



FINAL REPORT

Photoactivated Reductive Defluorination PFAS Destruction

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November 2023

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

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1. REPORT DATE (DD-MM-YYYY) 30/11/2023		2. REPORT TYPE ESTCP Final Report		3. DATES COVERED (From - To) 4/15/2022 - 4/15/2024	
4. TITLE AND SUBTITLE Photoactivated Reductive Defluorination PFAS Destruction				5a. CONTRACT NUMBER 22-C-0048	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Denise Kay Meng Wang Suzanne Witt Enspered Solutions				5d. PROJECT NUMBER ER21-7569	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Enspered Solutions 3610 Forest Road Suite 136 Lansing, MI 48910				8. PERFORMING ORGANIZATION REPORT NUMBER ER21-7569	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Office of the Deputy Assistant Secretary of Defense (Energy Resilience & Optimization) 3500 Defense Pentagon, RM 5C646 Washington, DC 20301-3500				10. SPONSOR/MONITOR'S ACRONYM(S) ESTCP	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S) ER21-7569	
12. DISTRIBUTION/AVAILABILITY STATEMENT DISTRIBUTION STATEMENT A. Approved for public release: distribution unlimited.					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT This project evaluated the ability to destruct per- and polyfluoroalkyl substances in concentrated aqueous samples using the photoactivated reductive defluorination (PRD) technology developed at Enspered Solutions. Enspered Solutions' PRD reaction has significant advantages over other emerging PFAS destruction technologies, including high PFAS degradation efficiencies, small equipment footprint, safe operation, a tunable reaction, and no toxic byproduct generation. The project objective was to demonstrate effectiveness, assess energy efficiency, and estimate total cost associated with PRD destruction of PFAS in liquid waste acquired from multiple U.S. Department of Defense sites.					
15. SUBJECT TERMS PFAS, PFAS treatment, AFFF, PFAS non-thermal treatment					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UNCLASS	18. NUMBER OF PAGES 583	19a. NAME OF RESPONSIBLE PERSON Denise Kay
a. REPORT UNCLASS	b. ABSTRACT UNCLASS	c. THIS PAGE UNCLASS			19b. TELEPHONE NUMBER (Include area code) 517-282-5211

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ACRONYMS

Acronym	Definition
4:2FTS	1H,1H, 2H, 2H-Perfluorohexane sulfonic acid
6:2FTS	1H,1H, 2H, 2H-Perfluorooctane sulfonic acid
8:2FTS	1H,1H, 2H, 2H-Perfluorodecane sulfonic acid
3:3FTCA	3-Perfluoropropyl propanoic acid
5:3FTCA	2H,2H,3H,3H-Perfluorooctanoic acid
7:3FTCA	3-Perfluoroheptyl propanoic acid
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
ADONA	4,8-Dioxa-3H-perfluorononanoic acid
AFB	Air Force Base
AFFF	Aqueous film forming foam
α	Ratio between organic fluorine and PFAS mass
CAPEX	Capital expenditure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
C	concentration
CTA+	Positively charged cetyltrimethylammonium ion
CTAB	Cetyltrimethylammonium bromide
CTAC	Cetyltrimethylammonium chloride
CIC	Combustion ion chromatography
DoD	U.S. Department of Defense
EEO	Electrical energy per order
EPA	U.S. Environmental Protection Agency
ESTCP	Environmental Security Technology Certification Program
FF	Foam fractionate
ft	feet
gal	gallons
GPD	Gallons per day
GPM	Gallons per minute
GW	Groundwater
HALT	Hydrothermal alkaline treatment
HFPO-DA	Hexafluoropropylene oxide dimer acid
IC	Ion chromatography
IP	Intellectual property
IDW NF	Investigation derived waste nanofiltrate
ISE	Ion-selective electrode
IX SB	Ion exchange still bottom
k	PRD rate constant
kW	Kilowatt
kWh	kilowatt-hour
L	Liters
LOD	Limit of detection
ln	Natural logarithm

m ³	Cubic meters
MCL	Maximum contaminant limit
MDL	Method detection limit
mg/L	Millograms per liter
NAS	Naval Air Station
NEtFOSA	N-ethyl perfluorooctanesulfonamide
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid
NEtFOSE	N-ethyl perfluorooctanesulfonamidoethanol
ND	Non-detect
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid
ng/L	Nanograms per liter
nm	Nanometers
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
NMeFOSA	N-methyl perfluorooctanesulfonamide
NMeFOSE	N-methyl perfluorooctanesulfonamidoethanol
OPEX	Operating expenditure
PFAS	Per and polyfluoroalkyl substances
PFBA	Perfluorobutanoic acid
PFBS	Perfluorobutanesulfonic acid
PFCA	Perfluorocarboxylic acid
PFDA	Perfluorodecanoic acid
PFDoA	Perfluorododecanoic acid
PFDS	Perfluorodecanesulfonic acid
PFDoS	Perfluorododecanesulfonic acid
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid
PFHpA	Perfluoroheptanoic acid
PFHpS	Perfluoroheptanesulfonic acid
PFHxA	Perfluorohexanoic acid
PFHxS	Perfluorohexanesulfonic acid
PFMPA	Perfluoro-3-methoxypropanoic acid
PFMBA	Perfluoro-4-methoxybutanoic acid
PFNA	Perfluorononanoic acid
PFNS	Perfluorononanesulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PFOSA	Perfluorooctanesulfonamide
PFPeA	Perfluoropentanoic acid
PFPeS	Perfluoropentanesulfonic acid
PFSA	Perfluorosulfonic acid
PFTeDA	Perfluorotetradecanoic acid
PFTrDA	Perfluorotridecanoic acid
PFUnA	Perfluoroundecanoic acid
ppb	parts-per-billion
ppm	parts-per-million
ppt	parts-per-trillion
PRD	Photoactivated reductive defluorination

RL	Reporting limit
SCWO	Super critical water oxidation
T	Time
TDS	Total dissolved solids
TOP	Total oxidizable precursors
U	Non-detect
UV	Ultraviolet
[UV] _T	UV dose
µg/L	Micrograms per liter
µS/cm	Microsiemens per centimeter
V	Volume

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ACKNOWLEDGEMENTS

Enspired Solutions acknowledges the following institutes and persons for providing access to PFAS contaminated aqueous samples for testing in this project.

<u>Sample Source</u>	<u>Persons (Institute)</u>
Naval Air Station Jax, FL	Jason Speicher (Navy), Zoom Nguyen (CDM Smith)
Naval Air Station Oceana, VA	Jason Speicher (Navy), Dave Reynolds (Geosyntec)
Michigan Army National Guard	Amy Handley (Michigan Army National Guard)
Naval Air Station Willow Grove, PA	Jason Speicher (Navy)
Wright-Patterson Air Force Base, OH	Hunter Anderson (Air Force), Chris Bellona, (Colorado School of Mines)
Tyndall Air Force Base, FL	Hunter Anderson (Air Force), Johnsie Lang (Arcadis)

Bonnie Packer (Army National Guard) also arranged an opportunity for a site visit in conjunction with Kristen Hasbrouck (Tanaq Environmental) and Craig Divine (Arcadis) to Camp Grayling, MI for consideration as a field pilot location for treatment of groundwater.

ABSTRACT

Introduction and Objectives

This project evaluated the ability to destruct per- and polyfluoroalkyl substances (PFAS) in concentrated aqueous samples using the photoactivated reductive defluorination (PRD) technology developed at Enspired Solutions. Enspired Solutions' PRD reaction has significant advantages over other emerging PFAS destruction technologies, including high PFAS degradation efficiencies, small equipment footprint, safe operation, a tunable reaction, and no toxic byproduct generation. The project objective was to demonstrate effectiveness, assess energy efficiency, and estimate total cost associated with PRD destruction of PFAS in liquid waste acquired from multiple U.S. Department of Defense (DoD) sites.

Technology Description

PRD is a chemical reaction that breaks fluorine-carbon bonds and disassembles PFAS molecules in a linear fashion beginning with the hydrophilic functional group and proceeds through shorter molecules to complete destruction. The reaction is facilitated by self-assembly of a micelle cage formed from cetyl trimethylammonium bromide (CTAB) which traps PFAS. A second non-toxic liquid reagent associates with the micelle surface. When stimulated with ultraviolet (UV) light, the secondary reagent produces hydrated electrons which initiate a reductive chemical reaction that cleaves fluorine-carbon and other molecular bonds resulting in the final products of fluoride, water, and simple carbon molecules (e.g., formic acid and acetic acid).

Performance and Cost Assessment

The PRD met and exceeded bench scale success criteria for the destruction of PFAS in five of seven samples tested. In the successful samples, PFOS and PFOA concentrations decreased 96% to >99% and 77% to 97%, respectively during the allotted treatment duration. In the two unsuccessful samples, reaction rate was inhibited when total dissolved solids increased and effectively stopped at 200,000 ppm. Key reaction parameters measured in benchtop studies translated very well to scaleup studies and support reasonable estimates of energy efficiency and overall treatment cost at commercial scale.

Implementation Issues

The PRD reaction demonstrated both technical effectiveness and economic feasibility for reducing PFAS concentrations in water. Some opportunities for improvement were observed and will be applied in future implementation of the technology. PFAS destruction reactions were more efficient at pH 10 than native sample pH. The commercial scale equipment has been designed to maintain pH 10 throughout the reaction duration. The oxidation reaction conducted after PRD reduced CTAB concentration by >99%. This is likely sufficient for permitted discharge at most locations although site-specific evaluation of the need for further capture or recycling of CTAB should be evaluated. The PRD reaction in solutions with high, non-PFAS, surfactant concentrations can be improved by adjusting reagent addition from standard formula. Therefore, matrix-specific benchtop treatability studies are recommended to optimize reaction efficiencies.

Publications

No peer-reviewed scientific publications were produced as a result of this ESTCP project.

EXECUTIVE SUMMARY

Introduction

Addressing and managing per- and polyfluoroalkyl substances (PFAS) is a pressing issue facing the U. S. Department of Defense (DoD). Full destruction of PFAS molecules is a preferred solution over PFAS capture because it mitigates lingering risks to human health and the environment. Progress has been made and challenges remain for PFAS destruction technologies, such as high energy requirement and low treatment efficiencies for short-chain fluorinated compounds. Additional challenges include fabrication of novel equipment, safety of high temperature and high-pressure equipment, functionality limitations due to strict reaction conditions, and generation of undesirable byproducts such as perfluorinated carboxylic acids from oxidizable precursors, perchlorate, hydrofluoric acid, and hydrogen fluoride gas. Enspired Solutions™ has developed a PFAS destruction technology, photoactivated reductive defluorination (PRD), that surmounts these limitations.

The application potential of PFAS destruction technologies to treat highly concentrated PFAS waste, such as aqueous film forming foam (AFFF) has been recognized. However, the commercial readiness and cost effectiveness of destruction technologies are still in question. DoD has identified technologies such as foam fractionation and solid-phase sorption to effectively remove PFAS from water, generating low-volume, concentrated PFAS wastes. The combination of these technologies and PRD provides a complete solution from concentration to destruction, preventing PFAS reintroduction to the environment. The effort described herein determined the commercial feasibility of PRD to destruct concentrated PFAS in liquid waste from DoD sites, and identified the most appropriate concentration technologies, if needed, to pair with in order to provide a cost-effective complete PFAS solution.

Objectives

On-site implementation of PRD will be accomplished in two phases. The specific objective achieved in the Phase I effort described herein was to obtain site-specific design parameters and develop a cost estimate for field implementation of PRD system. This included assessing energy efficiency and total cost associated with PRD destruction of concentrated PFAS liquid waste being generated at multiple DoD sites. Phase II, not included in this report, will be testing the deployment of a commercial-scale PRD system for PFAS destruction at DoD sites.

Technology Description

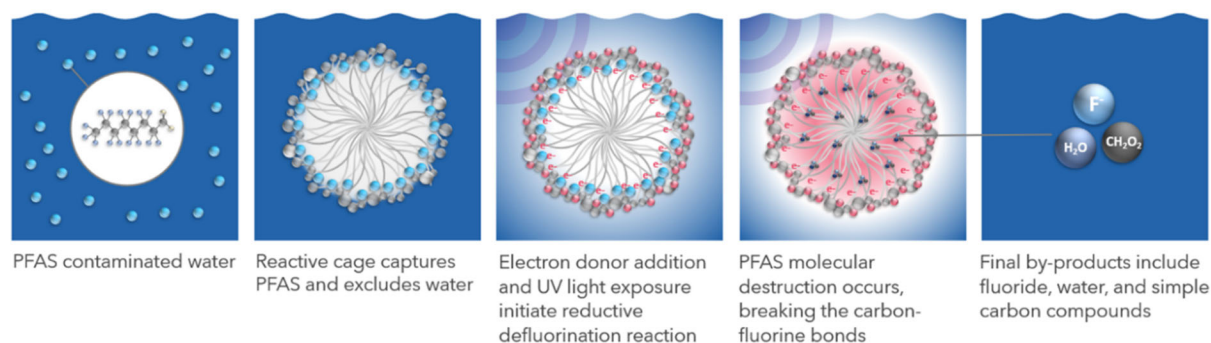


Figure E-1. Mechanism schematic.

The PRD process is based on a patented chemical reaction that breaks fluorine-carbon bonds and disassembles PFAS molecules in a linear fashion beginning with the hydrophilic functional groups and proceeds through shorter molecules to complete mineralization. **Figure E-1** shows how PRD is facilitated by adding cetyl trimethylammonium bromide (CTAB) to form a surfactant micelle cage that traps PFAS. A non-toxic proprietary chemical is added to solution which associates with the micelle surface and produces hydrated electrons when stimulated with ultraviolet (UV) light. These highly-reactive hydrated electrons have the energy required to cleave fluorine-carbon and other molecular bonds resulting in the final products of fluoride, water, and simple carbon molecules (e.g., formic acid and acetic acid). The self-assembled micelle creates a confined space that plays a key role for the comparatively high PFAS destruction efficiency. The negatively charged electron donor associates with the positively charged cetyltrimethylammonium ion (CTA⁺) which form the surfactant micelle to trap molecules with similar structures, selectively mineralizing compounds with both hydrophobic groups and hydrophilic groups such as PFAS.

Performance Assessment

Table E-1. PFAS decrease in benchtop test at limited treatment times

	% Decrease	AFFF		3M AFFF	IDW NF	
		GW	FF	Rinsate (diluted 10x)		
Σ Total PFAS ^a (ND = 0)		93%	96%	89%	86%	84%
Σ Total PFAS (ND = MDL)		93%	86%	90%	71%	88%
Σ Total PFAS (ND = RL)		94%	96%	91%	34%	92%
Σ Highly regulated PFAS ^b (ND = 0)		>99%	>99%	95%	92%	95%
Σ Highly regulated PFAS (ND = MDL)		>99%	98%	95%	88%	95%
Σ Highly regulated PFAS (ND = RL)		>99%	93%	95%	79%	95%
Σ High priority PFAS ^c (ND = 0)		91%	98%	85%	82%	84%
Σ High priority PFAS (ND = MDL)		91%	94%	85%	79%	86%
Σ High priority PFAS (ND = RL)		92%	87%	86%	70%	87%
Fluorine mass balance ^d		106%	109%	110%	65%	98%
Sorbed organic fluorine ^e		4%	4%	33%	N/A	31%

^aTotal PFAS = 40 analytes + unidentified PFCA precursors

^bEPA MCL PFAS = PFNA, PFOA, PFOS, PFHxS, PFBS, HFPO-DA

^cFrequently regulated PFAS = PFNA, PFOA, PFHxA, PFBA, PFOS, PFHxS, PFBS, HFPO-DA

^dRatio of the final to the initial organic fluorine plus inorganic fluoride concentrations (see Equation 1)

^ePercent of organic fluorine that sorbed to the reactor walls during treatment

MDL = method detection limit

RL = reporting limit

N/A = not available

- PRD tests were performed for the following samples collected from DoD sites: Naval Air Station (NAS) Jax groundwater (GW), NAS Oceana groundwater foam fractionate (FF), Tyndall Air Force Base (AFB) firefighting truck rinsate (AFFF Rinsate), 3M AFFF, Wright-Patterson AFB investigation derived waste nanofiltrate (IDW NF), NAS Willow Grove ion exchange still bottom (IX SB), and Ansulite AFFF. PRD treatment was more effective in low conductivity/total dissolved solids (TDS) solutions. Generally, the PRD reaction rates decrease for solutions with a TDS > 10,000 ppm, with an upper limit of 30,000 ppm. Ansulite AFFF

and IX SB samples showed low destruction efficiencies during initial screening tests, which was primarily attributed to their high TDS concentrations. Benchtop testing data are shown in **Table E-1** for the remaining five sample matrixes.

- During treatment, PFOS and PFOA concentrations decreased 96% to >99% and 77% to 97%, respectively. The EPA MCL PFAS group, including PFNA, PFOA, PFOS, PFHxS, PFBS, and HFPO-DA as listed by EPA proposed drinking water Maximum Contaminant Levels (MCLs) in March 2023, decreased >99% for GW, 93% for FF, 95% for AFFF Rinsate and IDW NF, and 79% for 3M AFFF (diluted 10x) during the treatment time allotted. Meanwhile, the total PFAS, including all 40 known PFAS analytes and unidentified perfluorocarboxylic acid (PFCA) precursors, decreased 34% to 96%. All these values are calculated by using reporting limits (RL) as concentrations for non-detects.
- Excellent fluorine/fluoride mass balance was achieved. There was nearly a 1:1 conversion of organic fluorine to free inorganic fluoride ion during treatment of GW, FF and AFFF Rinsate. The 3M AFFF (diluted 10x) achieved only 65% fluorine mass balance, but this was likely due to high adsorption of PFAS to the reactor.
- The remaining CTAB in benchtop test was degraded by UV oxidation as a post-processing step, which degraded >99% of remaining CTAB. The reaction occurs in the same reactor as the PRD.

Scaleup Testing

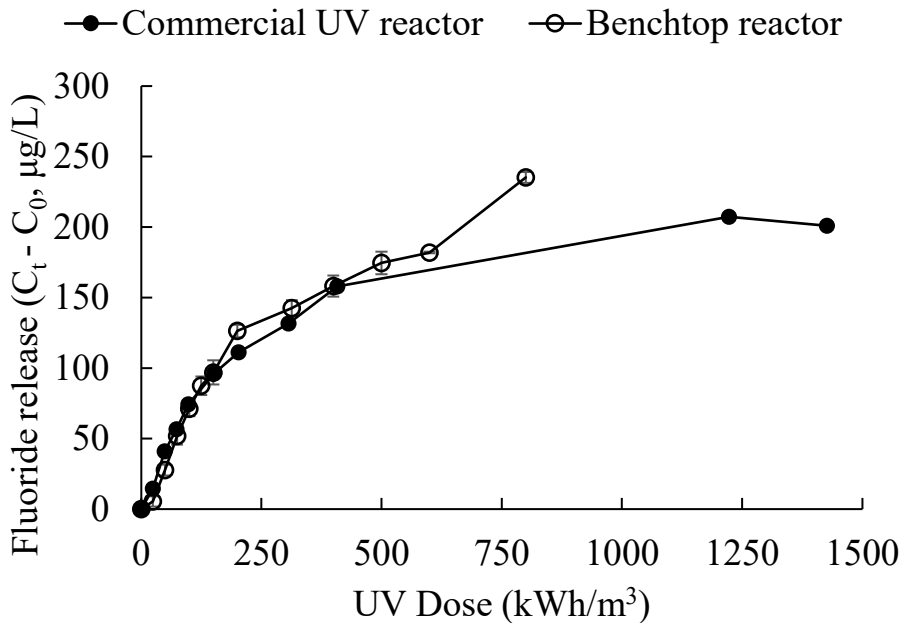


Figure E-2. Fluoride release between benchtop test and scaleup test for JAX groundwater sample

- Due to sample abundance and good destruction efficiency, the JAX groundwater sample was chosen to perform scaleup testing. During scaleup testing, the groundwater sample showed >99% decrease in PFOS, PFOA, the group of EPA MCL PFAS (PFNA, PFOA, PFOS, PFHxS, PFBS, and HFPO-DA), and the total PFAS (40 known PFAS analytes and unidentified PFCA precursors).

- PRD showed excellent scaleup consistency. **Figure E-2** shows the real-time fluoride monitoring data as the indicator of PFAS destruction over time. Data measured during the benchtop and the scaleup tests demonstrated great agreement.
- A significantly greater PFAS sorption was observed in the commercial UV reactor relative to sorption in the benchtop reactor which may be due to the higher PFAS sorption tendency to stainless steel relative to glass.

Commercial-scale Equipment Readiness



Figure E-3. Commercial-scale PFASigactor photo. The footprint of the equipment is 9' (Length) x 7' (Height) x 4' (Width). Co-founders of Enspered Solutions, Dr. Meng Wang (left) and Dr. Denise Kay (right) stand in front of the equipment.

Enspered Solutions has designed and manufactured fully automatic commercial-scale equipment called PFASigactor™, specializing in PRD PFAS destruction. The PFASigactor has been tested on PRD efficiency operational parameters and key metrics were proven to be consistent with benchtop studies. PFASigactor has multiple usage and design advantages:

- A small footprint with a modular design, which makes plugging into existing water treatment systems and scaleup easy.
- No special health and safety concerns given that it operates at atmospheric pressure and temperature.
- Minimum labor required given its fully automated design and safe operating environment. The equipment generates real-time fluoride data fed to a cloud-based web portal which enables remote monitoring and control.
- Tunable reaction by changing the final target fluoride concentration or reaction duration, therefore treatment processes can be adjusted with remediation target changes.

- Robust water treatment equipment with low long-term maintenance cost given no concerns on equipment corrosion during reaction and long usage history of UV equipment in water industry.

Cost Assessment

Table E-2. Cost estimate for groundwater and surface water PFAS destruction scenario

Parameter		Target 1 Long-chain PFAS	Target 2 EPA MCL PFAS	Target 3 Frequently regulated PFAS	Target 4 Total PFAS
Destruction Targets	Remediation Targets	PFOA, PFOS	PFNA, PFOA, PFOS, PFHxS, PFBS, HFPO-DA	PFNA, PFOA, PFHxA, PFBA, PFOS, PFHxS, PFBS, HFPO-DA	All 40 PFAS analytes + unidentified PFCA precursors + unknown PFAS compounds
	Destruction % Targets	99.9%	99.9%	99.9%	99.9%
	EEO (kWh/m ³ -order) ⁽¹⁾	91	150	520	580
	Destruction Energy Usage (kWh/gal)	1.0	1.7	5.9	6.6
Example Site Application Scenarios	Flow Rate	100 GPM			
	Paired with Technology	Pre-concentration (1,000x) ⁽²⁾			
	\$/gallon ⁽³⁾⁽⁴⁾⁽⁵⁾	\$0.0011	\$0.0023	\$0.0056	\$0.0068
	\$/gallon (CAPEX)	\$0.0004	\$0.0009	\$0.0022	\$0.0027
	\$/gallon (OPEX)	\$0.0007	\$0.0014	\$0.0034	\$0.0041
	# of PFASigators™ Needed	1	2	5	6
	24-hour Total Energy Use (Cost) ⁽⁶⁾	156 kW (\$30)	312 kW (\$59)	780 kW (\$148)	936 kW (\$178)

(1) EEO values are from Table 6-1.

(2) Pre-concentration assumes a 1,000-fold concentration for groundwater/surface water by available technology.

(3) Cost includes both CAPEX and OPEX. PFASigator lifetime is assumed as 15 years as a robust water treatment equipment. Monthly PFASigator OPEX includes all reagents and delivery to site, and IP sublicense. Routine maintenance, discharge compliance sampling and analysis, and energy costs not included.

(4) Equipment price and monthly subscription price for applied PFASigator model are obtained from Enspired Solutions.

(5) PFASigator is fully automated such that minimum labor is anticipated to operate it. Real-time end-product fluoride data can be accessed remotely via a web-based data portal.

(6) Based on 2023 residential electric supply rate for Michigan, \$0.19 per kW.

The cost estimate of field-scale application is comprised of the capital cost of constructing or deploying a field-ready PFAS destruction system, and the cost of daily operation. A reaction kinetics model for PFAS decrease and fluoride generation was developed and used to calculate the PRD energy efficiency for treating environmental samples. The data collected from both the benchtop and scaleup tests were used to fit the models to calculate the electrical energy per order (EEO) usage which was the key parameter to determine the treatment capacity demand and the energy usage for destruction. The results, serving as a basis for the field-scale cost estimate, were used to estimate the energy usage demand, chemical reagents usage rate and the treatment

capacity demand for the PRD equipment. Please note that the UV doses used in model fitting were direct electricity usages recorded from the lamp systems. Therefore, the EEOs calculated from the test data were direct indicators of the electrical demand to destruct PFAS in certain matrices by using a commercial UV system.

Two field implementation scenarios were proposed, one for PFAS-impacted groundwater or surface water, and the other for highly concentrated PFAS liquid waste such as firefighting truck rinse water or AFFF-impacted wastewater. Matrix-specific energy usage demands were used for each scenario cost estimation. These cost scenarios proposed pairing PFASigator with PFAS concentration for energy savings and minimizing off-site waste disposal.

For groundwater and surface water, the PFAS destruction cost was estimated within a range of \$0.0011/gal to \$0.0068/gal, depending on the site-specific remediation objective (**Table E-2**). The remediation target ranges from treating the long-chain PFAS including PFOA and PFOS (low-end cost) or treating all known and unknown PFAS compounds and precursors (high-end cost). For any given flow rate of 100 gallons per minute (GPM), the energy usage for PFAS destruction ranged from 156 kW/day to 936 kW/day, approximately \$30-\$178/day. For highly concentrated liquid waste such as firefighting truck rinse water or AFFF-impacted wastewater, the PFAS destruction cost was estimated within a range of \$4.6/gal to \$5.4/gal. Approximately 30-35 gallons of concentrated PFAS liquid waste can be treated per reactor unit per day, using 156 kW (\$30) of energy for PFAS destruction.

Implementation Issues

During the study, we also observed several improvements that can be applied in the future field implementation of the technology, as well as some remaining concerns or constraints that need to be further investigated and addressed:

- Higher PFAS destruction rates were observed under pH=10 versus native pH. In future field demonstrations, PFASigator should be set to maintain pH=10 condition by automatic chemical dosing, which can yield a faster reaction rate than the manually-operated tests described herein. This scenario can first be tested at the bench scale to determine the benefit of maintaining pH=10. In cases of direct discharge from the PFASigator, the pH can be adjusted down to 6 – 9 in order to comply with permitting requirements.
- Different destruction efficiencies were observed by using different reagent doses. A treatability study using a sample that is representative of the full-scale volume to be treated is recommended prior to a field pilot to determine the best PRD reaction recipe for a given sample matrix.
- Effective approaches for reducing, eliminating, or making beneficial use of CTAB in PRD treated solutions were identified. The appropriate approach needs to be determined on a site-specific basis. This decision will be informed by processes following PRD in the full water treatment train, site discharge permits, and client requirements. Each approach must also be evaluated first at a bench scale for CTAB effluent concentrations and potential harmful byproducts.

1.0 INTRODUCTION

1.1 BACKGROUND

Addressing and managing per- and polyfluoroalkyl substances (PFAS) is a pressing issue facing the U. S. Department of Defense (DoD). Full destruction of PFAS molecules is a preferred solution over PFAS capture because it mitigates lingering risks to human health and the environment. Progress has been made and challenges remain for PFAS destruction technologies, such as high energy requirement and low treatment efficiencies for short-chain fluorinated compounds. Additional challenges include fabrication of novel equipment, safety of high temperature and high-pressure equipment, functionality limitations due to strict reaction conditions, and generation of undesirable byproducts such as perfluorinated carboxylic acids from oxidizable precursors, perchlorate, hydrofluoric acid, and hydrogen fluoride gas. Enspired Solutions has developed a PFAS destruction technology, photoactivated reductive defluorination (PRD), that surmounts these limitations.

The application potential of PFAS destruction technologies to treat highly concentrated PFAS waste, such as aqueous film forming foam (AFFF) has been recognized. However, the commercial readiness and cost effectiveness of destruction technologies are still in question, especially for treating high flow water streams with low-level (parts per trillion [ppt] to parts per billion [ppb]) PFAS. DoD has identified technologies such as foam fractionation and solid-phase sorption to effectively remove PFAS from water, generating low-volume, concentrated PFAS wastes.¹ The combination of those technologies and PRD provides a complete solution from concentration to destruction, preventing PFAS reintroduction to the environment. The effort described herein determined both the technical effectiveness and commercial feasibility of PRD to destruct concentrated PFAS in liquid waste from DoD sites, identified the appropriate concentration technologies to pair with to provide a cost-effective complete PFAS destruction solution, and estimated energy and cost requirements for commercial implementation of PRD.

1.2 OBJECTIVE OF THE DEMONSTRATION

On-site implementation of PRD will be accomplished in two phases. The specific objective achieved in the Phase I effort described herein was to obtain site-specific design parameters. This included assessing energy efficiency and total cost associated with PRD destruction of concentrated PFAS liquid waste being generated at multiple DoD sites. To be specific, the objectives of this Phase I demonstration included:

1. Conduct rapid bench-scale PRD treatability tests on at least four PFAS liquid waste concentrates produced by ongoing DoD treatment systems or Environmental Security Technology Certification Program (ESTCP) projects, such as AFFF, foam fractionate, nanofiltration concentrate, and resin regenerate, to assess relative energy efficiency of PFAS destruction. Seven samples were acquired and tested.
2. Select two PFAS concentrates for empirical measurement of system design parameters in standard ultraviolet (UV)-light water treatment equipment. Objective was accomplished.
3. Evaluate treated water discharge alternatives including the need for discharge permits. Objective was accomplished.

4. Develop conceptual design of treatment train that includes all major elements for pairing PRD with active PFAS liquid waste concentration treatments to provide technically and economically feasible PFAS treatment through full destruction of PFAS. Objective was accomplished.
5. Develop a detailed cost estimate (delta + or – 25%) for construction or deployment of a field implementation system and the estimated operational costs (including electricity consumption). During the course of Phase I, Enspired Solutions independently proceeded with design and construction of a pilot-scale mobile system and fully automated modular commercial-scale equipment. Informed equipment costs have been incorporated into the estimated energy and cost requirements for commercial implementation of PRD.

The site-specific bench-scale data and design parameters obtained from objectives 1-5 during Phase I will serve as basis for the complete-design, construction, and field-implementation of PRD equipment to be proposed for deployment at DoD sites in Phase II, which are discussed as Phase I follow-on projects and will be covered in a future proposal if requested by DoD.

1.3 REGULATORY DRIVERS

Several states have imposed limits for PFAS contamination in drinking water, and the U.S. Environmental Protection Agency (EPA) proposed a National Primary Drinking Water Regulation in March 2023. Contamination of groundwater or surface water can originate at DoD sites due to legacy use of AFFF. PFAS contamination of water originating from DoD sites is highly problematic, as PFAS can travel from these sites toward public water supplies. Under the federal Comprehensive Environmental Response Compensation and Liability Act (CERCLA, or Superfund), the DoD is required to cooperate with PFAS clean up initiatives at contaminated sites.

2.0 TECHNOLOGY

2.1 TECHNOLOGY DESCRIPTION

The PRD process is based on a patented chemical reaction that breaks fluorine-carbon bonds and disassembles PFAS molecules in a linear fashion beginning with the hydrophilic functional groups and proceeds through shorter molecules to complete mineralization. **Figure 2-1** shows how PRD is facilitated by adding cetyl trimethylammonium bromide (CTAB) to form a surfactant micelle cage that traps PFAS. A non-toxic proprietary chemical is added to solution which associates with the micelle surface and produces hydrated electrons when stimulated with UV light. These highly-reactive hydrated electrons have the energy required to cleave fluorine-carbon and other molecular bonds resulting in the final products of fluoride, water, and simple carbon molecules (e.g., formic acid and acetic acid). The chemical reaction does not require further validation. The methods, mechanisms, theory, and reactions described herein have been published.²⁻⁴

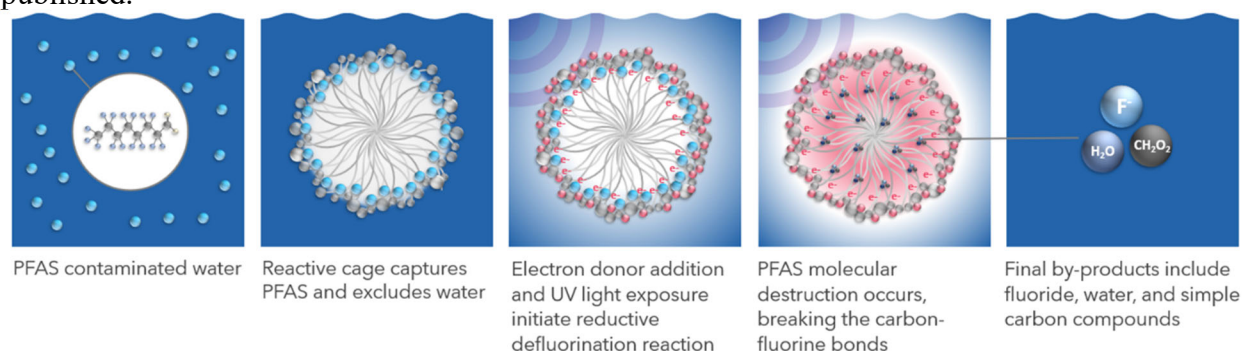


Figure 2-1. Mechanism schematic.

2.2 ADVANTAGES AND LIMITATIONS OF THE TECHNOLOGY

Advantages:

In comparison to other reported techniques PRD offers advantages including no requirement for solid catalysts or electrodes, which can be expensive to acquire and difficult to regenerate or dispose. In addition, because the aqueous solution is not heated or pressurized, and the UV wavelength used does not cause direct water photolysis, the energy input to the system is more directly employed to destruct the PFAS resulting in greater energy efficiency. Relative to UV/sodium sulfite and UV/sodium iodide systems, the fitted degradation rates in the PRD reaction system were ~18 and ~36 times higher, indicating that the key role of the self-assembled micelle is to create a confined space for the comparatively high PFAS destruction efficiency.⁴ The negatively charged hydrated electron associated with positively charged cetyltrimethylammonium ion (CTA⁺) forms the surfactant micelle to trap molecules with similar structures, selectively mineralizing compounds with both hydrophobic groups and hydrophilic groups such as PFAS.

Other technologies currently in development for PFAS destruction include electrochemical oxidation,⁵ super critical water oxidation (SCWO),⁶ hydrothermal alkaline treatment (HALT),⁷ and plasma.^{8,9} The PRD reaction has notable advantages over these technologies, including:

- **Safe equipment and operation.** The PRD reaction is performed at ambient temperature and pressure, which is in contrast to HALT and SCWO systems that require high

pressures (4 – 35 MPa) and temperatures (250 – 500 °C).^{6,7} The ambient temperature and pressure poses less concerns regarding environmental health and safety or volatilization of PFAS.

- **No toxic byproducts.** Electrochemical oxidation produces hydrofluoric acid, chlorine gas, bromate, perchlorate, and absorbable organic halides from the oxidation of other constituents in the water matrix.^{5,10,11} Furthermore, competing technologies struggle with complete mineralization of PFAS, meaning that not all of the fluorine mass is recovered during treatment.^{5,6,8,9,11} PRD achieved excellent fluorine mass balance during previous studies and this project, in which PFAS destruction could be accounted for by the real-time monitoring of fluoride ion release into bulk solution.
- **High energy efficiency.** PRD achieved higher energy efficiencies than competing technologies, in part, due to the sequestration of PFAS in micelles that create a “reactive cage” that targets PFAS for destruction. Competing technologies suffer significant energy losses due to the heating and pressurization of the bulk water. For example, the micelle accelerated PRD reaction is 18 - 36 times more efficient than UV/sulfite and UV/sodium iodide systems.¹²
- **Real-time reaction monitoring.** As PFAS destruction occurs and carbon-fluorine bonds are broken in PRD, the previously organic fluorine is released into solution as inorganic fluoride ions. Real-time monitoring of inorganic fluoride ion concentrations is an effective indicator of PFAS mineralization extent, and a cheaper alternative compared to PFAS laboratory analytical data.
- **Small footprint, fully automatic water treatment equipment.** Enspired Solutions has designed and manufactured a fully automatic commercial-scale equipment called PFASigator™, specializing in PRD PFAS destruction. It is modular and scalable, with a small footprint, and can be used alone or series, or plug into any existing water treatment trains. Unlike other competing technologies that require custom equipment, PFASigator employs commercially available UV reactors and monitoring meters that have been used in the water industry for decades.

Limitations:

The CTAB additive is only partially consumed during the reaction progress, which must be considered for effluent disposal options. Although CTAB is not problematic when discharged to downstream treatment processes that incorporate aerobic digestors where it is rapidly degraded, CTAB can be toxic to surface waters and anaerobic digestors. Therefore, site-specific consideration and possibly validation will be needed to address disposal options for treated solutions including site-specific evaluation of permitted discharges, and possible removal of CTAB from solution with cationic clay, ion exchange resins, or implementation of an oxidation reaction in the PRD equipment once target PFAS concentrations have been achieved, as described in detail in Section 5. Alternatively, the CTAB remaining in the waste stream could be recycled to the input of the preconcentration mechanism (*i.e.* foam fractionation, nanofiltration, resin), as illustrated in field application scenarios in Section 7. This offers an opportunity to remove it from the water and potential to recycle the CTAB and facilitate PFAS preconcentration in the cases of foam fractionation or other applicable technologies.

The PRD reaction rate was observed to slow down under several circumstances during this project. We observed noticeable decreases in reaction efficiency for solutions that were high in

conductivity/total dissolved solids (TDS) or had very low UV transmissivity. We hypothesize that in high TDS solutions (e.g. ion exchange still bottoms with TDS of 200,000 ppm), the presence of ionic species inhibit the association of the electron donor with the micelle, thus decreasing the reaction rate. Low UV transmissivity (i.e., < 1 %) prevents the penetration of UV light into the solution, such that only species in close proximity to the UV lamp are activated to initiate the reaction.

3.0 PERFORMANCE OBJECTIVES

A summary of the performance objectives, the data requirements, the success criteria and the results of the study are presented in **Table 3-1**, with detailed descriptions presented in subsections.

Table 3-1. Performance objectives

Performance Objective	Data Requirements	Success Criteria	Results
Quantitative Performance Objectives			
High remediation effectiveness	<ul style="list-style-type: none"> • Modified 537 analyses of 40 PFAS compounds for all samples • Organic and inorganic fluorine, and fluoride for all samples • Total oxidizable precursors (TOP) 	<ul style="list-style-type: none"> • Reduction to concentrations to meet site-specific target limits, for example, EPA Health Advisory Level (70 ppt PFOA and PFOS individually and summed) • No creation of PFAS from precursors • Fluoride mass balance. 	<ul style="list-style-type: none"> • EPA MCL PFAS group decreased 79% to >99%, among 5 different sample matrixes in benchtop tests. • PFOS, PFOA, the EPA MCL PFAS group and the total PFAS all achieved >99% decrease in a scaleup test. • The unidentified perfluorocarboxylic acid (PFCA) precursor concentration decreased 85% to >99% among 5 different sample matrices. Some transient accumulation of short chain (C ≤ 6) PFCAs was observed, which decreased with increasing UV dosage. • Fluorine/fluoride mass balance was excellent in cases with little PFAS sorption (nearly 100% recovery of organic fluorine into inorganic fluoride in water for GW, FF and AFFF Rinsate samples).
Low operational cost	<ul style="list-style-type: none"> • Cost of energy usage, final disposal of treated liquid, chemical, equipment, and labor. • Equipment capital cost • Opportunity for on-site permitted disposal of treated liquid 	DoD Project Manager determination of cost effectiveness relative to other PFAS disposal options available at the site	<p>According to the proposed field implementation scenarios:</p> <ul style="list-style-type: none"> • PFAS destruction cost was estimated within a range of \$0.0011/gal to \$0.0068/gal for groundwater and surface water when paired with proper pre-concentration step. The cost range reflected different remediation targets. • PFAS destruction cost was estimated between \$4.6/gal to \$5.4/gal for concentrated PFAS liquid waste such as firefighting truck rinsate and AFFF-impacted wastewater.

Performance Objective	Data Requirements	Success Criteria	Results
Qualitative Performance Objectives			
Ease of use	Feedback from technician on usability of technology, time required, and safety	A single technician able to safely and effectively maintain system and take measurements	Scale up testing with commercial UV treatment system was able to be performed safely by a single technician. System set up required the most time, however after set up the system could be left unattended between measurements.
Safety	Safety reports during operation periods	System operated safely during treatment with no reportable harm to human health and environment	One incident occurred during scale up testing in which a system operator was splashed while draining solution from the system. Better protocols were immediately put in place to prevent future accidents.
Discharge	Safely discharge treated solution	Develop an applicable discharge strategy with consideration of CTAB	<ul style="list-style-type: none"> • CTAB can be degraded by UV oxidation as a post-treatment step. • Alternatively, CTAB may be recirculated back to a foam fractionation or other unit to recycle CTAB for subsequent reactions.

3.1 QUANTITATIVE PERFORMANCE OBJECTIVES

3.1.1 Remediation Effectiveness

Remediation effectiveness was determined by measuring the amount of PFAS destroyed during treatment and quantifying the amount of organic fluoride recovered as aqueous inorganic fluoride ion (fluorine/fluoride mass balance). To quantify the PFAS concentration before, during and after treatment, modified EPA method 537 was used in conjunction with the total oxidizable precursor (TOP) assay to measure the 40 PFAS analytes listed in Draft Method 1633 and determine the unidentified PFCA precursor concentration. The performance goals were reduction of PFAS to site-specific target limits, to not produce detectable PFAS from unidentified precursors, and to demonstrate fluorine/fluoride mass balance.

The bench scale testing data show that, among 5 different sample matrixes, PFOS and PFOA concentrations decreased 96% to >99% and 77% to 97%, respectively, during treatment. The EPA MCL PFAS group, including PFNA, PFOA, PFOS, PFHxS, PFBS, HFPO-DA as listed by EPA proposed drinking water Maximum Contaminant Levels (MCLs) in March 2023, decreased 79% to >99%. Meanwhile, the total PFAS, including all 40 known PFAS analytes and unidentified PFCA precursors, decreased 34% to 96%. All these values are calculated by using RLs as concentrations for non-detects.

The unidentified PFCA precursor concentration decreased in all samples during treatment, from 85% to >99% among 5 different sample matrixes. The PRD reaction resulted in transient accumulation of short chain ($C \leq 6$) PFCAs. This is an expected result, as the reductive defluorination mechanism degrades PFCAs, perfluorosulfonic acids (PFSAs), precursors, and other compounds to short chain PFCAs. With increasing UV dose as demonstrated in the scaleup test, short chain PFCAs concentrations eventually decreased.

The fluorine/fluoride mass balance was excellently achieved, especially for samples where low PFAS sorption to the reactor walls was observed. Among these samples, nearly 100% of the fluorine decrease in individual PFAS compound mass was accounted for by an increase in inorganic fluoride measured in aqueous solution. For samples that showed high sorption of PFAS to the reactor walls, the fluorine/fluoride mass balance was achievable when accounting for PFAS losses from solution due to sorption.

For the groundwater sample chosen for scaleup testing, PFOS, PFOA, the EPA MCL PFAS group, and the total PFAS achieved >99% decrease during scaleup testing. The scaleup study also revealed a challenge for practical implementation of PFAS destruction: a noticeable amount of PFAS sorbed to the stainless reactor from the beginning. After the majority of PFAS was destroyed for concentrated samples, treating the trace remaining PFAS desorbed from the reactor to discharge limit (low ppt levels) was quite energy inefficient. We propose implementation scenarios to pair the PRD system with PFAS concentration units, which are employed to remove residual PFAS and feed that solution back into the PRD system for further destruction.

3.1.1 Operational Cost

The cost estimate of field-scale application is comprised of the capital cost of deploying a field-ready PFAS destruction system, and the cost of daily operation. Reaction kinetics model for PFAS decrease and fluoride generation was developed and used to calculate the PRD energy efficiency to treat given environmental samples. The data collected from both the benchtop tests and the scaleup test were used to fit the models. The results, serving as a basis for the field-scale cost estimate, were used to estimate the energy usage demand, chemical reagents usage rate and the required capacity of the PRD equipment. As aforementioned, Enspired Solutions has built a commercial-scale, fully automated equipment PFASigator that executes PRD chemistry. The prices of purchasing this equipment and chemical reagent supply were quoted from Enspired Solutions and were built into cost estimate of field-scale PRD application.

Two field implementation scenarios were proposed, one for PFAS-impacted groundwater and surface water stream, and the other for highly concentrated PFAS liquid waste such as firefighting truck rinse water or AFFF-impacted wastewater. Energy usage demands calculated for specific matrices were used for cost estimating for each scenario. It was also proposed to pair PFASigator with a PFAS concentration unit for energy savings.

For groundwater and surface water, the PFAS destruction cost was estimated within a range of \$0.0011/gal to \$0.0068/gal, depending on the site-specific remediation objective. The remediation target ranges from treating the long-chain PFAS including PFOA and PFOS (low-end cost) or treating all known and unknown PFAS compounds and precursors (high-end cost). For any given flow rate of 100 gallons per minute (GPM), the energy usage for PFAS destruction ranged from 156 kW/day to 936 kW/day, approximately \$30-\$178/day. For highly concentrated liquid waste such as firefighting truck rinse water or AFFF-impacted wastewater, the PFAS destruction cost was estimated within a range of \$4.6/gal to \$5.4/gal. Approximately 30-35 gallons of concentrated PFAS liquid waste can be treated per unit per day, using 156 kW (\$30) energy for PFAS destruction.

3.2 QUALITATIVE PERFORMANCE OBJECTIVES

The evaluation of qualitative performance is based on our operation with the commercial UV equipment during the scale up tests. The experience of handling this system provided us with important insights on designing and building our own commercial equipment, PFASigator, which was designed as more user-friendly and safer. Testing PFASigator is not in the scope of this work. However, we still discuss some improvements in PFASigator in relative to this commercial UV equipment to depicts a practical picture of potential field application.

3.2.1 Ease of Use

Ease of use was determined by feedback from system operators/technicians, with the goal of a single person being able to operate the system. The commercial UV system for scale up testing was easily operated by a single technician. Setting up the experiments took the longest (about 2 hours), but after set up the system could be run unattended for long periods, even overnight. Samples were manually collected at designated intervals.

In order to minimize labor, the PFASigator is designed as a fully-automated system. The equipment generates real-time fluoride data as an indicator of defluorination extent, which is fed to a cloud-based web portal for remote monitoring and control. The PFASigator can be initialized and run without in-person attendance. Only monthly visit is required for reagent changeout and necessary maintenance.

3.2.2 Safety

System operators made note of any safety concerns when operating the equipment, with the goal of safe operation and no harm to human health or the environment. The system was completed closed, so there was minimal risk of solution leaking during experiments. In the unlikely event of a leak, a drip pan was installed at the base of the system that was large enough to collect the entire volume. One incident occurred while the system was being drained following completion of the reaction, in which an operator was splashed with a few drops of sample. This incident was noted, and better safety protocols were put in place to prevent a similar accident in the future. The new protocols include the use of pumps to transfer the solution into tightly sealed containers, rather than using gravity feeding of the water into a wide mouthed container, as was used when the splash occurred.

PFASigator is fully-automated therefore no influent or discharge needs to be manually operated unless intended. It is equipped with a range of safety sensors, including leakage sensors, temperature sensors, and flowrate sensors to prevent any potential operational safety risks. The bottom is designed as a drip pan to prevent leaking or spills. Also, the equipment is operated under atmospheric pressure and temperature. Given that UV equipment has been used in water industry for decades, no additional safety and health protections are needed in additional to industrial standards.

3.2.3 Discharge

The PRD reaction uses the cationic surfactant CTAB, which has aquatic toxicity. Therefore, site-specific consideration and possibly validation will be needed to address disposal options for treated

solutions including site-specific evaluation of permitted discharges, and possible removal of CTAB from solution with traditional adsorption methods such as cationic clay and ion exchange resins. During this project, we conceptualized two additional strategies to handle residual CTAB present at the end of PRD treatment:

- Degrade CTAB using UV oxidation as a post-processing step. The reaction occurs in the same reactor as the PRD. The project demonstrated that CTAB can be degraded from 50 parts per million (ppm) to < 0.100 ppm using UV/H₂O₂ advanced oxidation after the PRD destruction of PFAS. This approach has the added benefit of degrading other organic compounds in solution and improving the clarity of the water. The byproducts of CTAB degradation need to be considered in this case, which we can explore in future work.
- Remove CTAB with foam fractionation or other method so that it can be recycled back to the PRD unit for subsequent reactions. The process scenarios are presented in Chapter 7.

4.0 SITE DESCRIPTION

The DoD sites targeted for this treatability study are those that can provide waste with PFAS concentrations in the high ppb to ppm range. Sites that meet this criterion are either equipped with a PFAS concentration technology or source areas of PFAS contamination. Disposal of neat AFFF or AFFF-associated waste is also a non-site-specific possibility that PRD is targeting for DoD benefit. Per our discussions with DoD Directors and Project Managers (**Appendix A**), the samples listed in **Table 4-1** were collected. The abbreviated sample IDs listed in the table will be used for the remainder of this report. As stated in **Table 4-1**, a total of seven (7) PFAS waste samples generated from varying concentration technologies or AFFF application conditions on DoD sites, including concentrate via foam fractionation or nanofiltration, resin regenerant, fire suppressant equipment rinsate, etc, were collected for this study.

Table 4-1. List of PFAS contaminated samples obtained for treatability studies

Location	Sample Matrix	Description of Remediation Efforts	Sample ID
Naval Air Station (NAS) Jax	Groundwater	AFFF impacted groundwater was pumped out for remedial investigations	GW
NAS Oceana	Foam fractionation foamate	AFFF impacted groundwater was subjected to <i>in-situ</i> foam fractionation to remove PFAS	FF
MI Army National Guard	AFFF concentrate	3M Lightwater 6% AFFF concentrate. Drums of AFFF were collected and stored	3M AFFF
MI Army National Guard	AFFF concentrate	Ansulite AFFF concentrate. Drums of AFFF were collected and stored	Ansulite AFFF
NAS Willow Grove	Reversible resin regenerate	AFFF impacted surface water from Site 5 Pilot was subjected to ion exchange removal of PFAS. Resin regenerate was distilled to generate still bottom concentrate.	IX SB
Wright-Patterson AFB	Nanofiltration concentrate	Investigation derived waste was treated with nanofiltration to remove PFAS	IDW NF
Tyndall AFB	Firefighting truck rinsate	Fire trucks containing legacy AFFF were rinsed with water to remove PFAS	AFFF Rinsate

5.0 TEST DESIGN

5.1 CONCEPTUAL EXPERIMENTAL DESIGN

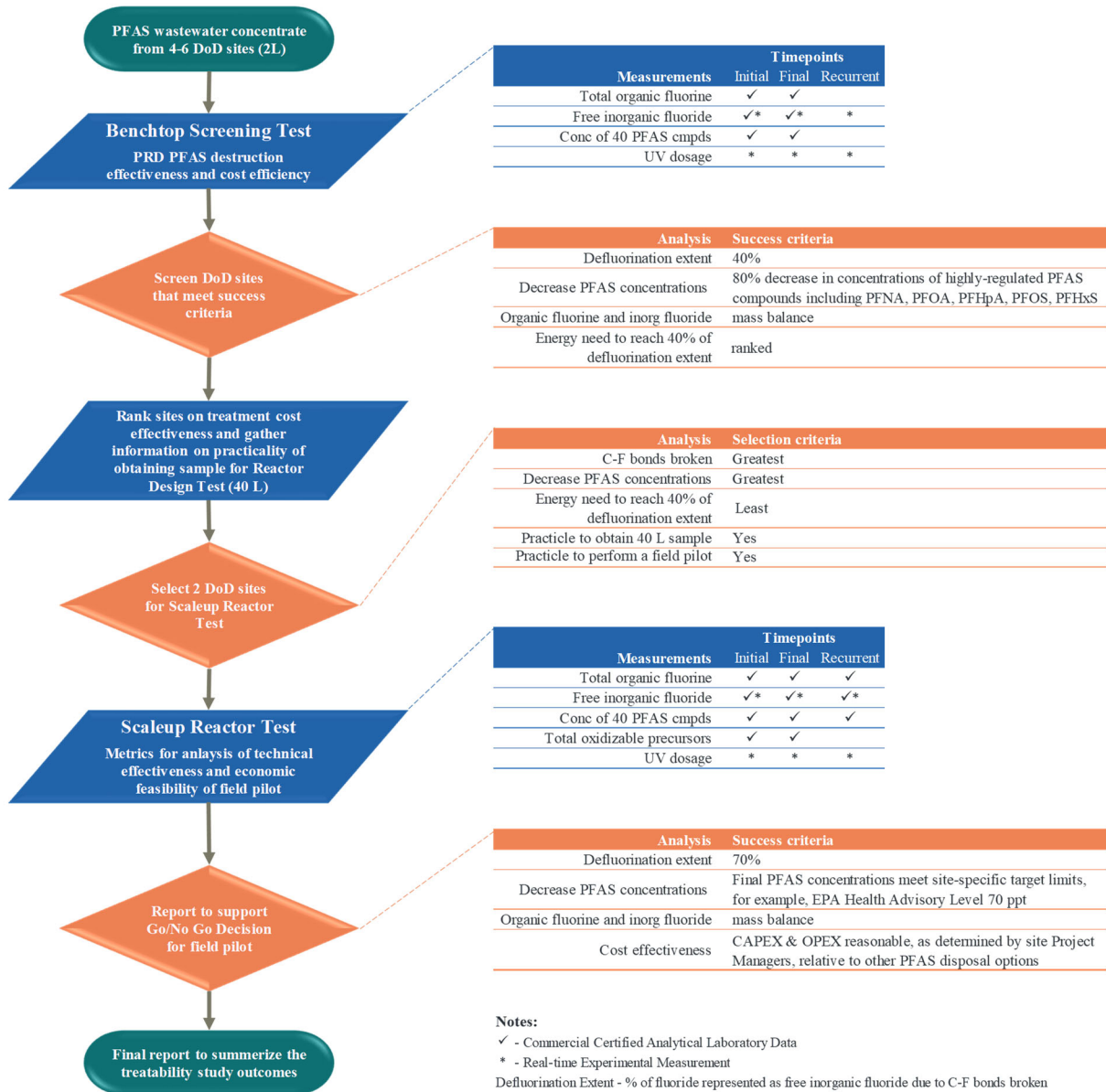


Figure 5-1. Process diagram of project design.

In this study, we used a stepwise approach to assess the field implementation readiness of PRD technology including a Benchtop Screening Test and a Scaleup Reactor Test (Figure 5-1). Benchtop Screening Tests were conducted on seven PFAS concentrates to determine relative effectiveness and energy efficiency of PFAS mineralization based on measurement of initial total PFAS (40 analytes plus unidentified precursors) and total organic fluorine, followed by production of free inorganic fluoride ions in solution as the PFAS destruction reaction proceeds and final measurement of total PFAS. The Scaleup Reactor Test is one step closer to field implementation. Two PFAS concentrates were chosen for the Scaleup Reactor Test. Energy

efficiency, additive quantities, and key design parameters were analyzed to develop treatment cost estimates and conceptual design of applicable field implementations.

5.2 BASELINE CHARACTERIZATION

Physiochemical properties relevant to the performance of the PRD reaction of the site samples are included in **Table 5-1**. Among all the samples, the IX SB from regenerable iron exchange resin had extremely high TDS, resulting from the high content of salts added to wash the PFAS off from the resin. Also, among all samples, the two AFFF samples and the still bottom sample have extremely low UV transmissivity at 254 nm. While the others had a UV transmissivity from 85% to 95%, those samples had nearly 0% UV transmissivity.

Table 5-1. Relevant physiochemical properties of samples

Sample	Matrix	Native pH	Conductivity (µS/cm)	Calculated TDS ^a (ppm)	%T ^b at 254 nm
GW	Groundwater	7.8	420	210	95%
FF	Foam fractionation foamate	7.2	250	130	92%
AFFF Rinsate	Firefighting truck rinsate	6.0	320	160	85%
3M AFFF	AFFF concentrate	9.5	1,000	500	0.01%
IDW NF	Nanofiltration concentrate	7.5	4,900	2,400	92%
IX SB	Regenerable resin regenerate	9.6	330,000	200,000	0.00%
Ansulite AFFF	AFFF concentrate	6.9	4,900	2,400	0.79%

^aTDS was calculated using a calibration curve and measured conductivity values. For conductivity values outside of the calibration window, TDS was approximated as one half of the conductivity.

^bPercent UV transmissivity at a wavelength of 254 nm.

A brief summary of initial PFAS profiles for all samples is presented in **Table 5-2**. Detections are grouped in the PFAS classes of PFCAs, PFSAs, PFCA precursors, unidentified PFCA precursors (determined with TOP assay), and Other PFAS. In **Table 5-2**, for a simple estimate of initial scales of total PFAS, analytes that were reported as non-detects were considered as zero when summing the data. Samples varied widely in their initial PFAS concentration. Except for the IX SB, which profile was dominated by a mixture of PFCAs and PFSAs, the composition of the tested samples was majority PFSAs and PFCA precursor compounds (identified and unidentified). This is a typical profile for AFFF, which is consistent with the fact that AFFF is the primary source of PFAS contamination at these sites. For a detailed list of each PFAS analyte, its PFAS class, its concentration, RL, and method detection limit (MDL), see **Appendix B and C**.

