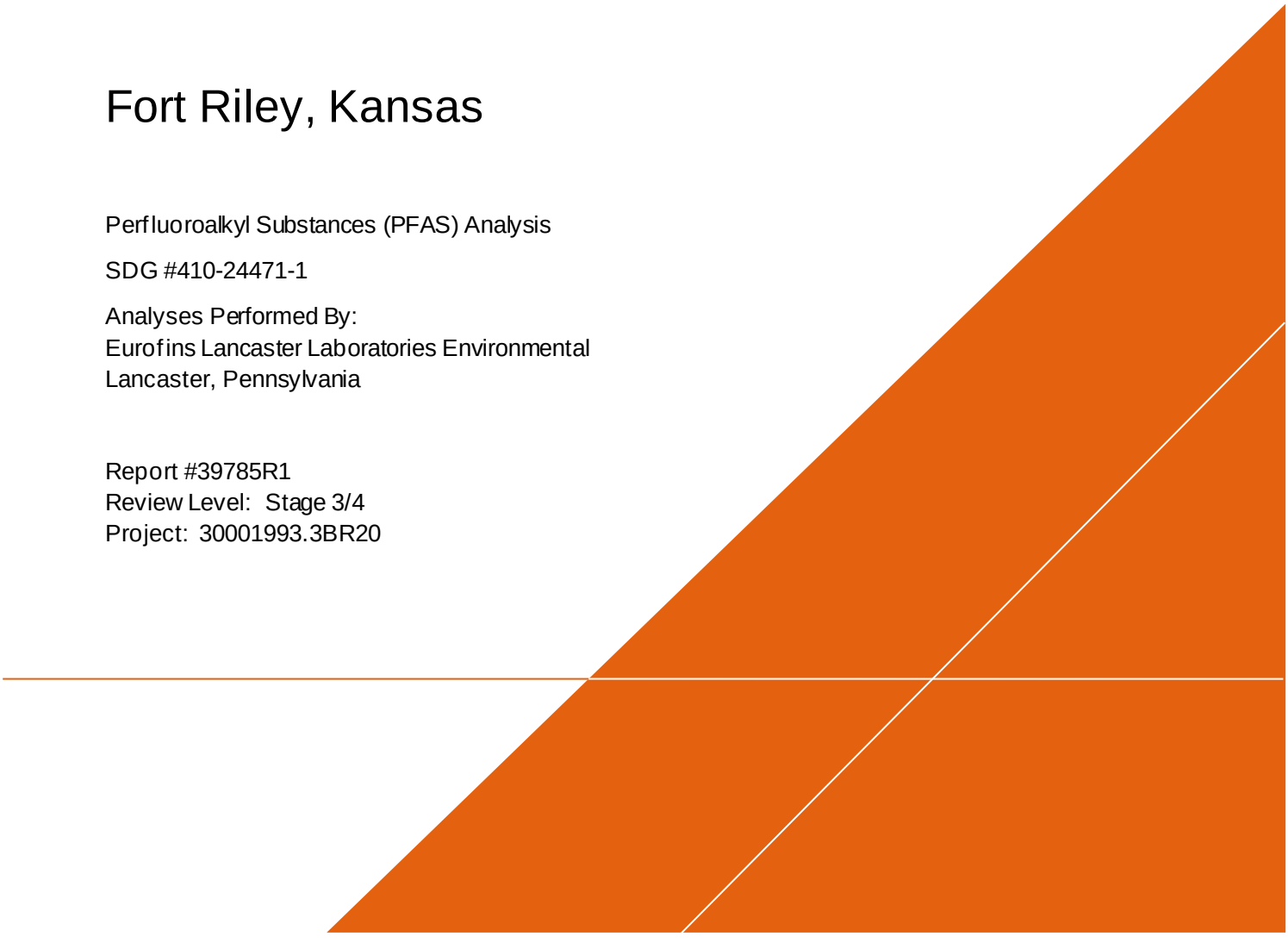
Fort Riley, Kansas

Perfluoroalkyl Substances (PFAS) Analysis

SDG #410-24471-1

Analyses Performed By:
Eurofins Lancaster Laboratories Environmental
Lancaster, Pennsylvania

Report #39785R1
Review Level: Stage 3/4
Project: 30001993.3BR20



SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # 410-24471-1 for samples collected in association with the Fort Riley Site. The review was conducted as a Stage 3/4 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	TOC	MISC
FTRI-OPR-V-121620	410-24471-1	Drinking Water	12/16/2020		X		
FTRI-OPR-W-121620	410-24471-2	Drinking Water	12/16/2020		X		
FTRI-OPR-DUP-3-121620	410-24471-3	Drinking Water	12/16/2020	FTRI-OPR-V-121620	X		
FTRI-Field Blank-5-121620	410-24471-4	Drinking Water	12/16/2020		X		

Note:

1. Stage 4 validation was performed on sample location FTRI-OPR-V-121620.
2. Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location FTRI-OPR-W-121620.

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) method 537 version 1.1 for drinking water. Data were reviewed in accordance with USEPA Method 537, ELLE SOP T-PFAS-WI25232, USEPA Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537, EPA 910-R-18-001, November 2018, Department of Defense (DoD) Quality Systems Manual (QSM) 5.1.1 and 5.3, DoD General Data Validation Guidelines, November 2019, and Final Programmatic Uniform Federal Policy-Quality Assurance Project Plan USAEC PFAS PA/SI Active Army Installations, October 2019 (Arcadis).