Table 5-2. Summary of initial PFAS concentrations of samples

Sample	Matrix	PFCAs (mg/L ^a)	PFSAs (mg/L)	PFCA Precursors (mg/L)	Unidentified PFCA Precursors (mg/L)	Other PFAS (mg/L)
GW	Groundwater	0.015	0.18	0.033	0.15	0
FF	Foam fractionation foamate	2.2	18	6.6	4.3	0
AFFF Rinsate	Firefighting truck rinsate	0.68	20	1.2	35	0
3M AFFF	AFFF concentrate	180	4,000	1.5	3,600	0
IDW NF	Nanofiltration concentrate	0.016	0.045	0.0061	0.015	0
IX SB	Reversible resin regenerate	320	180	5.0	34	0
Ansulite AFFF	AFFF concentrate	5.7	0.12	17	4,400	0

^amilligrams per liter

Samples were also characterized for total fluorine using Combustion Ion Chromatography (CIC) and inorganic fluoride concentration with Ion Chromatography (IC) at Eurofins Scientific Laboratories (West Sacramento, CA). Enspired Solutions measured the inorganic fluoride concentration with an ion selective electrode (ISE). The results of the organic fluorine and inorganic fluoride analysis are summarized in **Table 5-3**. The measured inorganic fluoride values showed good agreement between the methods used, albeit some samples exhibited high MDLs during IC analysis due to matrix effects. The ISE measurement did not appear to be as affected by the sample matrix.

Also included in **Table 5-3** is the organic fluorine concentration calculated from the individual molar contributions of each PFAS analyte, with values < MDL omitted. In general, the total fluorine measurement by CIC produced values that were significantly less than the total fluorine mass calculated from the PFAS data. The total fluorine measurement by CIC either had a very insensitive high MDL (such as IDW NF and GW sample) or had values 50% - 75% lower than the total fluorine estimated as the sum of organic fluorine from individual PFAS analytes. The total fluorine measurement by CIC in this case was therefore a poor indicator of the total amount of PFAS in the sample and was not used in the fluoride/fluorine mass balance in the data analysis presented in **Section 5.5**.

Table 5-3. Initial organic fluorine and inorganic fluoride concentrations of samples

Sample	Matrix	Measured Total Fluorine (µg/L ^a)	Calculated Total Fluorine (µg/L)	Fluoride measured by IC (µg/L)	Fluoride measured by ISE (µg/L)
GW	Groundwater	500 U	240	320	97
FF	Foam fractionation foamate	3,700	20,000	550	430
AFFF Rinsate	Firefighting truck rinsate	16,000	37,000	2,500 U	640
3M AFFF	AFFF concentrate	1,200,000	5,000,000	140,000	200,000
IDW NF	Nanofiltration concentrate	500 U	53	2,500 U	1,500
IX SB	Reversible resin regenerate	66,000	360,000	11,000 U	1,200
Ansulite AFFF	AFFF concentrate	960,000	2,900,000	270 U	6,400

^amicrograms per liter
U = non-detected

5.3 DESIGN AND LAYOUT OF TECHNOLOGY COMPONENTS

All samples were treated at Enspired Solutions laboratory in either a laboratory-built benchtop reactor (**Figure 5-2**) or a commercial UV reactor (**Figure 5-3**). The benchtop tests for all environmental matrixes were conducted in duplicate columns containing 300 mL of reaction mixture each. A 36 W low-pressure mercury lamp that produces monochromatic radiation at 254 nm wavelength is inserted at the center of the tube to provide *in-situ* UV irradiation. The reaction temperature was controlled between 35 °C to 40 °C by an external, non-circulating water jacket surrounding the tube. The scaleup tests were conducted in a commercial UV reactor which is considered a prototype of the PFASigator. The tested volume in the UV reactor was 18 L for each sample with a UV intensity of 880 W, which was supplied by an array of low pressure mercury lamps protected by quartz sleeves. The reaction temperature was also controlled between 35 °C to 40 °C during the reaction using a non-contact water jacket.

The liquid reagents added to the reaction included hexadecyltrimethylammonium bromide (CTAB, 98% purity, purchased from Fisher Scientific [Hampton, NH]) and the environmental benign electron donor (proprietary knowledge, purchased from Amazon [Seattle, WA]). Other chemicals used in the study include sodium hydroxide, sulfuric acid solution and methanol. All chemicals were used without any further purification. Further details of the experimental set ups and procedures are provided in the *Treatability Study Work Plan* and *Standard Operating Procedures* submitted by Enspired Solutions to ESTCP in May 2021.



Figure 5-2. Benchtop test reactor set up for small scale treatability studies.



Figure 5-3. Commercial UV reactor setup for scaled up studies.

5.4 SAMPLING METHODS

Samples were collected by individual site managers (**Appendix A**) in polypropylene or high density polyethylene containers and shipped to Enspered Solutions laboratory for PRD PFAS destruction testing. Samples were stored at 4 °C when not in use.

For both tests, the fluoride end-product concentration was measured in real-time in 2 mL sample aliquots using an ISE according to EPA method 9214. Meanwhile, for each wastewater sample

screened in the benchtop tests, samples were collected at the initial and final timepoints and sent to Eurofins for analytical chemistry analysis. For scaleup testing, additional samples were collected at 3 intermediate timepoints during the experiments. At each sampling point, approximately 500 mL of sample were collected and sent to Eurofins for additional analytical testing in polypropylene sample bottles on ice. The list of analytes and the analytical methods are provided in **Appendix B**. In brief, the analytical chemistry analysis included using the Modified EPA method 537 to analyze the full suite of 40 PFAS compounds identified in EPA method 1633, and also the TOP assay, as well as analyzing total organic fluorine and inorganic fluoride by direct-injection split stream IC and CIC.

At the end of the experiment, the CTAB concentration was degraded to < 0.100 mg/L using a previously reported UV/H₂O₂ oxidation method.¹³ The CTAB concentration was determined using a spectroscopic detection protocol reported in the literature¹³ and is documented in **Appendix E**.

5.5 SAMPLING RESULTS

5.5.1 Bench Top Testing

5.5.1.1 Comparison between native pH and pH 10

Each sample was treated with PRD at native pH and pH 10 while measuring the release of fluoride ion using an ISE. The extent of PFAS defluorination was estimated by taking the ratio of fluoride increase to the calculated total fluorine mass determined from the initial PFAS analysis (**Figure 5-4**). All samples showed the release of fluoride ion (indicating the defluorination of PFAS) except the IDW NF sample, which did not have sufficient PFAS concentration to observe the release of fluoride by ISE (limit of detection [LOD] ~200 µg/L). In general, all samples showed faster defluorination when the experiment was conducted at pH 10, which is consistent with previous experiments. The AFFF Rinsate appeared to defluorinate to a greater extent at native pH, however this was inconsistent with the final PFAS analysis and is believed to be an outlier. All data discussed in this section focuses on experiments conducted at pH 10. Data for experiments conducted at native pH are included in **Appendix C**.

The IX SB and both AFFF samples were diluted 10 times prior to testing. For the IX SB, we found that the undiluted sample did not defluorinate efficiently under any conditions tested. We believe that this is due to the high TDS of the sample. The UV transmissivity was increased by coagulation and UV oxidation of the sample prior to PRD treatment, however we did not observe improvement in the defluorination rate after applying these pre-treatments (**Appendix C; Figure C-11**). Only diluting the sample allowed for the PRD reaction to proceed. For the AFFF samples, insufficient volumes to run a full reaction column (300 mL) were obtained, therefore the samples were diluted to allow for multiple experiments.

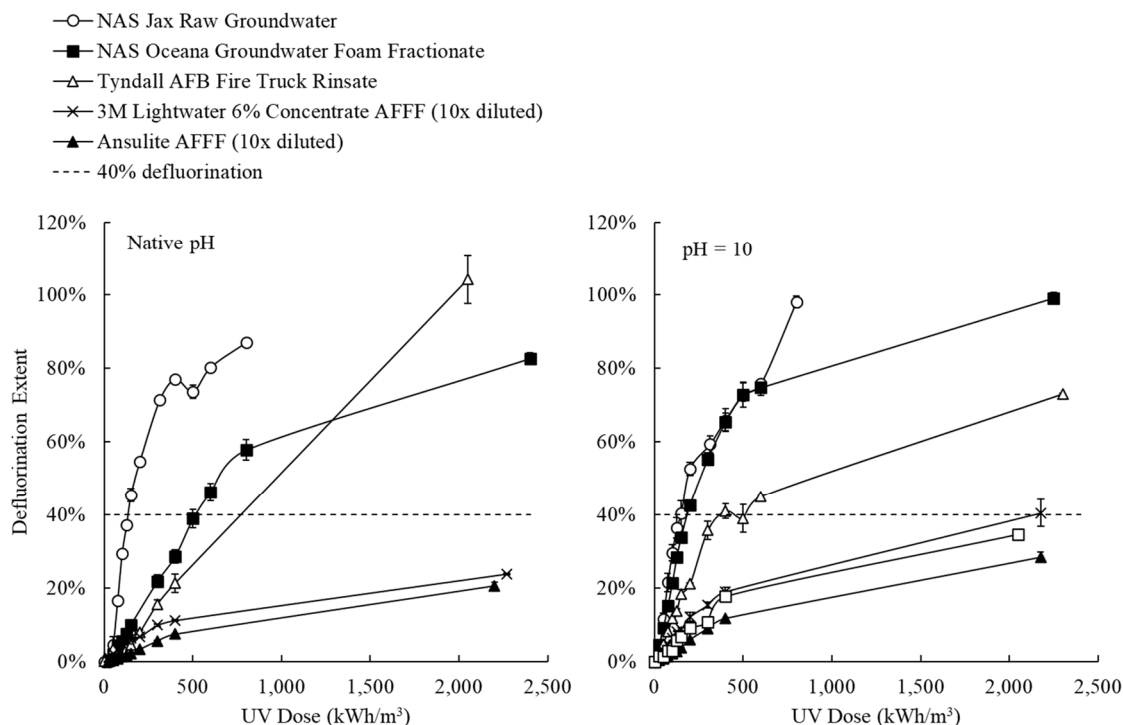


Figure 5-4. Percentage of organic fluorine released as fluoride ion as a function of UV dose for each sample.

Note: IDW NF is not included due to insufficient total fluorine concentration for detection of fluoride release.

In **Figure 5-4**, a horizontal dashed line indicates the point of 40% defluorination, which was one success criterion for the bench top testing (**Figure 5-1**). This criterion was met all samples in at least one experiment (i.e., pH 10 or native pH, or both) except the IX SB and Ansulite AFFF. Again, the IDW NF did not have sufficient PFAS concentration to detect the release of fluoride, therefore we were unable to determine if 40% defluorination criteria was achieved using real-time fluoride measurements. All samples except for IX SB and the Ansulite AFFF, which did not meet the 40% defluorination success criteria in benchtop studies, were sent for final PFAS analysis.

In the following subsections, we present results for PRD reactions for all tested matrices, including GW, FF, AFFF rinsate, 3M AFFF, IDW DF, IX SB, and Ansulite AFFF. For each sample, we show the following graphs and tables for available data:

- PFAS Fingerprint Graph:** The initial and final PFAS analysis are shown as blue and orange bars, respectively. Extremely high concentrations are cut and indicated by callout boxes to show details of low concentration PFAS. All 40 PFAS compounds per EPA Method 1633, as well as unidentified PFCA precursors (determined with TOP assay), are grouped and plotted into the classes PFCA, PFSA, Other PFAS, and PFCA Precursors. Non-detects are shown as hollow bars at the RLs while the dotted portion indicates the MDL values.
- Fluorine/Fluoride Mass Balance Graph:** Fluorine masses were calculated for each detected PFAS analyte. Analytes that were < MDL were omitted from this calculation.

For clarity, PFAS are grouped into the classes PFCA, PFSA, PFCA Precursors, Unidentified PFCA Precursors, and Other PFAS and shown as stacked bar plots. Overlaid on this data is the real-time fluoride release measurement to demonstrate how closely fluorine mass balance was achieved (with the exception of the IDW NF sample, which did not produce enough fluoride to be detected).

- **PFAS Decrease Table:** The table shows the starting and stopping concentrations of key PFAS analytes, plus the sum of all PFAS (40 analytes + unidentified PFCA precursors), sum of EPA MCL PFAS (PFNA, PFOA, PFOS, PFHxS, PFBS, HFPO-DA) as listed in the proposed EPA MCL (March, 2023), and sum of frequently regulated PFAS (PFNA, PFOA, PFHxA, PFBA, PFOS, PFHxS, PFBS, HFPO-DA) during treatment. PFAS sums were calculated three different ways: (1) with ND = 0, (2) with ND = MDL, and (3) with ND = RL to account for the sensitivity of treating non-detects. Percent decreases in PFAS analytes or sums are included where applicable.

5.5.1.2 NAS Jax groundwater sample

During the bench scale treatability study of the GW sample at pH 10, the sum of total PFAS and frequently regulated PFAS decreased by >90%, and the sum of EPA MCL PFAS decreased by >99% (**Table 5-4**). Decreases in concentrations were observed in every PFAS class, including unidentified PFCA precursors, however some accumulation of shorter chain ($C \leq 6$) PFCAs did occur (**Figure 5-5**). Short chain PFCAs are a byproduct of long chain PFCA, PFSA and precursor degradation, and can be degraded as well with longer treatment times or UV doses. This effect can be observed in the data for the scaleup testing of the GW sample (**Section 5.3.2.2**), where intermediate PFAS sampling and higher UV doses show the accumulation and subsequent degradation of short chain PFCAs.

The fluorine/fluoride mass balance for the GW bench top treatability test (**Figure 5-6**) was excellent, with nearly 100% of the decrease in organic fluorine accounted by an increase in inorganic fluoride ion from real-time fluoride measurements. This shows that the real-time fluoride ion measurement is an excellent proxy for the destruction of PFAS in this sample. The increase in inorganic fluoride actually exceeded the calculated decrease in organic fluorine, which could mean that the initial PFAS concentration was underestimated (i.e., PFAS compounds not detected with the analytical methods used were present in the sample) or a discrepancy between comparing fluoride ISE and PFAS LC/MS/MS analytical techniques. Some sorption of PFAS to the glass reactor walls was observed, however this was minimal (~ 4% of total decrease in organic fluorine).

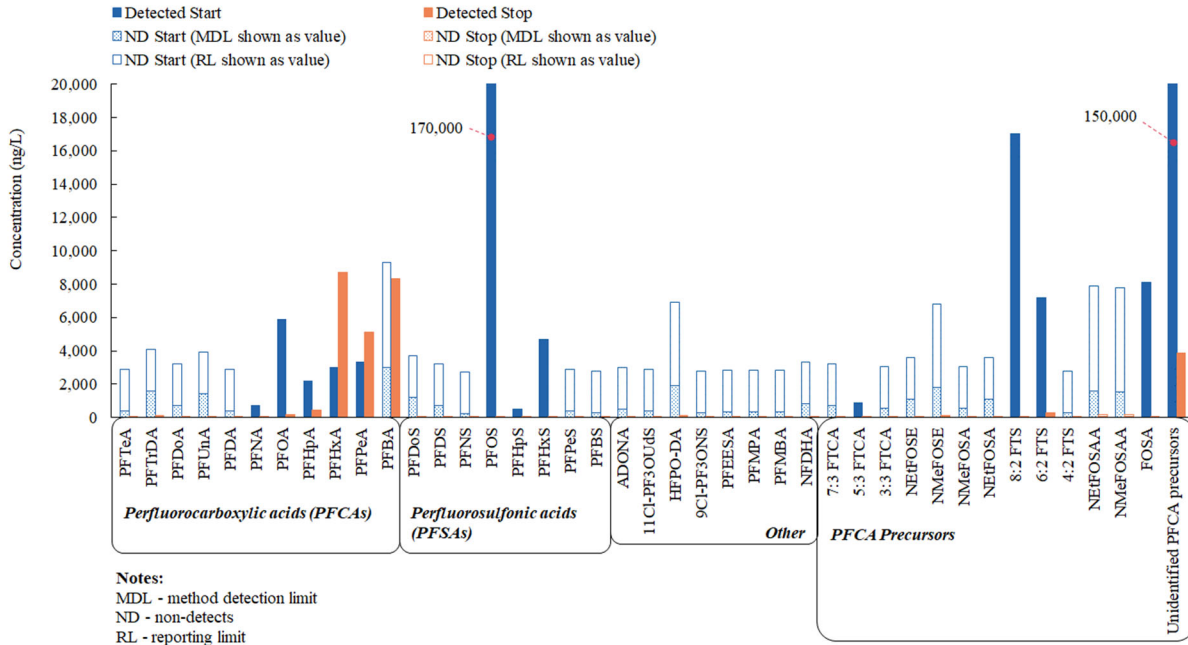


Figure 5-5. PFAS fingerprint graph – NAS Jax groundwater sample

Note: Data are for GW untreated (blue bars) and treated (orange bars) at pH 10.

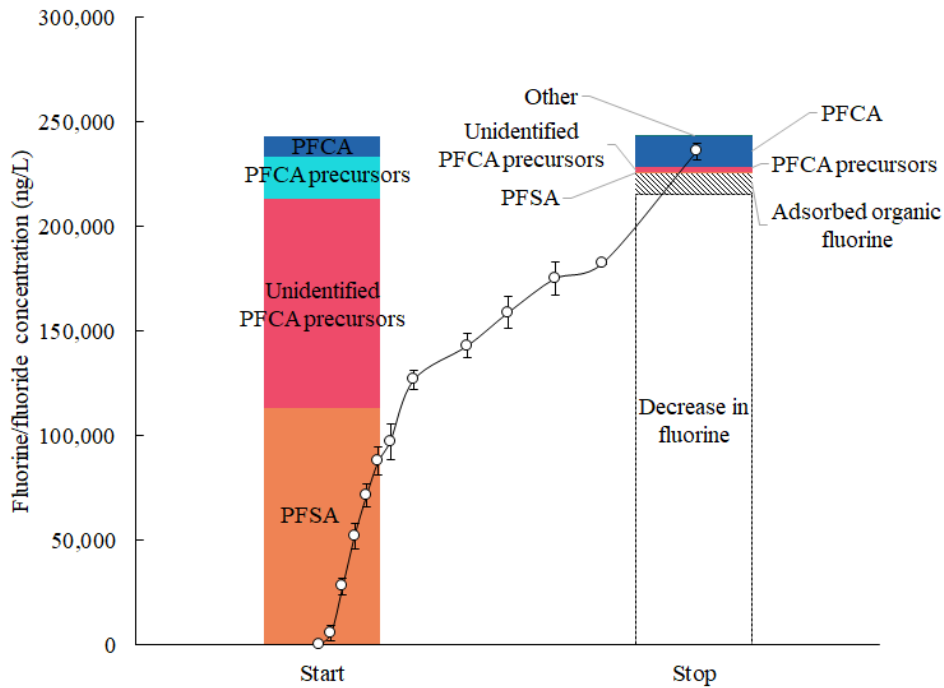


Figure 5-6. Fluorine/fluoride mass balance graph – NAS Jax groundwater sample

Note: Calculated organic fluorine (colored bars) and measured fluoride release (line with open circles) for the PRD treatment of GW at pH 10. Sorbed fluorine is indicated by black and white striped bar.

Table 5-4. PFAS decrease table – NAS Jax groundwater sample

Analyte	Units	Start	End	% Decrease
PFNA	ng/L	720 J	50 U	>93%
PFOA	ng/L	5,900	180	97%
PFHxA	ng/L	3,000	8,700	N/A
PFBA	ng/L	6,300 U	8,300	N/A
PFOS	ng/L	170,000	62	>99%
PFHxS	ng/L	4,700	85	98%
PFBS	ng/L	2,500 U	11 J	N/A
HFPO-DA	ng/L	5,000 U	100 U	N/A
Σ Total PFAS ^a (ND = 0)	ng/L	370,000	27,000	93%
Σ Total PFAS (ND = MDL)	ng/L	400,000	28,000	93%
Σ Total PFAS (ND = RL)	ng/L	460,000	29,000	94%
Σ Highly regulated PFAS ^b (ND = 0)	ng/L	180,000	340	>99%
Σ Highly regulated PFAS (ND = MDL)	ng/L	180,000	380	>99%
Σ Highly regulated PFAS (ND = RL)	ng/L	190,000	490	>99%
Σ High priority PFAS ^c (ND = 0)	ng/L	180,000	17,000	91%
Σ High priority PFAS (ND = MDL)	ng/L	190,000	17,000	91%
Σ High priority PFAS (ND = RL)	ng/L	200,000	17,000	92%

MDL = Method Detection Limit

RL = Reporting Limit

U = Non-detected, shown as reporting limit

J = Estimated

^aTotal PFAS = 40 analytes + unidentified PFCA precursors^bHighly regulated PFAS = PFNA, PFOA, PFOS, PFHxS, PFBS, HFPO-DA^cHigh priority PFAS = PFNA, PFOA, PFHxA, PFBA, PFOS, PFHxS, PFBS, HFPO-DA

5.5.1.3 NAS Oceana foam fractionation sample

During the bench scale treatability study of the FF sample at pH 10, the sum of total PFAS decreased by 96%, the sum of EPA MCL PFAS decreased by 93%, and the sum of frequently regulated PFAS decreased 87% (**Table 5-5**). Decreases in concentrations were observed in every PFAS class, including unidentified PFCA precursors, however some accumulation of PFHxA and PFPeA was observed (**Figure 5-7**). These are again a transient byproduct from degradation of longer chain PFAS and can be treated with longer treatment times or UV doses.

The fluorine/fluoride mass balance for the FF bench top treatability test (**Figure 5-8**) was comparable to the GW sample, with nearly 100% of the decrease in organic fluorine accounted for by an increase in inorganic fluoride ion from real-time fluoride measurements. This shows that the real-time fluoride ion measurement is an excellent proxy for the destruction of PFAS in this sample. Like the GW sample, the increase in inorganic fluoride exceeded the calculated decrease in organic fluorine, which could mean that the initial PFAS concentration was underestimated or there is a discrepancy between comparing fluoride ISE and PFAS LC/MS/MS analytical techniques. A small amount of sorbed PFAS (~ 4% of total decrease in organic fluorine) was measured after rinsing the reactor walls with methanol and collecting a sample.

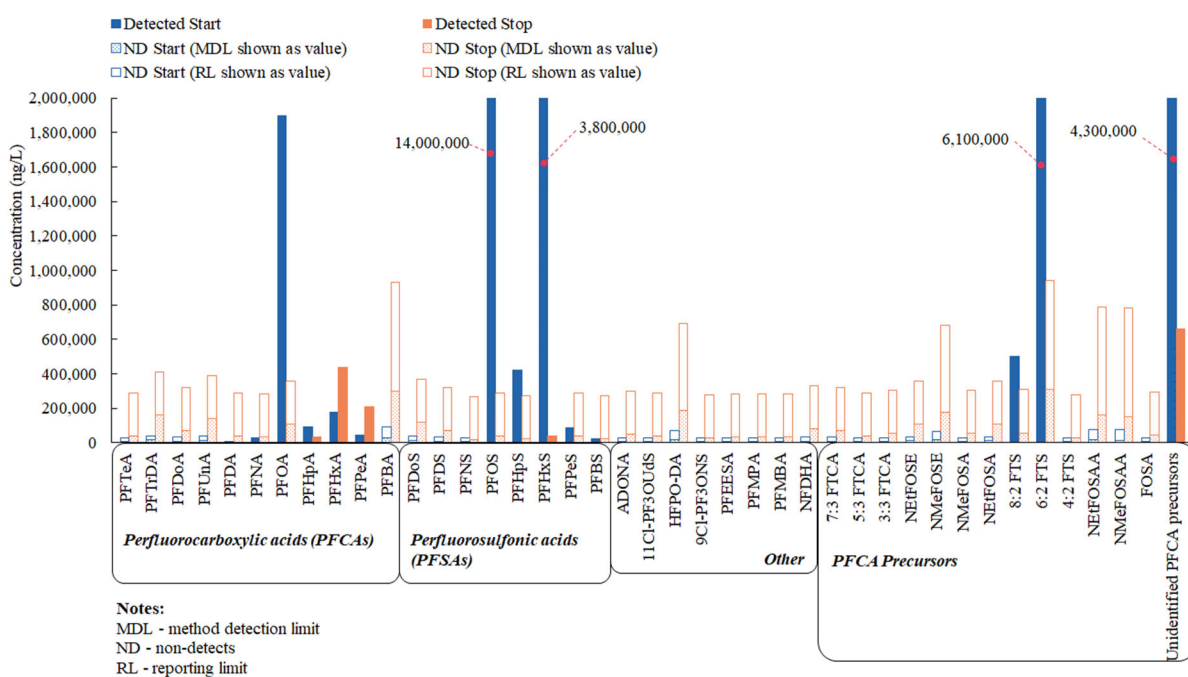


Figure 5-7. PFAS fingerprint graph – NAS Oceana foam fractionation sample

Note: Data are for FF untreated (blue bars) and treated (orange bars) at pH 10.

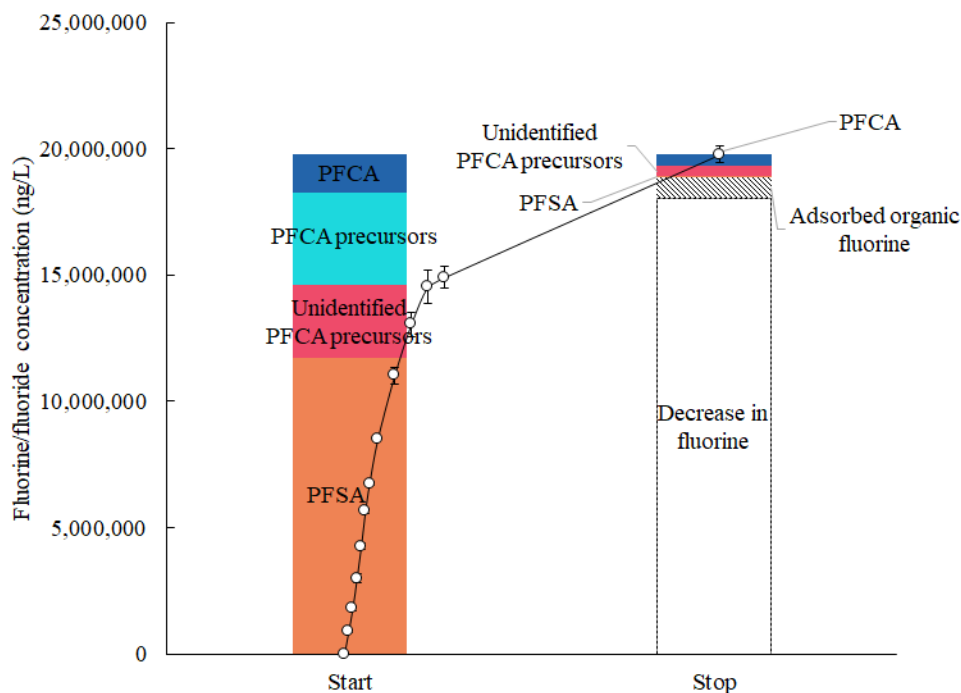


Figure 5-8. Fluorine/fluoride mass balance graph – NAS Oceana foam fractionation sample

Note: Calculated organic fluorine (colored bars) and measured fluoride release (line with open circles) for the PRD treatment of FF at pH 10. Sorbed fluorine is indicated by black and white striped bar.

Table 5-5. PFAS decrease table – NAS Oceana foam fractionation sample

Analyte	Units	Start	Stop	% Decrease
PFNA	ng/L	31,000	250,000 U	N/A
PFOA	ng/L	1,900,000	250,000 U	>87%
PFHxA	ng/L	180,000	440,000	N/A
PFBA	ng/L	63,000 U	630,000 U	N/A
PFOS	ng/L	14,000,000	250,000 U	>98%
PFHxS	ng/L	3,800,000	40,000 J	99%
PFBS	ng/L	23,000 J	250,000 U	N/A
HFPO-DA	ng/L	50,000 U	500,000 U	N/A
Σ Total PFAS ^a (ND = 0)	ng/L	32,000,000	1,400,000	96%
Σ Total PFAS (ND = MDL)	ng/L	32,000,000	4,500,000	86%
Σ Total PFAS (ND = RL)	ng/L	32,000,000	1,200,000	96%
Σ Highly regulated PFAS ^b (ND = 0)	ng/L	20,000,000	40,000	>99%
Σ Highly regulated PFAS (ND = MDL)	ng/L	20,000,000	440,000	98%
Σ Highly regulated PFAS (ND = RL)	ng/L	20,000,000	1,500,000	93%
Σ High priority PFAS ^c (ND = 0)	ng/L	20,000,000	480,000	98%
Σ High priority PFAS (ND = MDL)	ng/L	20,000,000	1,200,000	94%
Σ High priority PFAS (ND = RL)	ng/L	20,000,000	2,600,000	87%

MDL = Method Detection Limit

RL = Reporting Limit

U = Non-detected, shown as reporting limit

J = Estimated

^aTotal PFAS = 40 analytes + unidentified PFCA precursors

^bHighly regulated PFAS = PFNA, PFOA, PFOS, PFHxS, PFBS, HFPO-DA

^cHigh priority PFAS = PFNA, PFOA, PFHxA, PFBA, PFOS, PFHxS, PFBS, HFPO-DA

5.5.1.4 Tyndall AFB fire truck rinsate sample

During the bench scale treatability study of the AFFF Rinsate sample at pH 10, the sum of total PFAS, the sum of EPA MCL PFAS, and the sum of frequently regulated PFAS decreased by 91%, 95% and 86%, respectively (**Table 5-6**). Decreases in concentrations were observed in every PFAS class except for PFCAs, which had relatively low starting concentrations (**Figure 5-9**). The highest mass fractions of PFAS in this sample came from PFASs and unidentified PFCA precursors. Shorter chain PFCAs accumulated during the treatment time as a result of degradation of the other PFAS compounds present. Extended treatment times or UV doses are necessary to decrease the total short chain PFCA concentration.

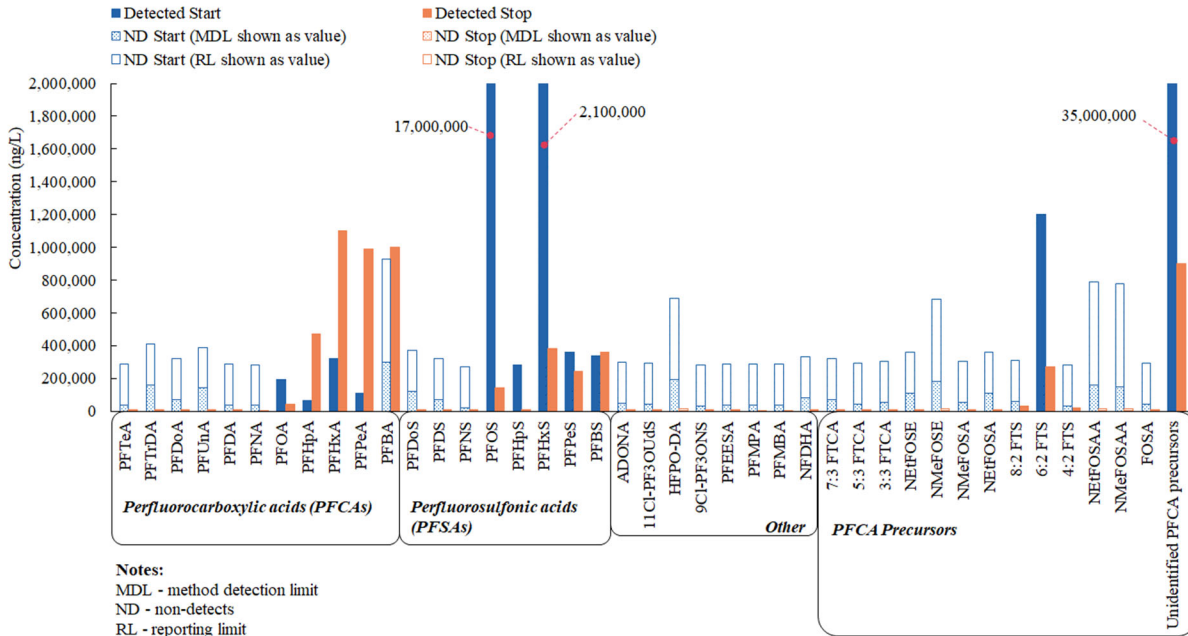


Figure 5-9. PFAS fingerprint graph – Tyndall AFB fire truck rinsate sample

Note: Data are for AFFF Rinsate untreated (blue bars) and treated (orange bars) at pH 10.

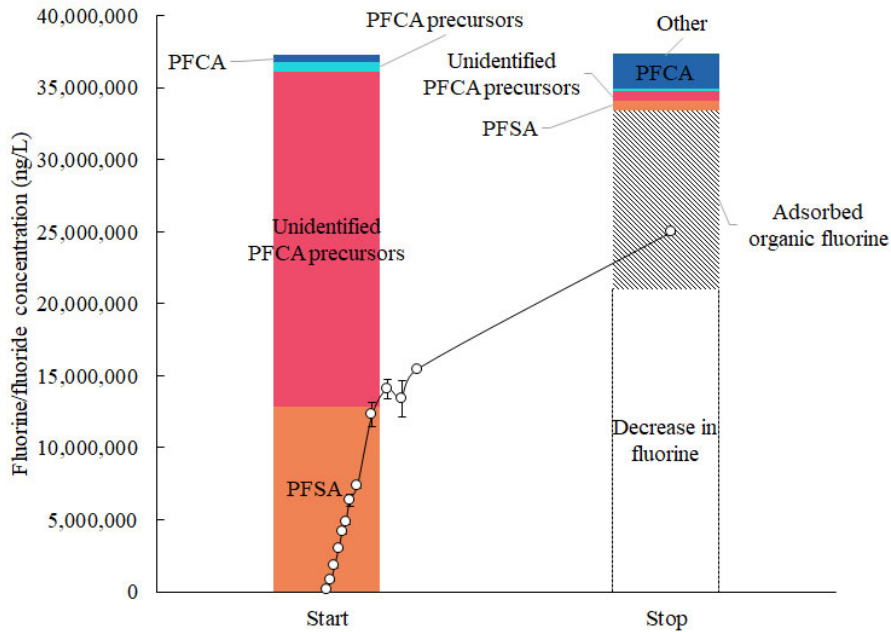


Figure 5-10. Fluorine/fluoride mass balance graph – Tyndall AFB fire truck rinsate sample

Note: Calculated organic fluorine (colored bars) and measured fluoride release (line with open circles) for the PRD treatment of AFFF Rinsate at pH 10. Sorbed fluorine is indicated by black and white striped bar.

The fluorine/fluoride mass balance for the AFFF Rinsate bench top treatability test (**Figure 5-10**) also showed nearly 100% of the decrease in organic fluorine accounted by an increase in inorganic fluoride ion from real-time fluoride measurements. The increase in inorganic fluoride also exceeded the calculated decrease in organic fluorine, likely for one of the reasons described previously. The AFFF Rinsate also showed a larger amount of PFAS sorption (~33 % of the total decrease in organic fluorine) compared to the GW and FF samples. This is likely due to the sample being a highly concentrated AFFF rinsate, comprised mostly of PFAS compounds with high affinity for surfaces.

Table 5-6. PFAS decrease table – Tyndall AFB fire truck rinsate sample

Analyte	Units	Start	Stop	% Decrease
PFNA	ng/L	250,000 U	4,100 J	N/A
PFOA	ng/L	190,000 J	44,000	77%
PFHxA	ng/L	320,000	1,100,000	N/A
PFBA	ng/L	630,000 U	1,000,000	N/A
PFOS	ng/L	17,000,000	140,000	99%
PFHxS	ng/L	2,100,000	380,000	82%
PFBS	ng/L	340,000	360,000	N/A
HFPO-DA	ng/L	500,000 U	10,000 U	N/A
Σ Total PFAS ^a (ND = 0)	ng/L	57,000,000	6,000,000	89%
Σ Total PFAS (ND = MDL)	ng/L	59,000,000	6,000,000	90%
Σ Total PFAS (ND = RL)	ng/L	66,000,000	6,100,000	91%
Σ Highly regulated PFAS ^b (ND = 0)	ng/L	20,000,000	930,000	95%
Σ Highly regulated PFAS (ND = MDL)	ng/L	20,000,000	930,000	95%
Σ Highly regulated PFAS (ND = RL)	ng/L	20,000,000	940,000	95%
Σ High priority PFAS ^c (ND = 0)	ng/L	20,000,000	3,030,000	85%
Σ High priority PFAS (ND = MDL)	ng/L	20,000,000	3,030,000	85%
Σ High priority PFAS (ND = RL)	ng/L	21,000,000	3,040,000	86%

MDL = Method Detection Limit

RL = Reporting Limit

U = Non-detected, shown as reporting limit

J = Estimated

^aTotal PFAS = 40 analytes + unidentified PFCA precursors

^bHighly regulated PFAS = PFNA, PFOA, PFOS, PFHxS, PFBS, HFPO-DA

^cHigh priority PFAS = PFNA, PFOA, PFHxA, PFBA, PFOS, PFHxS, PFBS, HFPO-DA

5.5.1.5 Michigan Army National Guard 3M AFFF Sample

During the bench scale treatability study of the 3M AFFF (diluted 10x) sample at pH 10, the sum of total PFAS decreased by 34%, the sum of EPA MCL PFAS decreased by 79%, and the sum of frequently regulated PFAS decreased by 70% (**Table 5-7**). These numbers might be underestimated because we used RLs as concentrations for non-detected samples, and RLs for 3M AFFF Stop sample were significantly higher (500 times difference) than RLs for Start sample. Decreases in concentrations were observed in every PFAS class, with some accumulation of the PFHxA, PFPeA and PFBA (**Figure 5-11**). These are again a byproduct from degradation of longer chain PFAS and can be treated with longer treatment times or UV doses.

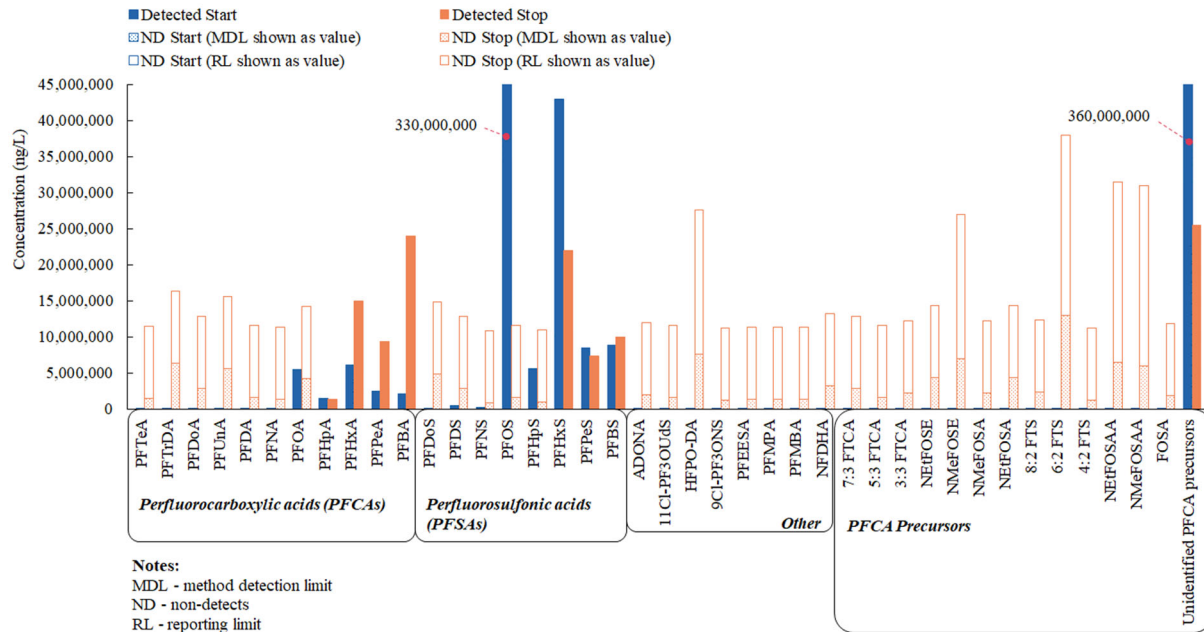


Figure 5-11. PFAS fingerprint graph – 3M AFFF sample (diluted 10x)

Note: Data are for 3M lightwater 6% concentrate AFFF untreated (blue bars) and treated (orange bars) at pH 10.

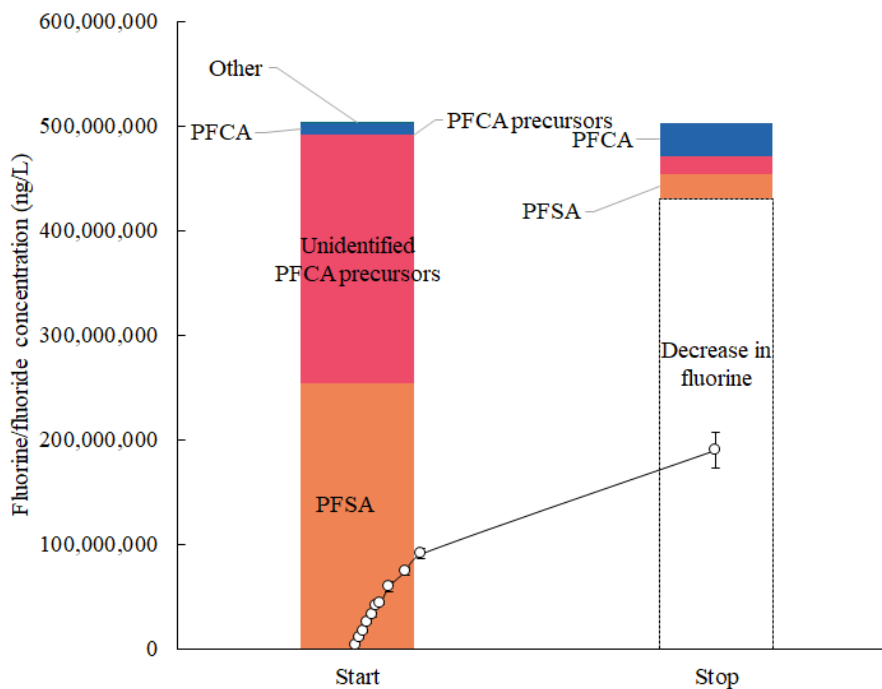


Figure 5-12. Fluorine/fluoride mass balance graph – 3M AFFF sample (diluted 10x)

Note: Calculated organic fluorine (colored bars) and measured fluoride release (line with open circles) for the PRD treatment of GW at pH 10. Sorbed fluorine is indicated by black and white striped bar.

Table 5-7. PFAS decrease table – 3M AFFF (diluted 10x)

Analyte	Units	Start	Stop	% Decrease
PFNA	ng/L	25,000 U	10,000,000 U	N/A
PFOA	ng/L	5,500,000	10,000,000 U	N/A
PFHxA	ng/L	6,100,000	15,000,000	N/A
PFBA	ng/L	2,100,000	24,000,000 J	N/A
PFOS	ng/L	330,000,000	10,000,000 U	>96%
PFHxS	ng/L	43,000,000	22,000,000	49%
PFBS	ng/L	8,900,000	10,000,000	N/A
HFPO-DA	ng/L	50,000 U	20,000,000 U	N/A
Σ Total PFAS ^a (ND = 0)	ng/L	770,000,000	110,000,000	86%
Σ Total PFAS (ND = MDL)	ng/L	770,000,000	220,000,000	71%
Σ Total PFAS (ND = RL)	ng/L	770,000,000	510,000,000	34%
Σ Highly regulated PFAS ^b (ND = 0)	ng/L	390,000,000	32,000,000	92%
Σ Highly regulated PFAS (ND = MDL)	ng/L	390,000,000	47,000,000	88%
Σ Highly regulated PFAS (ND = RL)	ng/L	390,000,000	82,000,000	79%
Σ High priority PFAS ^c (ND = 0)	ng/L	400,000,000	71,000,000	82%
Σ High priority PFAS (ND = MDL)	ng/L	400,000,000	86,000,000	79%
Σ High priority PFAS (ND = RL)	ng/L	400,000,000	120,000,000	70%

MDL = Method Detection Limit

RL = Reporting Limit

U = Non-detected, shown as reporting limit

J = Estimated

^aTotal PFAS = 40 analytes + unidentified PFCA precursors

^bHighly regulated PFAS = PFNA, PFOA, PFOS, PFHxS, PFBS, HFPO-DA

^cHigh priority PFAS = PFNA, PFOA, PFHxA, PFBA, PFOS, PFHxS, PFBS, HFPO-DA

The fluorine/fluoride mass balance for the 3M AFFF (diluted 10x) bench top treatability test (**Figure 5-12**) was poor compared to the other samples tested, with approximately 65% of the initial organic fluorine recovered as organic fluorine and inorganic fluoride in the final sample. PFAS sorption to the reactor walls was not measured for this sample due to exceeding our analytical budget, however it is presumed that sorption is quite high in this sample since it is highly concentrated AFFF. Sorption of PFAS in this sample is likely comparable to, or worse, than the AFFF Rinsate sample (~33% adsorbed). Therefore, the fluorine/fluoride mass balance could likely be improved after quantification of sorbed PFAS. Please note that for the AFFF samples, insufficient volumes to run a full reaction column (300 mL) were obtained, therefore there is a potential for the PRD to treat undiluted AFFF which needs further verification.

5.5.1.6 Investigation Derived Waste Nanofiltration Sample

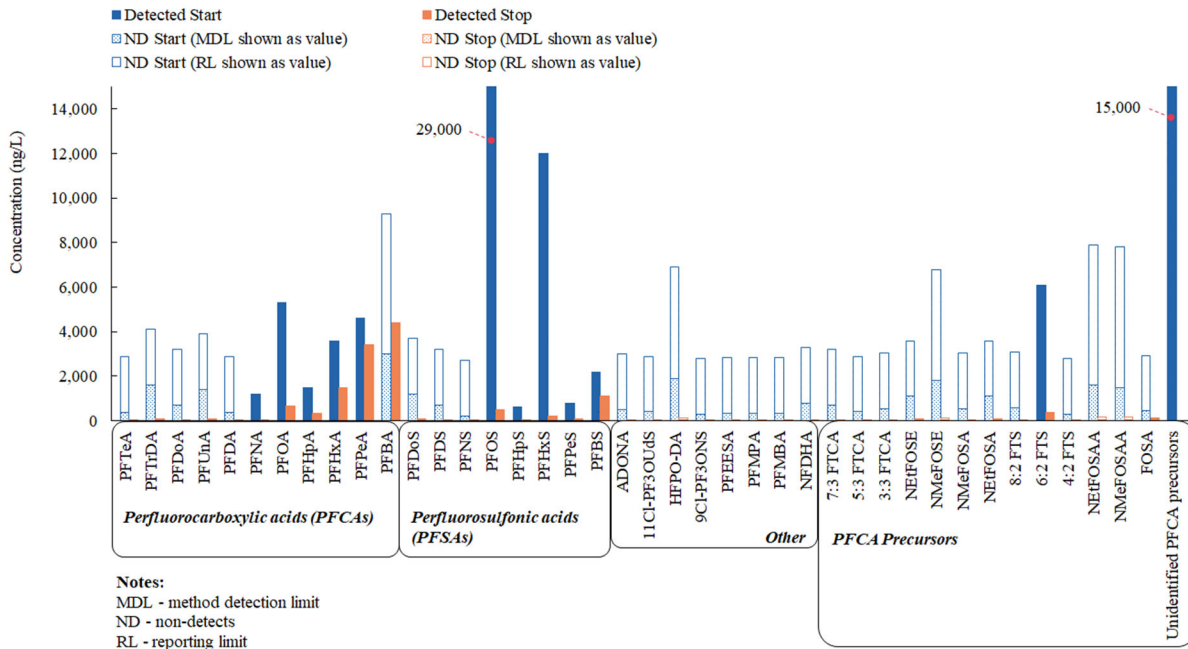


Figure 5-13. PFAS fingerprint graph – IDW nanofiltration sample

Note: Data are for IDW NF untreated (blue bars) and treated (orange bars) at pH 10.

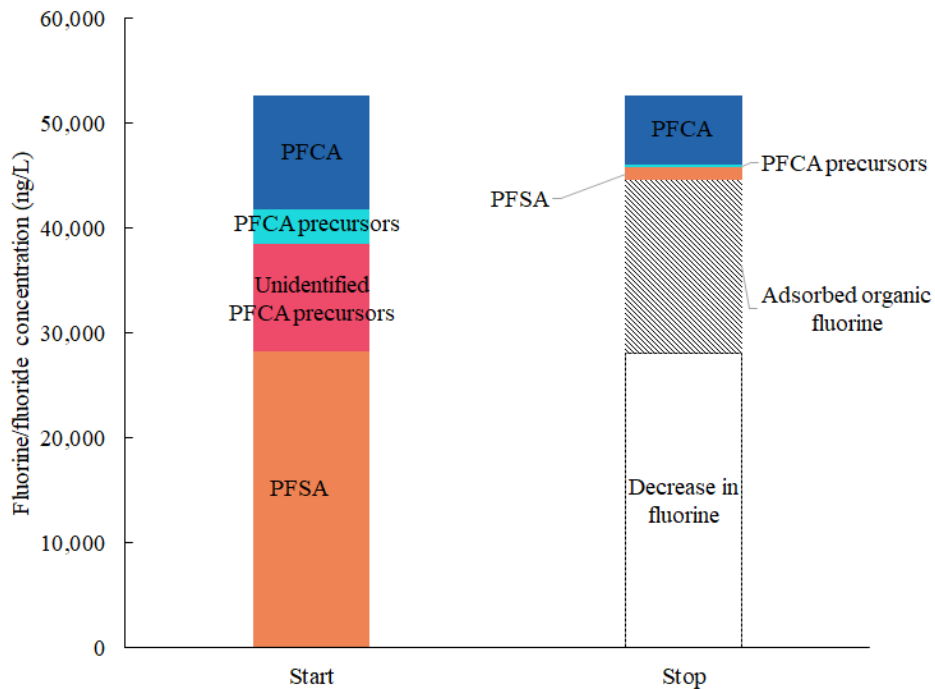


Figure 5-14. Fluorine/fluoride mass balance graph – IDW nanofiltration sample

Note: Calculated organic fluorine (colored bars) and measured fluoride release (line with open circles) for the PRD treatment of GW at pH 10. Sorbed fluorine is indicated by black and white striped bar.

Table 5-8. PFAS decrease table –IDW nanofiltration sample

Analyte	Units	Start	Stop	% Decrease
PFNA	ng/L	1,200 J	11 J	99%
PFOA	ng/L	5,300	650	88%
PFHxA	ng/L	3,600	1,500	58%
PFBA	ng/L	6,300 U	4,400	N/A
PFOS	ng/L	29,000	500	98%
PFHxS	ng/L	12,000	220	98%
PFBS	ng/L	2,200 J	1,100	50%
HFPO-DA	ng/L	5,000 U	100 U	N/A
Σ Total PFAS ^a (ND = 0)	ng/L	82,000	13,000	84%
Σ Total PFAS (ND = MDL)	ng/L	110,000	13,000	88%
Σ Total PFAS (ND = RL)	ng/L	170,000	14,000	92%
Σ Highly regulated PFAS ^b (ND = 0)	ng/L	50,000	2,500	95%
Σ Highly regulated PFAS (ND = MDL)	ng/L	52,000	2,500	95%
Σ Highly regulated PFAS (ND = RL)	ng/L	55,000	2,600	95%
Σ High priority PFAS ^c (ND = 0)	ng/L	53,000	8,400	84%
Σ High priority PFAS (ND = MDL)	ng/L	58,000	8,400	86%
Σ High priority PFAS (ND = RL)	ng/L	65,000	8,500	87%

MDL = Method Detection Limit

RL = Reporting Limit

U = Non-detected, shown as reporting limit

J = Estimated

^aTotal PFAS = 40 analytes + unidentified PFCA precursors

^bHighly regulated PFAS = PFNA, PFOA, PFOS, PFHxS, PFBS, HFPO-DA

^cHigh priority PFAS = PFNA, PFOA, PFHxA, PFBA, PFOS, PFHxS, PFBS, HFPO-DA

During the bench scale treatability study of the IDW NF sample at pH 10, the sum of total PFAS and high priority PFAS decreased by 92% and 87%, respectively, and the sum of EPA MCL PFAS decreased by 95% (**Table 5-8**). Decreases in concentrations were observed in every PFAS class, with some accumulation of PFBA as an intermediate (**Figure 5-13**).

The amount of organic fluorine converted to inorganic fluoride for the IDW NF bench top treatability test (**Figure 5-14**) could not be determined due to inability to make real-time fluoride release measurements. The amount of inorganic fluoride generated during treatment of this sample was less than the LOD of the ISE (~200 µg/L). PFAS sorption to the reactor walls was significant in this sample, with approximately 31% of initial organic fluorine lost to PFAS sorption. This sample is not considered the best match for the PRD technology due to the inability to measure fluoride release in real-time, and therefore monitor the reaction progress. Also, the low PFAS concentration of this sample compared to the others resulted in a relatively low mass of PFAS destroyed per UV dose. This result exemplifies that higher PFAS concentrations are more suitable for PFAS destruction by PRD due to improved energy efficiencies.

5.5.1.7 Resin regenerate still bottom sample

The IX SB sample was not submitted for PFAS analysis since the 40% defluorination benchmark was not achieved during treatability testing, likely due to the high TDS of the sample. After

applying multiple pre-treatments to this sample (discussed in Section 5.5.1.1), only a 10x sample dilution allowed for the release of fluoride from PFAS to be measured (**Figure 5-4**). Additional data for the IX SB sample is provided in **Appendix C**.

5.5.1.8 Ansulite AFFF sample

The Ansulite AFFF sample was not submitted for PFAS analysis since the 40% defluorination benchmark was not achieved during treatability testing (**Figure 5-4**). High sorption of PFAS to the reactor walls and a moderately high TDS concentration may have contributed to the low defluorination percentage for this sample. Data for the Ansulite AFFF sample is provided in (**Appendix C**).

5.5.1.9 General comparison among all samples

All samples tested showed a significant decrease in PFAS concentrations (**Table 5-9**). GW, FF and AFFF Rinsate matrices behaved the best, reaching 93% to >99% decrease for EPA MCL PFAS (PFNA, PFOA, PFOS, PFHxS, PFBS, HFPO-DA) and 91% to 96% decrease for total PFAS (40 analytes plus unidentified PFCA precursors). The 3M AFFF (diluted 10x) sample and IDW nanofiltration sample also had good decrease rates, with 79% to 95% decrease in EPA MCL PFAS, and 34% to 92% decrease in total PFAS. All these values are calculated by using RLs as concentrations for non-detects.

In March 2023, EPA proposed drinking water MCLs as follows: PFOA (4 ng/L), PFOS (4 ng/L), PFHxS (9 ng/L), PFNA (10 ng/L), PFBS (2,000 ng/L) and HFPO-DA (10 ng/L). Except that PFBS limit has been achieved in 2 of 5 samples, regulatory limits of other analytes were not achieved, even at high percentages of decrease. Due to the high initial PFAS concentrations in the samples, PFAS analytes need to reduce a total of 4-8 orders of magnitude to reach its regulatory limits. Further PFAS destruction could be achieved by inputting additional energy into the system via great light intensity or longer reaction duration at the same light intensity. However, for the greatest energy efficiency it is recommended that the PRD destruction system be paired with foam fractionation or other concentration technology to remove and concentrate the remaining PFAS prior to discharge. This concentrate could then be routed back to the PRD system for another cycle of PFAS destruction.

The fluorine mass balances shown in **Table 5-9** were calculated using the following equation:

$$\frac{\sum(\text{organic fluorine}_{\text{final}} + \text{inorganic fluoride}_{\text{final}})}{\sum(\text{organic fluorine}_{\text{initial}} + \text{inorganic fluoride}_{\text{initial}})} \quad \text{Eqn. 1}$$

Where the organic fluorine includes both the aqueous and sorbed fluorine mass. GW, FF and AFFF Rinsate samples exhibited excellent fluorine mass balance during treatment, and real-time measurement of fluoride release in the solution was a reliable indicator of PFAS destruction. The 3M AFFF sample showed the greatest difference between organic fluorine decrease and inorganic fluoride release (i.e., poor fluorine mass balance). Methanol rinse data for the AFFF Rinsate sample showed significant PFAS sorption to the reaction walls, and we suspect that this was also the case for the 3M AFFF sample. PFAS that remains sorbed when the reaction is stopped makes closing the fluorine mass balance more challenging. Highly concentrated AFFF samples also present analytical challenges, so the data should be interpreted with caution. For larger scale

treatment of these solutions, the sorption of PFAS to system components must be carefully considered when using real-time fluoride release data to monitor the reaction.

Table 5-9. PFAS destruction extents among all samples

	% Decrease	AFFF		3M AFFF	IDW NF	
		GW	FF	Rinsate (diluted 10x)		
Σ Total PFAS ^a (ND = 0)		93%	96%	89%	86%	84%
Σ Total PFAS (ND = MDL)		93%	86%	90%	71%	88%
Σ Total PFAS (ND = RL)		94%	96%	91%	34%	92%
Σ Highly regulated PFAS ^b (ND = 0)		>99%	>99%	95%	92%	95%
Σ Highly regulated PFAS (ND = MDL)		>99%	98%	95%	88%	95%
Σ Highly regulated PFAS (ND = RL)		>99%	93%	95%	79%	95%
Σ High priority PFAS ^c (ND = 0)		91%	98%	85%	82%	84%
Σ High priority PFAS (ND = MDL)		91%	94%	85%	79%	86%
Σ High priority PFAS (ND = RL)		92%	87%	86%	70%	87%
Fluorine mass balance ^d		106%	109%	110%	65%	98%
Sorbed organic fluorine ^e		4%	4%	33%	N/A	31%

^aTotal PFAS = 40 analytes + unidentified PFCA precursors

^bEPA MCL PFAS = PFNA, PFOA, PFOS, PFHxS, PFBS, HFPO-DA

^cFrequently regulated PFAS = PFNA, PFOA, PFHxA, PFBA, PFOS, PFHxS, PFBS, HFPO-DA

^dRatio of the final to the initial organic fluorine plus inorganic fluoride concentrations (see Equation 1)

^ePercent of organic fluorine that sorbed to the reactor walls during treatment

MDL = method detection limit

RL = reporting limit

N/A = not available

For the IDW NF sample, fluoride release could not be measured due to the low total fluorine concentration in the sample (~41,000 ng/L). PFAS analysis of the treated sample and methanol rinse of reactor revealed that a significant portion of the decrease in PFAS concentration was due to sorption to the reactor walls. It is unclear what caused the significant PFAS sorption in this sample.