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:

- Concentration (C) Qualifiers

  U The analyte was not detected and was reported as less than the LOD. The LOD has been adjusted for any dilution or concentration of the sample.

  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 reported result was an estimated value with an unknown bias.

  J+ The result was an estimated quantity, but the result may be biased high.

  J- The result was an estimated quantity, but the result may be biased low.

  UJ The analyte was not detected and was reported as less than the LOD. However, the associated numerical value is approximate.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  X The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

A 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.

PERFLUOROALKYL SUBSTANCES (PFAS) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
USEPA 537 Version 1.1	Drinking Water	14 days to extraction; 28 days from extraction to analysis	Trizma. Cool to <10 °C for first 48 hours.

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, instrument, and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Instrument blanks measure carryover in the instrument from one sample to another. Method blanks measure laboratory contamination. Equipment rinse 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 is calculated for QA blanks containing concentrations greater than the 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. Mass Calibration

Mass calibration and system performance were acceptable.

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The percent relative standard deviation (%RSD) of the response factors (RF) must be less than 20%, or for linear calibration, $r^2 \geq 0.99$. Analytes must be within 70-130% of their true value for each calibration standard.

All compounds associated with initial calibration were within the control limits.

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit of 30%.

All compounds associated with CCV %D were within control limits.

4.3 Instrument Sensitivity Check (ISC)

The ISC concentration must be at the LOQ. All target compounds associated with the ISC must exhibit a percent recovery (%R) of 50 to 150%.

All compounds associated with ISC recoveries were within control limits.

4.4 Ion Transitions

Quantitation of analytes must use the ion transitions documented in DoD QSM 5.1 Table B-15.

The ion transitions were as specified in DoD QSM 5.1.

5. Isotopically labeled Standards

5.1 Surrogates

Labeled standards must be added to all field samples and QC samples prior to extraction. The surrogate recoveries associated with EPA method 537 version 1.1 must be within 70% to 130% of the true value.

All surrogate recoveries were within control limits.

5.2 Injection Internal Standards

Injection internal standards must be added to the aliquot of sample dilutions, QC samples, and standards just prior to analysis. Peak areas must be within -50% to +50% of the area measured in the ICAL midpoint standard. When ICAL is not performed, the peak areas must be within -50% to +50% of the peak area measured in daily initial CCV.

All internal standard responses were within control limits.

6. 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 the EPA method 537 version 1.1 specified acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must be
≤ 30%.

Sample locations associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

Sample Locations	Compound	MS Recovery	MSD Recovery
FTRI-OPR-W-121620	Perfluorobutanesulfonic acid	<LL but >10%	AC
	Perflurohexanesulfonic acid	<LL but >10%	AC

Note:
AC Acceptable
LL Lower control limit

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J+

Control Limit	Sample Result	Qualification
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J-
< 10%	Non-detect	X
	Detect	J-
SR>4X: Parent sample concentration > four times the MS/MSD spiking solution concentration.	Detect	No Action
	Non-detect	

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within EPA method 537 version 1.1 acceptance limits of 70 to 130%.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

8. 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 35% for water matrices and 50% for soils 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 LOQ, a control limit of two times the LOQ is applied for water matrices and three time the LOQ for soil matrices.

Results for field duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
FTRI-OPR-V-121620/ FTRI-OPR-DUP-3-121620	Perfluorohexanoic acid	160	120	28.6%
	Perfluoroheptanoic acid	40	26	42.4%
	Perfluorooctanoic acid	110	85	25.6%
	Perfluorononanoic acid	0.68 J	0.47 J	AC
	Perfluorobutanesulfonic acid	61	56	8.5%
	Perfluorohexanesulfonic acid	230	170	30.0%
	Perfluorooctanesulfonic acid	18	16	11.8%

Notes:
AC Acceptable

The compound perfluoroheptanoic acid associated with sample locations FTRI-OPR-V-121620 and FTRI-OPR-DUP-3-121620 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.

9. Compound Identification

PFC analytes are identified by using the compound's ion abundance ratios, signal-to-noise values, and relative retention times.

All identified compounds met method criteria.

Note a number of results were manually integrated which were spot checked. The manual quantitation (M) laboratory qualifier has been preserved with the data as informational data for the end user; there was no impact on the data usability.

10. 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: EPA 537 Version 1.1	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)					
Stage 2 Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
C. Field 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		
Surrogate %R		X		X	
Injection Internal Standard %R		X		X	
Dilution Factor		X		X	
Moisture Content	X				X
Stage 3/4 Validation					
Instrument tune and performance check		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X		X	
Instrument sensitivity check		X		X	
Ion transitions used		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	

PFAS: EPA 537 Version 1.1	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)					
D. Transcription/calculations acceptable		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

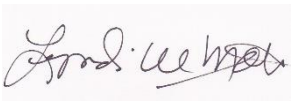
%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Lyndi Mott, Arcadis

SIGNATURE: 

DATE: January 5, 2021

PEER REVIEW: Dennis Capria, Arcadis

DATE: January 6, 2021

Stage 3 / 4
PFAS Calibration Standards %D

SDG #: 410-24471-1 Date: 1/5/2021
Lab: Eurofins Lancaster Page: 1
Project: Ft Riley PFAS PA/SI Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

PFOA 12/19/2020 Calibration Page 171 of 410-24471-1

Cal Conc	Std Area	IS Area	13C2-PFOA IS Conc	Area Ratio	Slope	Calc Amount	Tvalue	Calculated % D	Reported % D	
0.5	267104	5270650	10	0.050678	0.9106	0.55653	0.5	11.306	11.3	MATCH
1	429790	4934565	10	0.087098	0.9106	0.956489	1	-4.351	-4.3	MATCH
2.5	1106535	4880231	10	0.226738	0.9106	2.489987	2.5	-0.401	-0.4	MATCH
5	2434961	5252202	10	0.463608	0.9106	5.091233	5	1.825	1.8	MATCH
20	8965063	4946191	10	1.812519	0.9106	19.90466	20	-0.477	-0.5	MATCH

Concentration ng/L = (Peak area ratio/Slope) x DF x IS concentration

Stage 3 / 4
PFAS ICV CCV Standards %D

SDG #: 410-24471-1 Date: 1/5/2021
Lab: Eurofins Lancaster Page: 2
Project: Ft Riley PFAS PA/SI Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

ICV 410-78400/8 12/19/2020 13:37 Page 452 of 410-24471-1

Analyte	Analyte Area	IS Area	IS Conc	Area Ratio	Slope	Calc Amount	Tvalue	Calculated % D	Reported % D	
PFHxA	673390	5205744	10	0.129355	0.5653	2.288257	2.5	-8.470	-8.5	Match
PFOA	1065539	5205744	10	0.204685	0.9106	2.247806	2.5	-10.088	-10.1	Match
PFOS	163071	2453687	28.68	0.06646	1.0165	1.875121	2.39	-21.543	-21.5	Match

Concentration ng/L = (Peak area ratio/Slope) x IS concentration

Stage 3 / 4
PFAS LCS

SDG #: 410-24471-1 Date: 1/5/2021
Lab: Eurofins Lancaster Page: 3
Project: Ft Riley PFAS PA/SI Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

LCS ID LCS 410-78673/2-A
Page 113 of 410-24471-1
ANALYTE PFOS
REPORTED LCS %R 104
REPORTED LCSD %R NA
REPORTED RPD NA

$$\%R = \frac{100 * \text{LCS Concentration}}{\text{LCS TV}} \qquad RPD = \frac{100 * |\ \text{LCS \%R} - \text{LCSD \%R}\ |}{\text{Average of LCS LCSD \%R}}$$

LCS Concentration 76.9
LCSD Concentration
LCS TV 74
LCSD TV

LCS %R 103.92 MATCH

Stage 3 / 4
PFAS MS/MSD

SDG #: 410-24471-1 Date: 1/5/2021
Lab: Eurofins Lancaster Page: 4
Project: Ft Riley PFAS PA/SI Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

MS/MSD Sample ID	FTRI-OPR-W-121620
ANALYTE	PFOA
REPORTED MS %R	79
REPORTED MSD %R	83
REPORTED RPD	4

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$$\%R = \frac{100 * (\text{MS Conc} - \text{Sample Conc})}{\text{MS TV}} \qquad RPD = \frac{100 * |\text{MS \%R} - \text{MSD \%R}|}{\text{Average of MS MSD \%R}}$$

Sample Concentration	3.1			
MS Concentration	17.7	MS %R	78.92	MATCH
MSD Concentration	18.4	MSD %R	83.15	MATCH
MS TV	18.5	RPD	3.88	MATCH
MSD TV	18.4			

Stage 3 / 4
PFAS Sample Concentration

SDG #: 410-24471-1 Date: 1/5/2021
Lab: Eurofins Lancaster Page: 5
Project: Ft Riley PFAS PA/SI Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

FTRI-OPR-V-121620 Lab ID: 410-24471-1 Page 128 of SDG 410-24471-1
FV= 1ml

Analyte	Analyte Area	IS Area	IS Conc	Area Ratio	Slope	Calculated Amount ng/ml	Sample Volume mls	Dilution Factor	Calculated ng/L	Reported Value ng/L	
PFHxA	1198559	4323083	10	0.277246	0.6995	3.96	242.2	10	163.65	160	Match
PFOA	1091107	4323083	10	0.252391	0.9106	2.77	242.2	10	114.44	110	Match
PFOS	365745	2364362	28.68	0.154691	1.0165	4.36	242.2	1	18.02	18	Match

Concentration ng/ml = (Peak area ratio/Slope) x IS concentration
Concentration ng/L = concentration ng/ml / (sample volume/1000) x DF

Stage 3 / 4
PFAS Surrogate

SDG #:	410-24471-1	Date:	1/5/2021
Lab:	Eurofins Lancaster	Page:	6
Project:	Ft Riley PFAS PA/SI	Validated by:	LWM