In general, these experiments show that the real-time measurement of fluoride release was a consistent indicator of PFAS defluorination. The data show that defluorination occurred across all PFAS classes, including identified and unidentified PFCA precursors. Generally, an accumulation of short chain (\leq C6) PFCAs was observed at the end of the reaction, likely due to the breakdown of longer chain PFCAs, PFSAs, PFCA precursors, and other compounds.

The total fluorine and fluoride measurements by CIC and IC, respectively, for the treated samples are shown in **Appendix C**. As with the initial sample analysis, in general the measured total organic fluorine was in poor agreement with the PFAS data, as well as the change in fluoride concentration. Therefore, we did not use the measured total fluorine values in any calculations and relied on the PFAS data to calculate fluorine masses. This may indicate that the CIC method for total fluorine analysis is not suitable for the water matrices in this project.

A summary of the results for all samples with respect to the success criteria is shown in **Table 5-10**.

Table 5-10. Summary of bench scale treatability testing with respect to success criteria

Sample	Benchtop Test Performance Criteria			
	40% defluorination of total PFAS	80% decrease in EPA MCL PFAS	Fluorine mass balance	Sample obtained for scaleup testing
GW	✓	✓	✓	✓
AFFF Rinsate	✓	✓	✓	✓
FF	✓	✓	✓	×
3M AFFF	✓	✓	× ⁽¹⁾	×
IDW NF	✓	✓	N/A	×
Ansulite AFFF	× ⁽¹⁾	N/A	N/A	N/A
IX SB	× ⁽¹⁾	N/A	N/A	N/A

(1) Data missing for the portion of PFAS absorbed to the reactor wall; Maximum fluoride concentration that could be achieved assumed that all PFAS was in aqueous phase.

N/A – not available

5.5.2 Scaleup Testing

5.5.2.1 Selection of two samples for scaleup testing

Three of the original seven samples obtained met all three performance criteria for benchtop test, as shown in **Table 5-10**: GW, FF, and AFFF Rinsate. These samples were considered for scaleup testing, however sufficient volumes of FF were not available. Therefore, additional GW and AFFF Rinsate were obtained for scaleup testing in the next phase of the project.

Scaleup testing was conducted on the NAS Jax groundwater and Tyndall AFB fire truck rinsate samples (18 L each) using a commercial UV reactor. The best conditions (pH and reagent formula) found during benchtop testing were used for the scaleup experiments. The same analyses as benchtop experiments (PFAS, TOP assay, fluorine, fluoride) were conducted for larger scale experiments, and PFAS, fluorine and fluoride were measured for an additional three intermediate samples in each experiment.

5.5.2.2 NAX Jax groundwater sample

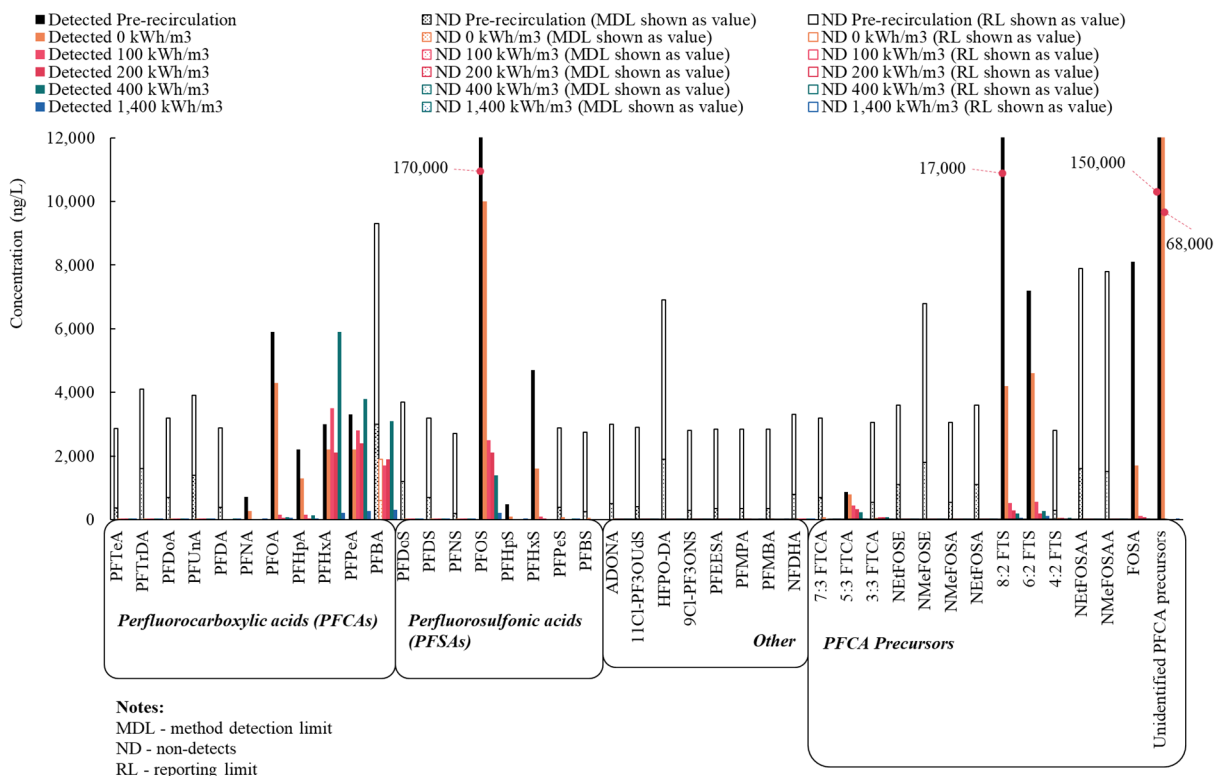


Figure 5-15. Time-Series PFAS fingerprint graph – NAS Jax groundwater sample

Note: Analytical results for treatment of 18 L of GW sample in a commercial UV reactor.

The PFAS analytical results for the GW sample are shown in **Figure 5-15** and **Figure 5-16** and summarized in **Appendix C**. The full list of analytes with their RL values can be found in **Appendix C; Table C-9**. As in the benchtop experiment, excellent PFAS destruction was observed after scaled up testing of the GW sample. Compared to the raw sample collected directly from the site, the total PFAS concentration (40 PFAS compounds + unidentified precursors) decreased >99% over the reaction process. Short-chain PFSAs, including PFHxA, PFPeA and PFBA, had a transient accumulation period but degraded with more UV dose applied.

Interestingly, we observed significantly higher PFAS sorption to the commercial UV reactor than its sorption to the glass reactor. Prior to initializing the reaction, the sample was recirculated through the commercial reactor system for 2 hours. The reason to perform the long duration of recirculation was because we wanted to reach an equilibrium between sorbed and non-sorbed PFAS before the reaction started. Then we were able to quantify the sorbed PFAS amount by taking a sample from the reactor and analyzing it. In this case, we didn't need to recirculate large volumes of methanol though the system and analyze the rinsate as in the benchtop test. We observed PFAS concentration of the GW sample after recirculating for 2 hours in the reactor was significantly lower than the pre-circulation concentration (~103,000 ng/L and ~410,000 ng/L, respectively). Also, based on **Table 5-11**, PFSA seemed to have a higher tendency for sorption to the reactor than the PFCAs. The difference of sorption amount between benchtop and scaleup

tests may be due to differences in PFAS sorption to the reactor walls of the stainless steel commercial UV reactor compared to the glass benchtop reactor.

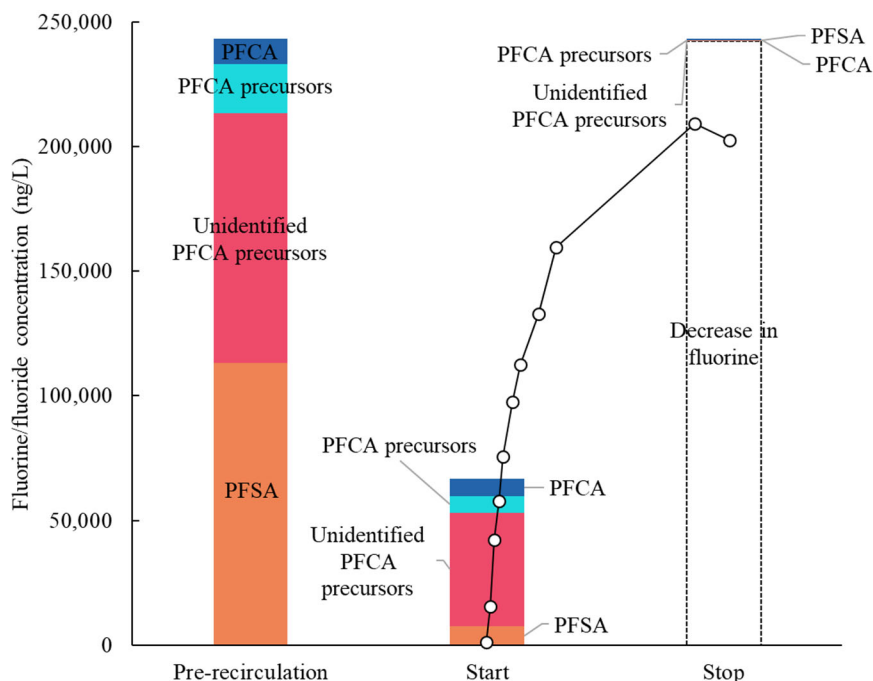


Figure 5-16. Fluorine/fluoride mass balance graph – scaleup test of NAS Jax groundwater sample.

Note: Sample Calculated organic fluorine (colored bars) and measured fluoride release (line with open circles) for the PRD treatment of 18 L GW. “Pre-recirculation” denotes the composition prior to recirculation in the reactor, “start” indicates the composition after recirculation for 2 hours before reaction initiated.

The significant initial sorption of PFAS to the commercial reactor was further reflected in the fluorine/fluoride mass balance analysis. For bench scale experiments, the mass balance was excellent for the NAS Jax groundwater sample. In the scaled up experiment, the excellent mass balance was reproducible if comparing the final sample to the pre-recirculation sample. However, the increase in measured free fluoride (~200,000 ng/L) was ~3 times of the organic fluorine calculated for the groundwater sample collected after recirculation for 2 hours (~67,000 ng/L). A possible explanation is that two processes occurred simultaneously within the commercial UV reactor after the reaction initialized: one was the PRD breakdown of PFAS molecules in aqueous phase to release fluoride ion, and the other was PFAS desorption from the reactor driven by the decreasing PFAS concentration in aqueous phase. The majority of the PFAS was destructed to the extent that PFAS desorption became a limiting factor, such that only trace PFAS was slowly released in the aqueous solution. In **Figure 5-16**, the pre-recirculation fluorine concentrations are included, and the decrease in total fluorine was calculated from the pre-recirculation fluorine values. The measured fluoride release aligns better with the pre-recirculation fluorine mass, supporting the idea that significant PFAS had sorbed to the system.

Table 5-11. Time-series PFAS decrease table – NAS Jax groundwater sample

Analyte	Units	Post-recirculation										
		Pre-recirculation concentration	0 kWh/m ³	% Decrease from pre-recirculation	100 kWh/m ³	% Decrease from pre-recirculation	200 kWh/m ³	% Decrease from pre-recirculation	400 kWh/m ³	% Decrease from pre-recirculation	1,400 kWh/m ³	% Decrease from pre-recirculation
PFNA	ng/L	720 J	270	62%	11	98%	6.3	99%	3.6	>99%	5 U	>99%
PFOA	ng/L	5,900	4,300	27%	160	97%	65	99%	81	99%	56	99%
PFHxA	ng/L	3,000	2,200	27%	3,500	N/A	2,100	30%	5,900	N/A	220	93%
PFBA	ng/L	6,300 U	1,300 U	N/A	1,700	N/A	1,900	N/A	3,100	N/A	310	N/A
PFOS	ng/L	170,000	10,000	94%	2,500	99%	2,100	99%	1,400	99%	210	>99%
PFHxS	ng/L	4,700	1,600	66%	94	98%	45	99%	27	99%	15	>99%
PFBS	ng/L	2,500 U	59	N/A	20	N/A	11	N/A	11	N/A	6.8	N/A
HFPO-DA	ng/L	5,000 U	10 U	N/A	4.2 U	N/A	3.9 U	N/A	3.9 U	N/A	10 U	N/A
Σ Total PFAS ^a (ND = 0)	ng/L	370,000	102,000	72%	13,000	96%	9,700	97%	15,000	96%	1,400	>99%
Σ Total PFAS (ND = MDL)	ng/L	400,000	103,000	74%	13,000	97%	9,700	98%	15,000	96%	1,400	>99%
Σ Total PFAS (ND = RL)	ng/L	460,000	103,000	78%	13,000	97%	9,700	98%	15,000	97%	1,500	>99%
Σ Highly regulated PFAS ^b (ND = 0)	ng/L	180,000	16,000	91%	2,800	98%	2,200	99%	1,500	99%	290	>99%
Σ Highly regulated PFAS (ND = MDL)	ng/L	180,000	16,000	91%	2,800	98%	2,200	99%	1,500	99%	290	>99%
Σ Highly regulated PFAS (ND = RL)	ng/L	190,000	16,000	92%	2,800	99%	2,200	99%	1,500	99%	300	>99%
Σ High priority PFAS ^c (ND = 0)	ng/L	180,000	18,000	90%	8,000	96%	6,200	97%	10,500	94%	820	>99%
Σ High priority PFAS (ND = MDL)	ng/L	190,000	19,000	90%	8,000	96%	6,200	97%	10,500	94%	820	>99%
Σ High priority PFAS (ND = RL)	ng/L	200,000	20,000	90%	8,000	96%	6,200	97%	10,500	95%	830	>99%

MDL = Method Detection Limit

RL = Reporting Limit

U = Non-detected, shown as reporting limit

J = Estimated

^aTotal PFAS = 40 analytes + unidentified PFCA precursors

^bHighly regulated PFAS = PFNA, PFOA, PFOS, PFHxS, PFBS, HFPO-DA

^cHigh priority PFAS = PFNA, PFOA, PFHxA, PFBA, PFOS, PFHxS, PFBS, HFPO-DA

5.5.2.3 Tyndall AFB fire truck rinsate sample

The results for the scaled up testing of AFFF Rinsate were unexpected, with very little PFAS destruction compared to the bench scale experiments. Results are included in **Appendix C (Figure C-12 & Figure C-13; Table C-10)**. The total PFAS concentration of the larger volume of AFFF Rinsate was about three orders of magnitude less than the sample used for benchtop testing (~85,000 ng/L and ~57,000,000 ng/L, respectively). The two samples were presumed to be similar in concentration (no analytical data was provided with the larger volume sample), and with this assumption, the scaled up testing was conducted using the same conditions as the benchtop.

For highly concentrated samples, such as the AFFF Rinsate used in bench scale, higher electron donor concentrations are used to accelerate the PRD reaction. Such high electron donor concentrations can be detrimental to lower PFAS concentrations due to UV adsorption interferences that do not lead to PFAS defluorination. This is likely the cause of the unfavorable results here. Further benchtop testing of the scaleup AFFF Rinsate sample showed faster fluoride release at a lower electron donor concentration (**Appendix C; Figure C-14**), indicating that the conditions used for the scaled up testing were not optimal.

Similar to the scaled up testing of the GW sample, the fluorine/fluoride mass balance for AFFF Rinsate in this experiment showed much higher fluoride release compared to the calculated change in organic fluorine (**Appendix C; Figure C-13**). The AFFF Rinsate was also recirculated through the system for 2 hours prior to removing the untreated sample for PFAS analysis. However, due to our assumption that the benchtop and scaleup samples were from the same batch (similar analytical data), the data for pre-circulation concentration was not collected, and therefore couldn't be used for the fluorine/fluoride mass balance calculation. The measured fluoride release of ~290,000 ng/L at the end of the reaction was higher than the ~53,000 ng/L of organic fluorine calculated for the initial sample after recirculation, as evidence of PFAS sorption to the reactor.

5.5.2.4 Comparison between benchtop testing and scaleup testing

The scaled up testing presented multiple lessons learned. First, careful selection of reagent concentrations is crucial for reaction success, as was seen when comparing bench scale and scaled up AFFF Rinsate experiments. It should not have been presumed that the additional volume obtained from the site was similar in PFAS composition to the original AFFF Rinsate sample used for benchtop testing. After conducting benchtop testing on the new AFFF Rinsate sample (**Appendix C; Figure C-14**), it is expected that better PFAS degradation efficiencies could be obtained in the commercial UV reactor if the appropriate reagent concentrations are used. In contrast, the GW sample, which had a consistent composition, showed excellent agreement in the fluoride release rate between bench scale and scaled up experiments (**Figure 5-17**).

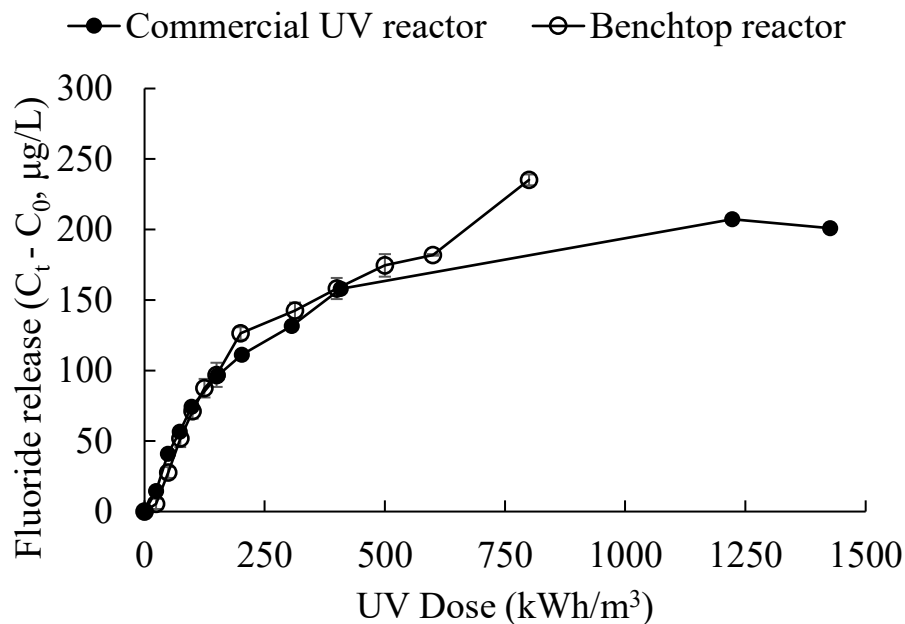


Figure 5-17. Comparison of fluoride release rates between benchtop reactor and commercial UV reactor used for scaled up experiments.

Second, sorption of PFAS and fluoride to reactor materials must be carefully considered when interpreting results. Owing to the interesting observation in the fluorine/fluoride mass balance for the scaled up experiments, it appears that PFAS more readily sorbed to the components of the stainless steel commercial UV reactor than the glass benchtop set up. While no direct comparisons between PFAS sorption to glass and stainless steel could be found in the literature, multiple reports indicate that PFAS sorbs less to glass than other laboratory materials (e.g., plastics).^{14,15} PFAS sorption to stainless steel has been reported in a fire suppression system remediation study.¹⁶

6.0 PERFORMANCE ASSESSMENT

6.1 QUANTITATIVE PERFORMANCE OBJECTIVES

6.1.1 *Remediation Effectiveness*

Bench scale treatability testing revealed that PRD treatment was more effective in low conductivity/TDS solutions and when the pH was raised to 10. Ansulite AFFF and IX SB samples showed poor destruction efficiencies during initial screening tests, which was attributed to their high TDS concentrations. As a result, further analysis of these samples was not pursued. The GW, FF, 3M AFFF, AFFF Rinsate, and IDW NF samples were then selected for analysis of PFAS after treatment.

For the PRD benchtop experiments, the decrease in total PFAS (40 analytes plus unidentified PFCA precursors) ranged from 34% to 96%, the decrease in EPA MCL PFAS (PFNA, PFOA, PFOS, PFHxS, PFBS, HFPO-DA) ranged from 79% to >99%, and the decrease in frequently regulated PFAS (PFNA, PFOA, PFHxA, PFBA, PFOS, PFHxS, PFBA, and HFPO-DA) ranged from 70% to 92%. Due to the high initial PFAS concentrations, regulatory limits that are typically in the low ng/L concentrations were not achieved in most cases, even at high percentages of decrease. For this reason, we recommend that the PRD destruction system be paired with foam fractionation or other concentration technology to remove and concentrate the remaining PFAS for increased energy efficiency of the total treatment. This concentrate could then be routed back to the PRD system for another cycle of PFAS destruction.

The samples that showed the most efficient PRD destruction of PFAS were GW and FF. These samples had sufficient PFAS concentrations for the real-time measurement of fluoride release, and relatively simple matrices with low TDS values. Furthermore, minimal sorption of PFAS to the reactor walls was observed for these samples. Fluoride release measurements compared to PFAS analysis showed excellent fluorine mass balance during treatment of GW and FF. Both samples showed decreases in total PFAS (94% and 96%, respectively) and EPA MCL PFAS (>99% and 93%, respectively) when treated at pH 10.

3M AFFF and AFFF Rinsate samples had slightly lower efficiencies in terms of electrical energy per unit order (EEO) for PRD destruction of PFAS, and the 3M AFFF sample had a poorer fluorine mass balance compared to GW and FF. Analysis of the methanol rinse of the reactor walls after experiments indicated that significant PFAS was adsorbing to the reactor components in the AFFF Rinsate sample. Though not analyzed, we strongly suspect that PFAS sorption was also occurring in the 3M AFFF sample. Sorption of PFAS decreases the PRD reaction efficiency because the reaction requires that PFAS be freely available in solution for destruction. Furthermore, PFAS sorption makes closing the fluorine mass balance more challenging. Regardless, 3M AFFF total PFAS concentration decreased by 34%, and EPA MCL PFAS decreased by 79% when treated at pH 10. For AFFF Rinsate treated at pH 10, total PFAS and EPA MCL PFAS concentrations decreased by 91% and 95%, respectively. For larger scale treatment of these solutions, the sorption of PFAS to system components must be carefully considered when using real-time fluoride release data to monitor the reaction.

Finally, the IDW NF showed a decrease of 92% of total PFAS and 95% of EPA MCL PFAS when treated at pH 10. An initial total PFAS concentration of ~120,000 ng/L did not allow for the real-

time measurement of fluoride release during treatment of this sample, therefore fluorine mass balance could not be demonstrated. The IDW NF sample also showed ~31% sorption of PFAS to the reactor walls upon analysis of a methanol rinse of the reactor after treatment. Of the samples treated, we believe that the IDW NF is the least compatible with PRD treatment due to its relatively low PFAS concentration and high likelihood of sorption losses.

All samples showed the presence of unidentified PFCA precursor compounds, as determined by TOP assay. The PRD treatment resulted in degradation of these precursors in addition to detected PFAS analytes. The total concentration of PFAS decreased in all experiments, with the remaining PFAS primarily comprised of $C \leq 6$ PFCA compounds. Short chain PFCA compounds are the result of reductive defluorination of the target PFAS analytes as well as unidentified PFCA precursors. Longer treatment times and/or higher UV dosages are required to degrade the remaining short chain PFCA as demonstrated in the scale up test, however it is likely more efficient to employ a concentration technology as a post-processing step to remove residual PFAS before attempting further PRD destruction.

6.1.2 Operational Cost

6.1.2.1 Energy Efficiency

Energy efficiency is critical in cost estimate of field-scale application. Energy efficiency of the reaction is evaluated in terms of applied UV dosage and electrical energy per order of magnitude decrease in PFAS concentration (EEO).

The UV dose ($[UV]_T$) represents the amount of UV energy applied to a unit volume of the reaction and can increase by either increasing UV light strength or UV exposure time or both, which is an effective parameter to quantify UV strength. It is calculated by

$$[UV]_T = \frac{kW \times T}{V} \quad \text{Eqn. 2}$$

where kW represents the UV lamp input power, T represents the applied time of the UV dose while V represents the reaction volume.

The EEO is calculated by

$$EEO = \frac{[UV]_T}{\log\left(\frac{C_T}{C_0}\right)} \quad \text{Eqn. 3}$$

Where C_0 and C_T represent the initial contaminant concentration and the contaminant concentration at time T, respectively.

6.1.2.2 Reaction Models

PFAS Degradation Model

The degradation of PFAS in PRD follows first-order kinetics⁴, such that the reaction rate is directly proportional to the concentration of the PFAS compound(s) in the sample, shown as

$$\frac{d[PFAS]}{d[UV]} = -k \times [PFAS] \quad \text{Eqn. 4}$$

where [PFAS] represents PFAS concentration, [UV] represents UV dose, and k represents the PRD reaction rate for PFAS degradation. Here, PFAS can represent any single PFAS compound or a simulated PFAS chemical to represent a mixture group of PFAS.

Integration of both sides of Equation 4 from $t = 0$ (initial) to $[UV] = [UV]_T$ gives the PFAS concentration at UV dose $[UV]_T$ as

$$[PFAS]_T = [PFAS]_0 \times e^{-k[UV]_T} \quad \text{Eqn. 5}$$

where $[PFAS]_0$ is the initial PFAS concentration at $t=0$ and $[PFAS]_T$ is the PFAS concentration at $t = T$.

Based on Eqn. 5, the EEO is calculated by

$$EEO = \ln(10) / k \quad \text{Eqn. 6}$$

Fluoride Production Model

For any given PFAS, assume a constant, α , as the ratio between the organic fluorine mass and the PFAS mass in the compound. Therefore, when $[UV] = [UV]_T$, the concentration of fluoride ion, as a final product generated from the PRD defluorination, is

$$[F^-] = \alpha([PFAS]_0 - [PFAS]_T) \quad \text{Eqn. 7}$$

Substituting Equation 5 into Equation 7, the fluoride ion concentration is converted into:

$$[F^-] = \alpha[PFAS]_0(1 - e^{-k[UV]_T}) \quad \text{Eqn. 8}$$

where $\alpha[PFAS]_0 = [F^-]_{max}$, as the maximum fluoride ion concentration that can be produced from complete defluorination, while k is the same PRD reaction rate of PFAS degradation as in Equations 4-6.

Therefore, the fluoride ion concentration is calculated by

$$[F^-] = [F^-]_{max} (1 - e^{-k[UV]_T}) \quad \text{Eqn. 9}$$

And the EEO calculation is represented the same as Equation 6.

Again, in the above equations, PFAS can represent any single PFAS compound or a simulated PFAS chemical to represent a mixture group of PFAS. However, $[F^-]$ is a sum of fluoride generated from all available PFAS compounds in the solution and cannot be differentiated from its origins; thus, the reaction rate k in Equation 8 represents the overall defluorination rate for all available PFAS chemicals in the solution instead of any single compound or selected groups.

6.1.2.3 EEO Calculations

Time-series PFAS degradation data and real-time monitoring fluoride release data are used for estimating reaction rate k by using the mathematical models in Section 7.1.2. The corresponding

EEO is calculated, as a key parameter for cost estimation of PRD full-scale implementation. Please note that the UV doses used in the mathematical model fitting were direct electricity energy usage recorded from the lamp systems. Just a small portion of the lamp’s electricity use converts to light and the remaining portion converts to heat. As a result, the EEOs calculated from the test data are direct indicators of the electricity demand to destruct PFAS in certain matrices by using a commercial UV system.

Scaleup testing data analysis

Per the discussion in **Chapter 5**, the scale up test with NAS Jax groundwater sample in the commercial UV reactor demonstrated a representative PFAS defluorination treatment. Therefore, the NAS Jax groundwater scale up test data was chosen for a complete quantitative analysis. Along with real-time fluoride ion measurements, the test had time-series samples during the reaction for external analytical laboratory quantification of 40 PFAS compounds listed in EPA method 1633. The PRD reaction rate was estimated by using two approaches, by (1) fitting the time-series PFAS degradation data using **Equation 5** and (2) fitting the real-time fluoride ion measurement using **Equation 9**. The fitted reaction rate k and its p-value, along with the corresponding calculated EEO, is presented in **Table 6-1**. Individual fitted curves are included in **Appendix D**. The fitting models written in programming language R [R Core Team (2022)]¹⁷ are included in **Appendix D**.

Table 6-1. Model fitting for scaleup Jax groundwater data

PFAS Degradation Model Fitting			
Analyte	k (m³/kwh)	p-value	EEO (kwh/m³-order)
PFNA	2.7E-02	3.7E-02 *	85
PFOA	2.5E-02	2.5E-02 *	92
PFOS	2.6E-02	4.9E-02 *	90
PFHxS	2.6E-02	3.1E-02 *	88
Highly regulated PFAS ^a	1.5E-02	3.6E-02 *	153
High priority PFAS ^b	4.5E-03	2.9E-02 *	517
Fluoride Production Model Fitting			
Analyte	[F]_{max} (ppm)	p-value ([F]_{max})	EEO (kwh/m³-order)
Fluoride Ion	203	6.0E-12 ****	580
	k (m³/kwh)	p-value (k)	
	4.0E-03	1.6E-08 ****	

* p-value ≤ 0.05

**** p-value ≤ 0.0001

^aHighly regulated PFAS = PFNA, PFOA, PFOS, PFHxS, PFBS, HFPO-DA

^bHigh priority PFAS = PFNA, PFOA, PFHxA, PFBA, PFOS, PFHxS, PFBS, HFPO-DA

As indicated in **Table 6-1**, PFNA, PFOA, PFOS and PFHxS were chosen to calculate its individual degradation rate k and the corresponding EEO as the energy necessary to degrade one-order of magnitude of this particular compound per a unit volume. In addition, two groups of PFAS were chosen for PFAS degradation model fitting, including the EPA MCL PFAS and the high priority PFAS which adds PFHxA and PFBA in addition to the previous list. In order to treat each carbon-fluorine bond equally into model, we calculated the organic fluorine mass from

each individual compound and took the sum as the total organic fluorine for both PFAS lists. Here, the non-detects were treated as their RLs. The total organic fluorine data were used to fit the degradation model to represent the list of PFAS compounds degradation. The time-series data of two PFAS groups and their fitted curves, as well as the real-time fluoride measurement and its fitted curve, are plotted in **Figure 6-1**. Meanwhile, the time-series data of the eight PFAS compounds in the frequently regulated PFAS list are presented in **Figure 6-2**.

The reason to choose PFNA, PFOA, PFOS and PFHxS as representative PFAS compounds for model fitting is because they are considered as priority PFAS compounds and are also parent compounds for break-down reactions. As shown in **Figure 6-2**, those compounds decreased several orders of magnitudes quickly with increasing UV light exposure while compounds PFHxA and PFBA, which served as intermediates, had slight increases before eventually dropping down. The concentrations of those intermediates were always a balance between generation from breakdown of long-chain PFAS molecules and their own degradation. This observation is consistent with the bench-top test results presented in **Chapter 5** that short-chain PFCAs are one of the last groups of PFAS to degrade during PRD reactions.

The EEO values presented in **Table 6-1** provide meaningful implications for energy usage in PFAS destruction:

- Energy for destructing long-chain PFAS compounds, such as PFOA and PFOS, is much less than destructing PFAS mixtures that contain short-chain and/or precursors. The EEO difference between individual PFOA/PFOS and PFAS groups is reasonable given the fact that breaking down carbon-fluorine bonds in short-chain PFAS needs more energy than in long-chain PFAS. Also, long chain PFAS more readily associate with the micelle due to hydrophobic interactions with CTAB, whereas short chain PFAS rely on weaker electrostatic interactions with the CTAB headgroup.
- Destructing frequently regulated PFAS group has a much higher energy demand than EPA MCL PFAS due to the additional two PFAS chemicals, PFHxA and PFBA, within the former group. The short-chain PFCAs, as represented by PFHxA and PFBA, are intermediate products in PRD reactions. The EEO calculated for the frequently regulated PFAS group is a conservative estimate (**Figure 6-1**) given that the fitted line doesn't capture the initial decrease quite well. Still, it is a good parameter to represent overall PFAS destruction in the sample.
- EEO calculated by fluoride model fitting (p-value ≤ 0.0001) is a better representation of total PFAS destruction than the one calculated by PFAS degradation model fitting (p-value ≤ 0.05). The total PFAS includes both known PFAS chemicals, precursors and unknown fluoroalkyl chemicals that can be broken down to inorganic fluoride ion. This can also explain why the EEO calculated by the fluoride model fitting has the highest value among all fitted EEOs in **Table 6-1**.

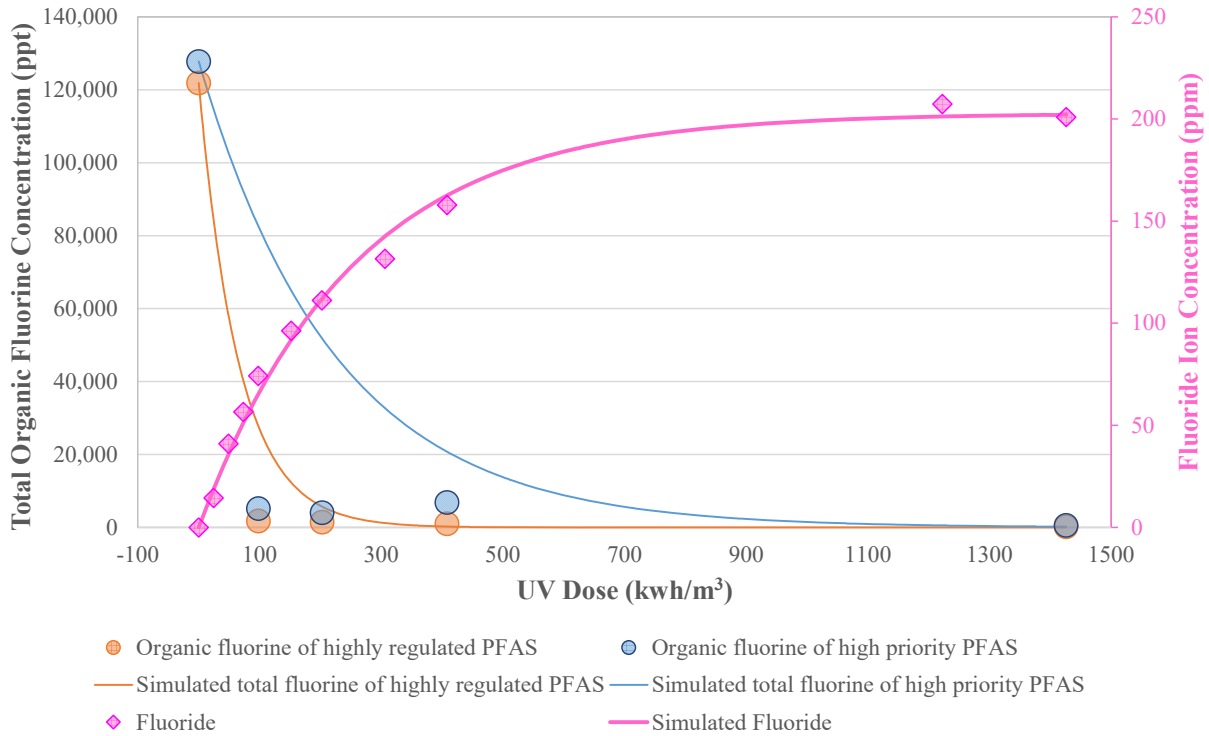


Figure 6-1. Experimental data and fitted curve for scaleup Jax groundwater data

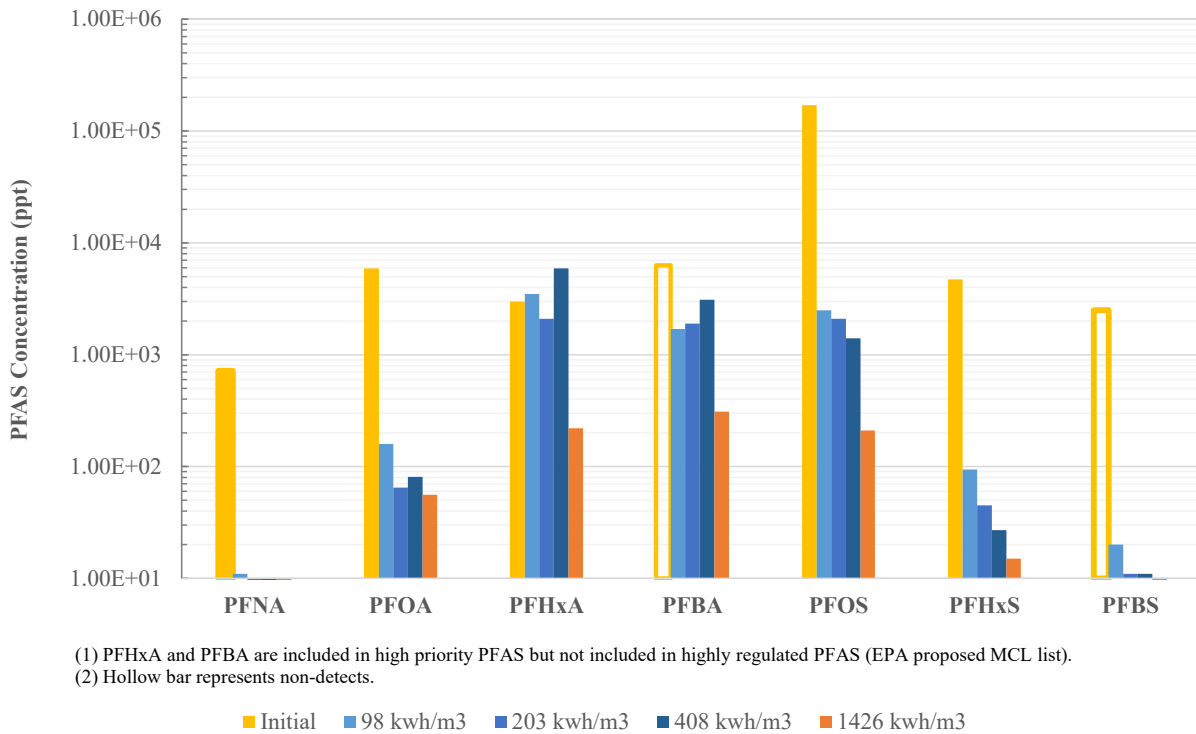


Figure 6-2. Time-series data of high priority PFAS in scaleup Jax groundwater test

Bench top testing data analysis

According to the previous discussion, EEO calculated by fluoride model fitting is a representative parameter to quantify energy usage in total PFAS destruction, including both known and unknown fluoroalkyl chemicals in the matrix. The inorganic fluoride ion measurement *via* ISE along the reaction is a much cheaper alternative than laboratory analysis of individual PFAS compounds and precursors. More data points can be collected in real-time for a quick assessment of energy demand needed for the PRD reaction. Therefore, the real-time fluoride measurement data for the benchtop tests were fitted by the fluoride model, and the results are shown in **Table 6-2**. Individual fitted curves are included in **Appendix D**. The fitting models written in programming language R¹⁷ are included in **Appendix D**.

Table 6-2. Model fitting for benchtop test fluoride data

Site	$[F^-]_{max}$ (ppm)	p-value ($[F^-]_{max}$)	k (m ³ /kWh)	p-value (k)	EEO (kWh/m ³ -order)
GW	230	5.4E-10 ****	3.4E-03	7.1E-07 ****	680
FF	20,000	3.5E-15 ****	2.6E-03	3.7E-12 ****	870
AFFF Rinsate	25,000	4.0E-12 ****	1.8E-03	8.2E-10 ****	1,300
3M AFFF (10x diluted)	190,000	1.3E-14 ****	1.6E-03	9.5E-13 ****	1,400
Ansulite AFFF (10x diluted)	93,000	1.9E-11 ****	1.0E-03	1.4E-11 ****	2,200
IX SB	13,000	1.7E-10 ****	1.4E-03	2.6E-09 ****	1,700

**** p-value \leq 0.0001

According to **Table 6-2**, the fluoride data had a perfect fitting with the model (p-value \leq 0.0001) for all tested samples. Two fitted parameters, $[F^-]_{max}$, the maximum fluoride ion concentration that can be produced from complete defluorination, and k, the total PFAS the overall defluorination rate for all available PFAS chemicals in the given solution, provide important implications for the field-scale PRD application:

- EEO calculated from the complete defluorination rate represents both the matrix and the PFAS compound profile impact on the energy demand.
- EEO values fitted from the benchtop fluoride data (680 kWh/m³-order) is comparable to the scaleup fluoride data (580 kWh/m³-order) for GW, implying that the benchtop data is sufficient to predict full-scale energy usage of PRD applications.
- Bench scale EEO values for GW (680 kWh/m³-order) and NAS Oceana Groundwater FF (870 kWh/m³-order) are similar, although the $[F^-]_{max}$ is two-orders of magnitude different, implying that the initial PFAS concentrations has little impact on the EEO. It is not surprising that these two matrices have similar energy demand because they are both groundwater impacted by AFFF release.

In addition, the results show that concentrating PFAS multiple orders of magnitude does not change the EEO value, which is a scaleless parameter.

- EEO values for AFFF Rinsate (1,300 kWh/m³-order) and 3M AFFF (10x diluted) (1,400 kWh/m³-order) are also similar, implying that the Fire Truck may have used a similar AFFF as the 3M Lightwater.

6.2 QUALITATIVE PERFORMANCE OBJECTIVES

The evaluation of qualitative performance is based on our operation with the commercial UV equipment during the scale up tests.

6.2.1 *Ease of Use*

Per previous discussion, the commercial UV system for scale up testing was easily operated by a single technician. Setting up the experiments took the longest (about 2 hours), but after set up the system could be run unattended for long periods, even overnight. Samples were manually collected at designated intervals.

6.2.2 *Safety*

Per previous discussion, there was minimal risk of solution leaking during scale up experiments. One incident occurred while the system was being drained following completion of the reaction, in which an operator was splashed with a few drops of sample. This incident was noted, and better safety protocols were put in place to prevent a similar accident in the future.

6.2.3 *Discharge*

Discharge considerations include final PFAS concentrations as well as remaining CTAB. Strategies for achieving site-specific PFAS discharge requirements are discussed in Chapter 7, for example, to loop the discharge back to the pre-concentration step. For addressing remaining CTAB, the loop back strategy may also serve this purpose, albeit the concentration of CTAB in the pre-concentration system effluent must be considered and evaluated. Another strategy is to degrade CTAB in solution using a UV oxidation step. This has the added benefit of degrading residual organic compounds that may be present in solution, which improves the clarity of the sample. During this project, we demonstrated the ability to degrade CTAB from 50 mg/L to < 0.100 mg/L using UV/H₂O₂ oxidation. Previously reported methods were used to degrade CTAB *via* UV/H₂O₂ oxidation and to spectrophotometrically monitor the decrease in concentration.¹³ Additionally, if necessary to comply with permitting requirements, as in the case of direct discharge of the effluent from the PFASigator, the pH needs to be adjusted down to 6 – 9 prior to discharge if pH is raised to 10 during the reaction phase.

Though out of scope for the current proposal, we are also investigating less toxic alternatives to CTAB to circumvent this issue. We have recently conducted proof-of-concept studies that demonstrate that cetyl trimethylammonium chloride, or CTAC, works just as efficiently for the PRD reaction as CTAB. The counter anion of CTAC is chloride, rather than bromide in CTAB, and is slightly less toxic. We plan to conduct treatability studies with CTAC on environmental samples to confirm its effectiveness. Additionally, we are exploring the synthesis of non-toxic cationic surfactants, as commercially available options all have some degree of aquatic toxicity.

6.2.4

Commercial Readiness of PFASigator



Figure 6-3. Commercial-scale PFASigator photo.

Note: The footprint of the equipment is 9' (Length) x 7' (Height) x 4' (Width). Co-founders of Enspired Solutions™, Dr. Meng Wang (left) and Dr. Denise Kay (right) stand in front of the equipment.

The experience of operating the commercial UV equipment during the scale up tests provided us with important feedbacks in designing and building our own system. In late 2022, Enspired Solutions' commercial-scale PFAS treatment equipment was factory-commissioned (**Figure 6-3**). The fully automated equipment that executes our PRD chemistry is called the PFASigator. The PFASigator has been tested on operational parameters on PRD efficiency and key metrics were proven to be consistent with benchtop studies. PFASigator has multiple usage and design advantages, including

- a small footprint with a modular design, which makes it easy to be plugged into existing water treatment system and scaleup.
- no special health and safety concerns given that it operates at atmospheric pressure and temperature and multiple sensors for leakage, temperature, water levels *et al.*
- minimum labor required given its fully automated design and safe operating environment. The equipment generates real-time fluoride data fed to a cloud-based web portal which enables remote monitoring and control.
- tunable reaction by changing the reaction duration, therefore treatment processes can be adjusted with remediation target changes.
- robust water treatment equipment with low long-term maintenance cost given that there are no concerns over equipment corrosion during the reaction and a long history of UV equipment usage in the water industry.

7.0 COST ASSESSMENT

7.1 COST MODEL

The cost estimate of field-scale application is comprised of the capital cost of constructing or purchasing a field-ready PFAS destruction system, and the cost of daily operation.

- Capital Expenditure (CAPEX): Given that PFASigator is a commercial scale equipment designed and manufactured for field application, the Scaleup Reactor Test technical effectiveness and UV efficiency results are used to estimate the number of PFASigator needed and the associated capital cost of purchase and installation.
- Operating Expenditure (OPEX): The estimated operation cost includes itemized costs in energy, chemical reagents, analytical chemistry, safety protection, and labor. The energy, chemical reagents, and materials usage rates are estimated by the quantified reaction rates shown in the previous discussion. Each itemized cost is discussed in detail in **Section 7.2**, and shown in field cases in **Section 7.3**.

7.2 COST DRIVERS

The cost breakdown of using PFASigator to destruct PFAS in aqueous solutions is detailed in **Table 7-1**. The PFASigator is modular and scalable; it can be used alone or in series; and it can be used as a standalone treatment or plugged directly into existing water treatment trains. The PFASigator™ has multiple design advantages. It has a small footprint and operates at atmospheric pressure and temperature, therefore no special health and safety training or installation is required to operate it. The simplicity of the unit provides confidence that challenges like supply chain issues and elevated safety concerns will not likely slow down operations. The fully automated PFASigator generates real-time fluoride data that are fed to a cloud-based web portal for remote monitoring and control. Therefore, as stated in **Table 7-1**, many operational components, including operational labor, safety, waste disposal, and monitoring, have minimal cost. The major cost drivers are equipment purchase, monthly subscription of reagent and end-user intellectual property (IP) licenses, and equipment energy usage. The treatment capacity, as defined by the number of modular PFASigator needed, is determined by the site-specific EEOs as calculated in **Section 7.1.3**, remediation targets, the treatment flow rate, and the paired available concentration technologies.

Table 7-1. Cost breakdown of PFASigator PFAS destruction

Category	Cost Element	Data Tracked During the Demonstration	Costs
CAPEX	PFASigator Equipment	Unit: \$ per unit for the chosen PFASigator model <ul style="list-style-type: none"> Influent flow rate, water quality, applied pre-concentration technologies determine the number of units needed. 	Equipment purchase from Enspired Solutions
	Reagent & material cost	Subscription: \$ per unit for the chosen PFASigator model.	Enspired Solutions provides monthly subscription for reagent & material usage (delivered to site) and end-user IP license
	End-user IP license	Subscription: \$ per unit for the chosen PFASigator model.	
OPEX	Operational Labor	PFASigator equipment is a 100% automatic equipment. Real-time operational process data is fed into a cloud-based database for user to view remotely. Monthly check might be needed for this equipment operation.	Minimum labor required
	Health and Safety Cost	PFASigator equipment is operated under atmospheric temperature and pressure.	No additional health and safety cost other than industrial standard
	Disposal Cost	PFAS destruction occurs on site; no waste disposal is anticipated with the process.	Minimum waste disposal cost if paired with proper concentration technology
	Discharge compliance sampling and analysis	PFAS destruction is assessed via real-time fluoride monitoring on PFASigator equipment, which is fed on a cloud-based database. However, discharge compliance sampling and analysis might be still needed per permit requirements.	Dependent on site permits
	Energy Cost	Unit: \$ per unit for the chosen PFASigator model per day. <ul style="list-style-type: none"> The same data requirements as determining the number of PFASigator units. 	Electricity charge
	Equipment Maintenance Cost	PFASigator equipment utilizes commercial available UV reactors and monitoring meters applied in water treatment industry.	No additional maintenance cost other than industrial standard

7.3 COST ANALYSIS

Data analysis of both benchtop and scaleup testing reveals two important implications for the commercial field application:

- The experimental data verifies that PFAS destruction with PRD follows first-order kinetics, and EEO keeps relatively constant for similar water matrices across a wide range of initial PFAS concentrations, meaning that the same amount of energy is needed to decrease any order of magnitude of PFAS. Therefore, as energy is a critical cost driver for PFAS destruction, adding a pre-concentration water treatment step to concentrate PFAS before destruction can be a significant cost saving for PFAS cleanup, especially for wastewater with ppt level of PFAS.

- The scaleup testing reveals the unavoidable issue of PFAS sorption to the destruction reactors. When PFAS concentration is decreased to a certain level during the destruction process, further PFAS decrease rate in aqueous phase is limited by the desorption rate of PFAS from the reactor. This issue might be alleviated by replacing stainless steel with other materials resistant to PFAS sorption. Still, it is a challenge to use the destruction unit as the compliance step to control PFAS discharge to permit levels, especially if the destruction starts with a concentrated PFAS stream, because treating the PFAS tail controlled by PFAS sorption is energy inefficient.

Based on the above implications, we propose the following two operational scenarios and estimate the associated cost to treat specific PFAS matrices according to the benchtop and scaleup data and analysis presented in **Section 5.7** and **Section 7.1**.

7.3.1 Groundwater and Surface Water Scenario

Figure 7-1 depicts a process that is applicable for high flow rate groundwater and surface water streams. In this scenario, the PFASigator is paired with a pre-concentration step that can bring lower-concentration, higher volume waters into concentrated PFAS wastes with a significantly reduced volume. The PFASigator destroys PFAS in the concentrate. The effluent of PFASigator, with majority of PFAS being destroyed, is looped back to the pre-concentration unit. In this case, the PFASigator can consistently destruct PFAS to an optimum concentration range to save energy. Also, the trace PFAS in PFASigator effluent, which is limited by reactor sorption/desorption, can be further addressed by the loop-back design. The pre-concentration phase, such as foam fractionation, solid-phase sorption, membrane technologies or other applicable technologies, is the compliance stage to control PFAS discharge.

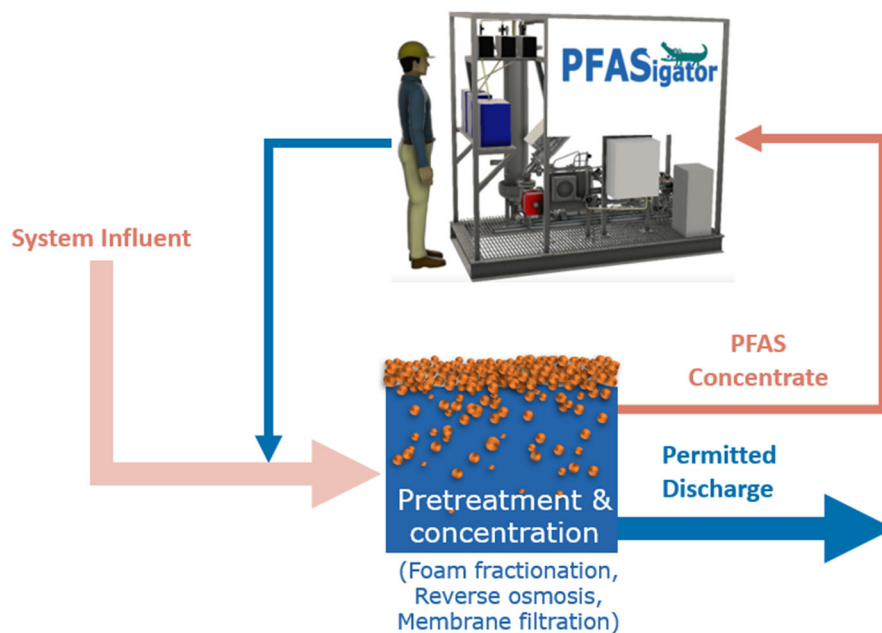


Figure 7-1. Process scenario for groundwater and surface water PFAS destruction

The cost estimate of PFAS destruction in this scenario is presented in **Table**. The EEOs calculated based on the scaleup testing data of groundwater (**Section 7.1.3.1**) are used to estimate the appropriate number of PFASigator systems and the energy consumption with a target of three orders of magnitude of PFAS decrease. A pre-concentration stage that is capable of achieving 1,000 times of PFAS concentration is assumed to pair with the destruction stage for energy efficiency.

Table 7-2. Cost estimate for groundwater and surface water PFAS destruction scenario

Parameter		Target 1 Long-chain PFAS	Target 2 EPA MCL PFAS	Target 3 Frequently regulated PFAS	Target 4 Total PFAS
Destruction Targets	Remediation Targets	PFOA, PFOS	PFNA, PFOA, PFOS, PFHxS, PFBS, HFPO-DA	PFNA, PFOA, PFHxA, PFBA, PFOS, PFHxS, PFBS, HFPO-DA	All 40 PFAS analytes + unidentified PFCA precursors + unknown PFAS compounds
	Destruction % Targets	99.9%	99.9%	99.9%	99.9%
	EEO (kWh/m ³ -order) ⁽¹⁾	91	150	520	580
	Destruction Energy Usage (kWh/gal)	1.0	1.7	5.9	6.6
Example Site Application Scenarios	Flow Rate	100 GPM			
	Paired with Technology	Pre-concentration (1,000x) ⁽²⁾			
	\$/gallon ⁽³⁾⁽⁴⁾⁽⁵⁾	\$0.0011	\$0.0023	\$0.0056	\$0.0068
	\$/gallon (CAPEX)	\$0.0004	\$0.0009	\$0.0022	\$0.0027
	\$/gallon (OPEX)	\$0.0007	\$0.0014	\$0.0034	\$0.0041
	# of PFASigators Needed	1	2	5	6
	24-hour Total Energy Use (Cost) ⁽⁶⁾	156 kW (\$30)	312 kW (\$59)	780 kW (\$148)	936 kW (\$178)

(1) EEO values are from Table 6-1.

(2) Pre-concentration assumes a 1,000-fold concentration for groundwater/surface water by available technology.

(3) Cost includes both CAPEX and OPEX. PFASigator lifetime is assumed as 15 years as a robust water treatment equipment. Monthly PFASigator OPEX includes all reagents and delivery to site, and IP sublicense. Routine maintenance, discharge compliance sampling and analysis, and energy costs not included.

(4) Equipment price and monthly subscription price for applied PFASigator™ model are obtained from Enspired Solutions

(5) PFASigator is fully automated such that minimum labor is anticipated to operate it. Real-time end-product fluoride data can be accessed remotely via a web-based data portal.

(6) Based on 2023 residential electric supply rate for Michigan, \$0.19 per kW.

As shown in **Table 7-2**, four different remediation targets are listed with increasingly stringent requirements, from Target 1 that focuses on long-chain compounds including PFOA and PFOS, to Target 4 comprised of all PFAS compounds and precursors. The range represents a spectrum of moving targets that can be chosen based on the specific regulatory requirements at any given site. The EEOs and the corresponding destruction energy usage are calculated on the same GW matrix, as an example to show the increasing energy demand needed with more stringent requirements. The cost of PFAS destruction per gallon of untreated groundwater/surface water breaks down into

both CAPEX and OPEX with an assumption that PFASigator works as a robust water treatment system for 15 years. Not surprisingly, with more stringent requirements, the PFAS destruction cost increases. Still, under this process scenario for groundwater and surface water, the PFAS destruction cost is within a range of \$0.0011/gal to \$0.0068/gal, which is an economically feasible price for practical applications. For a given flow rate of 100 GPM, the energy usage for PFAS destruction ranges from 156 kW/day to 936 kW/day, approximately \$30-\$178/day if estimated per residential electric supply rate for Michigan, which is also in a reasonable and affordable range for energy consumption.

7.3.2 Firefighting Truck Rinsate and AFFF Scenario

Figure 7-2 depicts a process that is applicable for firefighting truck rinsate and AFFF. In this scenario, the influent usually contains high concentration PFAS and thus PFASigator is used directly for destructing PFAS compounds in liquid waste. Meanwhile, it is more practical to pair the destruction equipment with a post-treatment unit as a mitigation point to meet regulatory discharge limits. This mitigation point can be a small-scale concentration unit, with appropriate technologies applied such as foam fractionation, reverse osmosis, etc. The concentrate generated by this mitigation unit can be returned back to PFASigator for further PFAS destruction while the effluent can be discharged on-site. In this case, PFASigator can focus on bringing down the PFAS concentration rapidly in the initial phase instead of spending enormous energy on degrading PFAS as it slowly desorbs from the reactor walls.