Method: EPA modified 537 per DoD QSM 5.3

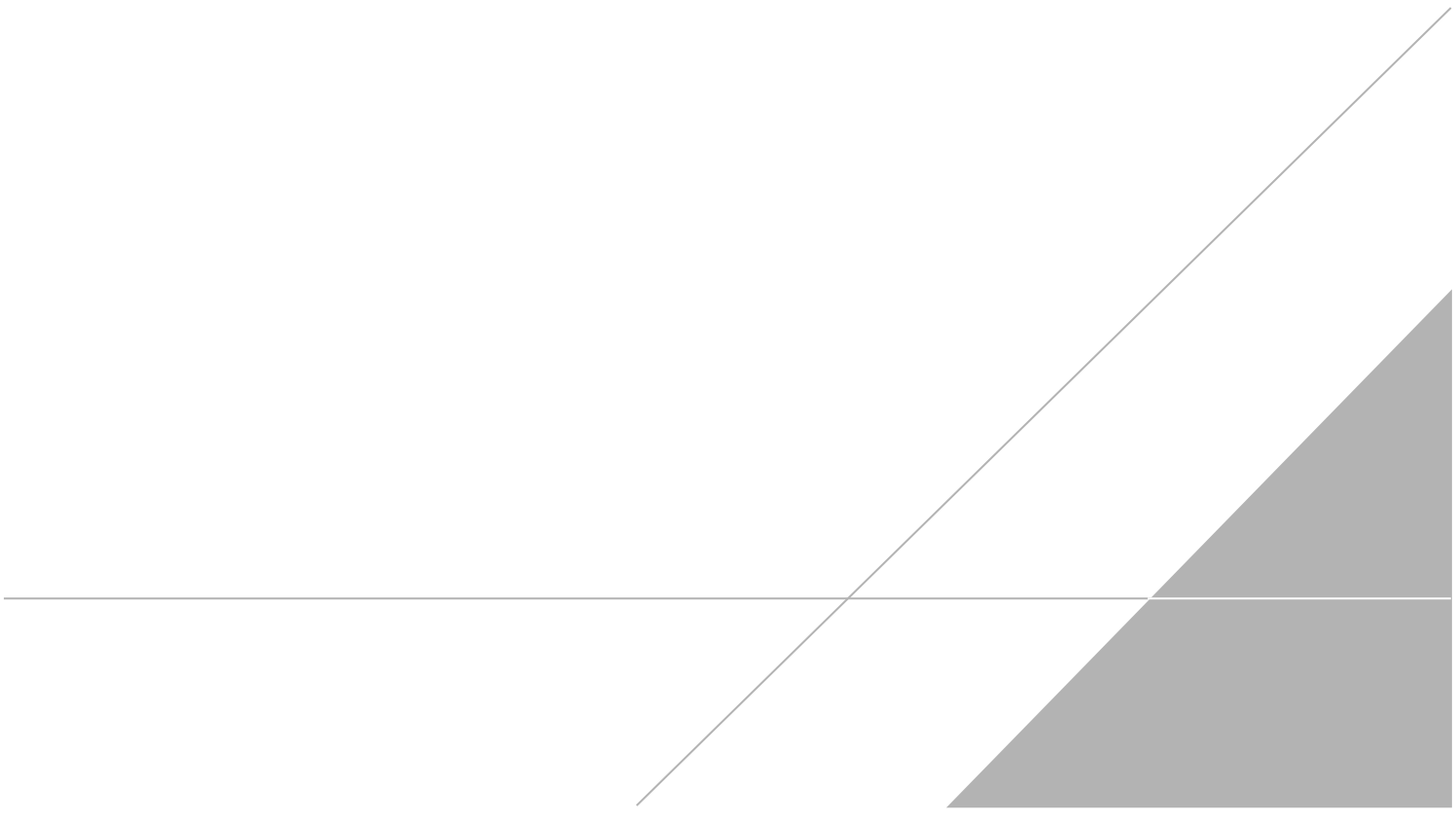
FTRI-OPR-V-121620 Lab ID: 410-24471-1 DF=10

Surrogate	13C2 PFHxA
REPORTED %R	98

$$\%R = \frac{100 * \text{Surr Concentration}}{\text{Surr TV}}$$

Surr Concentration	9.814	
Surr TV	10.0	
%R	98.1	MATCH

POST-VALIDATION CHAIN OF CUSTODY AND SAMPLE ANALYSIS DATA SHEETS



Environmental Analysis Request/Chain of

eurofins | Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Envi

Acct. # _____ Group # _____ Sample #

410-24471 Chain of Custody

COC # 613657

Client Information

Client: USACE Baltimore PFAS PA/SI	Acct. #: —
Project Name/#: Fort Riley / 30059933	PWSID #:
Project Manager: Britt Phillips	P.O. #: 30059933
Sampler: Sandy Conard	Quote #: —
State where samples were collected: Kansas	For Compliance: Yes ☐ No ☒

Matrix

Soil ☐ Sediment ☐ Tissue ☐ | Water: Potable ☐ Ground ☒ NPDES ☐ Surface ☐ | Other:

Analysis Requested

Preservation and Filtration Codes

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	PFAS Method 537.1
✓ FTRI-OPR-V-121620	12/16/20	1441	X		2	X
✓ FTRI-OPR-W-121620	1	1504	X		2	X
✓ FTRI-MS-121620		1504	X		2	X
✓ FTRI-MSD-121620	↓	1504	X		2	X
✓ FTRI-OPR-DUP-3-121620	12/16/20	—	X		2	X
✓ FTRI-Field Blank-5-121620	12/16/20	1530	X		2	X

For Lab Use Only

FSC: _____

SCR#: 269092

Preservation Codes

H=HCl	T=Thiosulfate
N=HNO_3	B=NaOH
S=H_2SO_4	P=H_3PO_4
F=Field Filtered	O=Other

Remarks

#227

~~Kansas City SC~~

~~* Pres included in Lab provided PFAS Free Water~~ SC

Turnaround Time (TAT) Requested (please circle)

Standard | Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Requested TAT in business days: _____

E-mail address: Britt.Phillips@arcadis.com, Ted.Wall@arcadis.com, Rebecca.Ingwers@arcadis.com, USACE.PFAS@arcadis.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP)	Type VI (Raw Data Only)	
Type III (Reduced non-CLP)	NJ DKQP	TX TRRP-13
NYSDEC Category A or B	MA MCP	CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Ian T. Nutt	12-16-20	1210	Sandy Conard	12-18-2020	1500
Sandy Conard	12-17-2020	1145	Britt Black	12-18-20	1150

EDD Required? (Yes) No

If yes, format: EQuIS

Site-Specific QC (MS/MSD/Dup)? (Yes) No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS ____ FedEx ____ Other Euro Fins

Temperature upon receipt 0.5 °C

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 410-24471-1

Login Number: 24471
List Number: 1
Creator: Sanchez, Melvin E

List Source: Eurofins Lancaster Laboratories Env

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	N/A	
Is the Field Sampler's name present on COC?	True	
Sample Preservation Verified.	N/A	
Residual Chlorine Checked.	N/A	
Sample custody seals are intact.	N/A	

Definitions/Glossary

Client: ARCADIS U.S., Inc.
Job ID: 410-24471-1
Project/Site: Fort Riley / 30059933

Qualifiers

LCMS

Qualifier	Qualifier Description
D	The reported value is from a dilution.
E	Result exceeded calibration range.
FL	MS and/or MSD recovery below control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
M	Manual integrated compound.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client Sample ID: FTRI-OPR-V-121620

Lab Sample ID: 410-24471-1

Date Collected: 12/16/20 14:41

Matrix: Drinking Water

Date Received: 12/18/20 15:21

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluoroheptanoic acid	**40**	J	2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluorononanoic acid	**0.68**	**J**	2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluorodecanoic acid	<1.5		2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluorotridecanoic acid	<1.5		2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluorotetradecanoic acid	<1.5		2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluorobutanesulfonic acid	**61**		2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluorooctanesulfonic acid	**18**	**M**	2.1	1.5	0.52	ng/L		12/22/20 00:47	1
NEtFOSAA	<1.5		2.1	1.5	0.52	ng/L		12/22/20 00:47	1
NMeFOSAA	<1.5		2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluoroundecanoic acid	<1.5		2.1	1.5	0.52	ng/L		12/22/20 00:47	1
Perfluorododecanoic acid	<1.5		2.1	1.5	0.52	ng/L		12/22/20 00:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*99*		*70 - 130*	*12/21/20 06:46*	*12/22/20 00:47*	*1*
13C2 PFDA	*125*		*70 - 130*	*12/21/20 06:46*	*12/22/20 00:47*	*1*
13C2 PFHxA	*114*		*70 - 130*	*12/21/20 06:46*	*12/22/20 00:47*	*1*
13C3 HFPO-DA	*129*		*70 - 130*	*12/21/20 06:46*	*12/22/20 00:47*	*1*

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018 - DL

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	**160**	**D**	21	15	5.2	ng/L		12/23/20 15:30	10
Perfluorooctanoic acid	**110**	**D M**	21	15	5.2	ng/L		12/23/20 15:30	10
Perfluorohexanesulfonic acid	**230**	**D**	21	15	5.2	ng/L		12/23/20 15:30	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*91*		*70 - 130*	*12/21/20 06:46*	*12/23/20 15:30*	*10*
13C2 PFDA	*92*		*70 - 130*	*12/21/20 06:46*	*12/23/20 15:30*	*10*
13C2 PFHxA	*98*		*70 - 130*	*12/21/20 06:46*	*12/23/20 15:30*	*10*
13C3 HFPO-DA	*93*		*70 - 130*	*12/21/20 06:46*	*12/23/20 15:30*	*10*

Client Sample ID: FTRI-OPR-W-121620

Lab Sample ID: 410-24471-2

Date Collected: 12/16/20 15:04

Matrix: Drinking Water

Date Received: 12/18/20 15:21

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	**22**		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluoroheptanoic acid	**3.9**		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorooctanoic acid	**3.1**	**M**	1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorobutanesulfonic acid	**6.7**	FL J-	1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorohexanesulfonic acid	**31**	FL J-	1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorooctanesulfonic acid	**16**	**M**	1.8	1.3	0.45	ng/L		12/31/20 09:24	1
NEtFOSAA	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
NMeFOSAA	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 09:24	1

Client Sample ID: FTRI-OPR-W-121620

Lab Sample ID: 410-24471-2
Matrix: Drinking Water
Date Collected: 12/16/20 15:04
Date Received: 12/18/20 15:21

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
d5-NEtFOSAA	75		70 - 130	12/29/20 19:14	12/31/20 09:24	1
13C2 PFDA	84		70 - 130	12/29/20 19:14	12/31/20 09:24	1
13C2 PFHxA	74		70 - 130	12/29/20 19:14	12/31/20 09:24	1
13C3 HFPO-DA	78		70 - 130	12/29/20 19:14	12/31/20 09:24	1