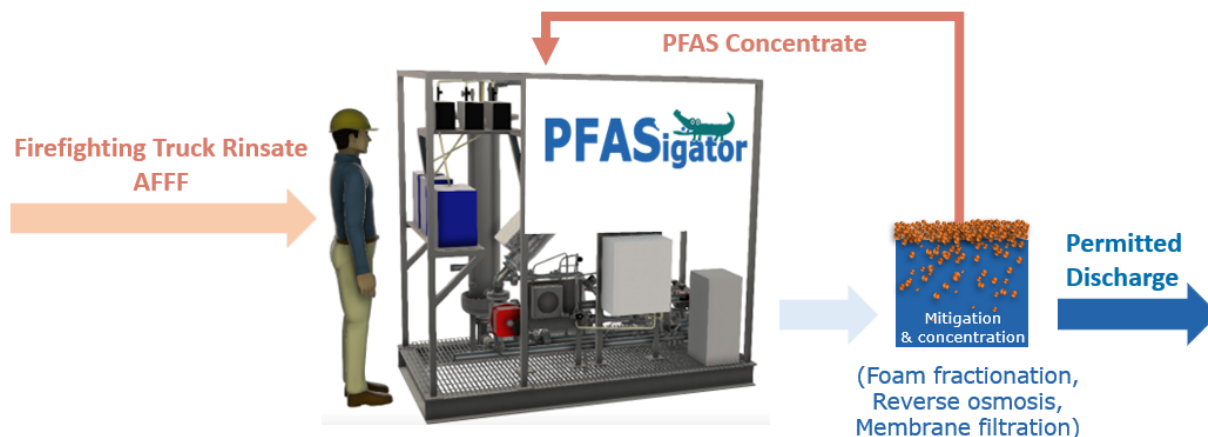


Figure 7-2. Process scenario for firefighting truck rinsate and AFFF

The cost estimate of PFAS destruction in this scenario is presented in **Table 7-3**. The EEOs calculated based on the benchtop testing data of the specific matrix (**Section 7.1.3.2**) are used to estimate the number of PFASigator systems applied and the energy consumption. As shown in **Table 7-3**, under this process scenario for treating AFFF-associated liquid waste, the PFAS destruction cost, including both CAPEX and OPEX, is within a range of \$4.6/gal to \$5.4/gal. The energy usage for PFAS destruction is 156 kW (\$30) per unit, treating approximately 30-35 gallons of highly concentrated PFAS liquid waste that has similar characteristics as the tested matrices in Scenario 1 and Scenario 2 on a daily basis.

Table 7-3. Cost estimate for firefighting truck rinsate and AFFF PFAS destruction scenario

Parameter	Scenario 1: AFFF Rinsate (high concentration)	Scenario 2: 3M AFFF (10x diluted)
Remediation Targets	Total PFAS: All 40 PFAS analytes + unidentified PFCA precursors + unknown PFAS compounds	Total PFAS: All 40 PFAS analytes + unidentified PFCA precursors + unknown PFAS compounds
Destruction % Targets	95%	95%
EEO (kWh/m ³ -order) ⁽¹⁾	1,300	1,400
Destruction Energy Usage (kWh/gal)	6.4	6.9
\$/gallon ⁽²⁾⁽³⁾⁽⁴⁾	\$4.6445	\$5.4186
\$/gallon (CAPEX)	\$1.8265	\$2.1309
\$/gallon (OPEX)	\$2.8180	\$3.2877
Flow Rate (gpd)	35	30
# of PFASigators Needed	1	1
24-hour Total Energy Use (Cost \$) ⁽⁵⁾	156 kW (\$30)	156 kW (\$30)

⁽¹⁾ EEO values are from Table 7-2.

⁽²⁾ Cost includes both CAPEX and OPEX. PFASigator lifetime is assumed as 15 years as a robust water treatment equipment. Monthly PFASigator OPEX includes all reagents and delivery to site, and IP sublicense. Routine maintenance, discharge compliance sampling and analysis, and energy costs not included.

⁽³⁾ Equipment price and monthly subscription price for applied PFASigator model are obtained from Enspired Solutions.

⁽⁴⁾ PFASigator is fully automated such that minimum labor is anticipated to operate it. Real-time end-product fluoride data can be accessed remotely via a web-based data portal.

⁽⁵⁾ Based on 2023 residential electric supply rate for Michigan, \$0.19 per kW.

8.0 IMPLEMENTATION ISSUES

While the PRD reaction demonstrated both technical effectiveness and economic feasibility for reducing PFAS concentrations in water in this study, we also observed several improvements that can be applied in the future implementations of the technology, as well as some remaining concerns or constraints that need to be further investigated and addressed:

- Experiments between native pH and pH=10 consistently show a higher PFAS destruction rates under pH=10 conditions. However, the pH value kept decreasing to neutral over the experiment even when the initial pH was adjusted to 10. In future field demonstrations, PFASigator will maintain a high pH condition throughout the reaction duration by automatic chemical dosage, which can yield a faster reaction rate than the manually-operated tests stated herein. If necessary to comply with permitting requirements, as in the case of direct discharge of the effluent from the PFASigator, the pH will be adjusted down to 6 – 9 prior to discharge. The benefits of maintaining pH=10 during the reaction will first be tested on the bench scale by manually monitoring the pH and making adjustments as necessary, and comparing this to experiments in which the pH is left to drift naturally.
- Experiments on the scaleup testing of the Tyndall AFB fire truck rinsate sample demonstrated the varying technical effectiveness by using different doses of electron donor. Therefore, a small-scale treatability study is recommended to determine the best PRD reaction recipe for a given sample matrix. Bench scale testing will be conducted on each new sample to optimize conditions prior to scaling up the reaction for a given matrix. For these tests, we will ensure that any sample tested at the bench for pre-scale up optimization is representative of the actual matrix to be treated in the PFASigator.
- There is a concern on the remaining CTAB in the discharge stream after PRD reaction. As discussed in 6.2.3, we are currently exploring different pathways to alleviate this concern by modifying the PRD process to include a CTAB degradation step, finding a less-toxic substitute for CTAB, or removing CTAB using a concentration technology during loop-back of the PFASigator effluent. During implementation, the concentration of CTAB at each step of the process will be considered and evaluated. In the case of CTAB degradation, careful evaluation of potential harmful byproduct formation, such as bromate and nitrosamines, will be conducted at the bench scale prior to implementation at full scale. Similarly, less-toxic substitutes for CTAB, such as CTAC, will be evaluated on the bench for differences in PFAS destruction efficiencies and potential byproducts. If using a concentration technology, such as foam fractionation, as a means to remove CTAB, the effluent from this system will be analyzed for the CTAB concentration.

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APPENDICES

APPENDIX A. POINT OF CONTACT

Table A-1. Points of Contact

POINT OF CONTACT Name	ORGANIZATION Name Address	Phone Fax E-mail	Role in Project
Denise Kay	Enspired Solutions 4942 Dawn Avenue Suite 104 East Lansing, MI 48823	Phone 517-282-5211 Email denise.kay@enspiredsolutions.com	Principal Investigator
Meng Wang	Enspired Solutions 4942 Dawn Avenue Suite 104 East Lansing, MI 48823	Phone 434-825-8361 Email meng.wang@enspiredsolutions.com	Co-performer
Suzanne Witt	Enspired Solutions 4942 Dawn Avenue Suite 104 East Lansing, MI 48823	Phone 937-470-9461 Email suzanne.witt@enspiredsolutions.com	Co-performer
Jason Speicher	US Navy	jason.a.speicher2.civ@us.navy.mil	DoD project manager
Hunter Anderson	US Air Force AFCEC/CZTE 2261 Hughes Avenue, Suite 155 Lackland AFB, TX 78236 -9821	richard.anderson.55@us.af.mil	DoD project manager
Bridgett Ashley	Tyndall AFB AFCEC/CXAE 139 Barnes Dr. Suite 2 Tyndall AFB FL 32403	Tel: 850-283-6004 Email: bridgett.ashley.1@us.af.mil	Tyndall AFB sample coordinator
Zoom Nguyen	CDM Smith 14432 SE Eastgate Way, Suite 100, Bellevue, WA 98007	phone: 425.519.8300 direct/fax: 425.519.8325 cell: 206.743.4990 email: nguyendd@cdmsmith.com	NAS Jax sample coordinator
Dave Reynolds	Geosyntec	DReynolds@Geosyntec.com	NAS Oceana sample coordinator
Amy Handley	PFAS Project Manager Department of Military and Veterans Affairs Michigan Army National Guard Environmental Section	C: +1 517-219-2209 HandleyA@michigan.gov	MI Army National Guard sample coordinator
John Anderson	Arcadis Arcadis G&M of North Carolina, Inc. 5420 Wade Park Blvd Suite 350, Raleigh, NC 27607	T +1 207 613 8363 M +1 207 205 8069 John.Anderson@arcadis.com	Tyndall AFB sample coordinator
Christopher Bellona	Colorado School of Mines	cbellona@mines.edu	WPAFB sample coordinator

APPENDIX B. LABORATORY ANALYTICAL LIST AND METHOD

Table B-1. PFAS Individual Compound Analytical List

Target Analyte Name	Abbreviation	CAS Number
Class: Perfluoroalkyl carboxylic acids (PFCAs)		
Perfluorobutanoic acid	PFBA	375-22-4
Perfluoropentanoic acid	PFPeA	2706-90-3
Perfluorohexanoic acid	PFHxA	307-24-4
Perfluoroheptanoic acid	PFHpA	375-85-9
Perfluorooctanoic acid	PFOA	335-67-1
Perfluorononanoic acid	PFNA	375-95-1
Perfluorodecanoic acid	PFDA	335-76-2
Perfluoroundecanoic acid	PFUnA	2058-94-8
Perfluorododecanoic acid	PFDoA	307-55-1
Perfluorotridecanoic acid	PFTrDA	72629-94-8
Perfluorotetradecanoic acid	PFTeDA	376-06-7
Class: Perfluoroalkyl sulfonic acids (PFSAs)		
Perfluorobutanesulfonic acid	PFBS	375-73-5
Perfluoropentanesulfonic acid	PFPeS	2706-91-4
Perfluorohexanesulfonic acid	PFHxS	355-46-4
Perfluoroheptanesulfonic acid	PFHpS	375-92-8
Perfluorooctanesulfonic acid	PFOS	1763-23-1
Perfluoronanesulfonic acid	PFNS	68259-12-1
Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluorododecanesulfonic acid	PFDoS	79780-39-5
Class: PFCA Precursors		
1H,1H, 2H, 2H-Perfluorohexane sulfonic acid	4:2FTS	757124-72-4
1H,1H, 2H, 2H-Perfluorooctane sulfonic acid	6:2FTS	27619-97-2
1H,1H, 2H, 2H-Perfluorodecane sulfonic acid	8:2FTS	39108-34-4
Perfluorooctanesulfonamide	PFOSA	754-91-6
N-methyl perfluorooctanesulfonamide	NMeFOSA	31506-32-8
N-ethyl perfluorooctanesulfonamide	NEtFOSA	4151-50-2
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6
N-methyl perfluorooctanesulfonamidoethanol	NMeFOSE	24448-09-7
N-ethyl perfluorooctanesulfonamidoethanol	NEtFOSE	1691-99-2
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-49-3
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4
Class: Other		
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5

Target Analyte Name	Abbreviation	CAS Number
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9Cl-PF3ONS	756426-58-1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	763051-92-9
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7

Table B-2. Sampling and Analytical Methods

Analyte	Method	Container	Preservative	Holding Time
PFBA	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFPeA	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFHxA	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFHpA	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFOA	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFNA	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFDA	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFUnA	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFDoA	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFTTrDA	EPA 537 (modified)	Polypropylene bottle	None	14 days

Analyte	Method	Container	Preservative	Holding Time
PFTeDA	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFBS	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFPeS	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFHxS	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFHpS	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFOS	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFNS	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFDS	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFDoS	EPA 537 (modified)	Polypropylene bottle	None	14 days
4:2FTS	EPA 537 (modified)	Polypropylene bottle	None	14 days
6:2FTS	EPA 537 (modified)	Polypropylene bottle	None	14 days
8:2FTS	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFOSA	EPA 537 (modified)	Polypropylene bottle	None	14 days
NMeFOSA	EPA 537 (modified)	Polypropylene bottle	None	14 days
NEtFOSA	EPA 537 (modified)	Polypropylene bottle	None	14 days
NMeFOSAA	EPA 537 (modified)	Polypropylene bottle	None	14 days
NEtFOSAA	EPA 537 (modified)	Polypropylene bottle	None	14 days
NMeFOSE	EPA 537 (modified)	Polypropylene bottle	None	14 days
NEtFOSE	EPA 537 (modified)	Polypropylene bottle	None	14 days
HFPO-DA	EPA 537 (modified)	Polypropylene bottle	None	14 days
ADONA	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFMPA	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFMBA	EPA 537 (modified)	Polypropylene bottle	None	14 days
NFDHA	EPA 537 (modified)	Polypropylene bottle	None	14 days
9Cl-PF3ONS	EPA 537 (modified)	Polypropylene bottle	None	14 days
11Cl-PF3OUdS	EPA 537 (modified)	Polypropylene bottle	None	14 days

Analyte	Method	Container	Preservative	Holding Time
PFEESA	EPA 537 (modified)	Polypropylene bottle	None	14 days
3:3FTCA	EPA 537 (modified)	Polypropylene bottle	None	14 days
5:3FTCA	EPA 537 (modified)	Polypropylene bottle	None	14 days
7:3FTCA	EPA 537 (modified)	Polypropylene bottle	None	14 days
PFCA Precursors	TOP Assay	Polypropylene bottle	None	14 days
Total Fluorine	CIC; Eurofins Lancaster, Facility Standard Operating Procedure	Polypropylene bottle	None	90 days
Fluoride	EPA 300.0	Polypropylene bottle	None	28 days

APPENDIX C. ADDITIONAL ANALYTICAL DATA

Table C-1. GW PFAS Detections

Analyte	Units	Start	Native pH		pH 10	
			End	% Decrease	End	% Decrease
PFTeA	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFTrDA	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFDoA	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFUnA	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFDA	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFNA	ng/L	720 J	50 U	>93%	50 U	>93%
PFOA	ng/L	5,900	210	96%	180	97%
PFHpA	ng/L	2,200 J	730	67%	450	80%
PFHxA	ng/L	3,000	14,000	N/A	8,700	N/A
PFPeA	ng/L	3,300	8,500	N/A	5,100	N/A
PFBA	ng/L	6,300 U	11,000	N/A	8,300	N/A
PFDoS	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFDS	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFNS	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFOS	ng/L	170,000	33 J	>99%	62	>99%
PFHpS	ng/L	480 J	50 U	90%	50 U	90%
PFHxS	ng/L	4,700	73	98%	85	98%
PFPeS	ng/L	2,500 U	50 U	N/A	17 J	N/A
PFBS	ng/L	2,500 U	17 J	N/A	11 J	N/A
ADONA	ng/L	2,500 U	50 U	N/A	50 U	N/A
11Cl-PF3OUdS	ng/L	2,500 U	50 U	N/A	50 U	N/A
HFPO-DA	ng/L	5,000 U	100 U	N/A	100 U	N/A
9Cl-PF3ONS	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFEESA	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFMPA	ng/L	2,500 U	14 J	N/A	10 J	N/A
PFMBA	ng/L	2,500 U	15 J	N/A	10 J	N/A
NFDHA	ng/L	2,500 U	50 U	N/A	50 U	N/A
7:3 FTCA	ng/L	2,500 U	50 U	N/A	50 U	N/A
5:3 FTCA	ng/L	870 J	50 U	94%	50 U	94%
3:3 FTCA	ng/L	2,500 U	50 U	N/A	50 U	N/A
NEtFOSE	ng/L	2,500 U	50 U	N/A	50 U	N/A
NMeFOSE	ng/L	5,000 U	100 U	N/A	100 U	N/A
NMeFOSA	ng/L	2,500 U	50 U	N/A	50 U	N/A
NEtFOSA	ng/L	2,500 U	50 U	N/A	50 U	N/A
8:2 FTS	ng/L	17,000	50 U	>99%	23 J	>99%
6:2 FTS	ng/L	7,200	380	95%	300	96%

Analyte	Units	Start	Native pH		pH 10	
			End	% Decrease	End	% Decrease
4:2 FTS	ng/L	2,500 U	30 J	N/A	33 J	N/A
NEtFOSAA	ng/L	6,300 U	130 U	N/A	130 U	N/A
NMeFOSAA	ng/L	6,300 U	130 U	N/A	130 U	N/A
FOSA	ng/L	8,100	10 J	>99%	50 U	>99%
Unidentified PFCA precursors	ng/L	150,000	3,200	98%	3,800	97%

Notes:

U = Non-detected, shown as reporting limit

J = Estimated

N/A = not available

ng/L = nanogram per liter

Table C-2. FF PFAS Detections

Analyte	Units	Start	Native pH		pH 10	
			End	% Decrease	End	% Decrease
PFTeA	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
PFTrDA	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
PFDoA	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
PFUnA	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
PFDA	ng/L	4,600 J	250,000 U	N/A	250,000 U	N/A
PFNA	ng/L	31,000	250,000 U	N/A	250,000 U	N/A
PFOA	ng/L	1,900,000	250,000 U	N/A	250,000 U	N/A
PFHpA	ng/L	95,000	51,000 J	46%	35,000 J	63%
PFHxA	ng/L	180,000	130,000 J	28%	440,000	N/A
PFPeA	ng/L	43,000	160,000 J	N/A	210,000 J	N/A
PFBA	ng/L	63,000 U	330,000 J	N/A	630,000 U	N/A
PFDoS	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
PFDS	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
PFNS	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
PFOS	ng/L	14,000,000	590,000	96%	250,000 U	>98%
PFHpS	ng/L	420,000	48,000 J	88%	250,000 U	>40%
PFHxS	ng/L	3,800,000	190,000 J	95%	40,000 J	99%
PFPeS	ng/L	85,000	250,000 U	N/A	250,000 U	N/A
PFBS	ng/L	23,000 J	250,000 U	N/A	250,000 U	N/A
ADONA	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
11Cl-PF3OUdS	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
HFPO-DA	ng/L	50,000 U	500,000 U	N/A	500,000 U	N/A

Analyte	Units	Start	Native pH		pH 10	
			End	% Decrease	End	% Decrease
9CI-PF3ONS	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
PFEESA	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
PFMPA	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
PFMBA	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
NFDHA	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
7:3 FTCA	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
5:3 FTCA	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
3:3 FTCA	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
NEtFOSE	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
NMeFOSE	ng/L	50,000 U	500,000 U	N/A	500,000 U	N/A
NMeFOSA	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
NEtFOSA	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
8:2 FTS	ng/L	500,000	250,000 U	>50%	250,000 U	>50%
6:2 FTS	ng/L	6,100,000	630,000 U	>90%	630,000 U	>90%
4:2 FTS	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
NEtFOSAA	ng/L	63,000 U	630,000 U	N/A	630,000 U	N/A
NMeFOSAA	ng/L	63,000 U	630,000 U	N/A	630,000 U	N/A
FOSA	ng/L	25,000 U	250,000 U	N/A	250,000 U	N/A
Unidentified PFCA precursors	ng/L	4,300,000	480,000	89%	660,000	85%

Notes:

U = Non-detected, shown as reporting limit

J = Estimated

N/A = not available

ng/L = nanogram per liter

Table C-3. AFFF Rinsate PFAS Detections

Analyte	Units	Start	Native pH		pH 10	
			End	% Decrease	End	% Decrease
PFTeA	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
PFTTrDA	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
PFDoA	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
PFUnA	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
PFDA	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
PFNA	ng/L	250,000 U	30,000	N/A	4,100 J	N/A
PFOA	ng/L	190,000 J	160,000	16%	44,000	77%
PFHpA	ng/L	64,000 J	2,000,000	N/A	470,000	N/A
PFHxA	ng/L	320,000	1,300,000	N/A	1,100,000	N/A
PFPeA	ng/L	110,000 J	1,900,000	N/A	990,000	N/A
PFBA	ng/L	630,000 U	1,800,000	N/A	1,000,000	N/A
PFDoS	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
PFDS	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
PFNS	ng/L	250,000 U	1,100 J	N/A	5,000 U	N/A
PFOS	ng/L	17,000,000	1,500,000	91%	140,000	99%
PFHpS	ng/L	280,000	37,000	87%	9,200	97%
PFHxS	ng/L	2,100,000	180,000	91%	380,000	82%
PFPeS	ng/L	360,000	96,000	73%	240,000	33%
PFBS	ng/L	340,000	300,000	12%	360,000	N/A
ADONA	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
11Cl-PF3OUdS	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
HFPO-DA	ng/L	500,000 U	10,000 U	N/A	10,000 U	N/A
9Cl-PF3ONS	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
PFEESA	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A

Analyte	Units	Start	Native pH		pH 10	
			End	% Decrease	End	% Decrease
PFMPA	ng/L	250,000 U	1,900 J	N/A	1,500 J	N/A
PFMBA	ng/L	250,000 U	1,300 J	N/A	1,100 J	N/A
NFDHA	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
7:3 FTCA	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
5:3 FTCA	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
3:3 FTCA	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
NEtFOSE	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
NMeFOSE	ng/L	500,000 U	10,000 U	N/A	10,000 U	N/A
NMeFOSA	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
NEtFOSA	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
8:2 FTS	ng/L	250,000 U	16,000	N/A	32,000	N/A
6:2 FTS	ng/L	1,200,000	190,000	84%	270,000	78%
4:2 FTS	ng/L	250,000 U	5,000 U	N/A	17,000	N/A
NEtFOSAA	ng/L	630,000 U	13000 U	N/A	13,000 U	N/A
NMeFOSAA	ng/L	630,000 U	13000 U	N/A	13,000 U	N/A
FOSA	ng/L	250,000 U	5,000 U	N/A	5,000 U	N/A
Unidentified PFCA precursors	ng/L	35,000,000	0	>99%	900,000	97%

Notes:

U = Non-detected, shown as reporting limit

J = Estimated

N/A = not available

ng/L = nanogram per liter

Table C-4. IDW NF PFAS Detections

Analyte	Units	Start	Native pH		pH 10	
			End	% Decrease	End	% Decrease
PFTeA	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFTrDA	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFDoA	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFUnA	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFDA	ng/L	2,500 U	15 J	N/A	50 U	N/A
PFNA	ng/L	1,200 J	120	90%	11 J	99%
PFOA	ng/L	5,300	4,200	21%	650	88%
PFHpA	ng/L	1,500 J	710	53%	330	78%
PFHxA	ng/L	3,600	1,800	50%	1,500	58%
PFPeA	ng/L	4,600	960	79%	3,400	26%
PFBA	ng/L	6,300 U	2,400	N/A	4,400	N/A
PFDoS	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFDS	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFNS	ng/L	2,500 U	10 J	N/A	50 U	N/A
PFOS	ng/L	29,000	10,000	66%	500	98%
PFHpS	ng/L	620 J	170	72%	50 U	>91%
PFHxS	ng/L	12,000	860	93%	220	98%
PFPeS	ng/L	790 J	190	76%	96	88%
PFBS	ng/L	2,200 J	260	88%	1,100	50%
ADONA	ng/L	2,500 U	50 U	N/A	50 U	N/A
11Cl- PF3OUdS	ng/L	2,500 U	50 U	N/A	50 U	N/A
HFPO-DA	ng/L	5,000 U	100 U	N/A	100 U	N/A
9Cl- PF3ONS	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFEESA	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFMPA	ng/L	2,500 U	50 U	N/A	50 U	N/A
PFMBA	ng/L	2,500 U	50 U	N/A	50 U	N/A
NFDHA	ng/L	2,500 U	50 U	N/A	50 U	N/A
7:3 FTCA	ng/L	2,500 U	50 U	N/A	50 U	N/A
5:3 FTCA	ng/L	2,500 U	50 U	N/A	50 U	N/A
3:3 FTCA	ng/L	2,500 U	50 U	N/A	50 U	N/A
NEtFOSE	ng/L	2,500 U	50 U	N/A	50 U	N/A
NMeFOSE	ng/L	5,000 U	100 U	N/A	100 U	N/A
NMeFOSA	ng/L	2,500 U	50 U	N/A	50 U	N/A
NEtFOSA	ng/L	2,500 U	50 U	N/A	50 U	N/A
8:2 FTS	ng/L	2,500 U	310	N/A	26 J	N/A

Analyte	Units	Start	Native pH		pH 10	
			End	% Decrease	End	% Decrease
6:2 FTS	ng/L	6,100 J	1,600	74%	380	94%
4:2 FTS	ng/L	2,500 U	50 U	N/A	42 J	N/A
NEtFOSAA	ng/L	6,300 U	130 U	N/A	130 U	N/A
NMeFOSAA	ng/L	6,300 U	130 U	N/A	130 U	N/A
FOSA	ng/L	2,500 U	110	N/A	110	N/A
Unidentified PFCA precursors	ng/L	15,000	4,800	68%	0	>99%

Notes:

U = Non-detected, shown as reporting limit

J = Estimated

N/A = not available

ng/L = nanogram per liter

Table C-5. 3M AFFF (diluted 10x) PFAS detections

Analyte	Units	Start	Native pH		pH 10	
			End	% Decrease	End	% Decrease
PFTeA	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
PFTrDA	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
PFDoA	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
PFUnA	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
PFDA	ng/L	6,200 J	10,000,000 U	N/A	10,000,000 U	N/A
PFNA	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
PFOA	ng/L	5,500,000	10,000,000 U	N/A	10,000,000 U	N/A
PFHpA	ng/L	1,500,000	17,00,000 J	N/A	1,400,000 J	7%
PFHxA	ng/L	6,100,000	15,000,000	N/A	15,000,000	N/A
PFPeA	ng/L	2,500,000	12,000,000	N/A	9,400,000 J	N/A
PFBA	ng/L	2,100,000	26,000,000	N/A	24,000,000 J	N/A
PFDoS	ng/L	53,000	10,000,000 U	N/A	10,000,000 U	N/A
PFDS	ng/L	510,000	10,000,000 U	N/A	10,000,000 U	N/A
PFNS	ng/L	230,000	10,000,000 U	N/A	10,000,000 U	N/A
PFOS	ng/L	330,000,000	10,000,000 U	N/A	10,000,000 U	N/A
PFHpS	ng/L	5,600,000	10,000,000 U	N/A	10,000,000 U	N/A
PFHxS	ng/L	43,000,000	19,000,000	56%	22,000,000	49%
PFPeS	ng/L	8,500,000	7,700,000 J	9%	7,400,000 J	13%
PFBS	ng/L	8,900,000	10,000,000	N/A	10,000,000	N/A
ADONA	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
11Cl-PF3OUdS	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
HFPO-DA	ng/L	50,000 U	10,000,000 U	N/A	20,000,000 U	N/A
9Cl-PF3ONS	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
PFEESA	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A

Analyte	Units	Start	Native pH		pH 10	
			End	% Decrease	End	% Decrease
PFMPA	ng/L	4,300 J	10,000,000 U	N/A	10,000,000 U	N/A
PFMBA	ng/L	4,400 J	10,000,000 U	N/A	10,000,000 U	N/A
NFDHA	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
7:3 FTCA	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
5:3 FTCA	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
3:3 FTCA	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
NEtFOSE	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
NMeFOSE	ng/L	140,000	20,000,000 U	N/A	20,000,000 U	N/A
NMeFOSA	ng/L	250,000 U	10,000,000 U	N/A	10,000,000 U	N/A
NEtFOSA	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
8:2 FTS	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
6:2 FTS	ng/L	63,000 U	25,000,000 U	N/A	25,000,000 U	N/A
4:2 FTS	ng/L	25,000 U	10,000,000 U	N/A	10,000,000 U	N/A
NEtFOSAA	ng/L	63,000 U	25,000,000 U	N/A	25,000,000 U	N/A
NMeFOSAA	ng/L	63,000 U	25,000,000 U	N/A	25,000,000 U	N/A
FOSA	ng/L	13,000 J	10,000,000 U	N/A	10,000,000 U	N/A
Unidentified PFCA precursors	ng/L	360,000,000	13,000,000	96%	26,000,000	93%

Notes:

U = Non-detected, shown as reporting limit

J = Estimated

N/A = not available

ng/L = nanogram per liter

Table C-6. Anslite AFFF and IX SB PFAS Detections

Analyte	Units	Anslite AFFF	IX SB
PFTeA	ng/L	5,200 J	250,000 U
PFTrDA	ng/L	17,000 J	250,000 U
PFDoA	ng/L	25,000 U	250,000 U
PFUnA	ng/L	25,000 U	250,000 U
PFDA	ng/L	95,000	750,000
PFNA	ng/L	5,600 J	1,400,000
PFOA	ng/L	1,300,000	270,000,000
PFHpA	ng/L	95,000	15,000,000
PFHxA	ng/L	3,600,000	24,000,000
PFPeA	ng/L	260,000	5,800,000
PFBA	ng/L	370,000	810,000
PFDoS	ng/L	25,000 U	250,000 U
PFDS	ng/L	25,000 U	250,000 U
PFNS	ng/L	25,000 U	250,000 U
PFOS	ng/L	120,000	95,000,000
PFHpS	ng/L	25,000 U	1,300,000
PFHxS	ng/L	12,000 J	59,000,000
PFPeS	ng/L	25,000 U	16,000,000
PFBS	ng/L	3,200 J	12,000,000
ADONA	ng/L	25,000 U	250,000 U
11Cl-PF3OUdS	ng/L	25,000 U	250,000 U
HFPO-DA	ng/L	50,000 U	250,000 U
9Cl-PF3ONS	ng/L	25,000 U	250,000 U
PFEESA	ng/L	25,000 U	250,000 U
PFMPA	ng/L	25,000 U	250,000 U
PFMBA	ng/L	25,000 U	250,000 U
NFDHA	ng/L	25,000 U	250,000 U
7:3 FTCA	ng/L	26,000	250,000 U
5:3 FTCA	ng/L	25,000 U	250,000 U
3:3 FTCA	ng/L	25,000 U	250,000 U
NEtFOSE	ng/L	25,000 U	250,000 U
NMeFOSE	ng/L	50,000 U	250,000 U
NMeFOSA	ng/L	25,000 U	250,000 U
NEtFOSA	ng/L	25,000 U	250,000 U
8:2 FTS	ng/L	5,100,000	2,100,000
6:2 FTS	ng/L	12,000,000	2,500,000
4:2 FTS	ng/L	230,000	250,000 U

Analyte	Units	Ansulite AFFF	IX SB
NEtFOSAA	ng/L	63,000 U	630,000 U
NMeFOSAA	ng/L	63,000 U	630,000 U
FOSA	ng/L	25,000 U	370,000
Unidentified PFCA precursors	ng/L	4,400,000,000	34,000,000

Notes:

U = Non-detected, shown as reporting limit

J = Estimated

N/A = not available

ng/L = nanogram per liter

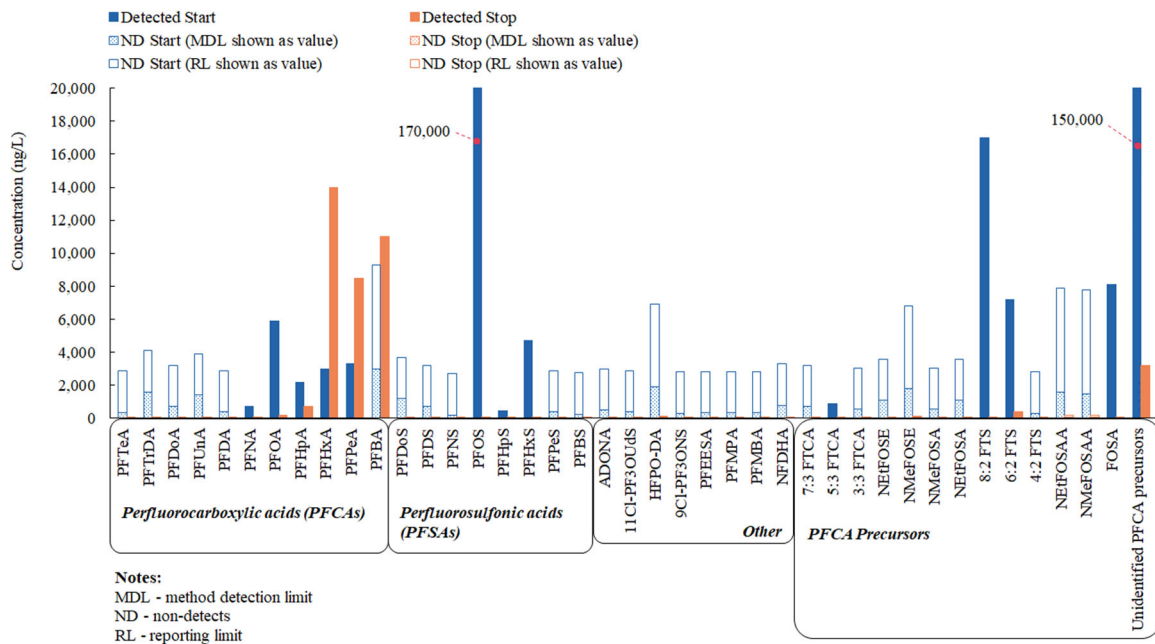


Figure C-1. PFAS fingerprint of GW untreated (blue bars) and treated (orange bars) at native pH.

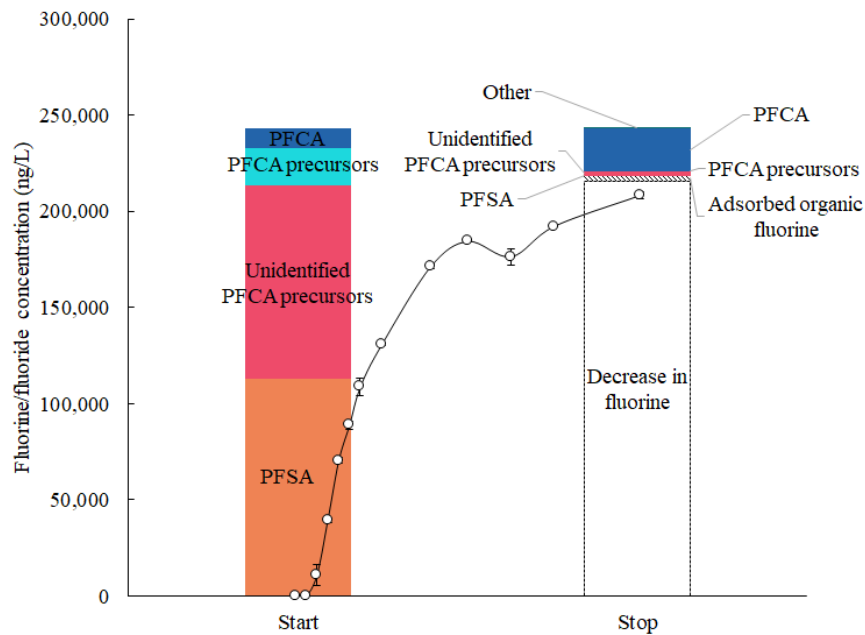


Figure C-2. Calculated organic fluorine (colored bars) and measured fluoride release (line with open circles) for the PRD treatment of GW at native pH. Sorbed fluorine is indicated by black and white striped bar.

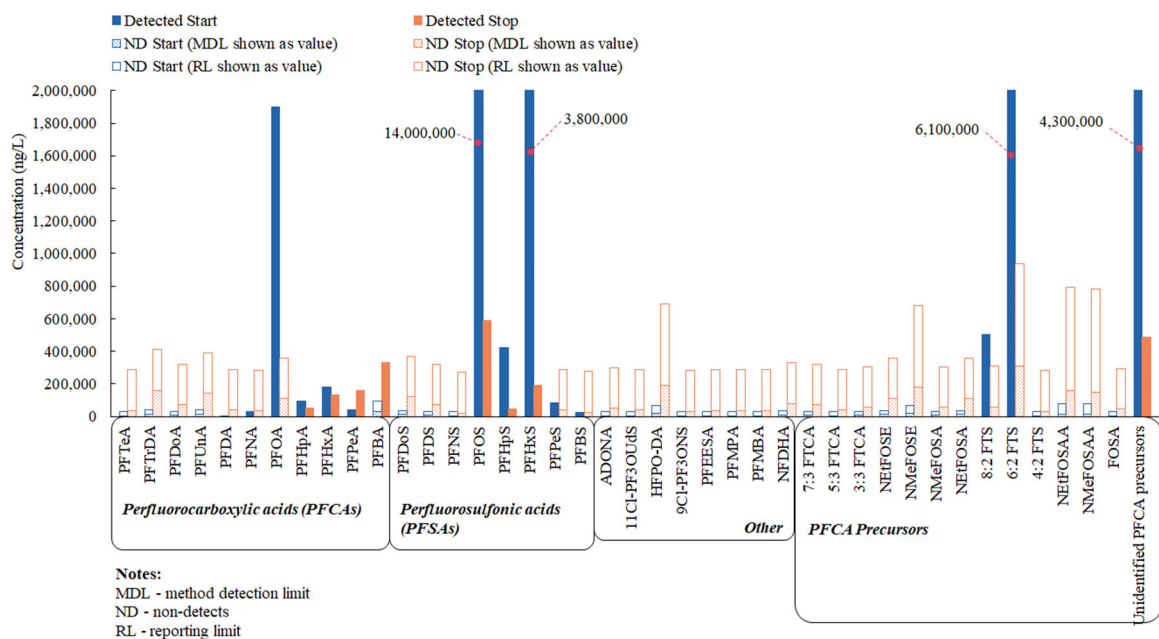


Figure C-3. PFAS fingerprint of FF untreated (blue bars) and treated (orange bars) at native pH.

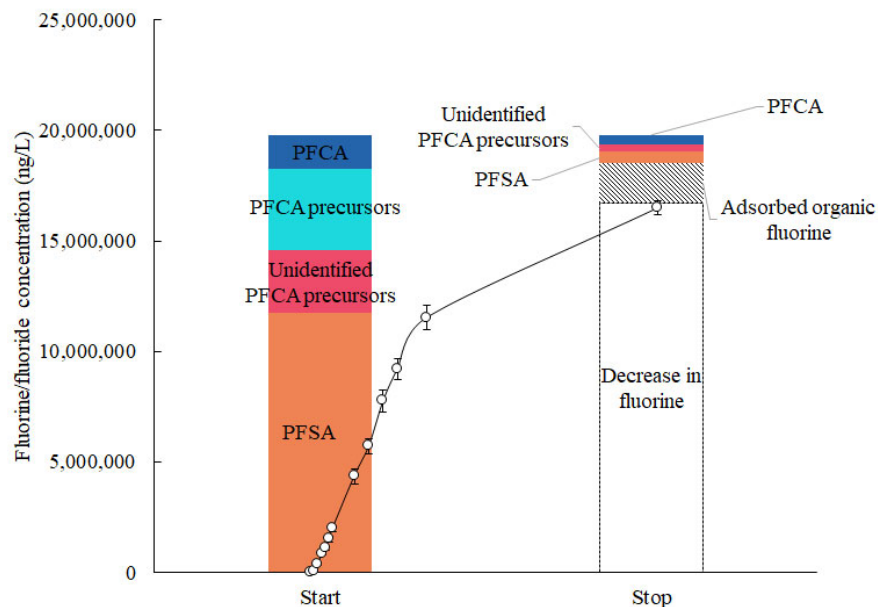


Figure C-4. Calculated organic fluorine (colored bars) and measured fluoride release (line with open circles) for the PRD treatment of FF at native pH. Sorbed fluorine is indicated by black and white striped bar.

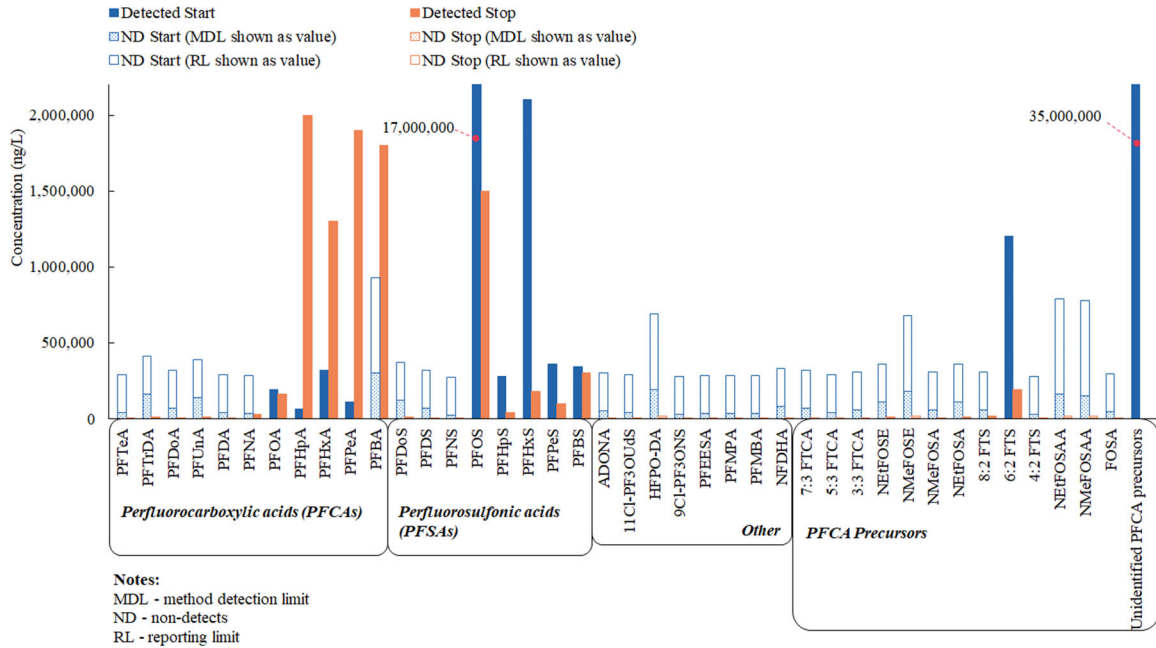


Figure C-5. PFAS fingerprint of AFFF Rinsate untreated (blue bars) and treated (orange bars) at native pH.

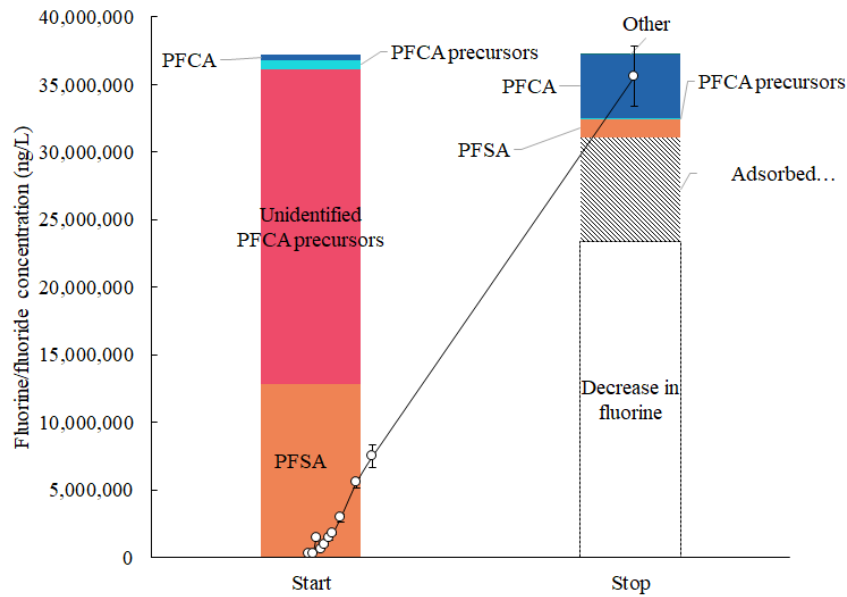


Figure C-6. Calculated organic fluorine (colored bars) and measured fluoride release (line with open circles) for the PRD treatment of AFFF Rinsate at native pH. Sorbed fluorine is indicated by black and white striped bar.

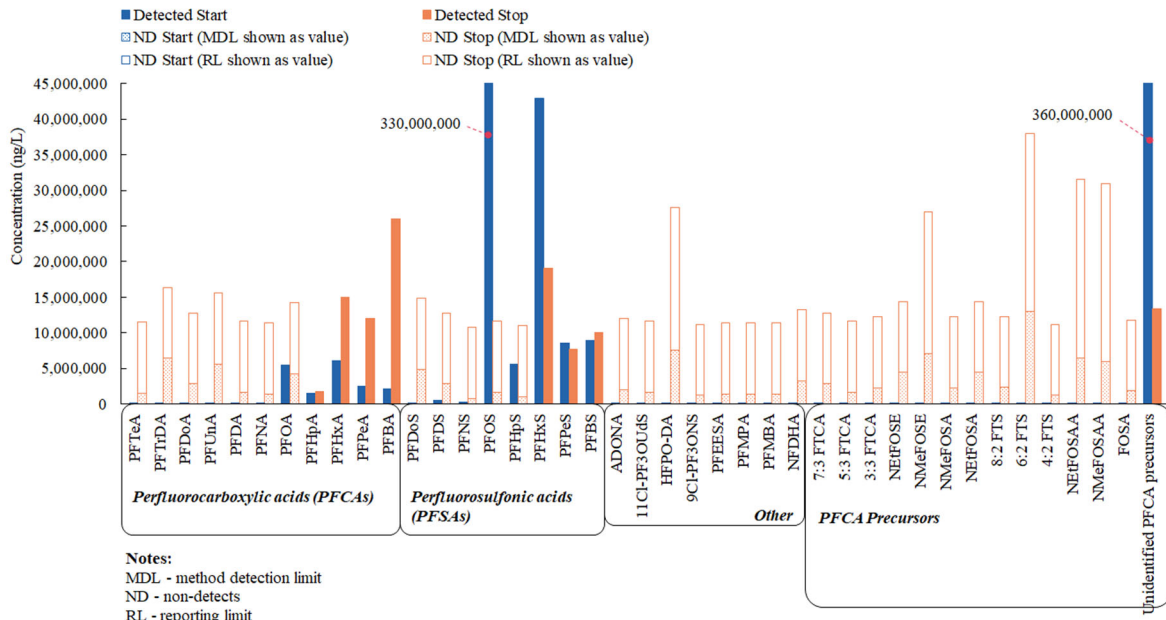


Figure C-7. PFAS fingerprint of 3M AFFF untreated (blue bars) and treated (orange bars) at native pH.

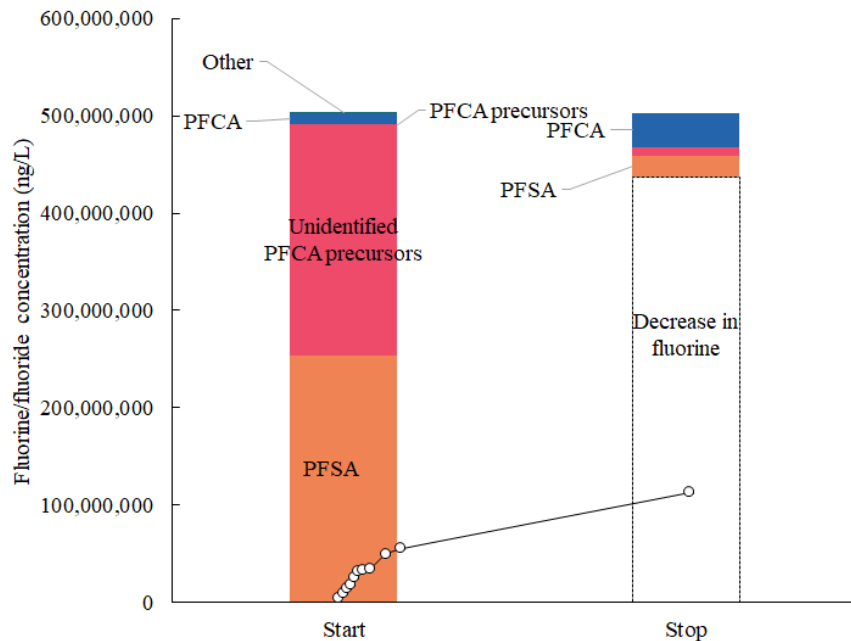


Figure C-8. Calculated organic fluorine (colored bars) and measured fluoride release (line with open circles) for the PRD treatment of 3M AFFF at native pH.

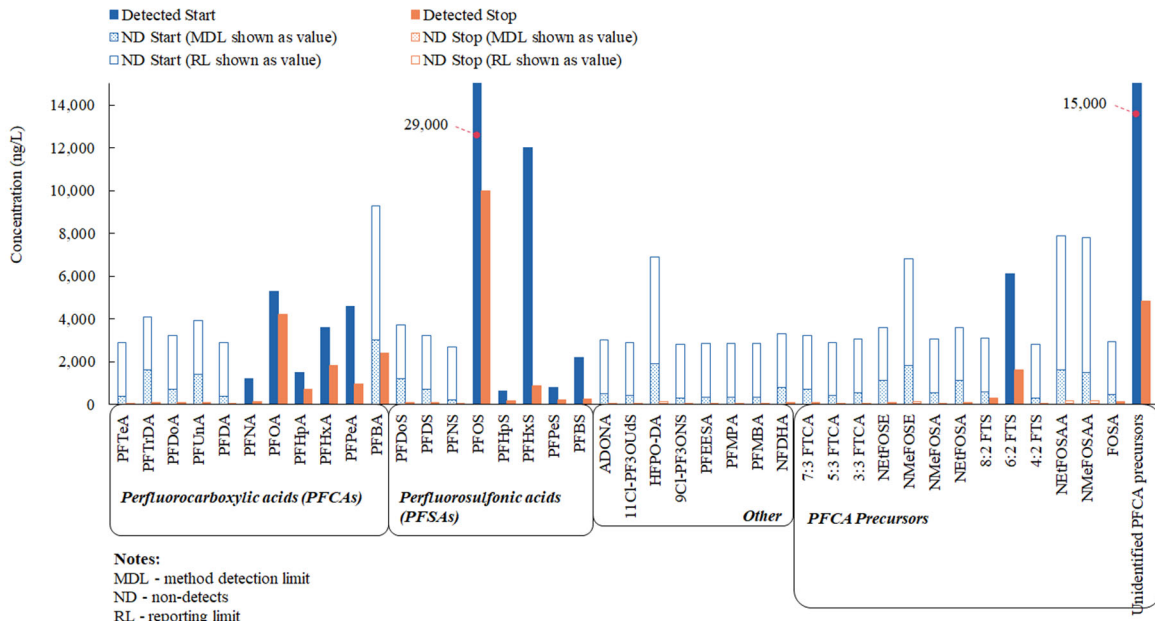


Figure C-9. PFAS fingerprint of IDW NF untreated (blue bars) and treated (orange bars) at native pH.

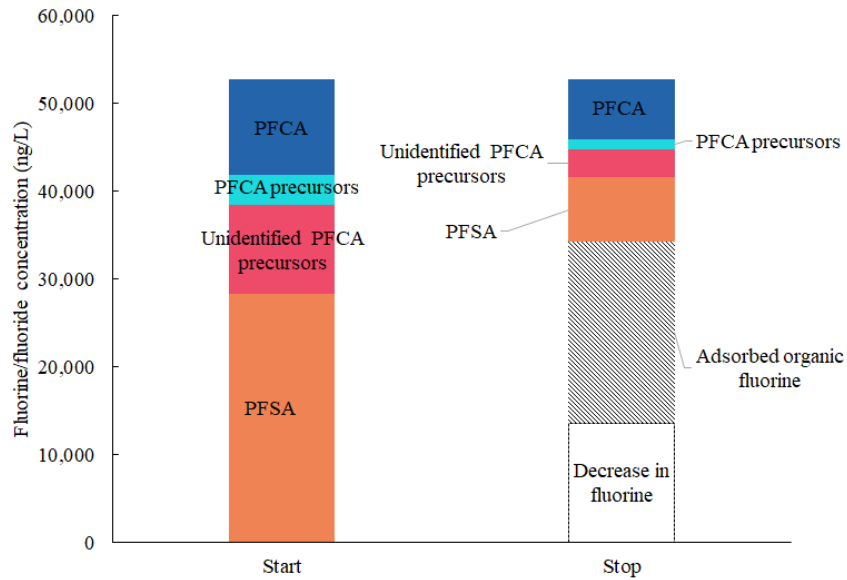


Figure C-10. Calculated organic fluorine (colored bars) for the PRD treatment of IDW NF at native pH. Sorbed fluorine is indicated by black and white striped bar.

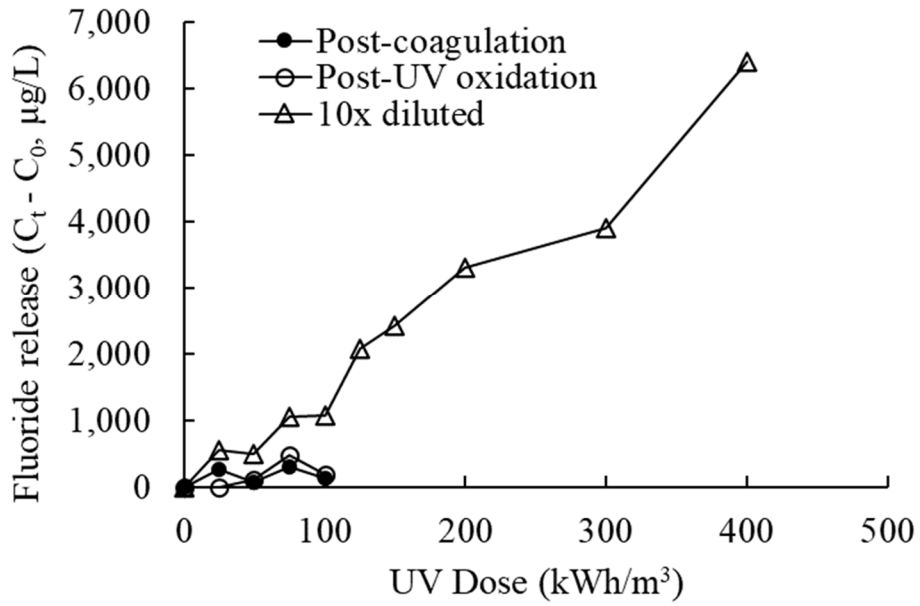


Figure C-11. Fluoride release during treatment of IX SB under varying conditions: post-coagulation (closed circles), post-UV oxidation (open circles), and 10x dilution (open triangles).

Table C-7. Organic fluorine and inorganic fluoride values for samples treated at native pH.

Sample	Measured Total Fluorine (µg/L)		Calculated Total Fluorine (µg/L)		Fluoride measured by IC (µg/L)		Fluoride measured by ISE (µg/L)	
	Start	End	Start	End	Start	End	Start	End
IDW NF	500 U	1,900	41	15	2,500 U	1,400	1,500	1,500
GW	500 U	470	240	23	320	330	97	310
FF	3,700	32,000	20,000	960	550	21,000	430	17,000
AFFF Rinsate	16,000	59,000	34,000	6,200	2,500 U	35,000	640	36,000
3M AFFF (diluted 10x)	120,000	270,000	460,000	51,000	14,000	64,000	200,000	310,000

Notes:

U = Non-detected, shown as reporting limit

J = Estimated

N/A = not available

ng/L = nanogram per liter

Table C-8. Organic fluorine and inorganic fluoride values for samples treated at pH 10.

Sample	Measured Total Fluorine (µg/L)		Calculated Total Fluorine (µg/L)		Fluoride measured by IC (µg/L)		Fluoride measured by ISE (µg/L)	
	Start	End	Start	End	Start	End	Start	End
IDW NF	500 U	1,800	41	8	2,500 U	1,300	1,500	1,500
GW	500 U	400	240	15	320	280	97	335
FF	3,700	29,000	20,000	480	550	18,000	430	20,000
AFFF Rinsate	16,000	58,000	34,000	3,200	2,500 U	27,000	640	26,000
3M AFFF (diluted 10x)	120,000	330,000	460,000	29,000	14,000	88,000	200,000	390,000

Notes:

U = Non-detected, shown as reporting limit

J = Estimated

N/A = not available

ng/L = nanogram per liter

Table C-9. PFAS detections during PRD treatment of 18 L GW

Analyte	Units	0 kWh/m ³	100 kWh/m ³	200 kWh/m ³	400 kWh/m ³	1,400 kWh/m ³	Total % Decrease
PFTeA	ng/L	5 U	2.1 U	1.9 U	1.9 U	5 U	N/A
PFTTrDA	ng/L	5 U	2.1 U	1.9 U	1.9 U	5 U	N/A
PFD _o A	ng/L	5 U	2.1 U	1.9 U	1.9 U	5 U	N/A
PFUnA	ng/L	5 U	2.1 U	1.9 U	1.9 U	5 U	N/A
PFDA	ng/L	25	3	2	1.9 U	5 U	>80%
PFNA	ng/L	270	11	6	4	5 U	>98%
PFOA	ng/L	4,300	160	65	81	56	99%
PFHpA	ng/L	1,300	150	37	130	31	98%
PFHxA	ng/L	2,200	3,500	2,100	5,900	220	90%
PFPeA	ng/L	2,200	2,800	2,400	3,800	270	88%
PFBA	ng/L	1,300 U	1,700	1,900	3,100	310	N/A
PFD _o S	ng/L	5 U	2.1 U	1.9 U	1.9 U	5 U	N/A
PFDS	ng/L	5 U	2.1 U	1.9 U	1.9 U	5 U	N/A
PFNS	ng/L	5 U	2.1 U	1.9 U	1.9 U	5 U	N/A
PFOS	ng/L	10,000	2,500	2,100	1,400	210	98%
PFHpS	ng/L	91	6	4	3	5 U	>94%
PFHxS	ng/L	1,600	94	45	27	15	99%
PFPeS	ng/L	84	6	2	1.9 U	5 U	>94%
PFBS	ng/L	59	20	11	11	7	88%
ADONA	ng/L	5 U	2.1 U	1.9 U	1.9 U	5 U	N/A
11Cl-PF3OUdS	ng/L	5 U	2.1 U	1.9 U	1.9 U	5 U	N/A
HFPO-DA	ng/L	10 U	4.2 U	3.9 U	3.9 U	10 U	N/A
9Cl-PF3ONS	ng/L	5 U	2.1 U	1.9 U	1.9 U	5 U	N/A
PFEESA	ng/L	5 U	2.1 U	1.9 U	1.9 U	5 U	N/A
PFMPA	ng/L	5 U	2.1 U	2	5	5 U	N/A
PFMBA	ng/L	5 U	3	4	8	5 U	N/A
NFDHA	ng/L	5 U	2.1 U	1.9 U	1.9 U	5 U	N/A
7:3 FTCA	ng/L	82	8	3	1.9 U	5 U	>93%
5:3 FTCA	ng/L	790	440	330	230	5 U	>99%
3:3 FTCA	ng/L	60	77	78	70	5 U	>91%
NEtFOSE	ng/L	5 U	2.1 U	1.9 U	1.9 U	5 U	N/A
NMeFOSE	ng/L	10 U	4.2 U	3.9 U	3.9 U	10 U	N/A
NMeFOSA	ng/L	5 U	2.1 U	1.9 U	1.9 U	5 U	N/A
NEtFOSA	ng/L	5 U	2.1 U	1.9 U	1.9 U	5 U	N/A
8:2 FTS	ng/L	4,200	530	290	200	53	99%

Analyte	Units	0 kWh/m ³	100 kWh/m ³	200 kWh/m ³	400 kWh/m ³	1,400 kWh/m ³	Total % Decrease
6:2 FTS	ng/L	4,600	570	200	270	110	98%
4:2 FTS	ng/L	65	50	48	68	29	55%
NEtFOSAA	ng/L	13 U	5.2 U	4.8 U	4.8 U	13 U	N/A
NMeFOSAA	ng/L	13 U	5.2 U	4.8 U	4.8 U	13 U	N/A
FOSA	ng/L	1,700	120	70	33	12	99%
Unidentified PFCA precursors	ng/L	68,000	NM	NM	NM	34	>99%

Notes:

U = Non-detected, shown as reporting limit

J = Estimated

N/A = not available

ng/L = nanogram per liter

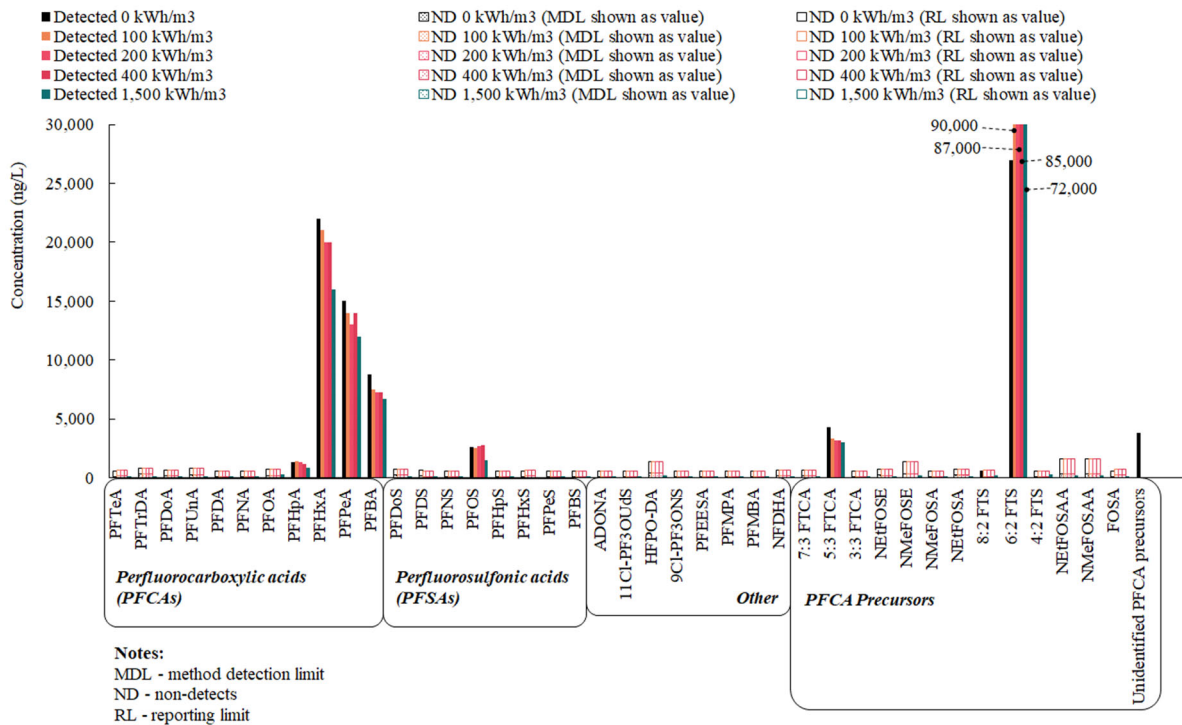


Figure C-12. PFAS analytical results for treatment of 18 L of AFFF Rinsate sample in a commercial UV reactor.

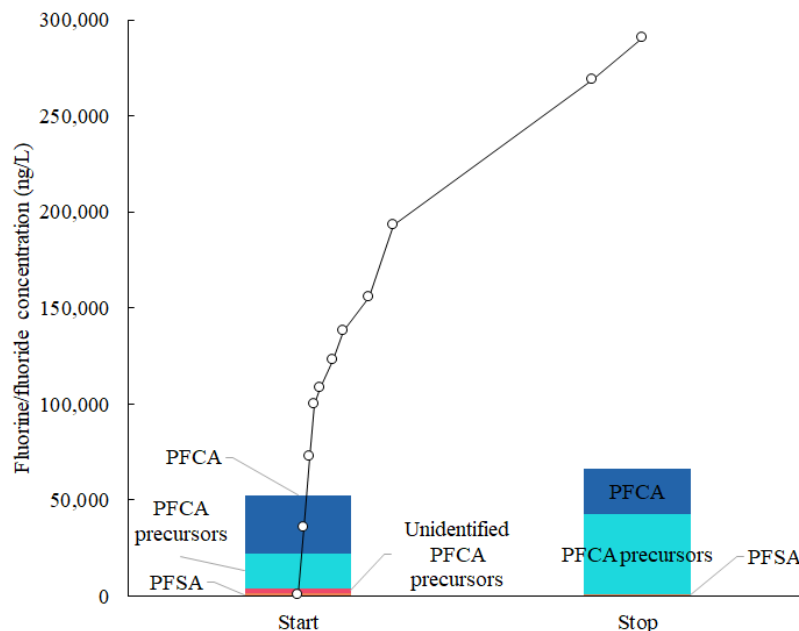


Figure C-13. Calculated organic fluorine (colored bars) and measured fluoride release (line with open circles) for the PRD treatment of 18 L AFFF Rinsate. Experiment was conducted at pH = 10.

Table C-10. PFAS detections during PRD treatment of 18 L AFFF Rinsate

Analyte	Units	0 kWh/m ³	100 kWh/m ³	200 kWh/m ³	400 kWh/m ³	1,400 kWh/m ³	Total % Decrease
PFTeA	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
PFTrDA	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
PFDoA	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
PFUnA	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
PFDA	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
PFNA	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
PFOA	ng/L	500 U	500 U	500 U	500 U	320	N/A
PFHpA	ng/L	1,300	1,400	1,300	1,200	830	36%
PFHxA	ng/L	22,000	21,000	20,000	20,000	16,000	27%
PFPeA	ng/L	15,000	14,000	13,000	14,000	12,000	20%
PFBA	ng/L	8,800	7,500	7,300	7,300	6,700	24%
PFDoS	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
PFDS	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
PFNS	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
PFOS	ng/L	2,600	2,500	2,700	2,800	1,500	42%
PFHpS	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
PFHxS	ng/L	500 U	500 U	500 U	500 U	77	N/A
PFPeS	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
PFBS	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
ADONA	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
11Cl-PF3OUdS	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
HFPO-DA	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	100 U	N/A
9Cl-PF3ONS	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
PFEESA	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
PFMPA	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
PFMBA	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
NFDHA	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
7:3 FTCA	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
5:3 FTCA	ng/L	4,300	3,300	3,200	3,200	3,000	30%
3:3 FTCA	ng/L	500 U	500 U	500 U	500 U	120	N/A
NEtFOSE	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
NMeFOSE	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	100 U	N/A
NMeFOSA	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
NEtFOSA	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
8:2 FTS	ng/L	610	500 U	500 U	500 U	210	66%

Analyte	Units	0 kWh/m ³	100 kWh/m ³	200 kWh/m ³	400 kWh/m ³	1,400 kWh/m ³	Total % Decrease
6:2 FTS	ng/L	27,000	90,000	87,000	85,000	72,000	N/A
4:2 FTS	ng/L	500 U	500 U	500 U	500 U	310	N/A
NEtFOSAA	ng/L	1,300 U	1,300 U	1,300 U	1,300 U	130 U	N/A
NMeFOSAA	ng/L	1,300 U	1,300 U	1,300 U	1,300 U	130 U	N/A
FOSA	ng/L	500 U	500 U	500 U	500 U	50 U	N/A
Unidentified PFCA precursors	ng/L	3,800	NM	NM	NM	0	>99%

Notes:

U = Non-detected, shown as reporting limit

J = Estimated

N/A = not available

ng/L = nanogram per liter

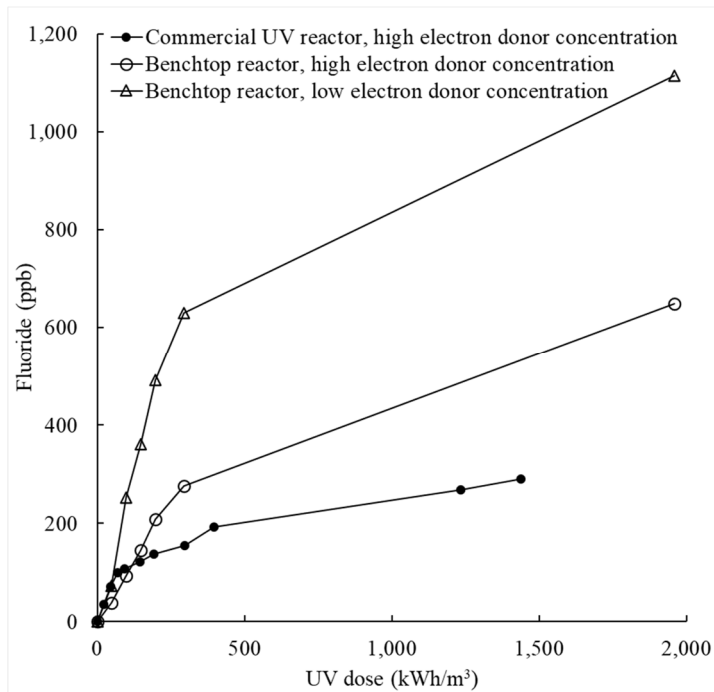


Figure C-14. Fluoride release as a function of UV dose for AFFF Rinsate sample used for scaled up experiments. Scaled up experiment used 18 L of sample and was treated in the commercial UV reactor with a high electron donor concentration (closed circles). Benchtop experiments were conducted with the same sample using 300 mL at high (open circles) and low (open triangles) electron donor concentrations.

APPENDIX D. MODELING CODES AND FIGURES

Figure D-1: ER21-EO-7569 Time Series Analysis

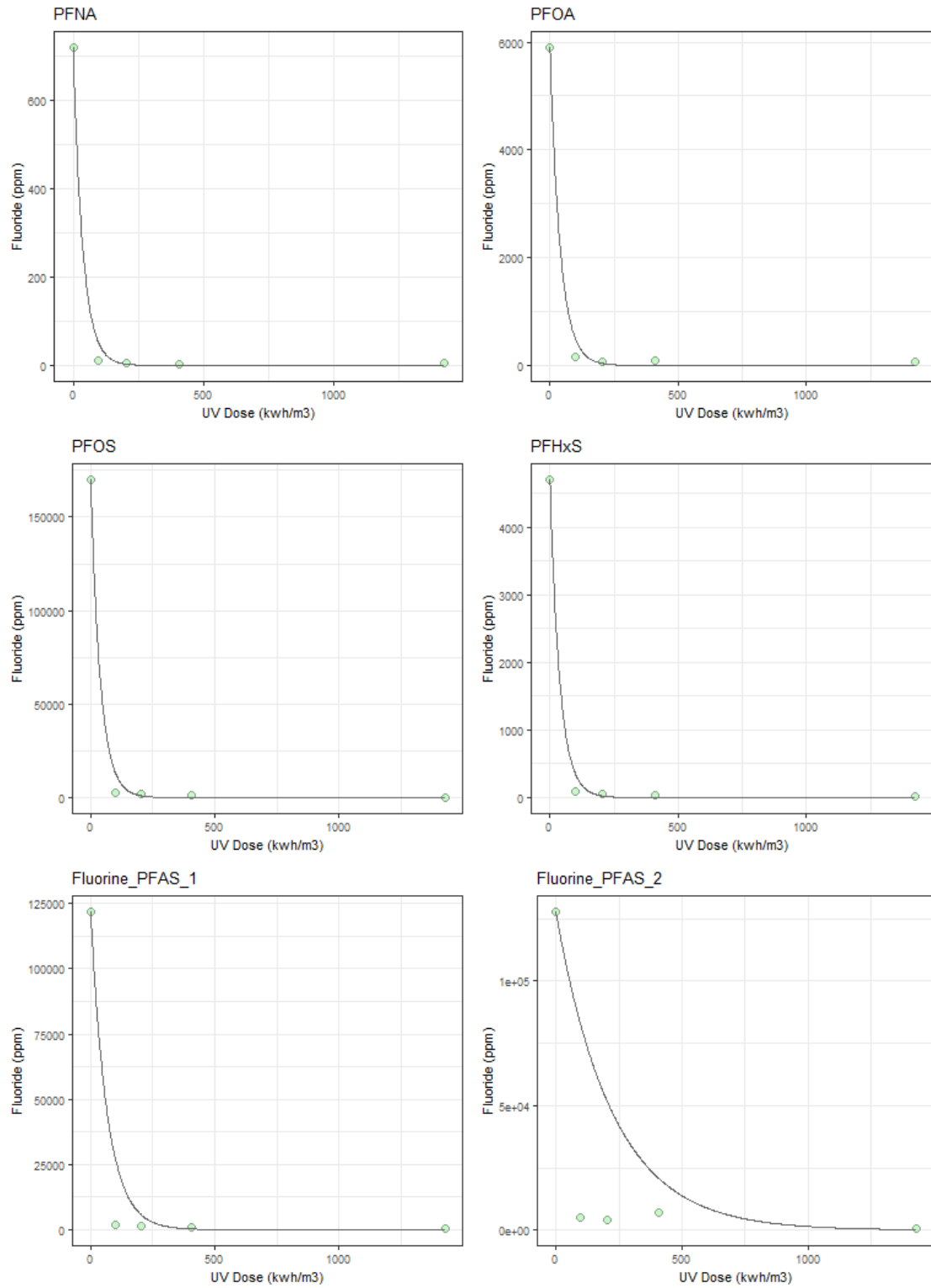
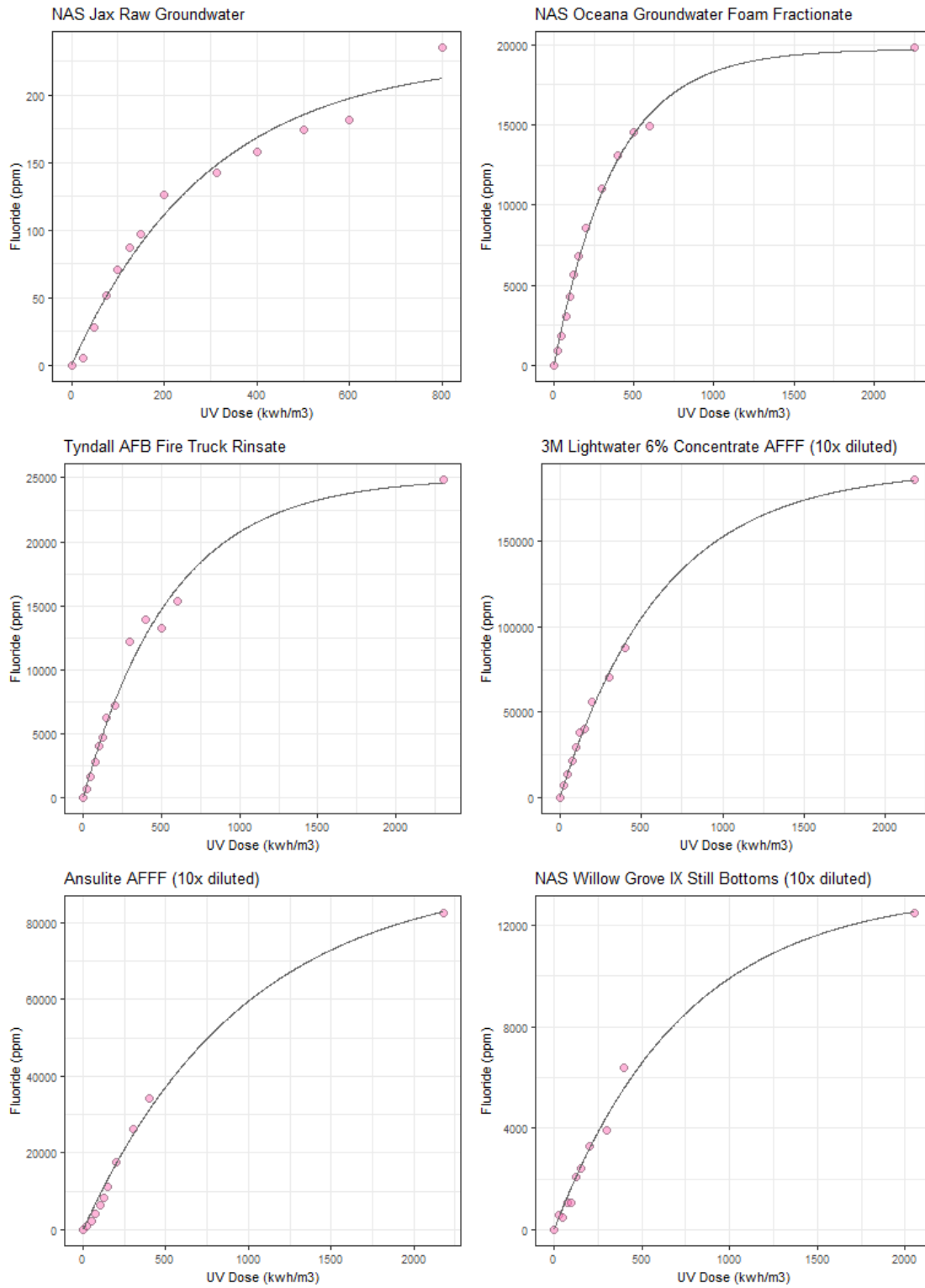


Figure D-2: ER21-EO-7569 Treatability Fluoride Analysis



Code - ER21-EO-7569 Time Series Analysis

Meng Wang

Nov 15th, 2023

Goal

Fit PFAS degradation by $PFAS = PFAS_0 \exp(-BT)$ Fit fluoride production by $F = F_{max} [1 - \exp(-kX)]$

Packages

```
library(data.table)
library(lfe)
library(ggplot2)
library(ggrepel)
library(aomisc)
library("cowplot")
```

Prepare the data for the analysis

First, load the input data

```
setwd("C://Temp/Analysis_updated")
#here is a directory to the code
#Load the data
#all non-detects use the value of report limit
DT_Fluoride = data.table(read.csv("NAS_Jax_Fluoride.csv"))
DT_PFAS = data.table(read.csv("NAS_Jax_majorPFAS.csv"))
DT_PFAS_Bench_0 = data.table(read.csv("NAS_Jax_majorPFAS_Bench_0.csv"))
)
Compound_ID = data.table(read.csv("Compound_ID.csv"))

#calculate total organic fluorine
#Method 1: calculate the 6 compounds in EPA MCL - PFOA, PFOS, PFNA, PFHxS, PFBS and GenX
DT_PFAS[, Fluorine_PFAS_1:= PFNA*0.696+PFOA*0.688+PFOS*0.646+PFHxS*0.617+PFBS*0.57+HFPO_DA*0.633]
DT_PFAS_Bench_0[, Fluorine_PFAS_1:= PFNA*0.696+PFOA*0.688+PFOS*0.646+PFHxS*0.617+PFBS*0.57+HFPO_DA*0.633]

#Method 2: calculate the 6 compounds in EPA MCL in addition to PFHxA and PFBA as suggested by Jason at Navy
DT_PFAS[, Fluorine_PFAS_2:= PFNA*0.696+PFOA*0.688+PFHxA*0.665+PFBA*0.621+PFOS*0.646+PFHxS*0.617+PFBS*0.57+HFPO_DA*0.633]
DT_PFAS_Bench_0[, Fluorine_PFAS_2:= PFNA*0.696+PFOA*0.688+PFHxA*0.665+PFBA*0.621+PFOS*0.646+PFHxS*0.617+PFBS*0.57+HFPO_DA*0.633]
```

```

#Convert Crosstab data into flat; add compound ID
DT_PFAS = melt (DT_PFAS, id="UV.Dose")
DT_PFAS_Bench_0 = melt (DT_PFAS_Bench_0, id="UV.Dose")
setkey(Compound_ID, "variable")
setkey(DT_PFAS, "variable")
setkey(DT_PFAS_Bench_0, "variable")
DT_PFAS=merge(DT_PFAS, Compound_ID)
DT_PFAS_Bench_0=merge(DT_PFAS_Bench_0, Compound_ID)
DT_PFAS_save=DT_PFAS
DT_PFAS_Bench_0_save=DT_PFAS_Bench_0

```

Second, we remove the outliers that would screw the fitting - the tailing zeros have no sensitivity over long duration of x values - Remove compound PFHxA and PFBA because they are not suitable for exponential decrease - Remove the last UV dosage point for INDIVIDUAL compounds because the tail data point screwed the model

```

DT_PFAS= DT_PFAS[variable!= "PFHxA"]
DT_PFAS= DT_PFAS[variable!= "PFBA"]
DT_PFAS_select = rbind(DT_PFAS[variable=="Fluorine_PFAS_1" & UV.Dose<
1400], DT_PFAS[variable=="Fluorine_PFAS_2"])
DT_PFAS= DT_PFAS[variable!= "Fluorine_PFAS_1"]
DT_PFAS= DT_PFAS[variable!= "Fluorine_PFAS_2"]
DT_PFAS=DT_PFAS[UV.Dose<400]
DT_PFAS=rbind (DT_PFAS, DT_PFAS_select)

```

```

DT_PFAS_Bench_0= DT_PFAS_Bench_0[variable!= "PFHxA"]
DT_PFAS_Bench_0= DT_PFAS_Bench_0[variable!= "PFBA"]
DT_PFAS_select = rbind(DT_PFAS_Bench_0[variable=="Fluorine_PFAS_1"& U
V.Dose<1400], DT_PFAS_Bench_0[variable=="Fluorine_PFAS_2"])
DT_PFAS_Bench_0= DT_PFAS_Bench_0[variable!= "Fluorine_PFAS_1"]
DT_PFAS_Bench_0= DT_PFAS_Bench_0[variable!= "Fluorine_PFAS_2"]
DT_PFAS_Bench_0=DT_PFAS_Bench_0[UV.Dose<400]
DT_PFAS_Bench_0=rbind (DT_PFAS_Bench_0, DT_PFAS_select)

```

Third, create table to export fitted data

```

#Table for fitted parameters
fit_Paras_PFAS=unique(DT_PFAS[, .(ID, variable)])
N=nrow(fit_Paras_PFAS)
fit_Paras_PFAS = data.table(ID=fit_Paras_PFAS$ID,Compound=fit_Paras_PF
AS$variable, Para_k = rep(0, each = N), Para_k_pvalue = rep(0, each =
N))

fit_Paras_PFAS = fit_Paras_PFAS[order(ID)]
fit_Paras_PFAS_Bench_0=fit_Paras_PFAS

```

```

#Table for simulated data
Simulated_PFAS=data.table(UV.Dose = seq(from=min(DT_PFAS$UV.Dose),to=
max(DT_PFAS$UV.Dose),length.out=1000), S_PFNA = rep(0, each=1000), S_PF
OA = rep(0, each=1000), S_PFOS = rep(0, each=1000), S_PFHxS = rep(0, e
ach=1000), S_PFBS = rep(0, each=1000), S_HFPO.DA = rep(0, each=1000),
S_Fluorine_PFAS_1 = rep(0, each=1000), S_Fluorine_PFAS_2 = rep(0, each
=1000) )
Simulated_PFAS_Bench_0=Simulated_PFAS

#Table for fluoride fitted data
#fit_Paras = data.table(Compound=fit_Paras_1$Compound, Para_init = rep
(0, each = N),Para_k = rep(0, each = N), Para_init_pvalue = rep(0, eac
h = N),Para_k_pvalue = rep(0, each = N))

fit_Paras_Fluoride=data.table(0,0, 0, 0)
Simulated_fluoride=data.table(UV.Dose = rep(0,each=1000), Simulated_Fl
uoride=rep(0, each=1000))
min_UV.Dose = min(DT_PFAS$UV.Dose)
max_UV.Dose = max(DT_PFAS$UV.Dose)

Forth, fit PFAS data by PFAS = PFAS0*exp(-BT)

Force the line goes through the initial point
for (i in 1:N) {
data = DT_PFAS_Bench_0[ID==(i)]
x=data$UV.Dose
y=data$value
Name = data$variable[1]
model <- lm(log(y)-log(y[1]) ~ 0+x)

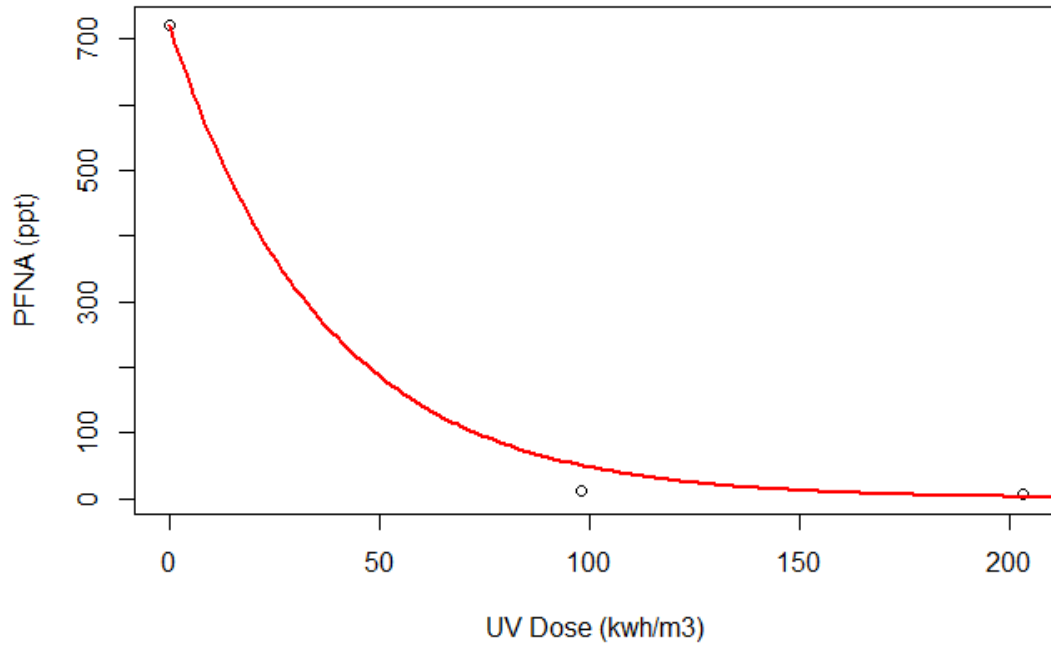
#plot the fitted model with the
#define x-values to use for regression line
x_fit=seq(from=min_UV.Dose,to=max_UV.Dose,length.out=1000)
#use the model to predict the y-values based on the x-values
y_fit=y[1]*exp(predict(model,newdata=list(x=seq(from=min_UV.Dose,to=ma
x_UV.Dose,length.out=1000)), interval="confidence"))

plot(x,y, xlab="UV Dose (kwh/m3)", ylab=paste(Name, " (ppt)", sep = ""
))
lines(x_fit, y_fit[,1], col="red", lwd=2)
title(main = paste("NAS Jax GW ", Name, sep = ""))
fit_Paras_PFAS_Bench_0$Para_k[i]=summary(model)$coefficients[1,1]
fit_Paras_PFAS_Bench_0$Para_k_pvalue[i]=summary(model)$coefficients[1,
4]

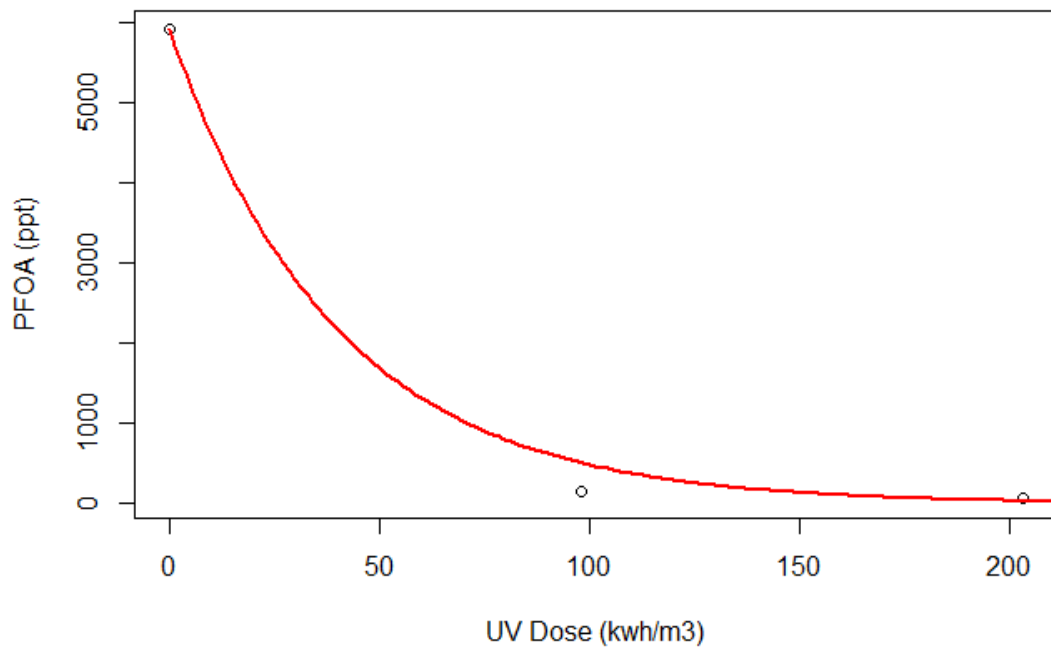
```

```
Simulated_PFAS_Bench_0[, i+1]=y_fit[,1]
}
```

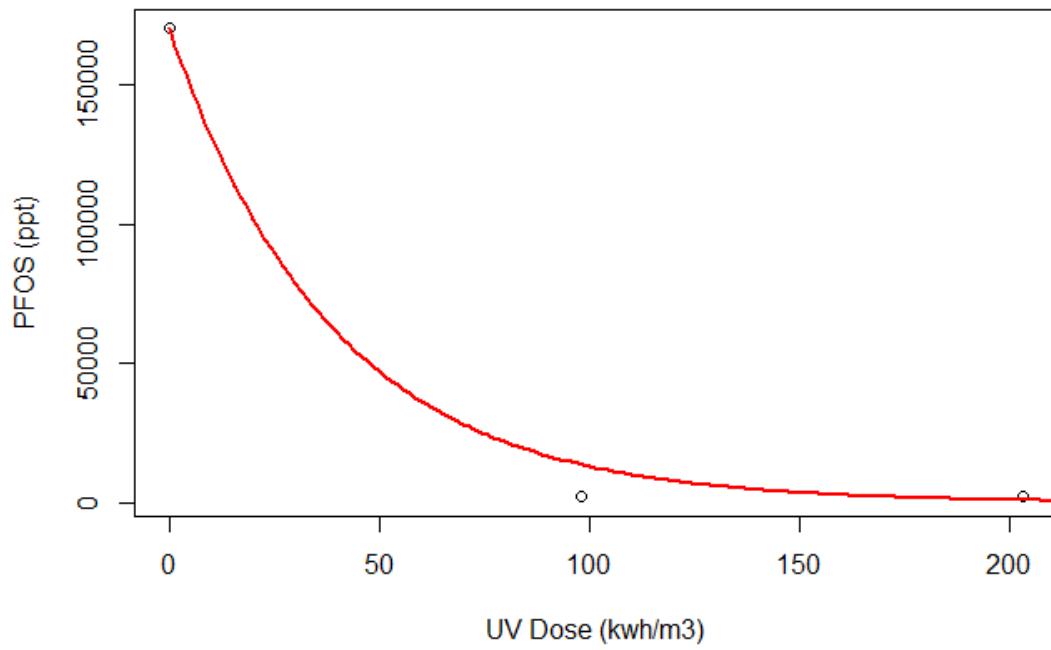
NAS Jax GW PFNA



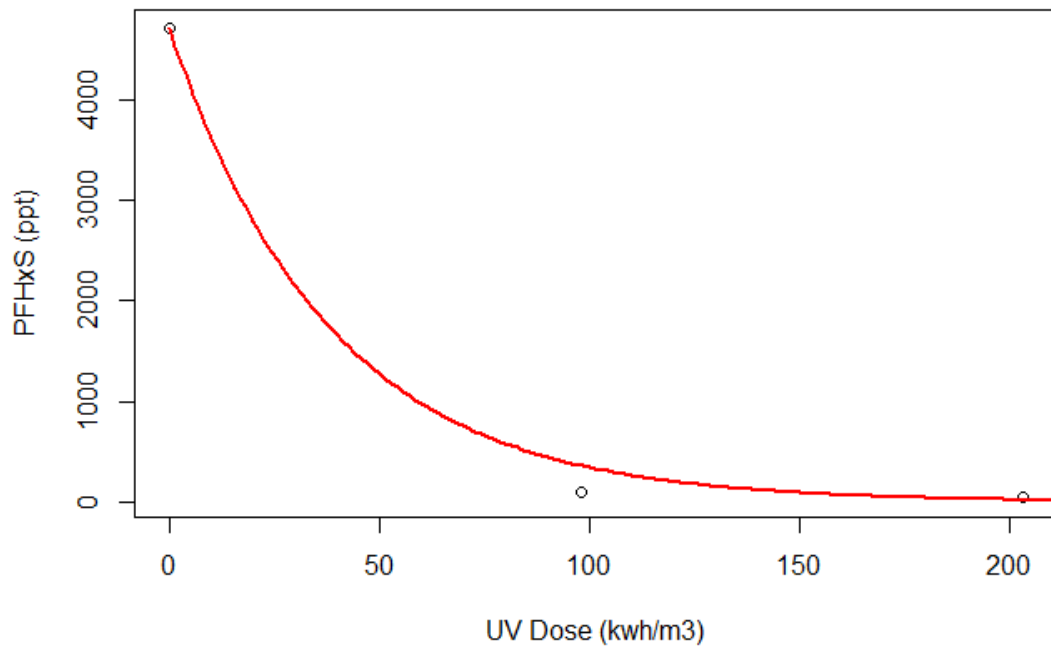
NAS Jax GW PFOA



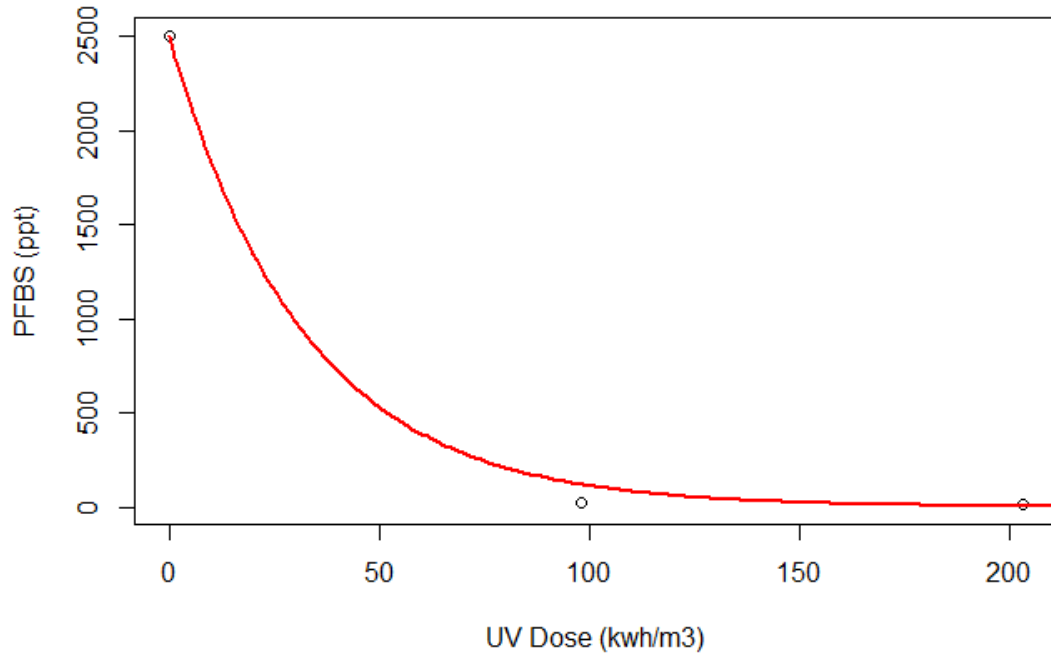
NAS Jax GW PFOS



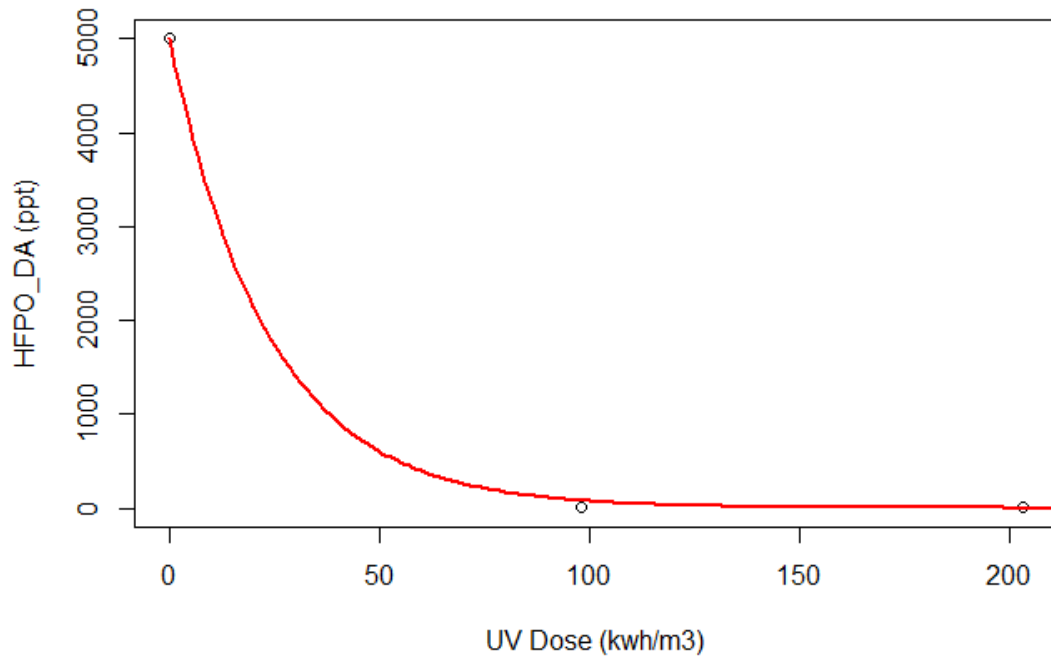
NAS Jax GW PFHxS



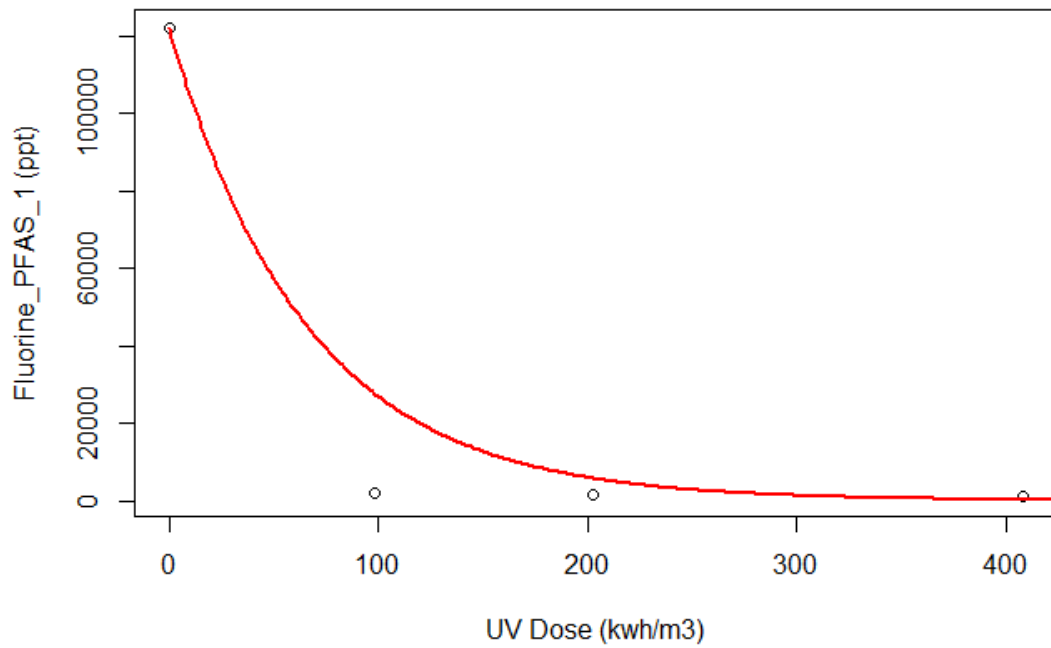
NAS Jax GW PFBS



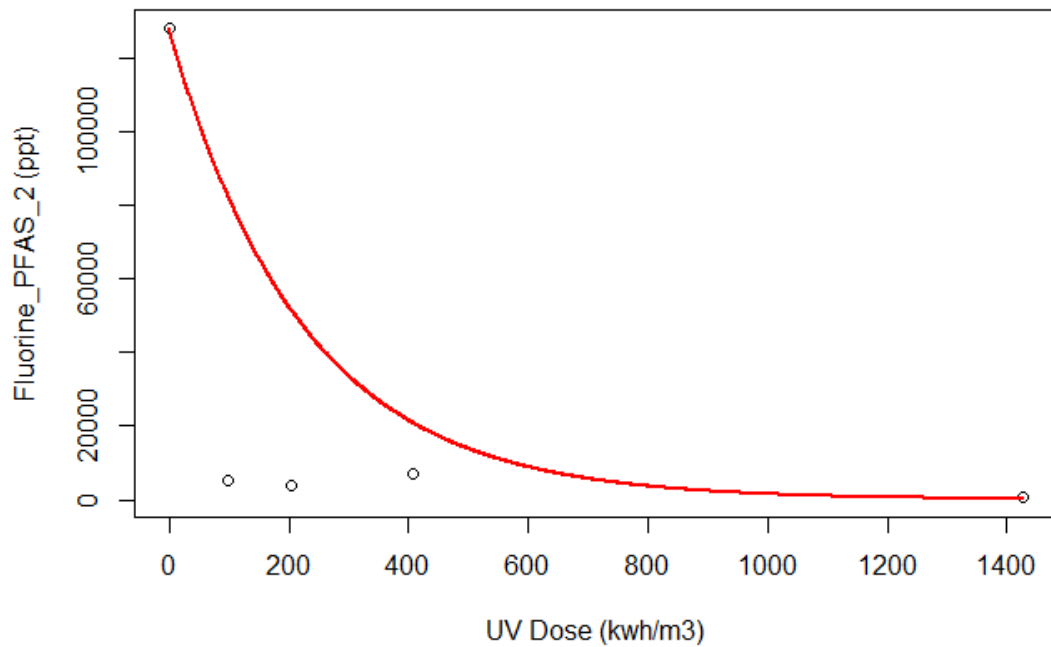
NAS Jax GW HFPO_DA



NAS Jax GW Fluorine_PFAS_1



NAS Jax GW Fluorine_PFAS_2



```
fit_Paras_PFAS_Bench_0[, EEO:=-log(10)/Para_k]  
fit_Paras_PFAS_Bench_0
```

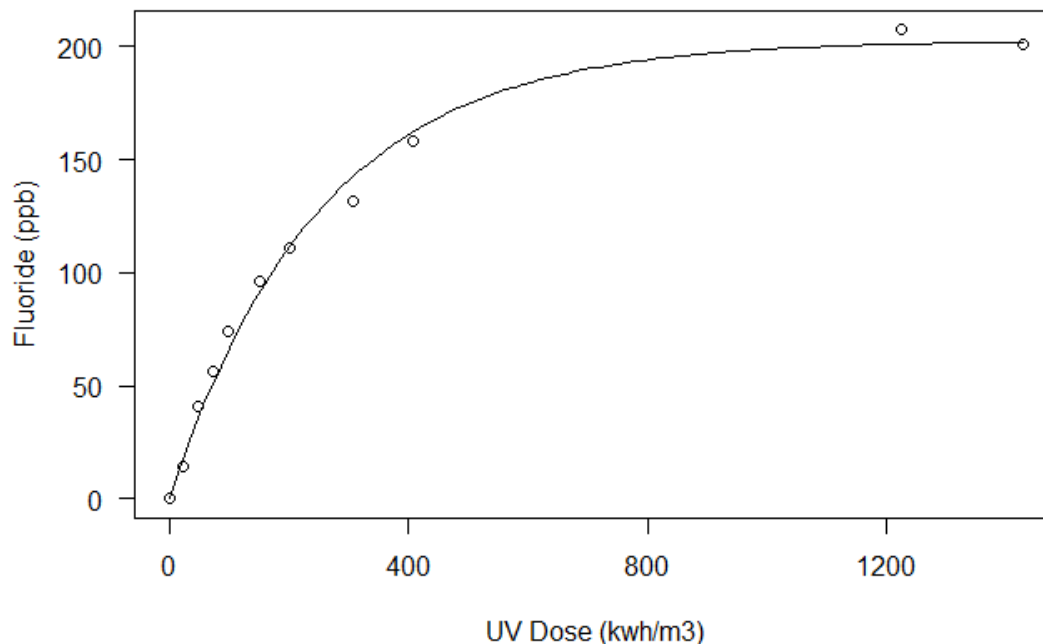
```

write.csv(fit_Paras_PFAS_Bench_0, "C://Temp/Analysis_updated\\Output_fit_Paras_NAX_Jax_PFAS_over0_Bench_0.csv", row.names=FALSE)
write.csv(Simulated_PFAS_Bench_0, "C://Temp/Analysis_updated\\Output_Simulated-PFAS_NAX_Jax_PFAS_over0_Bench_0.csv", row.names=FALSE)

DT_Fluoride=DT_Fluoride[UV.Dose!="NA"]
data = DT_Fluoride
x=data$UV.Dose
y=data$Fluoride
model <- drm(y ~ x, fct = DRC.negExp())
#plot(model, xlab="EEO (kwh/m3)", ylab="Fluoride (ppb)", log="", main = "Negative Exponential Regression")
plot(model, xlab="UV Dose (kwh/m3)", ylab="Fluoride (ppb)", log="")
title(main = paste("NAS Jax GW Scaleup Testing"))

```

NAS Jax GW Scaleup Testing



```

x_fit=seq(from=min(x),to=max(x),length.out=1000)
#use the model to predict the y-values based on the x-values
y_fit=model$fit$par[1]*(1-exp(-model$fit$par[2]*x_fit))

Simulated_fluoride$UV.Dose=x_fit
Simulated_fluoride$Simulated_Fluoride=y_fit

fit_Paras_Fluoride[1,1]=summary(model)$coefficients[1,1]

```

```

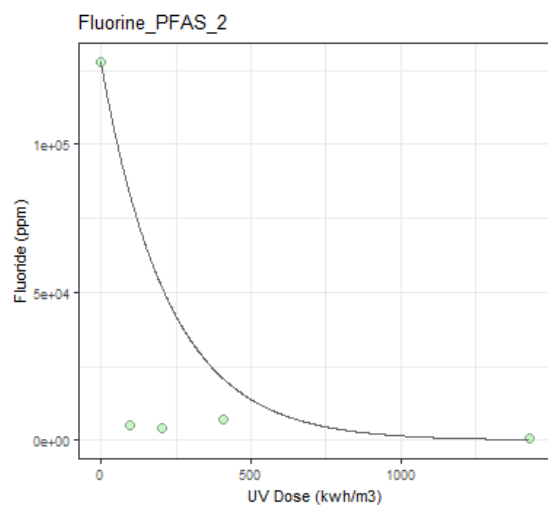
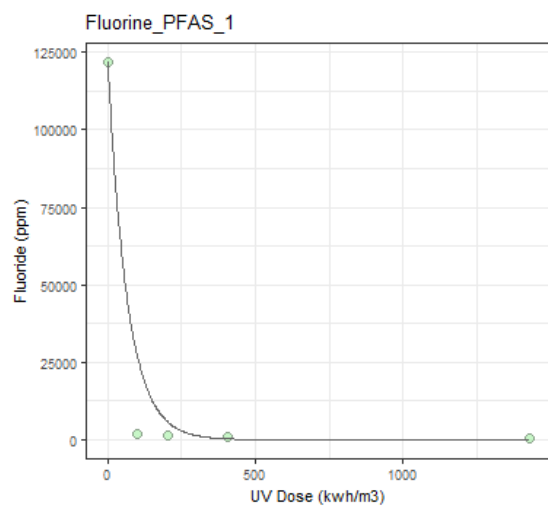
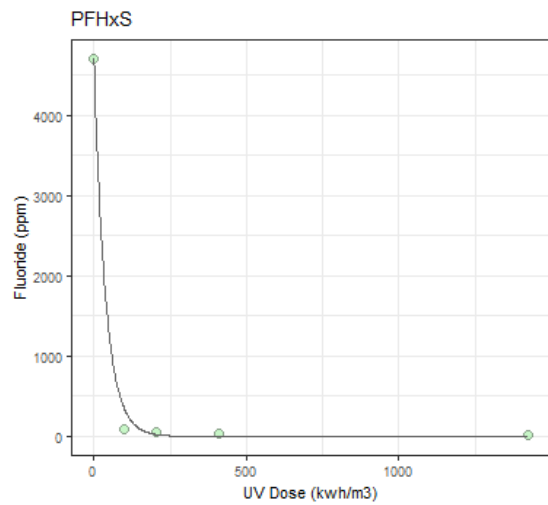
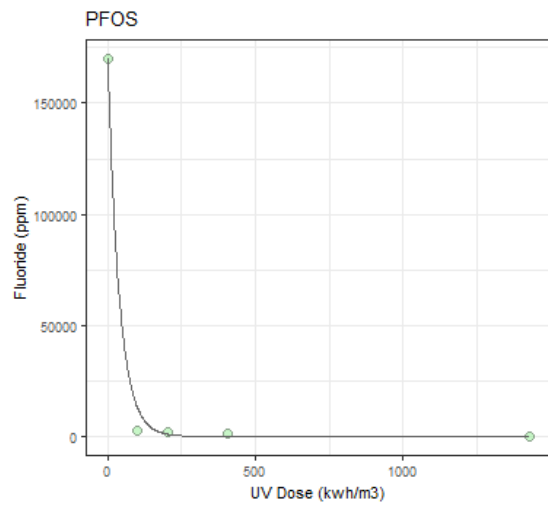
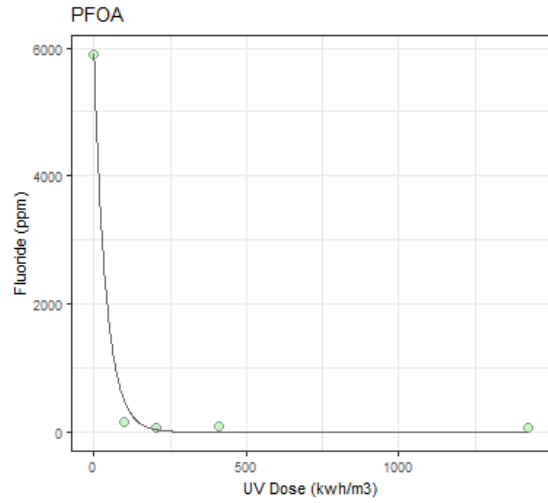
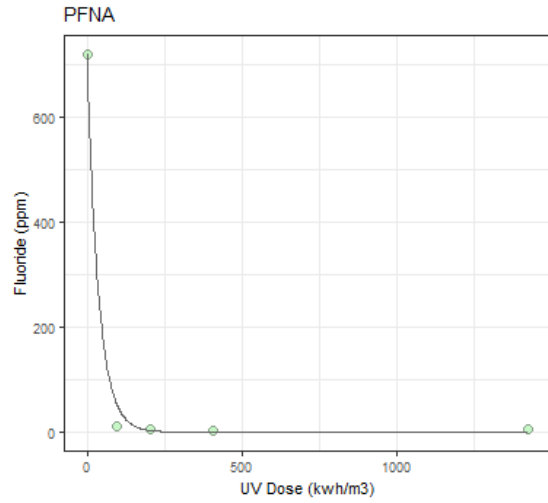
fit_Paras_Fluoride[1,2]=summary(model)$coefficients[2,1]
fit_Paras_Fluoride[1,3]=summary(model)$coefficients[1,4]
fit_Paras_Fluoride[1,4]=summary(model)$coefficients[2,4]
fit_Paras_Fluoride[, EE0:=log(10)/model$fit$par[2]]
fit_Paras_Fluoride

write.csv(fit_Paras_Fluoride, "C://Temp/Analysis_updated\\Output_NAX_G
W_fit_Paras_fluoride.csv", row.names=FALSE)
write.csv(Simulated_fluoride, "C://Temp/Analysis_updated\\Output_NAX_G
W_Simulated_fluoride.csv", row.names=FALSE)

Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.
4.0.
i Please use `linewidth` instead.
This warning is displayed once every 8 hours.
Call `lifecycle::last_lifecycle_warnings()` to see where this warning
was
generated.

Warning: Removed 1 rows containing missing values (`geom_point()`).
Removed 1 rows containing missing values (`geom_point()`).
Removed 1 rows containing missing values (`geom_point()`).
Removed 1 rows containing missing values (`geom_point()`).
Removed 1 rows containing missing values (`geom_point()`).
Removed 1 rows containing missing values (`geom_point()`).