Client Sample ID: FTRI-OPR-DUP-3-121620

Lab Sample ID: 410-24471-3
Matrix: Drinking Water
Date Collected: 12/16/20 00:00
Date Received: 12/18/20 15:21

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluoroheptanoic acid	**26**	J	1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluorononanoic acid	**0.47**	**J**	1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluorodecanoic acid	<1.4		1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluorotridecanoic acid	<1.4		1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluorotetradecanoic acid	<1.4		1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluorobutanesulfonic acid	**56**		1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluorooctanesulfonic acid	**16**	**M**	1.8	1.4	0.45	ng/L		12/31/20 09:58	1
NEtFOSAA	<1.4		1.8	1.4	0.45	ng/L		12/31/20 09:58	1
NMeFOSAA	<1.4		1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluoroundecanoic acid	<1.4		1.8	1.4	0.45	ng/L		12/31/20 09:58	1
Perfluorododecanoic acid	<1.4		1.8	1.4	0.45	ng/L		12/31/20 09:58	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
d5-NEtFOSAA	77		70 - 130	12/29/20 19:14	12/31/20 09:58	1
13C2 PFDA	99		70 - 130	12/29/20 19:14	12/31/20 09:58	1
13C2 PFHxA	82		70 - 130	12/29/20 19:14	12/31/20 09:58	1
13C3 HFPO-DA	91		70 - 130	12/29/20 19:14	12/31/20 09:58	1

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018 - DL

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	**120**	**D**	18	14	4.5	ng/L		01/04/21 15:07	10
Perfluorooctanoic acid	**85**	**D M**	18	14	4.5	ng/L		01/04/21 15:07	10
Perfluorohexanesulfonic acid	**170**	**D**	18	14	4.5	ng/L		01/04/21 15:07	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
d5-NEtFOSAA	92		70 - 130	12/29/20 19:14	01/04/21 15:07	10
13C2 PFDA	91		70 - 130	12/29/20 19:14	01/04/21 15:07	10
13C2 PFHxA	93		70 - 130	12/29/20 19:14	01/04/21 15:07	10
13C3 HFPO-DA	95		70 - 130	12/29/20 19:14	01/04/21 15:07	10

Client Sample ID: FTRI-Field Blank-5-121620

Lab Sample ID: 410-24471-4
Matrix: Drinking Water
Date Collected: 12/16/20 15:30
Date Received: 12/18/20 15:21

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorohexanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluoroheptanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorooctanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorononanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorodecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1

Client: ARCADIS U.S., Inc.
Project/Site: Fort Riley / 30059933

Job ID: 410-24471-1

Client Sample ID: FTRI-Field Blank-5-121620
Date Collected: 12/16/20 15:30
Date Received: 12/18/20 15:21

Lab Sample ID: 410-24471-4
Matrix: Drinking Water

Method: EPA 537.1 - EPA 537.1, Ver 1.0 Nov 2018 (Continued)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorotridecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorotetradecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorobutanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorohexanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorooctanesulfonic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
NEtFOSAA	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
NMeFOSAA	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluoroundecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1
Perfluorododecanoic acid	<1.3		1.8	1.3	0.45	ng/L		12/31/20 10:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d5-NEtFOSAA	*86*		*70 - 130*	*12/29/20 19:14*	*12/31/20 10:10*	*1*
13C2 PFDA	*96*		*70 - 130*	*12/29/20 19:14*	*12/31/20 10:10*	*1*
13C2 PFHxA	*85*		*70 - 130*	*12/29/20 19:14*	*12/31/20 10:10*	*1*
13C3 HFPO-DA	*88*		*70 - 130*	*12/29/20 19:14*	*12/31/20 10:10*	*1*

Attachment 2: Off-Post PFAS Analytical Data Results

		AOPI	OPR		OPR		OPR	
		Location	FTRI-OPR-A		FTRI-OPR-B		FTRI-OPR-C	
		Sample/Parent ID	FTRI-OPR-A-102220		FTRI-OPR-B-102220		FTRI-OPR-C-102820	
		Sample Date	10/22/2020		10/22/2020		10/28/2020	
		Sample Type	N		N		N	
		Matrix	Drinking Water		Drinking Water		Drinking Water	
Analyte	CAS	Units	Result	Qual	Result	Qual	Result	Qual
PFAS								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	ng/L	1.8	U	1.7	U	1.7	U
N-Methylperfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	ng/L	1.8	U	1.7	U	1.7	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	ng/L	1.8	U	1.7	U	1.7	U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	1.8	U	1.7	U	1.7	U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	1.8	U	1.7	U	1.7	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	1.8	U	1.7	U	1.7	U
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	ng/L	1.8	U	1.7	U	1.7	U
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	1.8	U	1.7	U	1.7	U
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	1.8	U	1.7	U	1.7	U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	1.8	U	1.7	U	1.7	U
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	1.8	U	1.7	U	1.7	U
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	1.8	U	1.7	U	1.7	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/L	1.8	U	1.7	U	1.7	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8	ng/L	1.8	U	1.7	U	1.7	U