```



Code - ER21-EO-7569 Treatability Fluoride Analysis

Meng Wang

July 19th, 2023

Goal

Fit fluoride production by $F = F_{max} * [1 - \exp(-kX)]$

Packages

```
library(data.table)
library(lfe)
library(ggplot2)
library(ggrepel)
library(aomisc)
library("cowplot")
```

Prepare the data for the analysis

First, load the input data

```
setwd("C://Users/wangm/Enspired/Client - General/007 Department of Defense/007A2022 ESTCP ER21-EO-7569/Reports/Draft Reports/final report/Draft 1/Analysis")
#here is a directory to the code
#Load the data
DT_Fluoride = data.table(read.csv("Treatability_Fluoride.csv"))
```

Second, create table to export fitted data

```
#Table for fitted parameters
fit_Paras=unique(DT_Fluoride[,.(ID, Site)])
N=nrow(fit_Paras)
fit_Paras = data.table(ID=fit_Paras$ID, Site=fit_Paras$Site, Para_max = rep(0, each = N), Para_k = rep(0, each = N), Para_max_pvalue = rep(0, each = N), Para_k_pvalue = rep(0, each = N))
fit_Paras = fit_Paras[order(ID)]

#Table for simulated data
Simulated_fluoride=data.table(UV.Dose_1 =rep(0, each=1000),UV.Dose_2 = rep(0, each=1000),UV.Dose_3 =rep(0, each=1000),UV.Dose_4 =rep(0, each=1000), UV.Dose_5 =rep(0, each=1000),UV.Dose_6 =rep(0, each=1000),ID_1 = rep(0, each=1000), ID_2 = rep(0, each=1000), ID_3 = rep(0, each=1000), ID_4 = rep(0, each=1000), ID_5 = rep(0, each=1000), ID_6 = rep(0, each=1000) )
```

Third, fit PFAS data by $PFAS = PFAS_0 * \exp(-BT)$

```

for (i in 1:N) {
data = DT_Fluoride[ID==(i)]
x=data$UV.Dose
y=data$Value
model <- drm(y ~ x, fct = DRC.negExp())
plot(model, xlab="UV Dose (kwh/m3)", ylab="Fluoride (ppb)", log="")
title(main = paste(data$Site[1]))

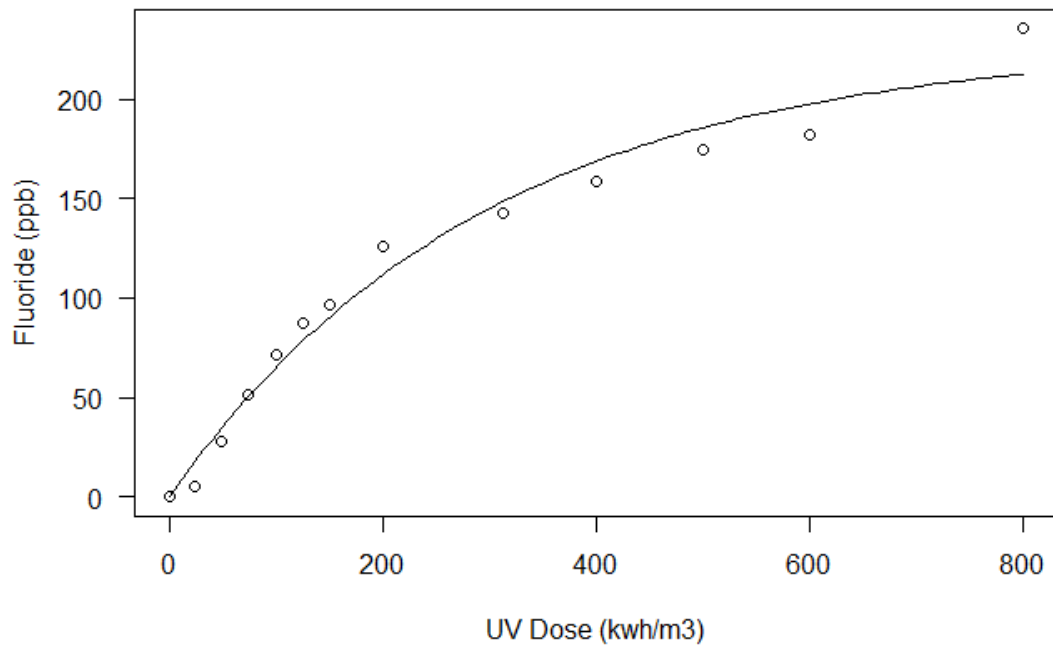
x_fit=seq(from=min(x),to=max(x),length.out=1000)
#use the model to predict the y-values based on the x-values
y_fit=model$fit$par[1]*(1-exp(-model$fit$par[2]*x_fit))

fit_Paras$Para_max[i]=summary(model)$coefficients[1,1]
fit_Paras$Para_max_pvalue[i]=summary(model)$coefficients[1,4]
fit_Paras$Para_k[i]=summary(model)$coefficients[2,1]
fit_Paras$Para_k_pvalue[i]=summary(model)$coefficients[2,4]

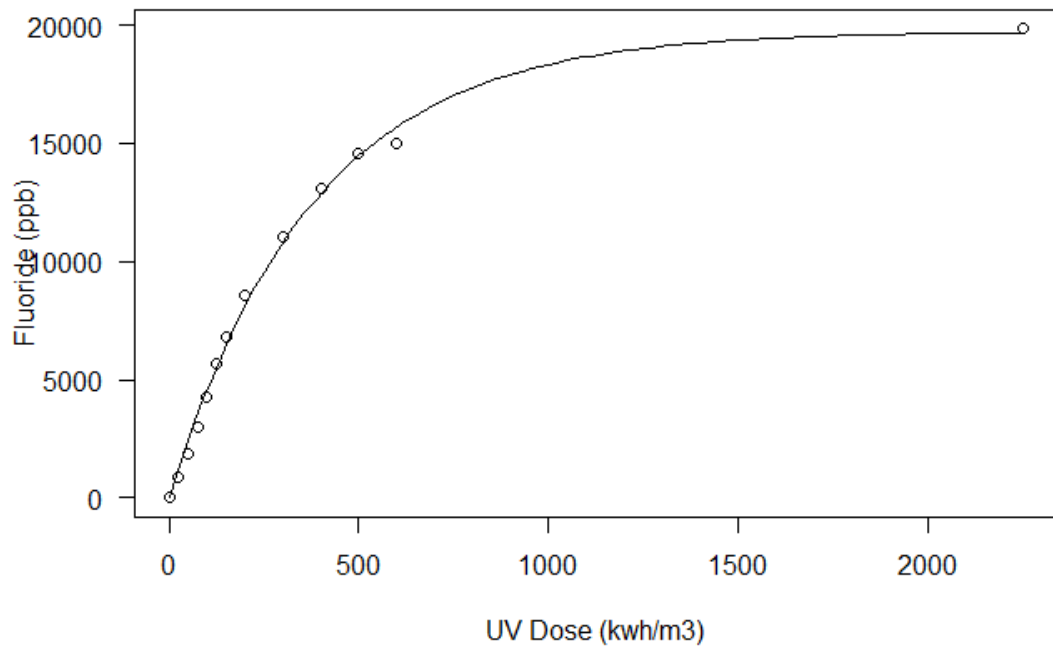
Simulated_fluoride[, i]=x_fit
Simulated_fluoride[, i+6]=y_fit
}

```

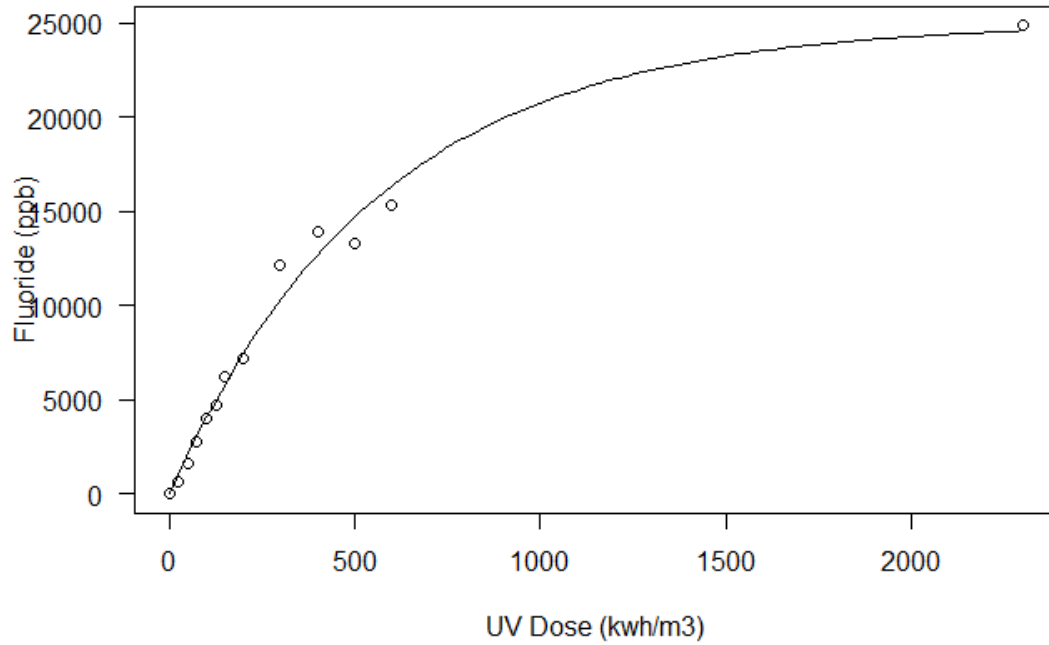

NAS Jax Raw Groundwater



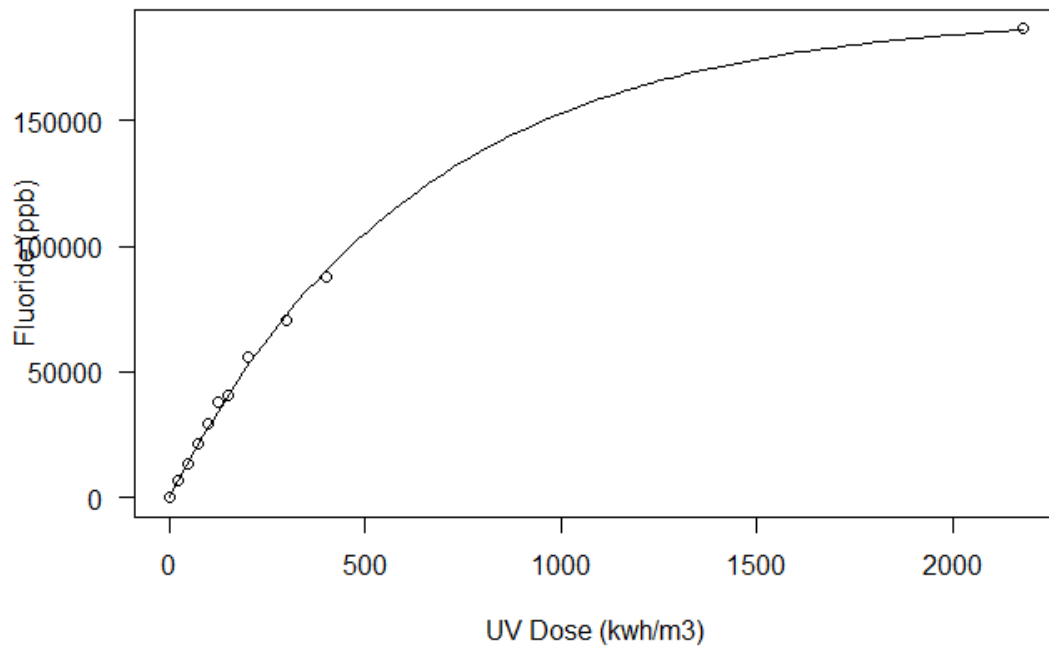
NAS Oceana Groundwater Foam Fractionate



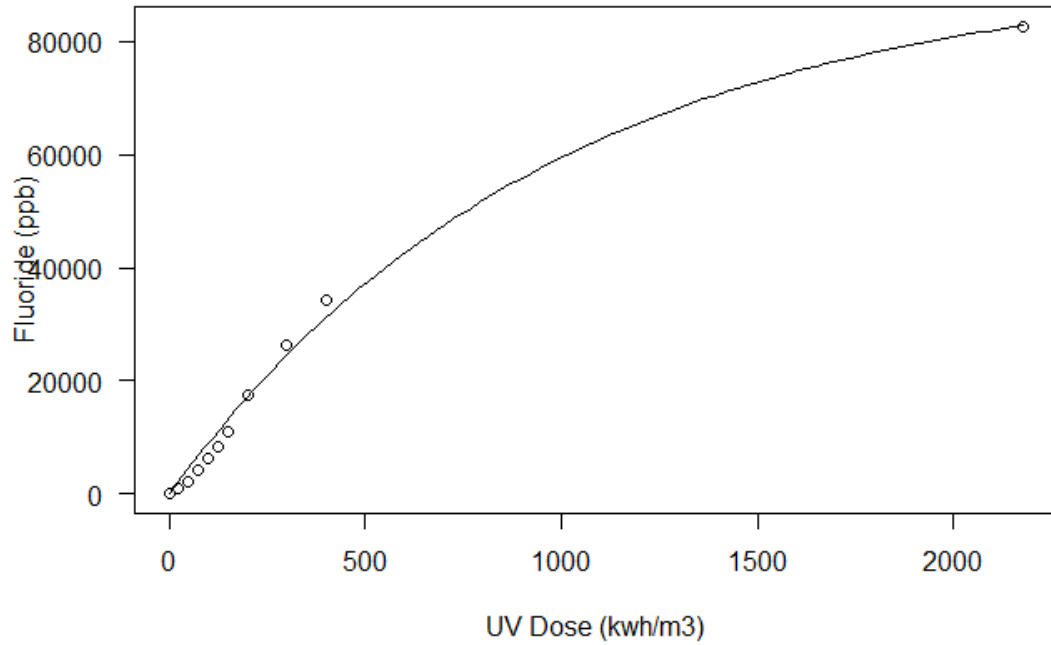
Tyndall AFB Fire Truck Rinsate



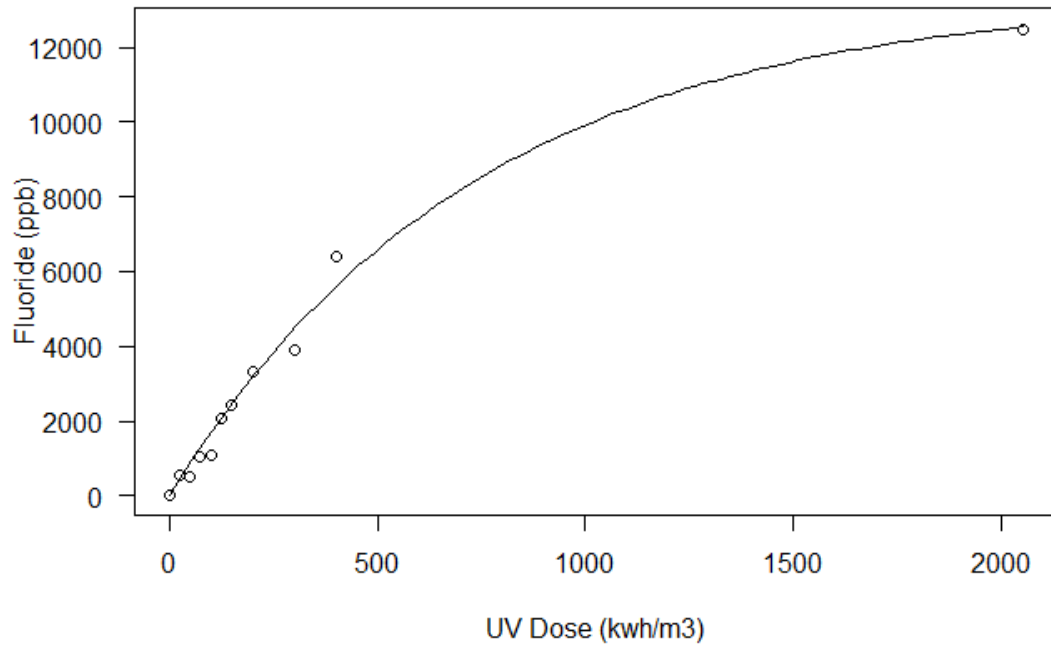
3M Lightwater 6% Concentrate AFFF (10x diluted)



Ansulite AFFF (10x diluted)



NAS Willow Grove IX Still Bottoms (10x diluted)



```
fit_Paras[, EEO:=log(10)/Para_k]  
fit_Paras
```

```
write.csv(fit_Paras, "C://Users/wangm/Enspired/Client - General/007 Department of Defense/007A2022 ESTCP ER21-E0-7569/Reports/Draft Reports/final report/Draft 1/Analysis\\Output_fit_Paras_Treatability_Fluoride.csv", row.names=FALSE)
write.csv(Simulated_fluoride, "C://Users/wangm/Enspired/Client - General/007 Department of Defense/007A2022 ESTCP ER21-E0-7569/Reports/Draft Reports/final report/Draft 1/Analysis\\Output_Simulated_Treatability_Fluoride.csv", row.names=FALSE)
```

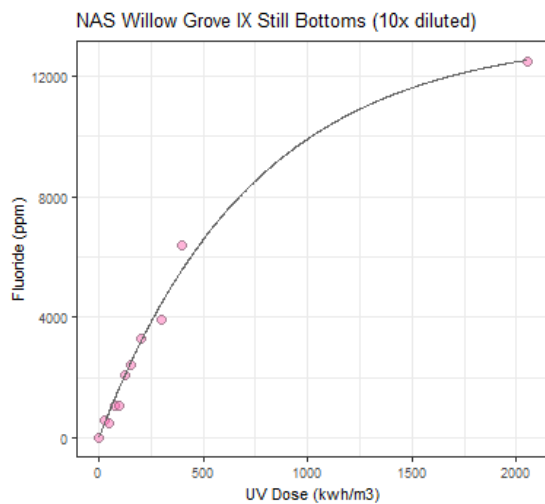
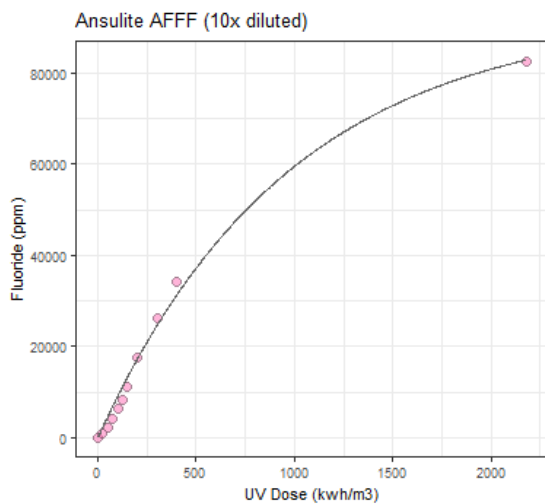
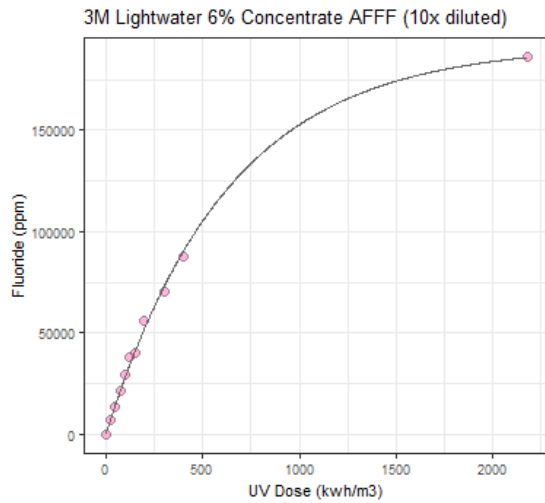
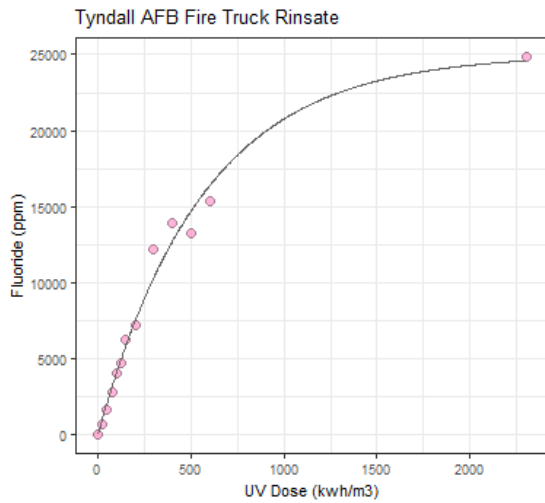
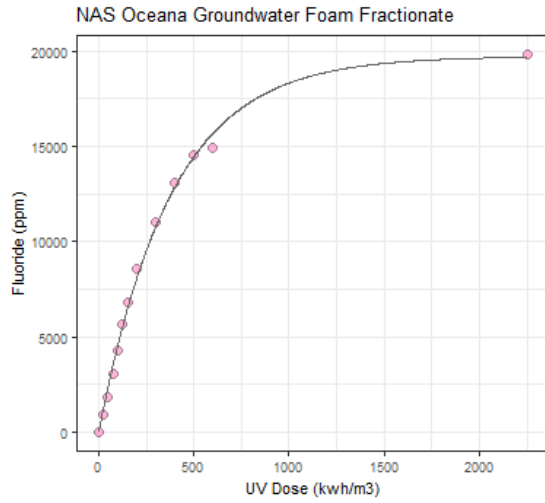
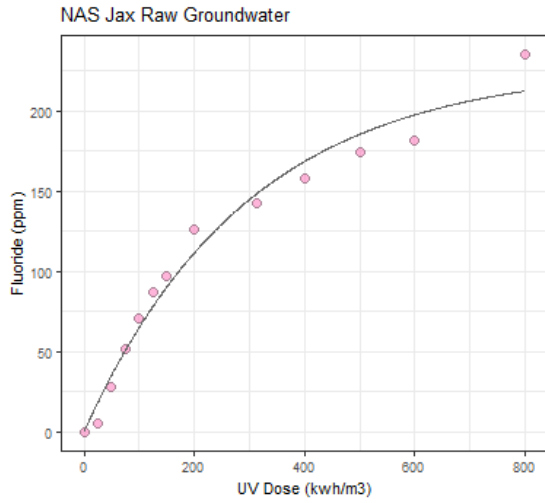
Forth, plot all fluoride points with fitted curve

```
Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.
```

```
! Please use `linewidth` instead.
```

```
This warning is displayed once every 8 hours.
```

```
Call `lifecycle::last_lifecycle_warnings()` to see where this warning was generated.
```



APPENDIX E. CTAB QUANTIFICATION METHOD

CTAB Quantification Method

Quantification of CTAB was performed according to a method reported by Mondal et. al.).¹ To measure the concentration of CTAB in a sample, 1 mL of sample was combined with 1 mL of chloroform (ethanol-free, 99+%, stab. With ca 50 ppm amylene, Thermo Scientific, Waltham, MA) and 250 μ L of 0.4 mM Orange II dye (pure, certified, Thermo Scientific, Waltham, MA). The mixture was vortexed to combine, then allowed to settle so the aqueous and organic phases could separate. The presence of CTAB in the sample causes migration of the Orange II dye into the organic phase. The aqueous phase was removed using a pipette and discarded. The UV-Vis spectrum of the organic phase was measured using a NanoDrop 1000 Spectrophotometer (Thermo Scientific, Waltham, MA) blanked with chloroform. The absorbance of the organic phase at 485 nm (absorbance peak for Orange II dye) was measured and compared to an external calibration curve (LOD = 0.100 mg/L) that was generated by performing extractions of known concentrations of CTAB.

- (1) Mondal, B.; Adak, A.; Datta, P. Effect of Operating Conditions and Interfering Substances on Photochemical Degradation of a Cationic Surfactant. *Environmental Technology (United Kingdom)* **2018**, *39* (21), 2771–2780. <https://doi.org/10.1080/09593330.2017.1365943>.

APPENDIX F. LABORATORY ANALYTICAL REPORT



ANALYTICAL REPORT

PREPARED FOR

Attn: Suzanne Witt
Enspired Solutions
9047 West Scenic Lake Dr
Laingsburg, Michigan 48848

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JOB DESCRIPTION

PFAS PRD Destruction Technology

JOB NUMBER

320-93078-1

Job Notes

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Authorization



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12/12/2022 2:30:24 PM

Authorized for release by
Laura Turpen, Project Manager I
Laura.Turpen@et.eurofinsus.com
(916)374-4414



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Definitions/Glossary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
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

Case Narrative

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-1

Job ID: 320-93078-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative 320-93078-1

Comments

No additional comments.

Receipt

The samples were received on 10/11/2022 10:22 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 20.5° C.

Receipt Exceptions

The following samples were received at the laboratory outside the required temperature criteria: NAS_J_t0 (320-93078-1), NAS_O_t0 (320-93078-2), ANG_1_t0 (320-93078-3), ANG_5_t0 (320-93078-4) and NAS_WG_t0 (320-93078-5) at 20.5C. There was only 1 bag of water indicating that any ice melted in route to lab. The COC was relinquished on 10/6/22 but the samples were not received until 10/11/22.

TOPS assay results are provided as job 320-93078-3; Fluoride results are provided as job 320-93078-2.

LCMS

Method ELLE SOP: Reporting limits were raised for the following samples due to interference from the sample matrix: NAS_O_t0 (320-93078-2), ANG_1_t0 (320-93078-3), ANG_5_t0 (320-93078-4) and NAS_WG_t0 (320-93078-5).

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

Organic Prep

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

Detection Summary

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-1

Client Sample ID: NAS_J_t0

Lab Sample ID: 320-93078-1

No Detections.

Client Sample ID: NAS_O_t0

Lab Sample ID: 320-93078-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Fluorine (TF)	3700		2500		ug/L	1		ELLE SOP	Total/NA

Client Sample ID: ANG_1_t0

Lab Sample ID: 320-93078-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Fluorine (TF)	1200000		500000		ug/L	1		ELLE SOP	Total/NA

Client Sample ID: ANG_5_t0

Lab Sample ID: 320-93078-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Fluorine (TF)	960000		500000		ug/L	1		ELLE SOP	Total/NA

Client Sample ID: NAS_WG_t0

Lab Sample ID: 320-93078-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Fluorine (TF)	66000		50000		ug/L	1		ELLE SOP	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-1

Client Sample ID: NAS_J_t0

Date Collected: 10/06/22 09:35

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-1

Matrix: Water

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	ND		500		ug/L		11/17/22 14:29	11/17/22 17:44	1

Client Sample ID: NAS_O_t0

Date Collected: 10/06/22 09:40

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-2

Matrix: Water

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	3700		2500		ug/L		11/30/22 12:09	12/01/22 14:11	1

Client Sample ID: ANG_1_t0

Date Collected: 10/06/22 09:45

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-3

Matrix: AFFF

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	1200000		500000		ug/L		11/30/22 12:09	12/01/22 14:47	1

Client Sample ID: ANG_5_t0

Date Collected: 10/06/22 09:50

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-4

Matrix: AFFF

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	960000		500000		ug/L		11/30/22 12:09	12/01/22 15:22	1

Client Sample ID: NAS_WG_t0

Date Collected: 10/06/22 09:55

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-5

Matrix: Water

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	66000		50000		ug/L		11/30/22 12:09	12/01/22 15:57	1

QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-1

Method: ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Lab Sample ID: MB 410-318736/1-A
Matrix: Water
Analysis Batch: 317597

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 318736

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	ND		500		ug/L		11/17/22 14:29	11/17/22 15:23	1

Lab Sample ID: LCS 410-318736/2-A
Matrix: Water
Analysis Batch: 317597

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 318736

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Fluorine (TF)	1010	990		ug/L		98	50 - 150

Lab Sample ID: LCSD 410-318736/3-A
Matrix: Water
Analysis Batch: 317597

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 318736

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Fluorine (TF)	1010	1060		ug/L		105	50 - 150	7	20

Lab Sample ID: MB 410-322161/1-A
Matrix: Water
Analysis Batch: 322594

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 322161

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	ND		500		ug/L		11/30/22 12:09	11/30/22 19:10	1

Lab Sample ID: LCS 410-322161/2-A
Matrix: Water
Analysis Batch: 322594

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 322161

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Fluorine (TF)	1010	972		ug/L		96	50 - 150

Lab Sample ID: LCSD 410-322161/3-A
Matrix: Water
Analysis Batch: 322594

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 322161

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Fluorine (TF)	1010	1000		ug/L		99	50 - 150	3	20

QC Association Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-1

LCMS

Analysis Batch: 317597

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-93078-1	NAS_J_t0	Total/NA	Water	ELLE SOP	318736
MB 410-318736/1-A	Method Blank	Total/NA	Water	ELLE SOP	318736
LCS 410-318736/2-A	Lab Control Sample	Total/NA	Water	ELLE SOP	318736
LCSD 410-318736/3-A	Lab Control Sample Dup	Total/NA	Water	ELLE SOP	318736

Prep Batch: 318736

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-93078-1	NAS_J_t0	Total/NA	Water	CIC Prep	
MB 410-318736/1-A	Method Blank	Total/NA	Water	CIC Prep	
LCS 410-318736/2-A	Lab Control Sample	Total/NA	Water	CIC Prep	
LCSD 410-318736/3-A	Lab Control Sample Dup	Total/NA	Water	CIC Prep	

Prep Batch: 322161

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-93078-2	NAS_O_t0	Total/NA	Water	CIC Prep	
320-93078-3	ANG_1_t0	Total/NA	AFFF	CIC Prep	
320-93078-4	ANG_5_t0	Total/NA	AFFF	CIC Prep	
320-93078-5	NAS_WG_t0	Total/NA	Water	CIC Prep	
MB 410-322161/1-A	Method Blank	Total/NA	Water	CIC Prep	
LCS 410-322161/2-A	Lab Control Sample	Total/NA	Water	CIC Prep	
LCSD 410-322161/3-A	Lab Control Sample Dup	Total/NA	Water	CIC Prep	

Analysis Batch: 322594

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-93078-2	NAS_O_t0	Total/NA	Water	ELLE SOP	322161
320-93078-3	ANG_1_t0	Total/NA	AFFF	ELLE SOP	322161
320-93078-4	ANG_5_t0	Total/NA	AFFF	ELLE SOP	322161
320-93078-5	NAS_WG_t0	Total/NA	Water	ELLE SOP	322161
MB 410-322161/1-A	Method Blank	Total/NA	Water	ELLE SOP	322161
LCS 410-322161/2-A	Lab Control Sample	Total/NA	Water	ELLE SOP	322161
LCSD 410-322161/3-A	Lab Control Sample Dup	Total/NA	Water	ELLE SOP	322161

Lab Chronicle

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-1

Client Sample ID: NAS_J_t0

Date Collected: 10/06/22 09:35

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	318736	11/17/22 14:29	F9DU	ELLE
Total/NA	Analysis	ELLE SOP		1			317597	11/17/22 17:44	F9DU	ELLE

Client Sample ID: NAS_O_t0

Date Collected: 10/06/22 09:40

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	CIC Prep			0.04 g	0.2 mL	322161	11/30/22 12:09	URGB	ELLE
Total/NA	Analysis	ELLE SOP		1			322594	12/01/22 14:11	URGB	ELLE

Client Sample ID: ANG_1_t0

Date Collected: 10/06/22 09:45

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-3

Matrix: AFFF

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	CIC Prep			0.0002 g	0.2 mL	322161	11/30/22 12:09	URGB	ELLE
Total/NA	Analysis	ELLE SOP		1			322594	12/01/22 14:47	URGB	ELLE

Client Sample ID: ANG_5_t0

Date Collected: 10/06/22 09:50

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-4

Matrix: AFFF

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	CIC Prep			0.0002 g	0.2 mL	322161	11/30/22 12:09	URGB	ELLE
Total/NA	Analysis	ELLE SOP		1			322594	12/01/22 15:22	URGB	ELLE

Client Sample ID: NAS_WG_t0

Date Collected: 10/06/22 09:55

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	CIC Prep			0.002 g	0.2 mL	322161	11/30/22 12:09	URGB	ELLE
Total/NA	Analysis	ELLE SOP		1			322594	12/01/22 15:57	URGB	ELLE

Laboratory References:

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

Accreditation/Certification Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-1

Laboratory: Eurofins Lancaster Laboratories Environment Testing, 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
A2LA	Dept. of Defense ELAP	0001.01	11-30-24
A2LA	ISO/IEC 17025	0001.01	11-30-24
Alaska	State	PA00009	07-01-23
Alaska (UST)	State	17-027	02-28-23
Arizona	State	AZ0780	03-12-23
Arkansas DEQ	State	88-00660	08-09-23
California	State	2792	11-30-22 *
Colorado	State	PA00009	06-30-23
Connecticut	State	PH-0746	06-30-23
DE Haz. Subst. Cleanup Act (HSCA)	State	019-006 (PA cert)	01-31-23
Delaware (DW)	State	N/A	01-31-23
Florida	NELAP	E87997	06-30-23
Georgia (DW)	State	C048	01-31-23
Hawaii	State	N/A	01-31-23
Illinois	NELAP	200027	01-31-23
Iowa	State	361	03-01-24
Kansas	NELAP	E-10151	10-31-22 *
Kentucky (DW)	State	KY90088	12-31-22
Kentucky (UST)	State	0001.01	11-30-24
Kentucky (WW)	State	KY90088	12-31-22
Louisiana (All)	NELAP	02055	06-30-23
Maine	State	2019012	03-12-23
Maryland	State	100	06-30-23
Massachusetts	State	M-PA009	06-30-23
Michigan	State	9930	01-31-23
Minnesota	NELAP	042-999-487	12-31-22
Mississippi	State	022	01-31-23
Missouri	State	450	01-31-25
Montana (DW)	State	0098	01-01-23
Montana (UST)	State	<cert No.>	02-01-23
Nebraska	State	NE-OS-32-17	01-31-23
New Hampshire	NELAP	2730	01-10-23
New Jersey	NELAP	PA011	06-30-23
New York	NELAP	10670	04-01-23
North Carolina (DW)	State	42705	07-31-23
North Carolina (WW/SW)	State	521	12-31-22
North Dakota	State	R-205	01-31-23
Oklahoma	NELAP	R-205	08-31-23
Oregon	NELAP	PA200001	09-11-23
PALA	Canada	1978	09-16-24
Pennsylvania	NELAP	36-00037	01-31-23
Rhode Island	State	LAO00338	12-30-22
South Carolina	State	89002	01-31-23
Tennessee	State	02838	01-31-23
Texas	NELAP	T104704194-22-43	08-31-23
USDA	US Federal Programs	P330-19-00197	08-09-23
Vermont	State	VT - 36037	10-28-23
Virginia	NELAP	460182	06-14-23
Washington	State	C457	04-11-23
West Virginia (DW)	State	9906 C	12-31-22

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

Eurofins Sacramento

Accreditation/Certification Summary

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-1

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC (Continued)

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

Authority	Program	Identification Number	Expiration Date
West Virginia DEP	State	055	07-31-23
Wyoming	State	8TMS-L	01-31-23
Wyoming (UST)	A2LA	0001.01	11-30-24

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Method Summary

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-1

Method	Method Description	Protocol	Laboratory
ELLE SOP	Total or Organic Fluorine by Combustion Ion Chromatography	ELLE - Lancaster	ELLE
CIC Prep	Preparation, Fluorine	ELLE - Lancaster	ELLE

Protocol References:

ELLE - Lancaster = Eurofins Lancaster, Facility Standard Operating Procedure.

Laboratory References:

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



Sample Summary

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-93078-1	NAS_J_t0	Water	10/06/22 09:35	10/11/22 10:22
320-93078-2	NAS_O_t0	Water	10/06/22 09:40	10/11/22 10:22
320-93078-3	ANG_1_t0	AFFF	10/06/22 09:45	10/11/22 10:22
320-93078-4	ANG_5_t0	AFFF	10/06/22 09:50	10/11/22 10:22
320-93078-5	NAS_WG_t0	Water	10/06/22 09:55	10/11/22 10:22

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Address: 4942 Dawn St.
Suite 104
East Lansing, MI 48823

Regulatory Program: DW NPDES RCRA Other: SURNAME TOXIC

Company Name: Enspired Solutions
 Address: 4942 Dawn St. Suite 104
 City/State/Zip: East Lansing, MI 48823
 Phone: 937-470-9410
 Fax:
 Project Name: ER21-ED-7569
 Site:
 P O #:

Project Manager: LAURE TURPEN Site Contact: SURNAME TOXIC
 Tel/Email: SURNAME WITH CRISP Date: 10/16/22
LAURE.TURPEN@ENSP.ENV Carrier:

COC No: 1 of 1 COCs
 Sampler:
 For Lab Use Only:
 Walk-in Client:
 Lab Sampling:
 Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Other	Sample Specific Notes
NAS-J-td	10/16/22	9:35	G	water	3	NN	TOP Assay (40 analysis)		see included data sheet
NAS-O-td	10/16/22	9:40	G	water	3	NN	TOP Assay (40 analysis)		
ANG-1-td	10/16/22	9:45	G	APFF	3	NN	TOP Assay (40 analysis)		
ANG-5-td	10/16/22	9:50	G	APFF	3	NN	TOP Assay (40 analysis)		
NAS-WG-td	10/16/22	9:55	G	water	3	NN	TOP Assay (40 analysis)		



Preservation Used: 1=Ice 2=HCl; 3=H2SO4; 4=HNO3; 5=NaOH; 6=Other
 Possible Hazard Identification:
 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
 Non-Hazard Flammable Skin Irritant Poison B Unknown
 Special Instructions/QC Requirements & Comments: Please use MDL values as reporting limits

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return to Client Disposal by Lab Archive for _____ Months
 Cooler Temp. (°C): 20.5 Corrd: W
 Therm ID No.: LOB
 Relinquished by: SURNAME WITT Date/Time: 10-11-22
 Relinquished by: Enspired Solutions Date/Time: 10/12/22 11:00
 Relinquished by: Date/Time:
 Relinquished by: Date/Time:



Sample ID	Approximate total [PFAS] (ppm)	Approximate [Fluoride] (ppm)	Approximate [organic Fluorine] (ppm)	Other known constituents/notes
NAS_J_t0	0.236	0.097	0.169	This is a groundwater sample
NAS_O_t0	81.2	0.433	50	This is the foamate collected from groundwater foam fractionation
ANG_1_t0	3644	202	2337	This is a pure AFFF solution
ANG_5_t0	127	6.36	81	This is a pure AFFF solution
NAS_WG_t0	1053	1.17	702	This is an ion exchange still bottom sample. The regenerate solution was 90%/10%/2% methanol/water/NaCl, and the spent regenerate was distilled to reduce the solution volume by 92%.



Eurofins Sacramento

880 Riverside Parkway
West Sacramento, CA 95605
Phone: 916-373-5600 Fax: 916-372-1059

Chain of Custody Record



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Client Information (Sub Contract Lab)		Sampler	Lab PM: Turpen, Laura		Carrier Tracking No(s):	COC No: 320-287131.1				
Client Contact: Shipping/Receiving		Phone:	E-Mail: Laura.Turpen@et.eurofinsus.com		State of Origin: Michigan	Page: Page 1 of 1				
Company: Eurofins Lancaster Laboratories Environm				Accreditations Required (See note):		Job #: 320-93078-1				
Address: 2425 New Holland Pike,		Due Date Requested: 11/14/2022		Analysis Requested						
City: Lancaster		TAT Requested (days):								
State, Zip: PA, 17601		PC #:								
Phone: 717-656-2300(Tel)		WO #:								
Email:		Project #: 32020425								
Project Name: PFAS PRD Destruction Technology		SSOW#:		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> Preservation Codes: A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Y - Trizma Z - other (specify) </td> <td style="width: 50%; vertical-align: top;"> Other: </td> </tr> </table>				Preservation Codes: A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Y - Trizma Z - other (specify)	Other:	
Preservation Codes: A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Y - Trizma Z - other (specify)	Other:									
Site:		SSOW#:								
Sample Identification - Client ID (Lab ID)		Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, AA=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	CIC_Fluorine/CIC_W_Prep Total Fluorine	Total Number of containers	Special Instructions/Note:
				Preservation Code:						
NAS_J_10 (320-93078-1)		10/6/22	09:35 Eastern		Water		X		1	expect ~0.169ppm
NAS_O_10 (320-93078-2)		10/6/22	09:40 Eastern		Water		X		1	expect ~50ppm
ANG_1_10 (320-93078-3)		10/6/22	09:45 Eastern		Water		X		1	AFFF sample expect ~2337ppm
ANG_5_10 (320-93078-4)		10/6/22	09:50 Eastern		Water		X		1	AFFF sample expect ~81ppm
NAS_WG_10 (320-93078-5)		10/6/22	09:55 Eastern		Water		X		1	expect ~702ppm
<p>Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northern California, LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northern California, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northern California, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Northern California, LLC.</p>										
Possible Hazard Identification					Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)					
Unconfirmed					<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months					
Deliverable Requested: I, II, III, IV, Other (specify)			Primary Deliverable Rank: 2		Special Instructions/QC Requirements:					
Empty Kit Relinquished by:			Date:		Time:		Method of Shipment:			
Relinquished by: <i>[Signature]</i>			Date/Time: 10-12-27 / 16:30		Company: EETSTT		Received by:		Date/Time:	
Relinquished by:			Date/Time:		Company:		Received by:		Date/Time:	
Relinquished by:			Date/Time:		Company:		Received by: Debra A. Bryan		Date/Time: 10-13-22 10:30	
Custody Seals Intact: Δ Yes Δ No		Custody Seal No.:			Cooler Temperature(s) °C and Other Remarks: 3.1					

LM

Login Sample Receipt Checklist

Client: Enspired Solutions

Job Number: 320-93078-1

Login Number: 93078

List Source: Eurofins Sacramento

List Number: 1

Creator: Oropeza, Salvador

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	1845734
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Water present in cooler; indicates evidence of melted ice.
Cooler Temperature is acceptable.	False	Refer to Job Narrative for details.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
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.	False	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Enspired Solutions

Job Number: 320-93078-1

Login Number: 93078

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC

List Number: 2

List Creation: 10/13/22 03:44 PM

Creator: McCaskey, Jonathan

Question	Answer	Comment
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 ($\leq 6^{\circ}\text{C}$, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable ($\leq 6^{\circ}\text{C}$, 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	
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	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace $>6\text{mm}$ in diameter (none, if from WV)?	N/A	

ANALYTICAL REPORT

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600


Laboratory Job ID: 320-93078-2

Client Project/Site: PFAS PRD Destruction Technology

For:

Enspired Solutions
9047 West Scenic Lake Dr
Laingsburg, Michigan 48848

Attn: Meng Wang



Authorized for release by:
10/31/2022 10:06:13 AM

Laura Turpen, Project Manager I
(916)374-4414
Laura.Turpen@et.eurofinsus.com

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results through



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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Definitions/Glossary

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-2

Qualifiers

HPLC/IC

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.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
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

Case Narrative

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-2

Job ID: 320-93078-2

Laboratory: Eurofins Sacramento

Narrative

Job Narrative 320-93078-2

Comments

No additional comments.

Receipt

The samples were received on 10/11/2022 10:22 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 20.5° C.

Receipt Exceptions

The following samples were received at the laboratory outside the required temperature criteria: NAS_J_t0 (320-93078-1), NAS_O_t0 (320-93078-2), ANG_1_t0 (320-93078-3), ANG_5_t0 (320-93078-4) and NAS_WG_t0 (320-93078-5) at 20.5C. There was only 1 bag of water indicating that any ice melted in route to lab. The COC was relinquished on 10/6/22 but the samples were not received until 10/11/22.

General Chemistry

Method 300.0: The following samples in analytical batch 320-625351 were diluted due to the nature of the sample matrix: NAS_J_t0 (320-93078-1), NAS_O_t0 (320-93078-2), ANG_1_t0 (320-93078-3), ANG_5_t0 (320-93078-4) and NAS_WG_t0 (320-93078-5). Elevated reporting limits (RLs) are provided.

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



Detection Summary

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-2

Client Sample ID: NAS_J_t0

Lab Sample ID: 320-93078-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	0.32	J	2.5	0.27	mg/L	5		300.0	Total/NA

Client Sample ID: NAS_O_t0

Lab Sample ID: 320-93078-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	0.55	J	2.5	0.27	mg/L	5		300.0	Total/NA

Client Sample ID: ANG_1_t0

Lab Sample ID: 320-93078-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	140		5.0	0.53	mg/L	10		300.0	Total/NA

Client Sample ID: ANG_5_t0

Lab Sample ID: 320-93078-4

No Detections.

Client Sample ID: NAS_WG_t0

Lab Sample ID: 320-93078-5

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Client Sample Results

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-2

Client Sample ID: NAS_J_t0

Date Collected: 10/06/22 09:35

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-1

Matrix: Water

Method: MCAWW 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.32	J	2.5	0.27	mg/L			10/17/22 14:50	5

Client Sample ID: NAS_O_t0

Date Collected: 10/06/22 09:40

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-2

Matrix: Water

Method: MCAWW 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.55	J	2.5	0.27	mg/L			10/17/22 15:09	5

Client Sample ID: ANG_1_t0

Date Collected: 10/06/22 09:45

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-3

Matrix: AFFF

Method: MCAWW 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	140		5.0	0.53	mg/L			10/17/22 15:29	10

Client Sample ID: ANG_5_t0

Date Collected: 10/06/22 09:50

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-4

Matrix: AFFF

Method: MCAWW 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		2.5	0.27	mg/L			10/17/22 15:48	5

Client Sample ID: NAS_WG_t0

Date Collected: 10/06/22 09:55

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-5

Matrix: Water

Method: MCAWW 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		100	11	mg/L			10/17/22 16:08	200

QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-2

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 320-625351/3
Matrix: Water
Analysis Batch: 625351

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.50	0.053	mg/L			10/17/22 13:51	1

Lab Sample ID: LCS 320-625351/4
Matrix: Water
Analysis Batch: 625351

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	7.50	7.48		mg/L		100	90 - 110

Lab Sample ID: LCSD 320-625351/5
Matrix: Water
Analysis Batch: 625351

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Fluoride	7.50	7.59		mg/L		101	90 - 110	1	10

QC Association Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-2

HPLC/IC

Analysis Batch: 625351

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-93078-1	NAS_J_t0	Total/NA	Water	300.0	
320-93078-2	NAS_O_t0	Total/NA	Water	300.0	
320-93078-3	ANG_1_t0	Total/NA	AFFF	300.0	
320-93078-4	ANG_5_t0	Total/NA	AFFF	300.0	
320-93078-5	NAS_WG_t0	Total/NA	Water	300.0	
MB 320-625351/3	Method Blank	Total/NA	Water	300.0	
LCS 320-625351/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 320-625351/5	Lab Control Sample Dup	Total/NA	Water	300.0	

Lab Chronicle

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-2

Client Sample ID: NAS_J_t0

Date Collected: 10/06/22 09:35

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	10 mL	10 mL	625351	10/17/22 14:50	Y1S	EET SAC

Client Sample ID: NAS_O_t0

Date Collected: 10/06/22 09:40

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	10 mL	10 mL	625351	10/17/22 15:09	Y1S	EET SAC

Client Sample ID: ANG_1_t0

Date Collected: 10/06/22 09:45

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-3

Matrix: AFFF

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	10 mL	10 mL	625351	10/17/22 15:29	Y1S	EET SAC

Client Sample ID: ANG_5_t0

Date Collected: 10/06/22 09:50

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-4

Matrix: AFFF

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	10 mL	10 mL	625351	10/17/22 15:48	Y1S	EET SAC

Client Sample ID: NAS_WG_t0

Date Collected: 10/06/22 09:55

Date Received: 10/11/22 10:22

Lab Sample ID: 320-93078-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	10 mL	10 mL	625351	10/17/22 16:08	Y1S	EET SAC

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-2

Laboratory: Eurofins Sacramento

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 (UST)	State	17-020	02-20-24
ANAB	Dept. of Defense ELAP	L2468	01-20-24
ANAB	Dept. of Energy	L2468.01	01-20-24
ANAB	ISO/IEC 17025	L2468	01-20-24
Arizona	State	AZ0708	08-11-23
Arkansas DEQ	State	88-0691	06-17-22 *
California	State	2897	10-18-22
Colorado	State	CA0004	08-31-23
Florida	NELAP	E87570	06-30-23
Georgia	State	4040	01-30-23
Hawaii	State	<cert No.>	01-29-23
Illinois	NELAP	200060	03-17-24
Kansas	NELAP	E-10375	10-31-22
Louisiana	NELAP	01944	06-30-23
Louisiana (All)	NELAP	01944	06-30-23
Maine	State	CA00004	04-14-24
Michigan	State	9947	01-31-23
Nevada	State	CA00044	07-31-23
New Hampshire	NELAP	2997	04-18-23
New Jersey	NELAP	CA005	06-30-23
New York	NELAP	11666	04-01-23
Ohio	State	41252	01-29-23
Oregon	NELAP	4040	01-29-23
Texas	NELAP	T104704399-19-13	05-31-23
US Fish & Wildlife	US Federal Programs	58448	04-30-23
USDA	US Federal Programs	P330-18-00239	01-23-23
Utah	NELAP	CA000442021-12	02-28-23
Virginia	NELAP	460278	03-14-23
Washington	State	C581	05-05-23
West Virginia (DW)	State	9930C	12-13-22
Wisconsin	State	998204680	08-31-23
Wyoming	State Program	8TMS-L	01-28-19 *

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

Method Summary

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-2

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	EET SAC

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600



Sample Summary

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-93078-1	NAS_J_t0	Water	10/06/22 09:35	10/11/22 10:22
320-93078-2	NAS_O_t0	Water	10/06/22 09:40	10/11/22 10:22
320-93078-3	ANG_1_t0	AFFF	10/06/22 09:45	10/11/22 10:22
320-93078-4	ANG_5_t0	AFFF	10/06/22 09:50	10/11/22 10:22
320-93078-5	NAS_WG_t0	Water	10/06/22 09:55	10/11/22 10:22

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

Address: 4942 Dawn St.
Suite 104
East Lansing, MI 48823

Regulatory Program: DW NPDES RCRA Other:

Company Name: Enspired Solutions
 Address: 4942 Dawn St. Suite 104
 City/State/Zip: East Lansing, MI 48823
 Phone: 937-470-9410
 Fax: _____
 Project Name: ER21-ED-7569
 Site: _____
 P O #: _____

Project Manager: Laura Turpen Site Contact: Suzanne Witt
 Tel/Email: suzanne.witt@enspired.com Date: 10/16/22
 Carrier: _____

COC No: _____ of _____ COCs

Sampler: _____
 For Lab Use Only:
 Walk-in Client: _____
 Lab Sampling: _____
 Job / SDG No.: _____

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Sample Specific Notes:
NAS-J-td	10/16/22	9:35	G	water	3	NN	TOP Assay (40 analysis)	see included data sheet
NAS-O-td	10/16/22	9:40	G	water	3	NN	300.0 Fluoride	
ANG-1-td	10/16/22	9:45	G	APFF	3	NN		
ANG-5-td	10/16/22	9:50	G	APFF	3	NN		
NAS-WG-td	10/16/22	9:55	G	water	3	NN		



320-93078 Chain of Custody

Preservation Used: 1=Ice 2=HCl; 3=H2SO4; 4=HNO3; 5=NaOH; 6=Other _____
 Possible Hazard Identification: _____
 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
 Non-Hazard Flammable Skin Irritant Poison B Unknown
 Special Instructions/QC Requirements & Comments: _____
 Return to Client Disposal by Lab Archive for _____ Months

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Company: Enspired Solutions Therm ID No.: COB
 Date/Time: 10-11-22 Date/Time: 10/22
 Received by: Suzanne Witt Received in Laboratory by: _____
 Date/Time: _____ Date/Time: _____



Sample ID	Approximate total [PFAS] (ppm)	Approximate [Fluoride] (ppm)	Approximate [organic Fluorine] (ppm)	Other known constituents/notes
NAS_J_t0	0.236	0.097	0.169	This is a groundwater sample
NAS_O_t0	81.2	0.433	50	This is the foamate collected from groundwater foam fractionation
ANG_1_t0	3644	202	2337	This is a pure AFFF solution
ANG_5_t0	127	6.36	81	This is a pure AFFF solution
NAS_WG_t0	1053	1.17	702	This is an ion exchange still bottom sample. The regenerate solution was 90%/10%/2% methanol/water/NaCl, and the spent regenerate was distilled to reduce the solution volume by 92%.



Login Sample Receipt Checklist

Client: Enspired Solutions

Job Number: 320-93078-2

Login Number: 93078

List Source: Eurofins Sacramento

List Number: 1

Creator: Oropeza, Salvador

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	1845734
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Water present in cooler; indicates evidence of melted ice.
Cooler Temperature is acceptable.	False	Refer to Job Narrative for details.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
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.	False	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

PREPARED FOR

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Generated 11/7/2023 10:39:56 AM Revision 1

JOB DESCRIPTION

PFAS PRD Destruction Technology

JOB NUMBER

320-93078-3

Job Notes

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The data in the report relate to the field sample(s) as received by the laboratory and associated QC. All results have been reviewed and have been found to be compliant with laboratory and accreditation requirements, with the exception of the noted deviation(s). For questions, please contact the Project Manager.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northern California, LLC Project Manager.

Authorization



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Definitions/Glossary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Qualifiers

LCMS

Qualifier	Qualifier Description
*-	LCS and/or LCSD is outside acceptance limits, low biased.
*+	LCS and/or LCSD is outside acceptance limits, high biased.
*5+	Isotope dilution analyte is outside acceptance limits, high biased.
B	Compound was found in the blank and sample.
H	Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
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

Case Narrative

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Laboratory: Eurofins Sacramento

Narrative

Job Narrative 320-93078-3

Revision

This report and the associated EDD were revised on November 7, 2023 to provide data reported to the MDL. MDL studies have not been performed for TOPS assay, but values for our standard PFAS modified 537 method have been applied. Data did change as a result of this revision.

Receipt

The samples were received on 10/11/2022 10:22 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 20.5° C.

Receipt Exceptions

The following samples were received at the laboratory outside the required temperature criteria: NAS_J_t0 (320-93078-1), NAS_O_t0 (320-93078-2), ANG_1_t0 (320-93078-3), ANG_5_t0 (320-93078-4) and NAS_WG_t0 (320-93078-5). Samples were received out of temp at 20.5C. There was only 1 bag of water. Ice melted in route to lab. Samples were shipped via FedEx Ground not Priority overnight. Ground delays a few days. COC was relinquished on 10/6/22 but samples were not received until 10/11/22.

LCMS

Method 537 (modified): Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the following samples: ANG_1_t0 (320-93078-3) and ANG_5_t0 (320-93078-4). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method 537 (modified): The labeled analyte M2-4:2FTS is converted to PFBA during the oxidation step of the TOP assay. The PFBA result in the Post-Treatment Method Blank (MB) indicates how much of a field sample's Post-Treatment PFBA result is contributed by the Reverse Surrogate, when adjusted for dilution factors.

Method 537 (modified): The labeled analyte M2-4:2FTS is employed in this analysis as a "Reverse Surrogate". It is used to monitor the oxidation efficiency of the TOP assay. This analyte is fortified into all sample fractions prior to any processing. The recovery of this analyte should be 0% in Post-Treatment fractions, indicating complete oxidation of the sample.

NAS_J_t0 (320-93078-1), NAS_O_t0 (320-93078-2), ANG_1_t0 (320-93078-3), ANG_5_t0 (320-93078-4), NAS_WG_t0 (320-93078-5), (LCS 320-625841/2-A), (LCSD 320-625841/3-A), (MB 320-625841/1-A), (LCS 320-625840/2-A), (LCSD 320-625840/3-A) and (MB 320-625840/1-A).

Method 537 (modified): Zero percent recovery of precursor analytes (such as 4:2 FTS, 6:2 FTS, 8:2 FTS, FOSA, NMeFOSAA, NEtFOSAA, etc.) and enhanced recoveries of PFCA is observed in the Post-Treatment Laboratory Control Sample (LCS) and Post-Treatment Laboratory Control Sample Duplicate (LCSD) associated with these samples, consistent with the expected oxidation of precursor analytes. The existing LCS control limits are based upon our historical performance for a set of 24-36 analytes in the LCS solution. We have recently expanded to 70+ analytes. As the LCS solution now contains new/additional precursor analytes we are seeing enhanced recoveries for some PFCA vs. the historical limits as a result. The LCS results are flagged as being high and outside of the established limits for some analytes; however, this is a function of the new analytes in the LCS solution and not indicative of an "out of control" process.

NAS_J_t0 (320-93078-1), NAS_O_t0 (320-93078-2), ANG_1_t0 (320-93078-3), ANG_5_t0 (320-93078-4), NAS_WG_t0 (320-93078-5), (LCS 320-625841/2-A), (LCSD 320-625841/3-A) and (MB 320-625841/1-A)

Method 537 (modified): Results for samples NAS_O_t0 (320-93078-2), ANG_1_t0 (320-93078-3), ANG_5_t0 (320-93078-4) and NAS_WG_t0 (320-93078-5) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits.

Method 537 (modified): The "I" qualifier means the transition mass ratio for Perfluorodecanoic acid (PFDA) was above the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty, and the reported value may have some high bias. However, analyst judgment was used to positively identify the analyte: ANG_5_t0 (320-93078-4).

Method 537 (modified): Perfluorooctanesulfonic acid (PFOS) was detected above the reporting limit (RL) in the method blank associated

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Laboratory: Eurofins Sacramento (Continued)

with preparation batch 320-625840 and analytical batch 320-628774 as well as in the following sample: ANG_5_t0 (320-93078-4) and (MB 320-625840/1-A). Affected sample was re-extracted outside of holding time. Both sets of data have been reported.

Method 537 (modified): The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 320-625840 and analytical batch 320-628774 recovered outside control limits for the following analyte: 5:3 FTCA. This analyte was biased high in the LCS/LCSD and was not detected in the associated samples; therefore, the data have been reported: NAS_J_t0 (320-93078-1), NAS_O_t0 (320-93078-2), ANG_1_t0 (320-93078-3), ANG_5_t0 (320-93078-4), NAS_WG_t0 (320-93078-5), (LCS 320-625840/2-A) and (LCSD 320-625840/3-A).

Method 537 (modified): The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 320-625840 and analytical batch 320-628774 recovered outside control limits for the following analytes: N-ethylperfluorooctane sulfonamide (NEtFOSA) and N-methylperfluorooctane sulfonamide (NMeFOSA). The associated samples were re-prepared outside holding time with concurring results: NAS_J_t0 (320-93078-1), NAS_O_t0 (320-93078-2), ANG_1_t0 (320-93078-3), ANG_5_t0 (320-93078-4), NAS_WG_t0 (320-93078-5), (LCS 320-625840/2-A) and (LCSD 320-625840/3-A). The original set of data have been reported.

Method 537 (modified): The "I" qualifier means the transition mass ratio for 7:3 FTCA was below the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty. However, analyst judgment was used to positively identify the analyte: ANG_5_t0 (320-93078-4).

Method 537 (modified): M2 4:2 FTS was flagged in the following continuing calibration blank (CCB) and continuing calibration verification (CCV) for failing acceptance limits for post-treatment TOPS analysis: (CCB 320-628781/1) and (CCV 320-628781/3). However, this analyte met the method acceptance criteria of 25 - 150% difference.

Method 537 (modified): The method blank for preparation batch 320-625840 and analytical batch 320-628774 contained Perfluorooctanesulfonic acid (PFOS) above the reporting limit (RL). Associated samples were not re-analyzed because results were greater than 10X the value found in the method blank: NAS_J_t0 (320-93078-1), NAS_O_t0 (320-93078-2), ANG_1_t0 (320-93078-3), NAS_WG_t0 (320-93078-5) and (MB 320-625840/1-A).

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

Organic Prep

Method TOP Post Prep: Due to the matrix being foamy, the initial volume used for the following sample deviated from the standard procedure: NAS_J_t0 (320-93078-1). A 500x dilution was made on the sample, then fortified with IDA and extracted. The reporting limits (RLs) have been adjusted proportionately.

Method TOP Post Prep: Due to the matrix being foamy, the initial volume used for the following sample deviated from the standard procedure: NAS_J_t0 (320-93078-1), NAS_O_t0 (320-93078-2) and ANG_5_t0 (320-93078-4). A 5,000x dilution was made on the sample, then fortified with IDA and extracted. The reporting limits (RLs) have been adjusted proportionately.

Method TOP Post Prep: Due to the matrix being foamy, the initial volume used for the following sample deviated from the standard procedure: NAS_O_t0 (320-93078-2) and ANG_5_t0 (320-93078-4). A 5,000,000x dilution was made on the sample, then fortified with IDA and extracted. The reporting limits (RLs) have been adjusted proportionately.

Method TOP Post Prep: Due to the matrix being foamy, the initial volume used for the following sample deviated from the standard procedure: ANG_1_t0 (320-93078-3) and NAS_WG_t0 (320-93078-5). A 50,000x dilution was made on the sample, then fortified with IDA and extracted. The reporting limits (RLs) have been adjusted proportionately.

Method TOP Post Prep: Due to the matrix being foamy, the initial volume used for the following sample deviated from the standard procedure: ANG_1_t0 (320-93078-3) and NAS_WG_t0 (320-93078-5). A 50,000,000x dilution was made on the sample, then fortified with IDA and extracted. The reporting limits (RLs) have been adjusted proportionately.

Method TOP Post Prep: The following samples were re-prepared outside of preparation holding time due to MB hit above reporting limit (RL) and low percent recovery in LCS/LCSD: NAS_J_t0 (320-93078-1), NAS_O_t0 (320-93078-2), ANG_1_t0 (320-93078-3), ANG_5_t0 (320-93078-4) and NAS_WG_t0 (320-93078-5).

Case Narrative

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Job ID: 320-93078-3 (Continued)

Laboratory: Eurofins Sacramento (Continued)

Method TOP Pre - Prep: Due to the matrix being foamy, the initial volume used for the following sample deviated from the standard procedure: NAS_J_t0 (320-93078-1). A 500x dilution was made on the sample, then fortified with IDA and extracted. The reporting limits (RLs) have been adjusted proportionately.

Method TOP Pre - Prep: Due to the matrix being foamy, the initial volume used for the following sample deviated from the standard procedure: NAS_J_t0 (320-93078-1), NAS_O_t0 (320-93078-2) and ANG_5_t0 (320-93078-4). A 5,000x dilution was made on the sample, then fortified with IDA and extracted. The reporting limits (RLs) have been adjusted proportionately.

Method TOP Pre - Prep: Due to the matrix being foamy, the initial volume used for the following sample deviated from the standard procedure: NAS_O_t0 (320-93078-2) and ANG_5_t0 (320-93078-4). A 5,000,000x dilution was made on the sample, then fortified with IDA and extracted. The reporting limits (RLs) have been adjusted proportionately.

Method TOP Pre - Prep: Due to the matrix being foamy, the initial volume used for the following sample deviated from the standard procedure: ANG_1_t0 (320-93078-3) and NAS_WG_t0 (320-93078-5). A 50,000x dilution was made on the sample, then fortified with IDA and extracted. The reporting limits (RLs) have been adjusted proportionately.

Method TOP Pre - Prep: Due to the matrix being foamy, the initial volume used for the following sample deviated from the standard procedure: ANG_1_t0 (320-93078-3) and NAS_WG_t0 (320-93078-5). A 50,000,000x dilution was made on the sample, then fortified with IDA and extracted. The reporting limits (RLs) have been adjusted proportionately.

Method TOP Pre - Prep: The following samples were re-prepared outside of preparation holding time due to MB hit above reporting limit (RL) and low percent recovery in LCS/LCSD: NAS_J_t0 (320-93078-1), NAS_O_t0 (320-93078-2), ANG_1_t0 (320-93078-3), ANG_5_t0 (320-93078-4) and NAS_WG_t0 (320-93078-5).

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

VOA Prep

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

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_J_t0

Lab Sample ID: 320-93078-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoropentanoic acid (PFPeA)	3300		2500	600	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	3000		2500	700	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	2200	J	2500	320	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanoic acid (PFOA)	5900		2500	1100	ng/L	1		537 (modified)	Pre-Treatment
Perfluorononanoic acid (PFNA)	720	J	2500	340	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	4700	B	2500	220	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	480	J	2500	240	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS)	170000	B	2500	400	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonamide (FOSA)	8100		2500	440	ng/L	1		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	7200		6300	3100	ng/L	1		537 (modified)	Pre-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	17000		2500	580	ng/L	1		537 (modified)	Pre-Treatment
5:3 FTCA	870	J**	2500	400	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	29000	B**	6300	3000	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA)	28000	B**	2500	600	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA)	110000	B**	2500	700	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	10000	B**	2500	320	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanoic acid (PFOA)	20000	**	2500	1100	ng/L	1		537 (modified)	Post-Treatment
Perfluorononanoic acid (PFNA)	1700	J**	2500	340	ng/L	1		537 (modified)	Post-Treatment
Perfluorodecanoic acid (PFDA)	480	J**	2500	390	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS)	5900		2500	220	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	520	J	2500	240	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS)	170000		2500	400	ng/L	1		537 (modified)	Post-Treatment
PFBA	29000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	25000				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	110000				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	10000				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	14000				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	180000				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	0.00				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	3300				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	3000				ng/L	1		Total PFCA-Sum	Pre-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_J_t0 (Continued)

Lab Sample ID: 320-93078-1

Analyte	Result	Qualifier	NONE	NONE	Unit	Dil Fac	D	Method	Prep Type
PFHpA	0.00				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	5900				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFNA	0.00				ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	12000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	29000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	28000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	110000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	10000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	20000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFNA	0.00				ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	200000				ng/L	1		Total PFCA-Sum	Post-Treatment

Client Sample ID: NAS_O_t0

Lab Sample ID: 320-93078-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoropentanoic acid (PFPeA)	43000		25000	6000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	180000		25000	7000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	95000		25000	3200	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanoic acid (PFOA)	1900000		25000	11000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorononanoic acid (PFNA)	31000		25000	3400	ng/L	1		537 (modified)	Pre-Treatment
Perfluorodecanoic acid (PFDA)	4600	J	25000	3900	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS)	23000	J	25000	2500	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanesulfonic acid (PFPeS)	85000		25000	3800	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	3800000	B	25000	2200	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	420000		25000	2400	ng/L	1		537 (modified)	Pre-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	500000		25000	5800	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS) - DL	14000000	B	250000	40000	ng/L	10		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS) - DL	6100000		630000	310000	ng/L	10		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	1400000	B **	63000	30000	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA)	2300000	B **	25000	6000	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	520000	B **	25000	3200	ng/L	1		537 (modified)	Post-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_O_t0 (Continued)

Lab Sample ID: 320-93078-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2000000	*+	25000	11000	ng/L	1		537 (modified)	Post-Treatment
Perfluorononanoic acid (PFNA)	59000	*+	25000	3400	ng/L	1		537 (modified)	Post-Treatment
Perfluorodecanoic acid (PFDA)	5200	J**	25000	3900	ng/L	1		537 (modified)	Post-Treatment
Perfluorotetradecanoic acid (PFTeA)	3700	J B	25000	3700	ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS)	25000		25000	2500	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanesulfonic acid (PFPeS)	79000		25000	3800	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS)	3900000		25000	2200	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	410000		25000	2400	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA) - DL	6900000	B**	250000	70000	ng/L	10		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS) - DL	13000000		250000	40000	ng/L	10		537 (modified)	Post-Treatment
PFBA	1400000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	2200000				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	6700000				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	430000				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	120000				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	27000				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	11000000				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	0.00				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	43000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	180000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	95000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	1900000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFNA	31000				ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	2200000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	1400000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	2300000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	6900000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	520000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	2000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFNA	59000				ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	13000000				ng/L	1		Total PFCA-Sum	Post-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: ANG_1_t0

Lab Sample ID: 320-93078-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	21000000		630000	300000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanoic acid (PFPeA)	25000000		250000	60000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	15000000		250000	32000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorodecanoic acid (PFDA)	62000	J	250000	39000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorononanesulfonic acid (PFNS)	2300000		250000	20000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorodecanesulfonic acid (PFDS)	5100000		250000	70000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorododecanesulfonic acid (PFDoS)	530000		250000	120000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonamide (FOSA)	130000	J	250000	44000	ng/L	1		537 (modified)	Pre-Treatment
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	1400000		500000	180000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoro-4-methoxybutanoic acid (PFMBA)	44000	J	250000	35000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoro-3-methoxypropanoic acid (PFMPA)	43000	J	250000	35000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA) - DL	61000000		25000000	7000000	ng/L	100		537 (modified)	Pre-Treatment
Perfluorooctanoic acid (PFOA) - DL	55000000		25000000	11000000	ng/L	100		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS) - DL	89000000		25000000	2500000	ng/L	100		537 (modified)	Pre-Treatment
Perfluoropentanesulfonic acid (PFPeS) - DL	85000000		25000000	3800000	ng/L	100		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS) - DL	430000000	B	25000000	2200000	ng/L	100		537 (modified)	Pre-Treatment
Perfluoroheptanesulfonic acid (PFHpS) - DL	56000000		25000000	2400000	ng/L	100		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS) - DL	3300000000	B	25000000	4000000	ng/L	100		537 (modified)	Pre-Treatment
Perfluorononanoic acid (PFNA)	210000	J**	250000	34000	ng/L	1		537 (modified)	Post-Treatment
Perfluorodecanoic acid (PFDA)	190000	J**	250000	39000	ng/L	1		537 (modified)	Post-Treatment
Perfluorododecanoic acid (PFDoA)	150000	J	250000	70000	ng/L	1		537 (modified)	Post-Treatment
Perfluorononanesulfonic acid (PFNS)	2100000		250000	20000	ng/L	1		537 (modified)	Post-Treatment
Perfluorodecanesulfonic acid (PFDS)	4300000		250000	70000	ng/L	1		537 (modified)	Post-Treatment
Perfluorododecanesulfonic acid (PFDoS)	280000		250000	120000	ng/L	1		537 (modified)	Post-Treatment
11Cl-PF3OUdS	51000	J	250000	40000	ng/L	1		537 (modified)	Post-Treatment
Perfluoro-4-methoxybutanoic acid (PFMBA)	2600000		250000	35000	ng/L	1		537 (modified)	Post-Treatment
Perfluoro-3-methoxypropanoic acid (PFMPA)	2000000	**	250000	35000	ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanoic acid (PFBA) - DL	720000000	B**	63000000	30000000	ng/L	100		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA) - DL	750000000	B**	25000000	6000000	ng/L	100		537 (modified)	Post-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: ANG_1_t0 (Continued)

Lab Sample ID: 320-93078-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA) - DL	2100000000	B **	25000000	7000000	ng/L	100		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA) - DL	590000000	B **	25000000	3200000	ng/L	100		537 (modified)	Post-Treatment
Perfluorooctanoic acid (PFOA) - DL	1100000000	**	25000000	11000000	ng/L	100		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS) - DL	940000000		25000000	2500000	ng/L	100		537 (modified)	Post-Treatment
Perfluoropentanesulfonic acid (PFPeS) - DL	870000000		25000000	3800000	ng/L	100		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS) - DL	3900000000		25000000	2200000	ng/L	100		537 (modified)	Post-Treatment
Perfluoroheptanesulfonic acid (PFHpS) - DL	380000000		25000000	2400000	ng/L	100		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS) - DL	2800000000		25000000	4000000	ng/L	100		537 (modified)	Post-Treatment
PFBA	700000000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	730000000				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	2100000000				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	430000000				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	570000000				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	3600000000				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	210000000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	250000000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	610000000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	150000000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	550000000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFNA	0.00				ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	1800000000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	720000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	750000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	2100000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	590000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	1100000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFNA	0.00				ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	3700000000				ng/L	1		Total PFCA-Sum	Post-Treatment

Client Sample ID: ANG_5_t0

Lab Sample ID: 320-93078-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	370000		63000	30000	ng/L	1		537 (modified)	Pre-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: ANG_5_t0 (Continued)

Lab Sample ID: 320-93078-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoropentanoic acid (PFPeA)	260000		25000	6000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	3600000		25000	7000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	95000		25000	3200	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanoic acid (PFOA)	1300000		25000	11000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorononanoic acid (PFNA)	5600	J	25000	3400	ng/L	1		537 (modified)	Pre-Treatment
Perfluorodecanoic acid (PFDA)	95000	I	25000	3900	ng/L	1		537 (modified)	Pre-Treatment
Perfluorotridecanoic acid (PFTTrDA)	17000	J	25000	16000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorotetradecanoic acid (PFTTeA)	5200	J	25000	3700	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS)	3200	J	25000	2500	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	12000	J B	25000	2200	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS)	120000	B	25000	4000	ng/L	1		537 (modified)	Pre-Treatment
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	230000		25000	3000	ng/L	1		537 (modified)	Pre-Treatment
7:3 FTCA	26000	I	25000	7000	ng/L	1		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS) - DL	12000000		630000	310000	ng/L	10		537 (modified)	Pre-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS) - DL	5100000		250000	58000	ng/L	10		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS) - RE	140000	J H	250000	40000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	640000000	B **	63000000	30000000	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA)	900000000	B **	25000000	6000000	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA)	1700000000	B **	25000000	7000000	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	500000000	B **	25000000	3200000	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanoic acid (PFOA)	650000000	**	25000000	11000000	ng/L	1		537 (modified)	Post-Treatment
Perfluorononanoic acid (PFNA)	47000000	**	25000000	3400000	ng/L	1		537 (modified)	Post-Treatment
Perfluorodecanoic acid (PFDA)	22000000	J **	25000000	3900000	ng/L	1		537 (modified)	Post-Treatment
Perfluorododecanoic acid (PFDoA)	8000000	J	25000000	7000000	ng/L	1		537 (modified)	Post-Treatment
Perfluorotetradecanoic acid (PFTTeA)	4000000	J B	25000000	3700000	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS)	10000000	J	25000000	4000000	ng/L	1		537 (modified)	Post-Treatment
PFBA	640000000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	900000000				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	1700000000				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	500000000				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	650000000				ng/L	1		Total PFCA-Dif	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: ANG_5_t0 (Continued)

Lab Sample ID: 320-93078-4

Analyte	Result	Qualifier	NONE	NONE	Unit	Dil Fac	D	Method	Prep Type
PFNA	47000000				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	4400000000				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	370000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	260000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	3600000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	95000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	1300000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFNA	0.00				ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	5600000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	640000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	900000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	1700000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	500000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	650000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFNA	47000000				ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	4400000000				ng/L	1		Total PFCA-Sum	Post-Treatment

Client Sample ID: NAS_WG_t0

Lab Sample ID: 320-93078-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	810000		630000	300000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanoic acid (PFPeA)	5800000		250000	60000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	24000000		250000	70000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	15000000		250000	32000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorononanoic acid (PFNA)	1400000		250000	34000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorodecanoic acid (PFDA)	750000		250000	39000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS)	12000000		250000	25000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanesulfonic acid (PFPeS)	16000000		250000	38000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	1300000		250000	24000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonamide (FOSA)	370000		250000	44000	ng/L	1		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	2500000		630000	310000	ng/L	1		537 (modified)	Pre-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	2100000		250000	58000	ng/L	1		537 (modified)	Pre-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_WG_t0 (Continued)

Lab Sample ID: 320-93078-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA) - DL	270000000		2500000	1100000	ng/L	10		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS) - DL	59000000	B	2500000	220000	ng/L	10		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS) - DL	95000000	B	2500000	400000	ng/L	10		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	6500000	B **	630000	300000	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA)	12000000	B **	250000	60000	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA)	40000000	B **	250000	70000	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	16000000	B **	250000	32000	ng/L	1		537 (modified)	Post-Treatment
Perfluorononanoic acid (PFNA)	1400000	*+	250000	34000	ng/L	1		537 (modified)	Post-Treatment
Perfluorodecanoic acid (PFDA)	770000	*+	250000	39000	ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS)	12000000		250000	25000	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanesulfonic acid (PFPeS)	15000000		250000	38000	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	1200000		250000	24000	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanoic acid (PFOA) - DL	280000000	*+	2500000	1100000	ng/L	10		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS) - DL	59000000		2500000	220000	ng/L	10		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS) - DL	92000000		2500000	400000	ng/L	10		537 (modified)	Post-Treatment
PFBA	5700000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	5700000				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	16000000				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	490000				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	7500000				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	36000				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	39000000				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	810000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	5800000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	24000000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	15000000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	270000000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFNA	1400000				ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	320000000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	6500000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	12000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	40000000				ng/L	1		Total PFCA-Sum	Post-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_WG_t0 (Continued)

Lab Sample ID: 320-93078-5

Analyte	Result	Qualifier	NONE	NONE	Unit	Dil Fac	D	Method	Prep Type
PFHpA	16000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	280000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFNA	1400000				ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	360000000				ng/L	1		Total PFCA-Sum	Post-Treatment

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

This Detection Summary does not include radiochemical test results.

Total Oxidation Precursors

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

TestAmerica Job ID: 320-93078-3

Client Sample ID: NAS_J_t0

Lab Sample ID: 320-93078-1
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	0.00		ng/L	29000		ng/L	29000	ng/L
Perfluorobutanoic acid (PFBA)	ND		ng/L	29000		ng/L	29000	ng/L
PFPA	3300		ng/L	28000		ng/L	25000	ng/L
Perfluoropentanoic acid (PFPeA)	3300		ng/L	28000		ng/L	25000	ng/L
PFHxA	3000		ng/L	110000		ng/L	110000	ng/L
Perfluorohexanoic acid (PFHxA)	3000		ng/L	110000		ng/L	110000	ng/L
PFHpA	0.00		ng/L	10000		ng/L	10000	ng/L
Perfluoroheptanoic acid (PFHpA)	2200	J	ng/L	10000		ng/L	10000	ng/L
PFOA	5900		ng/L	20000		ng/L	14000	ng/L
Perfluorooctanoic acid (PFOA)	5900		ng/L	20000		ng/L	14000	ng/L
PFNA	0.00		ng/L	0.00		ng/L	0.00	ng/L
Perfluorononanoic acid (PFNA)	720	J	ng/L	1700	J	ng/L	0.00	ng/L
Total PFCA	12000		ng/L	200000		ng/L	180000	ng/L

Client Sample ID: NAS_O_t0

Lab Sample ID: 320-93078-2
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	0.00		ng/L	1400000		ng/L	1400000	ng/L
Perfluorobutanoic acid (PFBA)	ND		ng/L	1400000		ng/L	1400000	ng/L
PFPA	43000		ng/L	2300000		ng/L	2200000	ng/L
Perfluoropentanoic acid (PFPeA)	43000		ng/L	2300000		ng/L	2200000	ng/L
PFHxA	180000		ng/L	6900000		ng/L	6700000	ng/L
Perfluorohexanoic acid (PFHxA)	180000		ng/L	6900000		ng/L	6700000	ng/L
PFHpA	95000		ng/L	520000		ng/L	430000	ng/L
Perfluoroheptanoic acid (PFHpA)	95000		ng/L	520000		ng/L	430000	ng/L
PFOA	1900000		ng/L	2000000		ng/L	120000	ng/L
Perfluorooctanoic acid (PFOA)	1900000		ng/L	2000000		ng/L	120000	ng/L
PFNA	31000		ng/L	59000		ng/L	27000	ng/L
Perfluorononanoic acid (PFNA)	31000		ng/L	59000		ng/L	27000	ng/L
Total PFCA	2200000		ng/L	13000000		ng/L	11000000	ng/L

¹ Difference = Post-Treatment - Pre-Treatment

Total Oxidation Precursors

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

TestAmerica Job ID: 320-93078-3

Client Sample ID: ANG_1_t0

Lab Sample ID: 320-93078-3
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	21000000		ng/L	720000000		ng/L	700000000	ng/L
Perfluorobutanoic acid (PFBA)	21000000		ng/L	720000000		ng/L	700000000	ng/L
PFPA	25000000		ng/L	750000000		ng/L	730000000	ng/L
Perfluoropentanoic acid (PFPeA)	25000000		ng/L	750000000		ng/L	730000000	ng/L
PFHxA	61000000		ng/L	2100000000		ng/L	2100000000	ng/L
Perfluorohexanoic acid (PFHxA)	61000000		ng/L	2100000000		ng/L	2100000000	ng/L
PFHpA	15000000		ng/L	59000000		ng/L	43000000	ng/L
Perfluoroheptanoic acid (PFHpA)	15000000		ng/L	59000000		ng/L	43000000	ng/L
PFOA	55000000		ng/L	110000000		ng/L	57000000	ng/L
Perfluorooctanoic acid (PFOA)	55000000		ng/L	110000000		ng/L	57000000	ng/L
PFNA	0.00		ng/L	0.00		ng/L	0.00	ng/L
Perfluorononanoic acid (PFNA)	ND		ng/L	210000 J		ng/L	0.00	ng/L
Total PFCA	180000000		ng/L	3700000000		ng/L	3600000000	ng/L

Client Sample ID: ANG_5_t0

Lab Sample ID: 320-93078-4
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	370000		ng/L	640000000		ng/L	640000000	ng/L
Perfluorobutanoic acid (PFBA)	370000		ng/L	640000000		ng/L	640000000	ng/L
PFPA	260000		ng/L	900000000		ng/L	900000000	ng/L
Perfluoropentanoic acid (PFPeA)	260000		ng/L	900000000		ng/L	900000000	ng/L
PFHxA	3600000		ng/L	1700000000		ng/L	1700000000	ng/L
Perfluorohexanoic acid (PFHxA)	3600000		ng/L	1700000000		ng/L	1700000000	ng/L
PFHpA	95000		ng/L	500000000		ng/L	500000000	ng/L
Perfluoroheptanoic acid (PFHpA)	95000		ng/L	500000000		ng/L	500000000	ng/L
PFOA	1300000		ng/L	650000000		ng/L	650000000	ng/L
Perfluorooctanoic acid (PFOA)	1300000		ng/L	650000000		ng/L	650000000	ng/L
PFNA	0.00		ng/L	47000000		ng/L	47000000	ng/L
Perfluorononanoic acid (PFNA)	5600 J		ng/L	47000000		ng/L	47000000	ng/L
Total PFCA	5600000		ng/L	4400000000		ng/L	4400000000	ng/L

¹ Difference = Post-Treatment - Pre-Treatment

Total Oxidation Precursors

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

TestAmerica Job ID: 320-93078-3

Client Sample ID: NAS_WG_t0

Lab Sample ID: 320-93078-5
 Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Result	Qualifier	Unit	Result	Qualifier	Unit	Result	Unit
	Total PFCA-Sum			Total PFCA-Sum				
PFBA	810000		ng/L	6500000		ng/L	5700000	ng/L
Perfluorobutanoic acid (PFBA)	810000		ng/L	6500000		ng/L	5700000	ng/L
PFPA	5800000		ng/L	12000000		ng/L	5700000	ng/L
Perfluoropentanoic acid (PFPeA)	5800000		ng/L	12000000		ng/L	5700000	ng/L
PFHxA	24000000		ng/L	40000000		ng/L	16000000	ng/L
Perfluorohexanoic acid (PFHxA)	24000000		ng/L	40000000		ng/L	16000000	ng/L
PFHpA	15000000		ng/L	16000000		ng/L	490000	ng/L
Perfluoroheptanoic acid (PFHpA)	15000000		ng/L	16000000		ng/L	490000	ng/L
PFOA	270000000		ng/L	280000000		ng/L	7500000	ng/L
Perfluorooctanoic acid (PFOA)	270000000		ng/L	280000000		ng/L	7500000	ng/L
PFNA	1400000		ng/L	1400000		ng/L	36000	ng/L
Perfluorononanoic acid (PFNA)	1400000		ng/L	1400000		ng/L	36000	ng/L
Total PFCA	320000000		ng/L	360000000		ng/L	39000000	ng/L

¹ Difference = Post-Treatment - Pre-Treatment

Client Sample Results

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_J_t0

Lab Sample ID: 320-93078-1

Date Collected: 10/06/22 09:35

Matrix: Water

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		6300	3000	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluoropentanoic acid (PFPeA)	3300		2500	600	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluorohexanoic acid (PFHxA)	3000		2500	700	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluoroheptanoic acid (PFHpA)	2200	J	2500	320	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluorooctanoic acid (PFOA)	5900		2500	1100	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluorononanoic acid (PFNA)	720	J	2500	340	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluorodecanoic acid (PFDA)	ND		2500	390	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluoroundecanoic acid (PFUnA)	ND		2500	1400	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluorododecanoic acid (PFDoA)	ND		2500	700	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluorotridecanoic acid (PFTrDA)	ND		2500	1600	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluorotetradecanoic acid (PFTeA)	ND		2500	370	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluorobutanesulfonic acid (PFBS)	ND		2500	250	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2500	380	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluorohexanesulfonic acid (PFHxS)	4700	B	2500	220	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluoroheptanesulfonic acid (PFHpS)	480	J	2500	240	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluorooctanesulfonic acid (PFOS)	170000	B	2500	400	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluorononanesulfonic acid (PFNS)	ND		2500	200	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluorodecanesulfonic acid (PFDS)	ND		2500	700	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluorododecanesulfonic acid (PFDoS)	ND		2500	1200	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluorooctanesulfonamide (FOSA)	8100		2500	440	ng/L		10/18/22 20:59	10/28/22 06:41	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		6300	1500	ng/L		10/18/22 20:59	10/28/22 06:41	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		6300	1600	ng/L		10/18/22 20:59	10/28/22 06:41	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		2500	300	ng/L		10/18/22 20:59	10/28/22 06:41	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	7200		6300	3100	ng/L		10/18/22 20:59	10/28/22 06:41	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	17000		2500	580	ng/L		10/18/22 20:59	10/28/22 06:41	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	*	2500	1100	ng/L		10/18/22 20:59	10/28/22 06:41	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	*	2500	550	ng/L		10/18/22 20:59	10/28/22 06:41	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		5000	1800	ng/L		10/18/22 20:59	10/28/22 06:41	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		2500	1100	ng/L		10/18/22 20:59	10/28/22 06:41	1
9Cl-PF3ONS	ND		2500	300	ng/L		10/18/22 20:59	10/28/22 06:41	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		5000	1900	ng/L		10/18/22 20:59	10/28/22 06:41	1
11Cl-PF3OUdS	ND		2500	400	ng/L		10/18/22 20:59	10/28/22 06:41	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2500	500	ng/L		10/18/22 20:59	10/28/22 06:41	1
3:3 FTCA	ND		2500	550	ng/L		10/18/22 20:59	10/28/22 06:41	1
5:3 FTCA	870	J**	2500	400	ng/L		10/18/22 20:59	10/28/22 06:41	1
7:3 FTCA	ND		2500	700	ng/L		10/18/22 20:59	10/28/22 06:41	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_J_t0

Lab Sample ID: 320-93078-1

Date Collected: 10/06/22 09:35

Matrix: Water

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		2500	800	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		2500	350	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		2500	350	ng/L		10/18/22 20:59	10/28/22 06:41	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		2500	350	ng/L		10/18/22 20:59	10/28/22 06:41	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	86		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C4 PFBA	95		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C5 PFPeA	94		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C2 PFHxA	97		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C4 PFHpA	97		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C4 PFOA	97		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C5 PFNA	91		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C2 PFDA	90		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C2 PFUnA	102		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C2 PFDoA	91		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C2 PFTeDA	94		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C3 PFBS	92		25 - 150	10/18/22 20:59	10/28/22 06:41	1
18O2 PFHxS	101		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C4 PFOS	92		25 - 150	10/18/22 20:59	10/28/22 06:41	1
d3-NMeFOSAA	87		25 - 150	10/18/22 20:59	10/28/22 06:41	1
d5-NEtFOSAA	89		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C2 4:2 FTS	112		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C2 6:2 FTS	117		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C2 8:2 FTS	109		25 - 150	10/18/22 20:59	10/28/22 06:41	1
d-N-MeFOSA-M	47		25 - 150	10/18/22 20:59	10/28/22 06:41	1
d-N-EtFOSA-M	37		25 - 150	10/18/22 20:59	10/28/22 06:41	1
d7-N-MeFOSE-M	26		25 - 150	10/18/22 20:59	10/28/22 06:41	1
d9-N-EtFOSE-M	28		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C3 HFPO-DA	96		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C-6:2 FTCA	69		25 - 150	10/18/22 20:59	10/28/22 06:41	1
13C-8:2 FTCA	83		25 - 150	10/18/22 20:59	10/28/22 06:41	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	29000	B **	6300	3000	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluoropentanoic acid (PFPeA)	28000	B **	2500	600	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluorohexanoic acid (PFHxA)	110000	B **	2500	700	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluoroheptanoic acid (PFHpA)	10000	B **	2500	320	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluorooctanoic acid (PFOA)	20000	**	2500	1100	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluorononanoic acid (PFNA)	1700	J **	2500	340	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluorodecanoic acid (PFDA)	480	J **	2500	390	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluoroundecanoic acid (PFUnA)	ND		2500	1400	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluorododecanoic acid (PFDoA)	ND		2500	700	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluorotridecanoic acid (PFTrDA)	ND		2500	1600	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluorotetradecanoic acid (PFTeA)	ND		2500	370	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluorobutanesulfonic acid (PFBS)	ND		2500	250	ng/L		10/18/22 21:48	10/28/22 19:33	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_J_t0

Lab Sample ID: 320-93078-1

Date Collected: 10/06/22 09:35

Matrix: Water

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanesulfonic acid (PFPeS)	ND		2500	380	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluorohexanesulfonic acid (PFHxS)	5900		2500	220	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluoroheptanesulfonic acid (PFHpS)	520 J		2500	240	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluorooctanesulfonic acid (PFOS)	170000		2500	400	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluorononanesulfonic acid (PFNS)	ND		2500	200	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluorodecanesulfonic acid (PFDS)	ND		2500	700	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluorododecanesulfonic acid (PFDoS)	ND		2500	1200	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluorooctanesulfonamide (FOSA)	ND		2500	440	ng/L		10/18/22 21:48	10/28/22 19:33	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		6300	1500	ng/L		10/18/22 21:48	10/28/22 19:33	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		6300	1600	ng/L		10/18/22 21:48	10/28/22 19:33	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		2500	300	ng/L		10/18/22 21:48	10/28/22 19:33	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		6300	3100	ng/L		10/18/22 21:48	10/28/22 19:33	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		2500	580	ng/L		10/18/22 21:48	10/28/22 19:33	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		2500	1100	ng/L		10/18/22 21:48	10/28/22 19:33	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		2500	550	ng/L		10/18/22 21:48	10/28/22 19:33	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		5000	1800	ng/L		10/18/22 21:48	10/28/22 19:33	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		2500	1100	ng/L		10/18/22 21:48	10/28/22 19:33	1
9Cl-PF3ONS	ND		2500	300	ng/L		10/18/22 21:48	10/28/22 19:33	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		5000	1900	ng/L		10/18/22 21:48	10/28/22 19:33	1
11Cl-PF3OUdS	ND		2500	400	ng/L		10/18/22 21:48	10/28/22 19:33	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2500	500	ng/L		10/18/22 21:48	10/28/22 19:33	1
3:3 FTCA	ND		2500	550	ng/L		10/18/22 21:48	10/28/22 19:33	1
5:3 FTCA	ND		2500	400	ng/L		10/18/22 21:48	10/28/22 19:33	1
7:3 FTCA	ND		2500	700	ng/L		10/18/22 21:48	10/28/22 19:33	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		2500	800	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		2500	350	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	*+	2500	350	ng/L		10/18/22 21:48	10/28/22 19:33	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		2500	350	ng/L		10/18/22 21:48	10/28/22 19:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	87		25 - 150				10/18/22 21:48	10/28/22 19:33	1
13C4 PFBA	89		25 - 150				10/18/22 21:48	10/28/22 19:33	1
13C5 PFPeA	91		25 - 150				10/18/22 21:48	10/28/22 19:33	1
13C2 PFHxA	91		25 - 150				10/18/22 21:48	10/28/22 19:33	1
13C4 PFHpA	99		25 - 150				10/18/22 21:48	10/28/22 19:33	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_J_t0

Lab Sample ID: 320-93078-1

Date Collected: 10/06/22 09:35

Matrix: Water

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	100		25 - 150	10/18/22 21:48	10/28/22 19:33	1
13C5 PFNA	93		25 - 150	10/18/22 21:48	10/28/22 19:33	1
13C2 PFDA	92		25 - 150	10/18/22 21:48	10/28/22 19:33	1
13C2 PFUnA	102		25 - 150	10/18/22 21:48	10/28/22 19:33	1
13C2 PFDoA	94		25 - 150	10/18/22 21:48	10/28/22 19:33	1
13C2 PFTeDA	95		25 - 150	10/18/22 21:48	10/28/22 19:33	1
13C3 PFBS	94		25 - 150	10/18/22 21:48	10/28/22 19:33	1
18O2 PFHxS	103		25 - 150	10/18/22 21:48	10/28/22 19:33	1
13C4 PFOS	93		25 - 150	10/18/22 21:48	10/28/22 19:33	1
d3-NMeFOSAA	91		25 - 150	10/18/22 21:48	10/28/22 19:33	1
d5-NEtFOSAA	98		25 - 150	10/18/22 21:48	10/28/22 19:33	1
13C2 4:2 FTS	0		0 - 10	10/18/22 21:48	10/28/22 19:33	1
13C2 6:2 FTS	124		25 - 150	10/18/22 21:48	10/28/22 19:33	1
13C2 8:2 FTS	107		25 - 150	10/18/22 21:48	10/28/22 19:33	1
d-N-MeFOSA-M	36		25 - 150	10/18/22 21:48	10/28/22 19:33	1
d-N-EtFOSA-M	31		25 - 150	10/18/22 21:48	10/28/22 19:33	1
d7-N-MeFOSE-M	33		25 - 150	10/18/22 21:48	10/28/22 19:33	1
d9-N-EtFOSE-M	32		25 - 150	10/18/22 21:48	10/28/22 19:33	1
13C3 HFPO-DA	91		25 - 150	10/18/22 21:48	10/28/22 19:33	1
13C-6:2 FTCA	71		25 - 150	10/18/22 21:48	10/28/22 19:33	1
13C-8:2 FTCA	75		25 - 150	10/18/22 21:48	10/28/22 19:33	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	29000				ng/L			01/05/23 15:01	1
PFPA	25000				ng/L			01/05/23 15:01	1
PFHxA	110000				ng/L			01/05/23 15:01	1
PFHpA	10000				ng/L			01/05/23 15:01	1
PFOA	14000				ng/L			01/05/23 15:01	1
PFNA	0.00				ng/L			01/05/23 15:01	1
Total PFCA	180000				ng/L			01/05/23 15:01	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	0.00				ng/L			01/05/23 14:58	1
PFPA	3300				ng/L			01/05/23 14:58	1
PFHxA	3000				ng/L			01/05/23 14:58	1
PFHpA	0.00				ng/L			01/05/23 14:58	1
PFOA	5900				ng/L			01/05/23 14:58	1
PFNA	0.00				ng/L			01/05/23 14:58	1
Total PFCA	12000				ng/L			01/05/23 14:58	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	29000				ng/L			01/05/23 15:00	1
PFPA	28000				ng/L			01/05/23 15:00	1
PFHxA	110000				ng/L			01/05/23 15:00	1
PFHpA	10000				ng/L			01/05/23 15:00	1
PFOA	20000				ng/L			01/05/23 15:00	1
PFNA	0.00				ng/L			01/05/23 15:00	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_J_t0

Lab Sample ID: 320-93078-1

Date Collected: 10/06/22 09:35

Matrix: Water

Date Received: 10/11/22 10:22

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment (Continued)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	200000				ng/L			01/05/23 15:00	1

Client Sample ID: NAS_O_t0

Lab Sample ID: 320-93078-2

Date Collected: 10/06/22 09:40

Matrix: Water

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		63000	30000	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluoropentanoic acid (PFPeA)	43000		25000	6000	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluorohexanoic acid (PFHxA)	180000		25000	7000	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluoroheptanoic acid (PFHpA)	95000		25000	3200	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluorooctanoic acid (PFOA)	1900000		25000	11000	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluorononanoic acid (PFNA)	31000		25000	3400	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluorodecanoic acid (PFDA)	4600	J	25000	3900	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluoroundecanoic acid (PFUnA)	ND		25000	14000	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluorododecanoic acid (PFDoA)	ND		25000	7000	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluorotridecanoic acid (PFTTrDA)	ND		25000	16000	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluorotetradecanoic acid (PFTTeA)	ND		25000	3700	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluorobutanesulfonic acid (PFBS)	23000	J	25000	2500	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluoropentanesulfonic acid (PFPeS)	85000		25000	3800	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluorohexanesulfonic acid (PFHxS)	3800000	B	25000	2200	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluoroheptanesulfonic acid (PFHpS)	420000		25000	2400	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluorononanesulfonic acid (PFNS)	ND		25000	2000	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluorodecanesulfonic acid (PFDS)	ND		25000	7000	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluorododecanesulfonic acid (PFDoS)	ND		25000	12000	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluorooctanesulfonamide (FOSA)	ND		25000	4400	ng/L		10/18/22 20:59	10/28/22 06:51	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		63000	15000	ng/L		10/18/22 20:59	10/28/22 06:51	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		63000	16000	ng/L		10/18/22 20:59	10/28/22 06:51	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		25000	3000	ng/L		10/18/22 20:59	10/28/22 06:51	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	500000		25000	5800	ng/L		10/18/22 20:59	10/28/22 06:51	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	*	25000	11000	ng/L		10/18/22 20:59	10/28/22 06:51	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	*	25000	5500	ng/L		10/18/22 20:59	10/28/22 06:51	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		50000	18000	ng/L		10/18/22 20:59	10/28/22 06:51	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		25000	11000	ng/L		10/18/22 20:59	10/28/22 06:51	1
9CI-PF3ONS	ND		25000	3000	ng/L		10/18/22 20:59	10/28/22 06:51	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		50000	19000	ng/L		10/18/22 20:59	10/28/22 06:51	1
11CI-PF3OUdS	ND		25000	4000	ng/L		10/18/22 20:59	10/28/22 06:51	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		25000	5000	ng/L		10/18/22 20:59	10/28/22 06:51	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_O_t0

Lab Sample ID: 320-93078-2

Date Collected: 10/06/22 09:40

Matrix: Water

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
3:3 FTCA	ND		25000	5500	ng/L		10/18/22 20:59	10/28/22 06:51	1
5:3 FTCA	ND	*+	25000	4000	ng/L		10/18/22 20:59	10/28/22 06:51	1
7:3 FTCA	ND		25000	7000	ng/L		10/18/22 20:59	10/28/22 06:51	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		25000	8000	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		25000	3500	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		25000	3500	ng/L		10/18/22 20:59	10/28/22 06:51	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		25000	3500	ng/L		10/18/22 20:59	10/28/22 06:51	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	88		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C4 PFBA	102		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C5 PFPeA	100		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C2 PFHxA	94		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C4 PFHpA	102		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C4 PFOA	99		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C5 PFNA	91		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C2 PFDA	97		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C2 PFUnA	102		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C2 PFDoA	94		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C2 PFTeDA	98		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C3 PFBS	95		25 - 150	10/18/22 20:59	10/28/22 06:51	1
18O2 PFHxS	100		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C4 PFOS	96		25 - 150	10/18/22 20:59	10/28/22 06:51	1
d3-NMeFOSAA	91		25 - 150	10/18/22 20:59	10/28/22 06:51	1
d5-NEtFOSAA	89		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C2 4:2 FTS	111		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C2 8:2 FTS	109		25 - 150	10/18/22 20:59	10/28/22 06:51	1
d-N-MeFOSA-M	46		25 - 150	10/18/22 20:59	10/28/22 06:51	1
d-N-EtFOSA-M	37		25 - 150	10/18/22 20:59	10/28/22 06:51	1
d7-N-MeFOSE-M	28		25 - 150	10/18/22 20:59	10/28/22 06:51	1
d9-N-EtFOSE-M	27		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C3 HFPO-DA	99		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C-6:2 FTCA	71		25 - 150	10/18/22 20:59	10/28/22 06:51	1
13C-8:2 FTCA	82		25 - 150	10/18/22 20:59	10/28/22 06:51	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	1400000	B	250000	40000	ng/L		10/18/22 20:59	11/12/22 20:21	10
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	610000		630000	310000	ng/L		10/18/22 20:59	11/12/22 20:21	10
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
13C4 PFOS	105		25 - 150	10/18/22 20:59	11/12/22 20:21	10			
13C2 6:2 FTS	106		25 - 150	10/18/22 20:59	11/12/22 20:21	10			

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1400000	B *+	63000	30000	ng/L		10/18/22 21:48	10/28/22 19:43	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_O_t0

Lab Sample ID: 320-93078-2

Date Collected: 10/06/22 09:40

Matrix: Water

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanoic acid (PFPeA)	2300000	B **	25000	6000	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluoroheptanoic acid (PFHpA)	520000	B **	25000	3200	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluorooctanoic acid (PFOA)	2000000	**	25000	11000	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluorononanoic acid (PFNA)	59000	**	25000	3400	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluorodecanoic acid (PFDA)	5200	J **	25000	3900	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluoroundecanoic acid (PFUnA)	ND		25000	14000	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluorododecanoic acid (PFDoA)	ND		25000	7000	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluorotridecanoic acid (PFTrDA)	ND		25000	16000	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluorotetradecanoic acid (PFTeA)	3700	J B	25000	3700	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluorobutanesulfonic acid (PFBS)	25000		25000	2500	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluoropentanesulfonic acid (PFPeS)	79000		25000	3800	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluorohexanesulfonic acid (PFHxS)	3900000		25000	2200	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluoroheptanesulfonic acid (PFHpS)	410000		25000	2400	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluorononanesulfonic acid (PFNS)	ND		25000	2000	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluorodecanesulfonic acid (PFDS)	ND		25000	7000	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluorododecanesulfonic acid (PFDoS)	ND		25000	12000	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluorooctanesulfonamide (FOSA)	ND		25000	4400	ng/L		10/18/22 21:48	10/28/22 19:43	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		63000	15000	ng/L		10/18/22 21:48	10/28/22 19:43	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		63000	16000	ng/L		10/18/22 21:48	10/28/22 19:43	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		25000	3000	ng/L		10/18/22 21:48	10/28/22 19:43	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		63000	31000	ng/L		10/18/22 21:48	10/28/22 19:43	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		25000	5800	ng/L		10/18/22 21:48	10/28/22 19:43	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		25000	11000	ng/L		10/18/22 21:48	10/28/22 19:43	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		25000	5500	ng/L		10/18/22 21:48	10/28/22 19:43	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		50000	18000	ng/L		10/18/22 21:48	10/28/22 19:43	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		25000	11000	ng/L		10/18/22 21:48	10/28/22 19:43	1
9CI-PF3ONS	ND		25000	3000	ng/L		10/18/22 21:48	10/28/22 19:43	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		50000	19000	ng/L		10/18/22 21:48	10/28/22 19:43	1
11CI-PF3OUdS	ND		25000	4000	ng/L		10/18/22 21:48	10/28/22 19:43	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		25000	5000	ng/L		10/18/22 21:48	10/28/22 19:43	1
3:3 FTCA	ND		25000	5500	ng/L		10/18/22 21:48	10/28/22 19:43	1
5:3 FTCA	ND		25000	4000	ng/L		10/18/22 21:48	10/28/22 19:43	1
7:3 FTCA	ND		25000	7000	ng/L		10/18/22 21:48	10/28/22 19:43	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		25000	8000	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		25000	3500	ng/L		10/18/22 21:48	10/28/22 19:43	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_O_t0

Lab Sample ID: 320-93078-2

Date Collected: 10/06/22 09:40

Matrix: Water

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	*+	25000	3500	ng/L		10/18/22 21:48	10/28/22 19:43	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		25000	3500	ng/L		10/18/22 21:48	10/28/22 19:43	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	87		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C4 PFBA	94		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C5 PFPeA	91		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C4 PFHpA	95		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C4 PFOA	98		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C5 PFNA	90		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C2 PFDA	95		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C2 PFUnA	100		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C2 PFDoA	92		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C2 PFTeDA	100		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C3 PFBS	94		25 - 150				10/18/22 21:48	10/28/22 19:43	1
18O2 PFHxS	97		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C4 PFOS	92		25 - 150				10/18/22 21:48	10/28/22 19:43	1
d3-NMeFOSAA	92		25 - 150				10/18/22 21:48	10/28/22 19:43	1
d5-NEtFOSAA	96		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C2 4:2 FTS	0		0 - 10				10/18/22 21:48	10/28/22 19:43	1
13C2 6:2 FTS	119		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C2 8:2 FTS	107		25 - 150				10/18/22 21:48	10/28/22 19:43	1
d-N-MeFOSA-M	38		25 - 150				10/18/22 21:48	10/28/22 19:43	1
d-N-EtFOSA-M	32		25 - 150				10/18/22 21:48	10/28/22 19:43	1
d7-N-MeFOSE-M	34		25 - 150				10/18/22 21:48	10/28/22 19:43	1
d9-N-EtFOSE-M	36		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C3 HFPO-DA	94		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C-6:2 FTCA	67		25 - 150				10/18/22 21:48	10/28/22 19:43	1
13C-8:2 FTCA	74		25 - 150				10/18/22 21:48	10/28/22 19:43	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	6900000	B *+	250000	70000	ng/L		10/18/22 21:48	11/12/22 21:52	10
Perfluorooctanesulfonic acid (PFOS)	13000000		250000	40000	ng/L		10/18/22 21:48	11/12/22 21:52	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	92		25 - 150				10/18/22 21:48	11/12/22 21:52	10
13C4 PFOS	104		25 - 150				10/18/22 21:48	11/12/22 21:52	10

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	1400000				ng/L			01/05/23 15:01	1
PFPA	2200000				ng/L			01/05/23 15:01	1
PFHxA	6700000				ng/L			01/05/23 15:01	1
PFHpA	430000				ng/L			01/05/23 15:01	1
PFOA	120000				ng/L			01/05/23 15:01	1
PFNA	27000				ng/L			01/05/23 15:01	1
Total PFCA	11000000				ng/L			01/05/23 15:01	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_O_t0

Lab Sample ID: 320-93078-2

Date Collected: 10/06/22 09:40

Matrix: Water

Date Received: 10/11/22 10:22

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	0.00				ng/L			01/05/23 14:58	1
PFPA	43000				ng/L			01/05/23 14:58	1
PFHxA	180000				ng/L			01/05/23 14:58	1
PFHpA	95000				ng/L			01/05/23 14:58	1
PFOA	1900000				ng/L			01/05/23 14:58	1
PFNA	31000				ng/L			01/05/23 14:58	1
Total PFCA	2200000				ng/L			01/05/23 14:58	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	1400000				ng/L			01/05/23 15:00	1
PFPA	2300000				ng/L			01/05/23 15:00	1
PFHxA	6900000				ng/L			01/05/23 15:00	1
PFHpA	520000				ng/L			01/05/23 15:00	1
PFOA	2000000				ng/L			01/05/23 15:00	1
PFNA	59000				ng/L			01/05/23 15:00	1
Total PFCA	13000000				ng/L			01/05/23 15:00	1

Client Sample ID: ANG_1_t0

Lab Sample ID: 320-93078-3

Date Collected: 10/06/22 09:45

Matrix: AFFF

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	21000000		630000	300000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Perfluoropentanoic acid (PFPeA)	25000000		250000	60000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Perfluoroheptanoic acid (PFHpA)	15000000		250000	32000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Perfluorononanoic acid (PFNA)	ND		250000	34000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Perfluorodecanoic acid (PFDA)	62000 J		250000	39000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Perfluoroundecanoic acid (PFUnA)	ND		250000	140000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Perfluorododecanoic acid (PFDoA)	ND		250000	70000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Perfluorotridecanoic acid (PFTTrDA)	ND		250000	160000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Perfluorotetradecanoic acid (PFTeA)	ND		250000	37000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Perfluorononanesulfonic acid (PFNS)	2300000		250000	20000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Perfluorodecanesulfonic acid (PFDS)	5100000		250000	70000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Perfluorododecanesulfonic acid (PFDoS)	530000		250000	120000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Perfluorooctanesulfonamide (FOSA)	130000 J		250000	44000	ng/L		10/18/22 20:59	10/28/22 07:01	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		630000	150000	ng/L		10/18/22 20:59	10/28/22 07:01	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		630000	160000	ng/L		10/18/22 20:59	10/28/22 07:01	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		250000	30000	ng/L		10/18/22 20:59	10/28/22 07:01	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		630000	310000	ng/L		10/18/22 20:59	10/28/22 07:01	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		250000	58000	ng/L		10/18/22 20:59	10/28/22 07:01	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND *-		250000	110000	ng/L		10/18/22 20:59	10/28/22 07:01	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: ANG_1_t0

Lab Sample ID: 320-93078-3

Date Collected: 10/06/22 09:45

Matrix: AFFF

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	*-	250000	55000	ng/L		10/18/22 20:59	10/28/22 07:01	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	1400000		500000	180000	ng/L		10/18/22 20:59	10/28/22 07:01	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		250000	110000	ng/L		10/18/22 20:59	10/28/22 07:01	1
9CI-PF3ONS	ND		250000	30000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		500000	190000	ng/L		10/18/22 20:59	10/28/22 07:01	1
11CI-PF3OUdS	ND		250000	40000	ng/L		10/18/22 20:59	10/28/22 07:01	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		250000	50000	ng/L		10/18/22 20:59	10/28/22 07:01	1
3:3 FTCA	ND		250000	55000	ng/L		10/18/22 20:59	10/28/22 07:01	1
5:3 FTCA	ND	*+	250000	40000	ng/L		10/18/22 20:59	10/28/22 07:01	1
7:3 FTCA	ND		250000	70000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		250000	80000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	44000	J	250000	35000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	43000	J	250000	35000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		250000	35000	ng/L		10/18/22 20:59	10/28/22 07:01	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	99		25 - 150				10/18/22 20:59	10/28/22 07:01	1
13C4 PFBA	111		25 - 150				10/18/22 20:59	10/28/22 07:01	1
13C5 PFPeA	109		25 - 150				10/18/22 20:59	10/28/22 07:01	1
13C4 PFHpA	93		25 - 150				10/18/22 20:59	10/28/22 07:01	1
13C5 PFNA	48		25 - 150				10/18/22 20:59	10/28/22 07:01	1
13C2 PFDA	109		25 - 150				10/18/22 20:59	10/28/22 07:01	1
13C2 PFUnA	113		25 - 150				10/18/22 20:59	10/28/22 07:01	1
13C2 PFDoA	110		25 - 150				10/18/22 20:59	10/28/22 07:01	1
13C2 PFTeDA	114		25 - 150				10/18/22 20:59	10/28/22 07:01	1
d3-NMeFOSAA	108		25 - 150				10/18/22 20:59	10/28/22 07:01	1
d5-NEtFOSAA	112		25 - 150				10/18/22 20:59	10/28/22 07:01	1
13C2 4:2 FTS	126		25 - 150				10/18/22 20:59	10/28/22 07:01	1
13C2 6:2 FTS	178	*5+	25 - 150				10/18/22 20:59	10/28/22 07:01	1
13C2 8:2 FTS	156	*5+	25 - 150				10/18/22 20:59	10/28/22 07:01	1
d-N-MeFOSA-M	57		25 - 150				10/18/22 20:59	10/28/22 07:01	1
d-N-EtFOSA-M	44		25 - 150				10/18/22 20:59	10/28/22 07:01	1
d7-N-MeFOSE-M	34		25 - 150				10/18/22 20:59	10/28/22 07:01	1
d9-N-EtFOSE-M	34		25 - 150				10/18/22 20:59	10/28/22 07:01	1
13C3 HFPO-DA	89		25 - 150				10/18/22 20:59	10/28/22 07:01	1
13C-6:2 FTCA	77		25 - 150				10/18/22 20:59	10/28/22 07:01	1
13C-8:2 FTCA	71		25 - 150				10/18/22 20:59	10/28/22 07:01	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	61000000		25000000	7000000	ng/L		10/18/22 20:59	11/12/22 20:52	100
Perfluorooctanoic acid (PFOA)	55000000		25000000	11000000	ng/L		10/18/22 20:59	11/12/22 20:52	100
Perfluorobutanesulfonic acid (PFBS)	89000000		25000000	2500000	ng/L		10/18/22 20:59	11/12/22 20:52	100

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Client Sample Results

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: ANG_1_t0

Lab Sample ID: 320-93078-3

Date Collected: 10/06/22 09:45

Matrix: AFFF

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment - DL (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanesulfonic acid (PFPeS)	85000000		25000000	3800000	ng/L		10/18/22 20:59	11/12/22 20:52	100
Perfluorohexanesulfonic acid (PFHxS)	430000000	B	25000000	2200000	ng/L		10/18/22 20:59	11/12/22 20:52	100
Perfluoroheptanesulfonic acid (PFHpS)	56000000		25000000	2400000	ng/L		10/18/22 20:59	11/12/22 20:52	100
Perfluorooctanesulfonic acid (PFOS)	330000000	B	25000000	4000000	ng/L		10/18/22 20:59	11/12/22 20:52	100
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	96		25 - 150				10/18/22 20:59	11/12/22 20:52	100
13C4 PFOA	109		25 - 150				10/18/22 20:59	11/12/22 20:52	100
13C3 PFBS	95		25 - 150				10/18/22 20:59	11/12/22 20:52	100
18O2 PFHxS	108		25 - 150				10/18/22 20:59	11/12/22 20:52	100
13C4 PFOS	101		25 - 150				10/18/22 20:59	11/12/22 20:52	100

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	210000	J**	250000	34000	ng/L		10/18/22 21:48	10/28/22 19:54	1
Perfluorodecanoic acid (PFDA)	190000	J**	250000	39000	ng/L		10/18/22 21:48	10/28/22 19:54	1
Perfluoroundecanoic acid (PFUnA)	ND		250000	140000	ng/L		10/18/22 21:48	10/28/22 19:54	1
Perfluorododecanoic acid (PFDoA)	150000	J	250000	70000	ng/L		10/18/22 21:48	10/28/22 19:54	1
Perfluorotridecanoic acid (PFTrDA)	ND		250000	160000	ng/L		10/18/22 21:48	10/28/22 19:54	1
Perfluorotetradecanoic acid (PFTeA)	ND		250000	37000	ng/L		10/18/22 21:48	10/28/22 19:54	1
Perfluorononanesulfonic acid (PFNS)	2100000		250000	20000	ng/L		10/18/22 21:48	10/28/22 19:54	1
Perfluorodecanesulfonic acid (PFDS)	4300000		250000	70000	ng/L		10/18/22 21:48	10/28/22 19:54	1
Perfluorododecanesulfonic acid (PFDoS)	280000		250000	120000	ng/L		10/18/22 21:48	10/28/22 19:54	1
Perfluorooctanesulfonamide (FOSA)	ND		250000	44000	ng/L		10/18/22 21:48	10/28/22 19:54	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		630000	150000	ng/L		10/18/22 21:48	10/28/22 19:54	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		630000	160000	ng/L		10/18/22 21:48	10/28/22 19:54	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		250000	30000	ng/L		10/18/22 21:48	10/28/22 19:54	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		630000	310000	ng/L		10/18/22 21:48	10/28/22 19:54	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		250000	58000	ng/L		10/18/22 21:48	10/28/22 19:54	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		250000	110000	ng/L		10/18/22 21:48	10/28/22 19:54	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		250000	55000	ng/L		10/18/22 21:48	10/28/22 19:54	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		500000	180000	ng/L		10/18/22 21:48	10/28/22 19:54	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		250000	110000	ng/L		10/18/22 21:48	10/28/22 19:54	1
9CI-PF3ONS	ND		250000	30000	ng/L		10/18/22 21:48	10/28/22 19:54	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		500000	190000	ng/L		10/18/22 21:48	10/28/22 19:54	1
11CI-PF3OUdS	51000	J	250000	40000	ng/L		10/18/22 21:48	10/28/22 19:54	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: ANG_1_t0

Lab Sample ID: 320-93078-3

Date Collected: 10/06/22 09:45

Matrix: AFFF

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		250000	50000	ng/L		10/18/22 21:48	10/28/22 19:54	1
3:3 FTCA	ND		250000	55000	ng/L		10/18/22 21:48	10/28/22 19:54	1
5:3 FTCA	ND		250000	40000	ng/L		10/18/22 21:48	10/28/22 19:54	1
7:3 FTCA	ND		250000	70000	ng/L		10/18/22 21:48	10/28/22 19:54	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		250000	80000	ng/L		10/18/22 21:48	10/28/22 19:54	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	2600000		250000	35000	ng/L		10/18/22 21:48	10/28/22 19:54	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	2000000	*+	250000	35000	ng/L		10/18/22 21:48	10/28/22 19:54	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		250000	35000	ng/L		10/18/22 21:48	10/28/22 19:54	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	95		25 - 150				10/18/22 21:48	10/28/22 19:54	1
13C5 PFNA	44		25 - 150				10/18/22 21:48	10/28/22 19:54	1
13C2 PFDA	99		25 - 150				10/18/22 21:48	10/28/22 19:54	1
13C2 PFUnA	121		25 - 150				10/18/22 21:48	10/28/22 19:54	1
13C2 PFDoA	103		25 - 150				10/18/22 21:48	10/28/22 19:54	1
13C2 PFTeDA	106		25 - 150				10/18/22 21:48	10/28/22 19:54	1
d3-NMeFOSAA	107		25 - 150				10/18/22 21:48	10/28/22 19:54	1
d5-NEtFOSAA	110		25 - 150				10/18/22 21:48	10/28/22 19:54	1
13C2 4:2 FTS	0		0 - 10				10/18/22 21:48	10/28/22 19:54	1
13C2 6:2 FTS	113		25 - 150				10/18/22 21:48	10/28/22 19:54	1
13C2 8:2 FTS	123		25 - 150				10/18/22 21:48	10/28/22 19:54	1
d-N-MeFOSA-M	41		25 - 150				10/18/22 21:48	10/28/22 19:54	1
d-N-EtFOSA-M	34		25 - 150				10/18/22 21:48	10/28/22 19:54	1
d7-N-MeFOSE-M	36		25 - 150				10/18/22 21:48	10/28/22 19:54	1
d9-N-EtFOSE-M	36		25 - 150				10/18/22 21:48	10/28/22 19:54	1
13C3 HFPO-DA	102		25 - 150				10/18/22 21:48	10/28/22 19:54	1
13C-6:2 FTCA	75		25 - 150				10/18/22 21:48	10/28/22 19:54	1
13C-8:2 FTCA	77		25 - 150				10/18/22 21:48	10/28/22 19:54	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	720000000	B **	63000000	30000000	ng/L		10/18/22 21:48	11/12/22 22:13	100
Perfluoropentanoic acid (PFPeA)	750000000	B **	25000000	6000000	ng/L		10/18/22 21:48	11/12/22 22:13	100
Perfluorohexanoic acid (PFHxA)	2100000000	B **	25000000	7000000	ng/L		10/18/22 21:48	11/12/22 22:13	100
Perfluoroheptanoic acid (PFHpA)	59000000	B **	25000000	3200000	ng/L		10/18/22 21:48	11/12/22 22:13	100
Perfluorooctanoic acid (PFOA)	110000000	*+	25000000	11000000	ng/L		10/18/22 21:48	11/12/22 22:13	100
Perfluorobutanesulfonic acid (PFBS)	94000000		25000000	2500000	ng/L		10/18/22 21:48	11/12/22 22:13	100
Perfluoropentanesulfonic acid (PFPeS)	87000000		25000000	3800000	ng/L		10/18/22 21:48	11/12/22 22:13	100
Perfluorohexanesulfonic acid (PFHxS)	390000000		25000000	2200000	ng/L		10/18/22 21:48	11/12/22 22:13	100
Perfluoroheptanesulfonic acid (PFHpS)	38000000		25000000	2400000	ng/L		10/18/22 21:48	11/12/22 22:13	100
Perfluorooctanesulfonic acid (PFOS)	280000000		25000000	4000000	ng/L		10/18/22 21:48	11/12/22 22:13	100
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	103		25 - 150				10/18/22 21:48	11/12/22 22:13	100

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: ANG_1_t0

Lab Sample ID: 320-93078-3

Date Collected: 10/06/22 09:45

Matrix: AFFF

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment - DL (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFPeA	94		25 - 150	10/18/22 21:48	11/12/22 22:13	100
13C2 PFHxA	128		25 - 150	10/18/22 21:48	11/12/22 22:13	100
13C4 PFHpA	101		25 - 150	10/18/22 21:48	11/12/22 22:13	100
13C4 PFOA	100		25 - 150	10/18/22 21:48	11/12/22 22:13	100
13C3 PFBS	97		25 - 150	10/18/22 21:48	11/12/22 22:13	100
18O2 PFHxS	121		25 - 150	10/18/22 21:48	11/12/22 22:13	100
13C4 PFOS	126		25 - 150	10/18/22 21:48	11/12/22 22:13	100