		AOPI	OPR		OPR		OPR	
		Location	FTRI-OPR-D		FTRI-OPR-E		FTRI-OPR-F	
		Sample/Parent ID	FTRI-OPR-D-102220		FTRI-OPR-E-102220		FTRI-OPR-F-102220	
		Sample Date	10/22/2020		10/22/2020		10/22/2020	
		Sample Type	N		N		N	
		Matrix	Drinking Water		Drinking Water		Drinking Water	
Analyte	CAS	Units	Result	Qual	Result	Qual	Result	Qual
PFAS								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	ng/L	1.7	U	1.7	U	1.7	U
N-Methylperfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	ng/L	1.7	U	1.7	U	1.7	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	ng/L	1.7	U	1.7	U	1.7	U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	1.7	U	1.7	U	1.7	U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	1.7	U	1.7	U	1.7	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	1.7	U	1.7	U	1.7	U
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	ng/L	1.7	U	1.7	U	1.7	U
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	1.7	U	1.7	U	1.7	U
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	1.7	U	1.7	U	1.7	U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	1.7	U	1.7	U	**1.2**	J
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	1.7	U	1.7	U	**0.58**	J
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	1.7	U	1.7	U	1.7	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/L	1.7	U	1.7	U	1.7	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8	ng/L	1.7	U	1.7	U	1.7	U

		AOPI	OPR		OPR		OPR	
		Location	FTRI-OPR-G		FTRI-OPR-G		FTRI-OPR-H	
		Sample/Parent ID	FTRI-OPR-G-102220		FTRI-FD-1-102220 / FTRI-OPR-G-102220		FTRI-OPR-H-102320	
		Sample Date	10/22/2020		10/22/2020		10/23/2020	
		Sample Type	N		FD		N	
		Matrix	Drinking Water		Drinking Water		Drinking Water	
Analyte	CAS	Units	Result	Qual	Result	Qual	Result	Qual
PFAS								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	ng/L	1.7	U	1.7	U	1.8	U
N-Methylperfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	ng/L	1.7	U	1.7	U	1.8	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	ng/L	1.7	U	1.7	U	1.8	U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	1.7	U	1.7	U	1.8	U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	1.7	U	1.7	U	1.8	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	1.7	U	1.7	U	1.8	U
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	ng/L	1.7	U	1.7	U	1.8	U
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	1.7	U	1.7	U	1.8	U
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	1.7	U	1.7	U	1.8	U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	1.7	U	1.7	U	1.8	U
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	1.7	U	1.7	U	1.8	U
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	1.7	U	1.7	U	1.8	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/L	1.7	U	1.7	U	1.8	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8	ng/L	1.7	U	1.7	U	1.8	U

		AOPI	OPR		OPR		OPR	
		Location	FTRI-OPR-I		FTRI-OPR-J		FTRI-OPR-K	
		Sample/Parent ID	FTRI-OPR-I-102320		FTRI-OPR-J-102320		FTRI-OPR-K-102320	
		Sample Date	10/23/2020		10/23/2020		10/23/2020	
		Sample Type	N		N		N	
		Matrix	Drinking Water		Drinking Water		Drinking Water	
Analyte	CAS	Units	Result	Qual	Result	Qual	Result	Qual
PFAS								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	ng/L	1.8	U	1.8	U	1.8	U
N-Methylperfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	ng/L	1.8	U	1.8	U	1.8	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	ng/L	1.8	U	1.8	U	1.8	U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	1.8	U	1.8	U	1.8	U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	1.8	U	1.8	U	1.8	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	1.8	U	1.8	U	1.8	U
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	ng/L	1.8	U	1.8	U	1.8	U
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	1.8	U	1.8	U	1.8	U
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	1.8	U	1.8	U	1.8	U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	1.8	U	1.8	U	1.8	U
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	1.8	U	1.8	U	1.8	U
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	1.8	U	1.8	U	1.8	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/L	1.8	U	1.8	U	1.8	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8	ng/L	1.8	U	1.8	U	1.8	U

		AOPI	OPR		OPR		OPR	
		Location	FTRI-OPR-L		FTRI-OPR-M		FTRI-OPR-N	
		Sample/Parent ID	FTRI-OPR-L-102320		FTRI-OPR-M-102420		FTRI-OPR-N-102420	
		Sample Date	10/23/2020		10/24/2020		10/24/2020	
		Sample Type	N		N		N	
		Matrix	Drinking Water		Drinking Water		Drinking Water	
Analyte	CAS	Units	Result	Qual	Result	Qual	Result	Qual
PFAS								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	ng/L	1.8	U	1.8	U	1.7	U
N-Methylperfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	ng/L	1.8	U	1.8	U	1.7	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	ng/L	1.8	U	1.8	U	1.7	U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	1.8	U	1.8	U	1.7	U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	1.8	U	1.8	U	1.7	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	1.8	U	1.8	U	1.7	U
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	ng/L	1.8	U	1.8	U	1.7	U
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	1.8	U	1.8	U	1.7	U
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	1.8	U	1.8	U	1.7	U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	1.8	U	1.8	U	1.7	U
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	1.8	U	1.8	U	1.7	U
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	1.8	U	1.8	U	1.7	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/L	1.8	U	1.8	U	1.7	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8	ng/L	1.8	U	1.8	U	1.7	U

		AOPI	OPR		OPR		OPR	
		Location	FTRI-OPR-O		FTRI-OPR-P		FTRI-OPR-Q	
		Sample/Parent ID	FTRI-OPR-O-102420		FTRI-OPR-P-102820		FTRI-OPR-Q-102820	
		Sample Date	10/24/2020		10/28/2020		10/28/2020	
		Sample Type	N		N		N	
		Matrix	Drinking Water		Drinking Water		Drinking Water	
Analyte	CAS	Units	Result	Qual	Result	Qual	Result	Qual
PFAS								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	ng/L	1.8	U	1.7	U	1.7	U
N-Methylperfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	ng/L	1.8	U	1.7	U	1.7	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	ng/L	1.8	U	1.7	U	1.7	U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	1.8	U	1.7	U	1.7	U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	1.8	U	1.7	U	1.7	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	1.8	U	1.7	U	1.7	U
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	ng/L	1.8	U	1.7	U	1.7	U
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	1.8	U	1.7	U	1.7	U
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	1.8	U	1.7	U	1.7	U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	1.8	U	1.7	U	**0.45**	J
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	1.8	U	1.7	U	1.7	U
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	1.8	U	1.7	U	1.7	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/L	1.8	U	1.7	U	1.7	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8	ng/L	1.8	U	1.7	U	1.7	U

		AOPI	OPR		OPR		OPR	
		Location	FTRI-OPR-R		FTRI-OPR-S		FTRI-OPR-T	
		Sample/Parent ID	FTRI-OPR-R-102820		FTRI-OPR-S-102820		FTRI-OPR-T-102820	
		Sample Date	10/28/2020		10/28/2020		10/28/2020	
		Sample Type	N		N		N	
		Matrix	Drinking Water		Drinking Water		Drinking Water	
Analyte	CAS	Units	Result	Qual	Result	Qual	Result	Qual
PFAS								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	ng/L	1.8	U	1.7	U	1.8	U
N-Methylperfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	ng/L	1.8	U	1.7	U	1.8	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	ng/L	1.8	U	1.7	U	1.8	U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	1.8	U	1.7	U	1.8	U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	1.8	U	1.7	U	1.8	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	1.8	U	1.7	U	1.8	U
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	ng/L	1.8	U	1.7	U	1.8	U
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	1.8	U	1.7	U	1.8	U
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	1.8	U	1.7	U	1.8	U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	1.8	U	1.7	U	1.8	U
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	1.8	U	1.7	U	1.8	U
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	1.8	U	1.7	U	1.8	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/L	1.8	U	1.7	U	1.8	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8	ng/L	1.8	U	1.7	U	1.8	U

		AOPI	OPR		OPR		OPR	
		Location	FTRI-OPR-U		FTRI-OPR-V		FTRI-OPR-V	
		Sample/Parent ID	FTRI-OPR-U-102820		FTRI-OPR-V-121620		FTRI-OPR-DUP-3-121620 / FTRI-OPR-V-121620	
		Sample Date	10/28/2020		12/16/2020		12/16/2020	
		Sample Type	N		N		FD	
		Matrix	Drinking Water		Drinking Water		Drinking Water	
Analyte	CAS	Units	Result	Qual	Result	Qual	Result	Qual
PFAS								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	ng/L	1.8	U	2.1	U	1.8	U
N-Methylperfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	ng/L	1.8	U	2.1	U	1.8	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	ng/L	1.8	U	**61**		**56**	
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	1.8	U	2.1	U	1.8	U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	1.8	U	2.1	U	1.8	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	1.8	U	**40**	J	**26**	J
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	ng/L	1.8	U	**230**		**170**	
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	1.8	U	**160**		**120**	
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	1.8	U	2.1	U	1.8	U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	1.8	U	**18**		**16**	
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	1.8	U	**110**		**85**	
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	1.8	U	2.1	U	1.8	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/L	1.8	U	2.1	U	1.8	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8	ng/L	1.8	U	2.1	U	1.8	U

		AOPI	OPR
		Location	FTRI-OPR-W
		Sample/Parent ID	FTRI-OPR-W-121620
		Sample Date	12/16/2020
		Sample Type	N
		Matrix	Drinking Water
Analyte	CAS	Units	Result	Qual
PFAS				
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	ng/L	1.8	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	ng/L	1.8	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	ng/L	**6.7**	J-
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	1.8	U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	1.8	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	**3.9**	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	ng/L	**31**	J-
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	**22**	
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	1.8	U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	**16**	
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	**3.1**	
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	1.8	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/L	1.8	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8	ng/L	1.8	U

Notes:

1. **Bolded** values indicate the result was detected greater than the limit of detection
2. Grey shaded values indicate the combined result for PFOS and PFOA was detected greater than the USEPA Lifetime Health Advisory

Acronyms/Abbreviations:
-- = not applicable
% = percent
AOPI = Area of Potential Interest
CAS = Chemical Abstracts Service number
FD = field duplicate sample
ID = identification
N = primary sample
ng/L = nanograms per liter (parts per trillion)
PFAS = per- and polyfluoroalkyl substances

Qualifier	Description
J	The analyte was positively identified; however the associated numerical value is an estimated concentration only
J-	The result is an estimated quantity; the result may be biased low.
U	The analyte was analyzed for but the result was not detected above the limit of quantitation (LOQ).

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