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	70000000				ng/L			01/05/23 15:01	1
PFPA	73000000				ng/L			01/05/23 15:01	1
PFHxA	210000000				ng/L			01/05/23 15:01	1
PFHpA	43000000				ng/L			01/05/23 15:01	1
PFOA	57000000				ng/L			01/05/23 15:01	1
PFNA	0.00				ng/L			01/05/23 15:01	1
Total PFCA	360000000				ng/L			01/05/23 15:01	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	21000000				ng/L			01/05/23 14:58	1
PFPA	25000000				ng/L			01/05/23 14:58	1
PFHxA	61000000				ng/L			01/05/23 14:58	1
PFHpA	15000000				ng/L			01/05/23 14:58	1
PFOA	55000000				ng/L			01/05/23 14:58	1
PFNA	0.00				ng/L			01/05/23 14:58	1
Total PFCA	180000000				ng/L			01/05/23 14:58	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	72000000				ng/L			01/05/23 15:00	1
PFPA	75000000				ng/L			01/05/23 15:00	1
PFHxA	210000000				ng/L			01/05/23 15:00	1
PFHpA	59000000				ng/L			01/05/23 15:00	1
PFOA	110000000				ng/L			01/05/23 15:00	1
PFNA	0.00				ng/L			01/05/23 15:00	1
Total PFCA	370000000				ng/L			01/05/23 15:00	1

Client Sample ID: ANG_5_t0

Lab Sample ID: 320-93078-4

Date Collected: 10/06/22 09:50

Matrix: AFFF

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	370000		63000	30000	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluoropentanoic acid (PFPeA)	260000		25000	6000	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluorohexanoic acid (PFHxA)	3600000		25000	7000	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluoroheptanoic acid (PFHpA)	95000		25000	3200	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluorooctanoic acid (PFOA)	1300000		25000	11000	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluorononanoic acid (PFNA)	5600 J		25000	3400	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluorodecanoic acid (PFDA)	95000 I		25000	3900	ng/L		10/18/22 20:59	10/28/22 07:11	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: ANG_5_t0

Lab Sample ID: 320-93078-4

Date Collected: 10/06/22 09:50

Matrix: AFFF

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	ND		25000	14000	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluorododecanoic acid (PFDoA)	ND		25000	7000	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluorotridecanoic acid (PFTrDA)	17000	J	25000	16000	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluorotetradecanoic acid (PFTeA)	5200	J	25000	3700	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluorobutanesulfonic acid (PFBS)	3200	J	25000	2500	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluoropentanesulfonic acid (PFPeS)	ND		25000	3800	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluorohexanesulfonic acid (PFHxS)	12000	J B	25000	2200	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		25000	2400	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluorooctanesulfonic acid (PFOS)	120000	B	25000	4000	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluorononanesulfonic acid (PFNS)	ND		25000	2000	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluorodecanesulfonic acid (PFDS)	ND		25000	7000	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluorododecanesulfonic acid (PFDoS)	ND		25000	12000	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluorooctanesulfonamide (FOSA)	ND		25000	4400	ng/L		10/18/22 20:59	10/28/22 07:11	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		63000	15000	ng/L		10/18/22 20:59	10/28/22 07:11	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		63000	16000	ng/L		10/18/22 20:59	10/28/22 07:11	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	230000		25000	3000	ng/L		10/18/22 20:59	10/28/22 07:11	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	*-	25000	11000	ng/L		10/18/22 20:59	10/28/22 07:11	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	*-	25000	5500	ng/L		10/18/22 20:59	10/28/22 07:11	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		50000	18000	ng/L		10/18/22 20:59	10/28/22 07:11	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		25000	11000	ng/L		10/18/22 20:59	10/28/22 07:11	1
9CI-PF3ONS	ND		25000	3000	ng/L		10/18/22 20:59	10/28/22 07:11	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		50000	19000	ng/L		10/18/22 20:59	10/28/22 07:11	1
11CI-PF3OUdS	ND		25000	4000	ng/L		10/18/22 20:59	10/28/22 07:11	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		25000	5000	ng/L		10/18/22 20:59	10/28/22 07:11	1
3:3 FTCA	ND		25000	5500	ng/L		10/18/22 20:59	10/28/22 07:11	1
5:3 FTCA	ND	*+	25000	4000	ng/L		10/18/22 20:59	10/28/22 07:11	1
7:3 FTCA	26000	I	25000	7000	ng/L		10/18/22 20:59	10/28/22 07:11	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		25000	8000	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		25000	3500	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		25000	3500	ng/L		10/18/22 20:59	10/28/22 07:11	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		25000	3500	ng/L		10/18/22 20:59	10/28/22 07:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	43		25 - 150				10/18/22 20:59	10/28/22 07:11	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: ANG_5_t0

Lab Sample ID: 320-93078-4

Date Collected: 10/06/22 09:50

Matrix: AFFF

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	172	*5+	25 - 150	10/18/22 20:59	10/28/22 07:11	1
13C5 PFPeA	176	*5+	25 - 150	10/18/22 20:59	10/28/22 07:11	1
13C2 PFHxA	166	*5+	25 - 150	10/18/22 20:59	10/28/22 07:11	1
13C4 PFHpA	166	*5+	25 - 150	10/18/22 20:59	10/28/22 07:11	1
13C4 PFOA	101		25 - 150	10/18/22 20:59	10/28/22 07:11	1
13C5 PFNA	136		25 - 150	10/18/22 20:59	10/28/22 07:11	1
13C2 PFDA	38		25 - 150	10/18/22 20:59	10/28/22 07:11	1
13C2 PFUnA	180	*5+	25 - 150	10/18/22 20:59	10/28/22 07:11	1
13C2 PFDoA	42		25 - 150	10/18/22 20:59	10/28/22 07:11	1
13C2 PFTeDA	155	*5+	25 - 150	10/18/22 20:59	10/28/22 07:11	1
13C3 PFBS	171	*5+	25 - 150	10/18/22 20:59	10/28/22 07:11	1
18O2 PFHxS	175	*5+	25 - 150	10/18/22 20:59	10/28/22 07:11	1
13C4 PFOS	153	*5+	25 - 150	10/18/22 20:59	10/28/22 07:11	1
d3-NMeFOSAA	162	*5+	25 - 150	10/18/22 20:59	10/28/22 07:11	1
d5-NEtFOSAA	169	*5+	25 - 150	10/18/22 20:59	10/28/22 07:11	1
13C2 4:2 FTS	201	*5+	25 - 150	10/18/22 20:59	10/28/22 07:11	1
d-N-MeFOSA-M	101		25 - 150	10/18/22 20:59	10/28/22 07:11	1
d-N-EtFOSA-M	72		25 - 150	10/18/22 20:59	10/28/22 07:11	1
d7-N-MeFOSE-M	90		25 - 150	10/18/22 20:59	10/28/22 07:11	1
d9-N-EtFOSE-M	89		25 - 150	10/18/22 20:59	10/28/22 07:11	1
13C3 HFPO-DA	160	*5+	25 - 150	10/18/22 20:59	10/28/22 07:11	1
13C-6:2 FTCA	118		25 - 150	10/18/22 20:59	10/28/22 07:11	1
13C-8:2 FTCA	115		25 - 150	10/18/22 20:59	10/28/22 07:11	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	12000000		630000	310000	ng/L		10/18/22 20:59	11/12/22 20:32	10
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	5100000		250000	58000	ng/L		10/18/22 20:59	11/12/22 20:32	10

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 6:2 FTS	104		25 - 150	10/18/22 20:59	11/12/22 20:32	10
13C2 8:2 FTS	55		25 - 150	10/18/22 20:59	11/12/22 20:32	10

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	140000	J H	250000	40000	ng/L		11/17/22 12:23	11/30/22 06:11	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	148		25 - 150	11/17/22 12:23	11/30/22 06:11	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	640000000	B **	63000000	30000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluoropentanoic acid (PFPeA)	900000000	B **	25000000	6000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluorohexanoic acid (PFHxA)	1700000000	B **	25000000	7000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluoroheptanoic acid (PFHpA)	500000000	B **	25000000	3200000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluorooctanoic acid (PFOA)	650000000	*+	25000000	11000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluorononanoic acid (PFNA)	470000000	*+	25000000	3400000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluorodecanoic acid (PFDA)	220000000	J **	25000000	3900000	ng/L		10/18/22 21:48	10/28/22 18:53	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: ANG_5_t0

Lab Sample ID: 320-93078-4

Date Collected: 10/06/22 09:50

Matrix: AFFF

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	ND		25000000	14000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluorododecanoic acid (PFDoA)	8000000	J	25000000	7000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluorotridecanoic acid (PFTTrDA)	ND		25000000	16000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluorotetradecanoic acid (PFTeA)	4000000	J B	25000000	3700000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluorobutanesulfonic acid (PFBS)	ND		25000000	2500000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluoropentanesulfonic acid (PFPeS)	ND		25000000	3800000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluorohexanesulfonic acid (PFHxS)	ND		25000000	2200000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		25000000	2400000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluorooctanesulfonic acid (PFOS)	10000000	J	25000000	4000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluorononanesulfonic acid (PFNS)	ND		25000000	2000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluorodecanesulfonic acid (PFDS)	ND		25000000	7000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluorododecanesulfonic acid (PFDoS)	ND		25000000	12000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluorooctanesulfonamide (FOSA)	ND		25000000	4400000	ng/L		10/18/22 21:48	10/28/22 18:53	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		63000000	15000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		63000000	16000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		25000000	3000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		63000000	31000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		25000000	5800000	ng/L		10/18/22 21:48	10/28/22 18:53	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		25000000	11000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		25000000	5500000	ng/L		10/18/22 21:48	10/28/22 18:53	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		50000000	18000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		25000000	11000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
9CI-PF3ONS	ND		25000000	3000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		50000000	19000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
11CI-PF3OUdS	ND		25000000	4000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		25000000	5000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
3:3 FTCA	ND		25000000	5500000	ng/L		10/18/22 21:48	10/28/22 18:53	1
5:3 FTCA	ND		25000000	4000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
7:3 FTCA	ND		25000000	7000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		25000000	8000000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		25000000	3500000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	+	25000000	3500000	ng/L		10/18/22 21:48	10/28/22 18:53	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		25000000	3500000	ng/L		10/18/22 21:48	10/28/22 18:53	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: ANG_5_t0

Lab Sample ID: 320-93078-4

Date Collected: 10/06/22 09:50

Matrix: AFFF

Date Received: 10/11/22 10:22

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	85		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C4 PFBA	89		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C5 PFPeA	89		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C2 PFHxA	89		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C4 PFHpA	96		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C4 PFOA	102		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C5 PFNA	97		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C2 PFDA	94		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C2 PFUnA	105		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C2 PFDoA	93		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C2 PFTeDA	104		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C3 PFBS	93		25 - 150	10/18/22 21:48	10/28/22 18:53	1
18O2 PFHxS	102		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C4 PFOS	97		25 - 150	10/18/22 21:48	10/28/22 18:53	1
d3-NMeFOSAA	90		25 - 150	10/18/22 21:48	10/28/22 18:53	1
d5-NEtFOSAA	93		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C2 4:2 FTS	0		0 - 10	10/18/22 21:48	10/28/22 18:53	1
13C2 6:2 FTS	124		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C2 8:2 FTS	102		25 - 150	10/18/22 21:48	10/28/22 18:53	1
d-N-MeFOSA-M	39		25 - 150	10/18/22 21:48	10/28/22 18:53	1
d-N-EtFOSA-M	34		25 - 150	10/18/22 21:48	10/28/22 18:53	1
d7-N-MeFOSE-M	35		25 - 150	10/18/22 21:48	10/28/22 18:53	1
d9-N-EtFOSE-M	38		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C3 HFPO-DA	96		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C-6:2 FTCA	69		25 - 150	10/18/22 21:48	10/28/22 18:53	1
13C-8:2 FTCA	74		25 - 150	10/18/22 21:48	10/28/22 18:53	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	640000000				ng/L			01/05/23 15:01	1
PFPA	900000000				ng/L			01/05/23 15:01	1
PFHxA	1700000000				ng/L			01/05/23 15:01	1
PFHpA	500000000				ng/L			01/05/23 15:01	1
PFOA	650000000				ng/L			01/05/23 15:01	1
PFNA	470000000				ng/L			01/05/23 15:01	1
Total PFCA	4400000000				ng/L			01/05/23 15:01	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	370000				ng/L			01/05/23 14:58	1
PFPA	260000				ng/L			01/05/23 14:58	1
PFHxA	3600000				ng/L			01/05/23 14:58	1
PFHpA	95000				ng/L			01/05/23 14:58	1
PFOA	1300000				ng/L			01/05/23 14:58	1
PFNA	0.00				ng/L			01/05/23 14:58	1
Total PFCA	5600000				ng/L			01/05/23 14:58	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	640000000				ng/L			01/05/23 15:00	1
PFPA	900000000				ng/L			01/05/23 15:00	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: ANG_5_t0

Lab Sample ID: 320-93078-4

Date Collected: 10/06/22 09:50

Matrix: AFFF

Date Received: 10/11/22 10:22

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment (Continued)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFHxA	1700000000				ng/L			01/05/23 15:00	1
PFHpA	500000000				ng/L			01/05/23 15:00	1
PFOA	650000000				ng/L			01/05/23 15:00	1
PFNA	470000000				ng/L			01/05/23 15:00	1
Total PFCA	4400000000				ng/L			01/05/23 15:00	1

Client Sample ID: NAS_WG_t0

Lab Sample ID: 320-93078-5

Date Collected: 10/06/22 09:55

Matrix: Water

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	810000		630000	300000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluoropentanoic acid (PFPeA)	5800000		250000	60000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluorohexanoic acid (PFHxA)	24000000		250000	70000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluoroheptanoic acid (PFHpA)	15000000		250000	32000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluorononanoic acid (PFNA)	1400000		250000	34000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluorodecanoic acid (PFDA)	750000		250000	39000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluoroundecanoic acid (PFUnA)	ND		250000	140000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluorododecanoic acid (PFDoA)	ND		250000	70000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluorotridecanoic acid (PFTrDA)	ND		250000	160000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluorotetradecanoic acid (PFTeA)	ND		250000	37000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluorobutanesulfonic acid (PFBS)	1200000		250000	25000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluoropentanesulfonic acid (PFPeS)	1600000		250000	38000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluoroheptanesulfonic acid (PFHpS)	1300000		250000	24000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluorononanesulfonic acid (PFNS)	ND		250000	20000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluorodecanesulfonic acid (PFDS)	ND		250000	70000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluorododecanesulfonic acid (PFDoS)	ND		250000	120000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluorooctanesulfonamide (FOSA)	370000		250000	44000	ng/L		10/18/22 20:59	10/28/22 07:21	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		630000	150000	ng/L		10/18/22 20:59	10/28/22 07:21	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		630000	160000	ng/L		10/18/22 20:59	10/28/22 07:21	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		250000	30000	ng/L		10/18/22 20:59	10/28/22 07:21	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	250000		630000	310000	ng/L		10/18/22 20:59	10/28/22 07:21	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	210000		250000	58000	ng/L		10/18/22 20:59	10/28/22 07:21	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	*	250000	110000	ng/L		10/18/22 20:59	10/28/22 07:21	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	*	250000	55000	ng/L		10/18/22 20:59	10/28/22 07:21	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		500000	180000	ng/L		10/18/22 20:59	10/28/22 07:21	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		250000	110000	ng/L		10/18/22 20:59	10/28/22 07:21	1
9CI-PF3ONS	ND		250000	30000	ng/L		10/18/22 20:59	10/28/22 07:21	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_WG_t0

Lab Sample ID: 320-93078-5

Date Collected: 10/06/22 09:55

Matrix: Water

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		500000	190000	ng/L		10/18/22 20:59	10/28/22 07:21	1
11CI-PF3OUdS	ND		250000	40000	ng/L		10/18/22 20:59	10/28/22 07:21	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		250000	50000	ng/L		10/18/22 20:59	10/28/22 07:21	1
3:3 FTCA	ND		250000	55000	ng/L		10/18/22 20:59	10/28/22 07:21	1
5:3 FTCA	ND	+	250000	40000	ng/L		10/18/22 20:59	10/28/22 07:21	1
7:3 FTCA	ND		250000	70000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		250000	80000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		250000	35000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		250000	35000	ng/L		10/18/22 20:59	10/28/22 07:21	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		250000	35000	ng/L		10/18/22 20:59	10/28/22 07:21	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	102		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C4 PFBA	108		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C5 PFPeA	106		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C2 PFHxA	108		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C4 PFHpA	108		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C5 PFNA	103		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C2 PFDA	107		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C2 PFUnA	115		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C2 PFDoA	105		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C2 PFTeDA	111		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C3 PFBS	111		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C4 PFOS	113		25 - 150	10/18/22 20:59	10/28/22 07:21	1
d3-NMeFOSAA	106		25 - 150	10/18/22 20:59	10/28/22 07:21	1
d5-NEtFOSAA	110		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C2 4:2 FTS	131		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C2 6:2 FTS	108		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C2 8:2 FTS	122		25 - 150	10/18/22 20:59	10/28/22 07:21	1
d-N-MeFOSA-M	54		25 - 150	10/18/22 20:59	10/28/22 07:21	1
d-N-EtFOSA-M	42		25 - 150	10/18/22 20:59	10/28/22 07:21	1
d7-N-MeFOSE-M	31		25 - 150	10/18/22 20:59	10/28/22 07:21	1
d9-N-EtFOSE-M	33		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C3 HFPO-DA	108		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C-6:2 FTCA	76		25 - 150	10/18/22 20:59	10/28/22 07:21	1
13C-8:2 FTCA	77		25 - 150	10/18/22 20:59	10/28/22 07:21	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	270000000		2500000	1100000	ng/L		10/18/22 20:59	11/12/22 20:42	10
Perfluorohexanesulfonic acid (PFHxS)	59000000	B	2500000	220000	ng/L		10/18/22 20:59	11/12/22 20:42	10
Perfluorooctanesulfonic acid (PFOS)	95000000	B	2500000	400000	ng/L		10/18/22 20:59	11/12/22 20:42	10
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
13C4 PFOA	102		25 - 150	10/18/22 20:59	11/12/22 20:42	10			

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_WG_t0

Lab Sample ID: 320-93078-5

Date Collected: 10/06/22 09:55

Matrix: Water

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment - DL (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	108		25 - 150	10/18/22 20:59	11/12/22 20:42	10
13C4 PFOS	99		25 - 150	10/18/22 20:59	11/12/22 20:42	10

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	6500000	B **	630000	300000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluoropentanoic acid (PFPeA)	12000000	B **	250000	60000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluorohexanoic acid (PFHxA)	40000000	B **	250000	70000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluoroheptanoic acid (PFHpA)	16000000	B **	250000	32000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluorononanoic acid (PFNA)	1400000	*+	250000	34000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluorodecanoic acid (PFDA)	770000	*+	250000	39000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluoroundecanoic acid (PFUnA)	ND		250000	140000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluorododecanoic acid (PFDoA)	ND		250000	70000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluorotridecanoic acid (PFTrDA)	ND		250000	160000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluorotetradecanoic acid (PFTeA)	ND		250000	37000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluorobutanesulfonic acid (PFBS)	12000000		250000	25000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluoropentanesulfonic acid (PFPeS)	15000000		250000	38000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluoroheptanesulfonic acid (PFHpS)	1200000		250000	24000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluorononanesulfonic acid (PFNS)	ND		250000	20000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluorodecanesulfonic acid (PFDS)	ND		250000	70000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluorododecanesulfonic acid (PFDoS)	ND		250000	120000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluorooctanesulfonamide (FOSA)	ND		250000	44000	ng/L		10/18/22 21:48	10/28/22 20:14	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		630000	150000	ng/L		10/18/22 21:48	10/28/22 20:14	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		630000	160000	ng/L		10/18/22 21:48	10/28/22 20:14	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		250000	30000	ng/L		10/18/22 21:48	10/28/22 20:14	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		630000	310000	ng/L		10/18/22 21:48	10/28/22 20:14	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		250000	58000	ng/L		10/18/22 21:48	10/28/22 20:14	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		250000	110000	ng/L		10/18/22 21:48	10/28/22 20:14	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		250000	55000	ng/L		10/18/22 21:48	10/28/22 20:14	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		500000	180000	ng/L		10/18/22 21:48	10/28/22 20:14	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		250000	110000	ng/L		10/18/22 21:48	10/28/22 20:14	1
9CI-PF3ONS	ND		250000	30000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		500000	190000	ng/L		10/18/22 21:48	10/28/22 20:14	1
11CI-PF3OUdS	ND		250000	40000	ng/L		10/18/22 21:48	10/28/22 20:14	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		250000	50000	ng/L		10/18/22 21:48	10/28/22 20:14	1
3:3 FTCA	ND		250000	55000	ng/L		10/18/22 21:48	10/28/22 20:14	1
5:3 FTCA	ND		250000	40000	ng/L		10/18/22 21:48	10/28/22 20:14	1
7:3 FTCA	ND		250000	70000	ng/L		10/18/22 21:48	10/28/22 20:14	1

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Client Sample Results

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_WG_t0

Lab Sample ID: 320-93078-5

Date Collected: 10/06/22 09:55

Matrix: Water

Date Received: 10/11/22 10:22

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		250000	80000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		250000	35000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	+	250000	35000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		250000	35000	ng/L		10/18/22 21:48	10/28/22 20:14	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	99		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C4 PFBA	103		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C5 PFPeA	103		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C2 PFHxA	109		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C4 PFHpA	109		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C5 PFNA	111		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C2 PFDA	113		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C2 PFUnA	120		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C2 PFDoA	108		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C2 PFTeDA	113		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C3 PFBS	110		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C4 PFOS	115		25 - 150				10/18/22 21:48	10/28/22 20:14	1
d3-NMeFOSAA	107		25 - 150				10/18/22 21:48	10/28/22 20:14	1
d5-NEtFOSAA	115		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C2 4:2 FTS	0		0 - 10				10/18/22 21:48	10/28/22 20:14	1
13C2 6:2 FTS	106		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C2 8:2 FTS	123		25 - 150				10/18/22 21:48	10/28/22 20:14	1
d-N-MeFOSA-M	47		25 - 150				10/18/22 21:48	10/28/22 20:14	1
d-N-EtFOSA-M	39		25 - 150				10/18/22 21:48	10/28/22 20:14	1
d7-N-MeFOSE-M	43		25 - 150				10/18/22 21:48	10/28/22 20:14	1
d9-N-EtFOSE-M	41		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C3 HFPO-DA	107		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C-6:2 FTCA	76		25 - 150				10/18/22 21:48	10/28/22 20:14	1
13C-8:2 FTCA	89		25 - 150				10/18/22 21:48	10/28/22 20:14	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	280000000	+	2500000	1100000	ng/L		10/18/22 21:48	11/12/22 22:03	10
Perfluorohexanesulfonic acid (PFHxS)	59000000		2500000	220000	ng/L		10/18/22 21:48	11/12/22 22:03	10
Perfluorooctanesulfonic acid (PFOS)	92000000		2500000	400000	ng/L		10/18/22 21:48	11/12/22 22:03	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	105		25 - 150				10/18/22 21:48	11/12/22 22:03	10
18O2 PFHxS	103		25 - 150				10/18/22 21:48	11/12/22 22:03	10
13C4 PFOS	102		25 - 150				10/18/22 21:48	11/12/22 22:03	10

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	5700000				ng/L			01/05/23 15:01	1
PFPA	5700000				ng/L			01/05/23 15:01	1
PFHxA	16000000				ng/L			01/05/23 15:01	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_WG_t0

Lab Sample ID: 320-93078-5

Date Collected: 10/06/22 09:55

Matrix: Water

Date Received: 10/11/22 10:22

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference) (Continued)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFHpA	490000				ng/L			01/05/23 15:01	1
PFOA	7500000				ng/L			01/05/23 15:01	1
PFNA	36000				ng/L			01/05/23 15:01	1
Total PFCA	39000000				ng/L			01/05/23 15:01	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	810000				ng/L			01/05/23 14:58	1
PFPA	5800000				ng/L			01/05/23 14:58	1
PFHxA	24000000				ng/L			01/05/23 14:58	1
PFHpA	15000000				ng/L			01/05/23 14:58	1
PFOA	270000000				ng/L			01/05/23 14:58	1
PFNA	1400000				ng/L			01/05/23 14:58	1
Total PFCA	320000000				ng/L			01/05/23 14:58	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	6500000				ng/L			01/05/23 15:00	1
PFPA	12000000				ng/L			01/05/23 15:00	1
PFHxA	40000000				ng/L			01/05/23 15:00	1
PFHpA	16000000				ng/L			01/05/23 15:00	1
PFOA	280000000				ng/L			01/05/23 15:00	1
PFNA	1400000				ng/L			01/05/23 15:00	1
Total PFCA	360000000				ng/L			01/05/23 15:00	1

Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: AFFF

Prep Type: Pre-Treatment

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	C4PFHA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)	PFDaA (25-150)
320-93078-3	ANG_1_t0	99	111	109	93	48	109	113	110
320-93078-4 - DL	ANG_5_t0								

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFTDA (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)	M242FTS (25-150)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)
320-93078-3	ANG_1_t0	114	108	112	126	178 *5+	156 *5+	57	44
320-93078-4 - DL	ANG_5_t0					104	55		

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	NMFM (25-150)	NEFM (25-150)	HFPODA (25-150)	MFHEA (25-150)	MFOEA (25-150)
320-93078-3	ANG_1_t0	34	34	89	77	71
320-93078-4 - DL	ANG_5_t0					

Surrogate Legend

- PFOSA = 13C8 FOSA
- PFBA = 13C4 PFBA
- PFPeA = 13C5 PFPeA
- C4PFHA = 13C4 PFHpA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDaA = 13C2 PFDaA
- PFTDA = 13C2 PFTeDA
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- M242FTS = 13C2 4:2 FTS
- M262FTS = 13C2 6:2 FTS
- M282FTS = 13C2 8:2 FTS
- dMeFOSA = d-N-MeFOSA-M
- dEtFOSA = d-N-EtFOSA-M
- NMFM = d7-N-MeFOSE-M
- NEFM = d9-N-EtFOSE-M
- HFPODA = 13C3 HFPO-DA
- MFHEA = 13C-6:2 FTCA
- MFOEA = 13C-8:2 FTCA

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: AFFF

Prep Type: Pre-Treatment

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFHxA (25-150)	PFOA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)
320-93078-3 - DL	ANG_1_t0	96	109	95	108	101

Surrogate Legend

- PFHxA = 13C2 PFHxA
- PFOA = 13C4 PFOA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: AFFF

Prep Type: Pre-Treatment

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-93078-4	ANG_5_t0	43	172 *5+	176 *5+	166 *5+	166 *5+	101	136	38

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-93078-4	ANG_5_t0	180 *5+	42	155 *5+	171 *5+	175 *5+	153 *5+	162 *5+	169 *5+

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	M242FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFM (25-150)	NEFM (25-150)	HFPODA (25-150)	MFHEA (25-150)	MFOEA (25-150)
320-93078-4	ANG_5_t0	201 *5+	101	72	90	89	160 *5+	118	115

Surrogate Legend

- PFOSA = 13C8 FOSA
- PFBA = 13C4 PFBA
- PFPeA = 13C5 PFPeA
- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDoA = 13C2 PFDoA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- M242FTS = 13C2 4:2 FTS
- dMeFOSA = d-N-MeFOSA-M
- dEtFOSA = d-N-EtFOSA-M
- NMFM = d7-N-MeFOSE-M
- NEFM = d9-N-EtFOSE-M
- HFPODA = 13C3 HFPO-DA
- MFHEA = 13C-6:2 FTCA
- MFOEA = 13C-8:2 FTCA

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: AFFF

Prep Type: Pre-Treatment

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFOS (25-150)
320-93078-4 - RE	ANG_5_t0	148

Surrogate Legend

- PFOS = 13C4 PFOS

Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: AFFF

Prep Type: Post-Treatment

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-93078-3	ANG_1_t0	95						44	99
320-93078-3 - DL	ANG_1_t0		103	94	128	101	100		
320-93078-4	ANG_5_t0	85	89	89	89	96	102	97	94

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDaA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-93078-3	ANG_1_t0	121	103	106				107	110
320-93078-3 - DL	ANG_1_t0				97	121	126		
320-93078-4	ANG_5_t0	105	93	104	93	102	97	90	93

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	M242FTS (0-10)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFM (25-150)	NEFM (25-150)	HFPODA (25-150)
320-93078-3	ANG_1_t0	0	113	123	41	34	36	36	102
320-93078-3 - DL	ANG_1_t0								
320-93078-4	ANG_5_t0	0	124	102	39	34	35	38	96

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	MFHEA (25-150)	MFOEA (25-150)
320-93078-3	ANG_1_t0	75	77
320-93078-3 - DL	ANG_1_t0		
320-93078-4	ANG_5_t0	69	74

Surrogate Legend

- PFOSA = 13C8 FOSA
- PFBA = 13C4 PFBA
- PFPeA = 13C5 PFPeA
- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDaA = 13C2 PFDaA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- M242FTS = 13C2 4:2 FTS
- M262FTS = 13C2 6:2 FTS
- M282FTS = 13C2 8:2 FTS
- dMeFOSA = d-N-MeFOSA-M
- dEtFOSA = d-N-EtFOSA-M
- NMFM = d7-N-MeFOSE-M
- NEFM = d9-N-EtFOSE-M
- HFPODA = 13C3 HFPO-DA
- MFHEA = 13C-6:2 FTCA
- MFOEA = 13C-8:2 FTCA

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Pre-Treatment

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-93078-1	NAS_J_t0	86	95	94	97	97	97	91	90
320-93078-2	NAS_O_t0	88	102	100	94	102	99	91	97
320-93078-2 - DL	NAS_O_t0								
320-93078-5	NAS_WG_t0	102	108	106	108	108		103	107
320-93078-5 - DL	NAS_WG_t0						102		
LCS 320-625840/2-A	Lab Control Sample	86	93	91	94	97	100	90	92
LCS 320-633658/2-A	Lab Control Sample								
LCSD 320-625840/3-A	Lab Control Sample Dup	84	91	89	93	97	95	90	89
LCSD 320-633658/3-A	Lab Control Sample Dup								
MB 320-625840/1-A	Method Blank	86	97	97	100	105	101	93	92
MB 320-633658/1-A	Method Blank								

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-93078-1	NAS_J_t0	102	91	94	92	101	92	87	89
320-93078-2	NAS_O_t0	102	94	98	95	100	96	91	89
320-93078-2 - DL	NAS_O_t0						105		
320-93078-5	NAS_WG_t0	115	105	111	111		113	106	110
320-93078-5 - DL	NAS_WG_t0					108	99		
LCS 320-625840/2-A	Lab Control Sample	98	89	97	94	108	95	85	89
LCS 320-633658/2-A	Lab Control Sample						85		
LCSD 320-625840/3-A	Lab Control Sample Dup	94	89	95	91	101	94	92	85
LCSD 320-633658/3-A	Lab Control Sample Dup						84		
MB 320-625840/1-A	Method Blank	104	94	94	96	105	96	91	98
MB 320-633658/1-A	Method Blank						92		

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		M242FTS (25-150)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFM (25-150)	NEFM (25-150)	HFPODA (25-150)
320-93078-1	NAS_J_t0	112	117	109	47	37	26	28	96
320-93078-2	NAS_O_t0	111		109	46	37	28	27	99
320-93078-2 - DL	NAS_O_t0		106						
320-93078-5	NAS_WG_t0	131	108	122	54	42	31	33	108
320-93078-5 - DL	NAS_WG_t0								
LCS 320-625840/2-A	Lab Control Sample	108	126	104	47	36	26	26	96
LCS 320-633658/2-A	Lab Control Sample								
LCSD 320-625840/3-A	Lab Control Sample Dup	109	119	100	46	34	25	26	96
LCSD 320-633658/3-A	Lab Control Sample Dup								
MB 320-625840/1-A	Method Blank	110	125	110	48	37	31	32	102
MB 320-633658/1-A	Method Blank								

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)	
		MFHEA (25-150)	MFOEA (25-150)
320-93078-1	NAS_J_t0	69	83
320-93078-2	NAS_O_t0	71	82
320-93078-2 - DL	NAS_O_t0		
320-93078-5	NAS_WG_t0	76	77
320-93078-5 - DL	NAS_WG_t0		
LCS 320-625840/2-A	Lab Control Sample	68	72
LCS 320-633658/2-A	Lab Control Sample		

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Isotope Dilution Summary

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Water

Prep Type: Pre-Treatment

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)	
		MFHEA (25-150)	MFOEA (25-150)
LCSD 320-625840/3-A	Lab Control Sample Dup	68	70
LCSD 320-633658/3-A	Lab Control Sample Dup		
MB 320-625840/1-A	Method Blank	74	75
MB 320-633658/1-A	Method Blank		

Surrogate Legend

- PFOSA = 13C8 FOSA
- PFBA = 13C4 PFBA
- PFPeA = 13C5 PFPeA
- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDaA = 13C2 PFDaA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- M242FTS = 13C2 4:2 FTS
- M262FTS = 13C2 6:2 FTS
- M282FTS = 13C2 8:2 FTS
- dMeFOSA = d-N-MeFOSA-M
- dEtFOSA = d-N-EtFOSA-M
- NMFM = d7-N-MeFOSE-M
- NEFM = d9-N-EtFOSE-M
- HFPODA = 13C3 HFPO-DA
- MFHEA = 13C-6:2 FTCA
- MFOEA = 13C-8:2 FTCA

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Post-Treatment

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-93078-1	NAS_J_t0	87	89	91	91	99	100	93	92
320-93078-2	NAS_O_t0	87	94	91		95	98	90	95
320-93078-2 - DL	NAS_O_t0				92				
320-93078-5	NAS_WG_t0	99	103	103	109	109		111	113
320-93078-5 - DL	NAS_WG_t0						105		
LCS 320-625841/2-A	Lab Control Sample	85	88	88	95	94	98	93	93
LCSD 320-625841/3-A	Lab Control Sample Dup	90	91	87	98	100	103	93	94
MB 320-625841/1-A	Method Blank	87	89	95	92	100	100	95	92

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFUnA (25-150)	PFDaA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-93078-1	NAS_J_t0	102	94	95	94	103	93	91	98

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Water

Prep Type: Post-Treatment

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-93078-2	NAS_O_t0	100	92	100	94	97	92	92	96
320-93078-2 - DL	NAS_O_t0						104		
320-93078-5	NAS_WG_t0	120	108	113	110		115	107	115
320-93078-5 - DL	NAS_WG_t0					103	102		
LCS 320-625841/2-A	Lab Control Sample	99	92	98	92	104	94	89	96
LCSD 320-625841/3-A	Lab Control Sample Dup	103	96	100	99	106	99	92	99
MB 320-625841/1-A	Method Blank	100	94	97	96	107	94	91	93

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	M242FTS (0-10)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFm (25-150)	NEFM (25-150)	HFPODA (25-150)
320-93078-1	NAS_J_t0	0	124	107	36	31	33	32	91
320-93078-2	NAS_O_t0	0	119	107	38	32	34	36	94
320-93078-2 - DL	NAS_O_t0								
320-93078-5	NAS_WG_t0	0	106	123	47	39	43	41	107
320-93078-5 - DL	NAS_WG_t0								
LCS 320-625841/2-A	Lab Control Sample	0	108	98	33	28	29	29	95
LCSD 320-625841/3-A	Lab Control Sample Dup	0	120	104	41	32	33	33	99
MB 320-625841/1-A	Method Blank	0	114	99	35	30	32	30	98

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	MFHEA (25-150)	MFOEA (25-150)
320-93078-1	NAS_J_t0	71	75
320-93078-2	NAS_O_t0	67	74
320-93078-2 - DL	NAS_O_t0		
320-93078-5	NAS_WG_t0	76	89
320-93078-5 - DL	NAS_WG_t0		
LCS 320-625841/2-A	Lab Control Sample	73	72
LCSD 320-625841/3-A	Lab Control Sample Dup	78	76
MB 320-625841/1-A	Method Blank	73	75

Surrogate Legend

- PFOSA = 13C8 FOSA
- PFBA = 13C4 PFBA
- PFPeA = 13C5 PFPeA
- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDoA = 13C2 PFDoA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- M242FTS = 13C2 4:2 FTS
- M262FTS = 13C2 6:2 FTS
- M282FTS = 13C2 8:2 FTS

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Isotope Dilution Summary

Client: Enspired Solutions

Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

dMeFOSA = d-N-MeFOSA-M

dEtFOSA = d-N-EtFOSA-M

NMFM = d7-N-MeFOSE-M

NEFM = d9-N-EtFOSE-M

HFPODA = 13C3 HFPO-DA

MFHEA = 13C-6:2 FTCA

MFOEA = 13C-8:2 FTCA

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-625840/1-A
Matrix: Water
Analysis Batch: 628774

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 625840

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorobutanoic acid (PFBA)	ND		13	6.0	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluoropentanoic acid (PFPeA)	ND		5.0	1.2	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluorohexanoic acid (PFHxA)	ND		5.0	1.4	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluoroheptanoic acid (PFHpA)	ND		5.0	0.63	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluorooctanoic acid (PFOA)	ND		5.0	2.1	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluorononanoic acid (PFNA)	ND		5.0	0.68	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluorodecanoic acid (PFDA)	ND		5.0	0.78	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0	2.8	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluorododecanoic acid (PFDoA)	ND		5.0	1.4	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluorotridecanoic acid (PFTrDA)	ND		5.0	3.2	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0	0.73	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluorobutanesulfonic acid (PFBS)	ND		5.0	0.50	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0	0.75	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluorohexanesulfonic acid (PFHxS)	0.466	J	5.0	0.43	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0	0.48	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluorooctanesulfonic acid (PFOS)	9.19		5.0	0.80	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0	0.40	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0	1.4	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0	2.4	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0	0.88	ng/L		10/18/22 20:59	10/28/22 05:00	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13	3.0	ng/L		10/18/22 20:59	10/28/22 05:00	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13	3.3	ng/L		10/18/22 20:59	10/28/22 05:00	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0	0.60	ng/L		10/18/22 20:59	10/28/22 05:00	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13	6.3	ng/L		10/18/22 20:59	10/28/22 05:00	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0	1.2	ng/L		10/18/22 20:59	10/28/22 05:00	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0	2.2	ng/L		10/18/22 20:59	10/28/22 05:00	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0	1.1	ng/L		10/18/22 20:59	10/28/22 05:00	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10	3.5	ng/L		10/18/22 20:59	10/28/22 05:00	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0	2.2	ng/L		10/18/22 20:59	10/28/22 05:00	1
9Cl-PF3ONS	ND		5.0	0.60	ng/L		10/18/22 20:59	10/28/22 05:00	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10	3.8	ng/L		10/18/22 20:59	10/28/22 05:00	1
11Cl-PF3OUdS	ND		5.0	0.80	ng/L		10/18/22 20:59	10/28/22 05:00	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0	1.0	ng/L		10/18/22 20:59	10/28/22 05:00	1
3:3 FTCA	ND		5.0	1.1	ng/L		10/18/22 20:59	10/28/22 05:00	1
5:3 FTCA	ND		5.0	0.80	ng/L		10/18/22 20:59	10/28/22 05:00	1
7:3 FTCA	ND		5.0	1.4	ng/L		10/18/22 20:59	10/28/22 05:00	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0	1.6	ng/L		10/18/22 20:59	10/28/22 05:00	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-625840/1-A
Matrix: Water
Analysis Batch: 628774

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 625840

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		5.0	0.70	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0	0.70	ng/L		10/18/22 20:59	10/28/22 05:00	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		5.0	0.70	ng/L		10/18/22 20:59	10/28/22 05:00	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	86		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C4 PFBA	97		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C5 PFPeA	97		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C2 PFHxA	100		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C4 PFHpA	105		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C4 PFOA	101		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C5 PFNA	93		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C2 PFDA	92		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C2 PFUnA	104		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C2 PFDoA	94		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C2 PFTeDA	94		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C3 PFBS	96		25 - 150	10/18/22 20:59	10/28/22 05:00	1
18O2 PFHxS	105		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C4 PFOS	96		25 - 150	10/18/22 20:59	10/28/22 05:00	1
d3-NMeFOSAA	91		25 - 150	10/18/22 20:59	10/28/22 05:00	1
d5-NEtFOSAA	98		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C2 4:2 FTS	110		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C2 6:2 FTS	125		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C2 8:2 FTS	110		25 - 150	10/18/22 20:59	10/28/22 05:00	1
d-N-MeFOSA-M	48		25 - 150	10/18/22 20:59	10/28/22 05:00	1
d-N-EtFOSA-M	37		25 - 150	10/18/22 20:59	10/28/22 05:00	1
d7-N-MeFOSE-M	31		25 - 150	10/18/22 20:59	10/28/22 05:00	1
d9-N-EtFOSE-M	32		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C3 HFPO-DA	102		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C-6:2 FTCA	74		25 - 150	10/18/22 20:59	10/28/22 05:00	1
13C-8:2 FTCA	75		25 - 150	10/18/22 20:59	10/28/22 05:00	1

Lab Sample ID: LCS 320-625840/2-A
Matrix: Water
Analysis Batch: 628774

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 625840

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	100	116		ng/L		116	76 - 136
Perfluoropentanoic acid (PFPeA)	100	103		ng/L		103	71 - 131
Perfluorohexanoic acid (PFHxA)	100	106		ng/L		106	73 - 133
Perfluoroheptanoic acid (PFHpA)	100	105		ng/L		105	72 - 132
Perfluorooctanoic acid (PFOA)	100	102		ng/L		102	70 - 130
Perfluorononanoic acid (PFNA)	100	102		ng/L		102	75 - 135
Perfluorodecanoic acid (PFDA)	100	97.8		ng/L		98	76 - 136
Perfluoroundecanoic acid (PFUnA)	100	95.3		ng/L		95	68 - 128

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-625840/2-A
Matrix: Water
Analysis Batch: 628774

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 625840

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorododecanoic acid (PFDoA)	100	106		ng/L		106	71 - 131
Perfluorotridecanoic acid (PFTrDA)	100	107		ng/L		107	71 - 131
Perfluorotetradecanoic acid (PFTeA)	100	91.6		ng/L		92	70 - 130
Perfluorobutanesulfonic acid (PFBS)	88.8	87.1		ng/L		98	67 - 127
Perfluoropentanesulfonic acid (PFPeS)	93.8	99.0		ng/L		105	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	91.2	87.6		ng/L		96	59 - 119
Perfluoroheptanesulfonic acid (PFHpS)	95.4	109		ng/L		114	76 - 136
Perfluorooctanesulfonic acid (PFOS)	93.0	95.7		ng/L		103	70 - 130
Perfluorononanesulfonic acid (PFNS)	96.2	94.4		ng/L		98	75 - 135
Perfluorodecanesulfonic acid (PFDS)	96.4	92.5		ng/L		96	71 - 131
Perfluorododecanesulfonic acid (PFDoS)	97.0	92.1		ng/L		95	67 - 127
Perfluorooctanesulfonamide (FOSA)	100	96.2		ng/L		96	73 - 133
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	106		ng/L		106	76 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	101		ng/L		101	76 - 136
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	108		ng/L		116	79 - 139
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	92.9		ng/L		98	59 - 175
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	102		ng/L		106	75 - 135
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	52.6	*-	ng/L		53	78 - 138
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	55.1	*-	ng/L		55	67 - 154
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	104		ng/L		104	70 - 130
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	102		ng/L		102	71 - 131
9CI-PF3ONS	93.4	88.4		ng/L		95	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	98.4		ng/L		98	51 - 173
11CI-PF3OUdS	94.4	94.2		ng/L		100	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	105		ng/L		111	79 - 139
3:3 FTCA	100	86.2		ng/L		86	70 - 130
5:3 FTCA	100	137	*+	ng/L		137	70 - 130
7:3 FTCA	100	112		ng/L		112	70 - 130
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	99.8		ng/L		100	70 - 130
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	99.8		ng/L		100	70 - 130

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-625840/2-A
Matrix: Water
Analysis Batch: 628774

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 625840

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	99.6		ng/L		100	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	89.2	84.6		ng/L		95	70 - 130

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
13C8 FOSA	86		25 - 150
13C4 PFBA	93		25 - 150
13C5 PFPeA	91		25 - 150
13C2 PFHxA	94		25 - 150
13C4 PFHpA	97		25 - 150
13C4 PFOA	100		25 - 150
13C5 PFNA	90		25 - 150
13C2 PFDA	92		25 - 150
13C2 PFUnA	98		25 - 150
13C2 PFDoA	89		25 - 150
13C2 PFTeDA	97		25 - 150
13C3 PFBS	94		25 - 150
18O2 PFHxS	108		25 - 150
13C4 PFOS	95		25 - 150
d3-NMeFOSAA	85		25 - 150
d5-NEtFOSAA	89		25 - 150
13C2 4:2 FTS	108		25 - 150
13C2 6:2 FTS	126		25 - 150
13C2 8:2 FTS	104		25 - 150
d-N-MeFOSA-M	47		25 - 150
d-N-EtFOSA-M	36		25 - 150
d7-N-MeFOSE-M	26		25 - 150
d9-N-EtFOSE-M	26		25 - 150
13C3 HFPO-DA	96		25 - 150
13C-6:2 FTCA	68		25 - 150
13C-8:2 FTCA	72		25 - 150

Lab Sample ID: LCSD 320-625840/3-A
Matrix: Water
Analysis Batch: 628774

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 625840

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	
								RPD	Limit
Perfluorobutanoic acid (PFBA)	100	114		ng/L		114	76 - 136	2	30
Perfluoropentanoic acid (PFPeA)	100	106		ng/L		106	71 - 131	3	30
Perfluorohexanoic acid (PFHxA)	100	109		ng/L		109	73 - 133	3	30
Perfluoroheptanoic acid (PFHpA)	100	106		ng/L		106	72 - 132	1	30
Perfluorooctanoic acid (PFOA)	100	104		ng/L		104	70 - 130	3	30
Perfluorononanoic acid (PFNA)	100	103		ng/L		103	75 - 135	1	30
Perfluorodecanoic acid (PFDA)	100	102		ng/L		102	76 - 136	4	30
Perfluoroundecanoic acid (PFUnA)	100	102		ng/L		102	68 - 128	7	30
Perfluorododecanoic acid (PFDoA)	100	106		ng/L		106	71 - 131	0	30

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-625840/3-A
Matrix: Water
Analysis Batch: 628774

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 625840

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorotridecanoic acid (PFTTrDA)	100	102		ng/L		102	71 - 131	4	30
Perfluorotetradecanoic acid (PFTeA)	100	94.3		ng/L		94	70 - 130	3	30
Perfluorobutanesulfonic acid (PFBS)	88.8	92.6		ng/L		104	67 - 127	6	30
Perfluoropentanesulfonic acid (PFPeS)	93.8	100		ng/L		107	66 - 126	1	30
Perfluorohexanesulfonic acid (PFHxS)	91.2	88.6		ng/L		97	59 - 119	1	30
Perfluoroheptanesulfonic acid (PFHpS)	95.4	104		ng/L		109	76 - 136	4	30
Perfluorooctanesulfonic acid (PFOS)	93.0	120		ng/L		129	70 - 130	22	30
Perfluorononanesulfonic acid (PFNS)	96.2	92.5		ng/L		96	75 - 135	2	30
Perfluorodecanesulfonic acid (PFDS)	96.4	93.6		ng/L		97	71 - 131	1	30
Perfluorododecanesulfonic acid (PFDoS)	97.0	92.1		ng/L		95	67 - 127	0	30
Perfluorooctanesulfonamide (FOSA)	100	99.8		ng/L		100	73 - 133	4	30
N-methylperfluorooctanesulfonamide (NMeFOSAA)	100	100		ng/L		100	76 - 136	5	30
N-ethylperfluorooctanesulfonamide (NEtFOSAA)	100	103		ng/L		103	76 - 136	1	30
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	116		ng/L		124	79 - 139	7	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	98.3		ng/L		103	59 - 175	6	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	103		ng/L		107	75 - 135	1	30
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	54.1	*-	ng/L		54	78 - 138	3	30
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	56.4	*-	ng/L		56	67 - 154	2	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	93.8		ng/L		94	70 - 130	11	30
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	95.4		ng/L		95	71 - 131	6	30
9CI-PF3ONS	93.4	88.9		ng/L		95	75 - 135	1	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	97.2		ng/L		97	51 - 173	1	30
11CI-PF3OUdS	94.4	92.2		ng/L		98	54 - 114	2	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	102		ng/L		108	79 - 139	3	30
3:3 FTCA	100	94.8		ng/L		95	70 - 130	10	30
5:3 FTCA	100	136	*+	ng/L		136	70 - 130	1	30
7:3 FTCA	100	114		ng/L		114	70 - 130	1	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	103		ng/L		103	70 - 130	3	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	102		ng/L		102	70 - 130	2	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	103		ng/L		103	70 - 130	3	30

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-625840/3-A
Matrix: Water
Analysis Batch: 628774

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 625840

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	89.2	85.1		ng/L		95	70 - 130	1	30
LCSD LCSD									
Isotope Dilution	%Recovery	Qualifier	Limits						
13C8 FOSA	84		25 - 150						
13C4 PFBA	91		25 - 150						
13C5 PFPeA	89		25 - 150						
13C2 PFHxA	93		25 - 150						
13C4 PFHpA	97		25 - 150						
13C4 PFOA	95		25 - 150						
13C5 PFNA	90		25 - 150						
13C2 PFDA	89		25 - 150						
13C2 PFUnA	94		25 - 150						
13C2 PFDoA	89		25 - 150						
13C2 PFTeDA	95		25 - 150						
13C3 PFBS	91		25 - 150						
18O2 PFHxS	101		25 - 150						
13C4 PFOS	94		25 - 150						
d3-NMeFOSAA	92		25 - 150						
d5-NEtFOSAA	85		25 - 150						
13C2 4:2 FTS	109		25 - 150						
13C2 6:2 FTS	119		25 - 150						
13C2 8:2 FTS	100		25 - 150						
d-N-MeFOSA-M	46		25 - 150						
d-N-EtFOSA-M	34		25 - 150						
d7-N-MeFOSE-M	25		25 - 150						
d9-N-EtFOSE-M	26		25 - 150						
13C3 HFPO-DA	96		25 - 150						
13C-6:2 FTCA	68		25 - 150						
13C-8:2 FTCA	70		25 - 150						

Lab Sample ID: MB 320-633658/1-A
Matrix: Water
Analysis Batch: 635844

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 633658

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		50	8.0	ng/L		11/17/22 12:23	11/28/22 23:15	1
MB MB									
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOS	92		25 - 150				11/17/22 12:23	11/28/22 23:15	1

Lab Sample ID: LCS 320-633658/2-A
Matrix: Water
Analysis Batch: 635844

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 633658

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorooctanesulfonic acid (PFOS)	93.0	105		ng/L		113	70 - 130

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
13C4 PFOS	85		25 - 150

Lab Sample ID: LCSD 320-633658/3-A
Matrix: Water
Analysis Batch: 635844

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 633658

Analyte	Spike Added	LCSD LCSD		Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
		Result	Qualifier						
Perfluorooctanesulfonic acid (PFOS)	93.0	106		ng/L		114	70 - 130	1	30

Isotope Dilution	LCSD LCSD		Limits
	%Recovery	Qualifier	
13C4 PFOS	84		25 - 150

Lab Sample ID: MB 320-625841/1-A
Matrix: Water
Analysis Batch: 628781

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 625841

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorobutanoic acid (PFBA)	20.0		13	6.0	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluoropentanoic acid (PFPeA)	1.28	J	5.0	1.2	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluorohexanoic acid (PFHxA)	1.99	J I	5.0	1.4	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluoroheptanoic acid (PFHpA)	0.907	J	5.0	0.63	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluorooctanoic acid (PFOA)	ND		5.0	2.1	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluorononanoic acid (PFNA)	ND		5.0	0.68	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluorodecanoic acid (PFDA)	ND		5.0	0.78	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0	2.8	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluorododecanoic acid (PFDoA)	ND		5.0	1.4	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluorotridecanoic acid (PFTTrDA)	ND		5.0	3.2	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluorotetradecanoic acid (PFTeA)	0.904	J	5.0	0.73	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluorobutanesulfonic acid (PFBS)	ND		5.0	0.50	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0	0.75	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluorohexanesulfonic acid (PFHxS)	ND		5.0	0.43	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0	0.48	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluorooctanesulfonic acid (PFOS)	ND		5.0	0.80	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0	0.40	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0	1.4	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0	2.4	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0	0.88	ng/L		10/18/22 21:48	10/28/22 17:52	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13	3.0	ng/L		10/18/22 21:48	10/28/22 17:52	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13	3.3	ng/L		10/18/22 21:48	10/28/22 17:52	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0	0.60	ng/L		10/18/22 21:48	10/28/22 17:52	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13	6.3	ng/L		10/18/22 21:48	10/28/22 17:52	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0	1.2	ng/L		10/18/22 21:48	10/28/22 17:52	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0	2.2	ng/L		10/18/22 21:48	10/28/22 17:52	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0	1.1	ng/L		10/18/22 21:48	10/28/22 17:52	1

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-625841/1-A
Matrix: Water
Analysis Batch: 628781

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 625841

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10	3.5	ng/L		10/18/22 21:48	10/28/22 17:52	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0	2.2	ng/L		10/18/22 21:48	10/28/22 17:52	1
9CI-PF3ONS	ND		5.0	0.60	ng/L		10/18/22 21:48	10/28/22 17:52	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10	3.8	ng/L		10/18/22 21:48	10/28/22 17:52	1
11CI-PF3OUdS	ND		5.0	0.80	ng/L		10/18/22 21:48	10/28/22 17:52	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0	1.0	ng/L		10/18/22 21:48	10/28/22 17:52	1
3:3 FTCA	ND		5.0	1.1	ng/L		10/18/22 21:48	10/28/22 17:52	1
5:3 FTCA	ND		5.0	0.80	ng/L		10/18/22 21:48	10/28/22 17:52	1
7:3 FTCA	ND		5.0	1.4	ng/L		10/18/22 21:48	10/28/22 17:52	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0	1.6	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		5.0	0.70	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0	0.70	ng/L		10/18/22 21:48	10/28/22 17:52	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		5.0	0.70	ng/L		10/18/22 21:48	10/28/22 17:52	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	87		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C4 PFBA	89		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C5 PFPeA	95		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C2 PFHxA	92		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C4 PFHpA	100		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C4 PFOA	100		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C5 PFNA	95		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C2 PFDA	92		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C2 PFUnA	100		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C2 PFDoA	94		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C2 PFTeDA	97		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C3 PFBS	96		25 - 150	10/18/22 21:48	10/28/22 17:52	1
18O2 PFHxS	107		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C4 PFOS	94		25 - 150	10/18/22 21:48	10/28/22 17:52	1
d3-NMeFOSAA	91		25 - 150	10/18/22 21:48	10/28/22 17:52	1
d5-NEtFOSAA	93		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C2 4:2 FTS	0		0 - 10	10/18/22 21:48	10/28/22 17:52	1
13C2 6:2 FTS	114		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C2 8:2 FTS	99		25 - 150	10/18/22 21:48	10/28/22 17:52	1
d-N-MeFOSA-M	35		25 - 150	10/18/22 21:48	10/28/22 17:52	1
d-N-EtFOSA-M	30		25 - 150	10/18/22 21:48	10/28/22 17:52	1
d7-N-MeFOSE-M	32		25 - 150	10/18/22 21:48	10/28/22 17:52	1
d9-N-EtFOSE-M	30		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C3 HFPO-DA	98		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C-6:2 FTCA	73		25 - 150	10/18/22 21:48	10/28/22 17:52	1
13C-8:2 FTCA	75		25 - 150	10/18/22 21:48	10/28/22 17:52	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-625841/2-A
Matrix: Water
Analysis Batch: 628781

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 625841

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	100	309	*+	ng/L		309	93 - 153
Perfluoropentanoic acid (PFPeA)	100	238	*+	ng/L		238	85 - 145
Perfluorohexanoic acid (PFHxA)	100	373	*+	ng/L		373	81 - 141
Perfluoroheptanoic acid (PFHpA)	100	261	*+	ng/L		261	104 - 171
Perfluorooctanoic acid (PFOA)	100	640	*+	ng/L		640	158 - 454
Perfluorononanoic acid (PFNA)	100	176	*+	ng/L		176	66 - 126
Perfluorodecanoic acid (PFDA)	100	185	*+	ng/L		185	65 - 125
Perfluoroundecanoic acid (PFUnA)	100	104		ng/L		104	57 - 117
Perfluorododecanoic acid (PFDoA)	100	103		ng/L		103	66 - 126
Perfluorotridecanoic acid (PFTTrDA)	100	103		ng/L		103	65 - 136
Perfluorotetradecanoic acid (PFTeA)	100	93.2		ng/L		93	63 - 123
Perfluorobutanesulfonic acid (PFBS)	88.8	89.9		ng/L		101	75 - 135
Perfluoropentanesulfonic acid (PFPeS)	93.8	98.5		ng/L		105	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	91.2	95.7		ng/L		105	64 - 124
Perfluoroheptanesulfonic acid (PFHpS)	95.4	108		ng/L		113	70 - 131
Perfluorooctanesulfonic acid (PFOS)	93.0	94.8		ng/L		102	68 - 128
Perfluorononanesulfonic acid (PFNS)	96.2	95.3		ng/L		99	70 - 130
Perfluorodecanesulfonic acid (PFDS)	96.4	92.5		ng/L		96	66 - 126
Perfluorododecanesulfonic acid (PFDoS)	97.0	96.1		ng/L		99	67 - 127
Perfluorooctanesulfonamide (FOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	ND		ng/L		0	0 - 10
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	ND		ng/L		0	0 - 10
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	ND		ng/L		0	0 - 10
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	ND		ng/L		0	0 - 10
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	ND		ng/L		0	0 - 10
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	ND		ng/L		0	0 - 10
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	ND		ng/L		0	0 - 10
9CI-PF3ONS	93.4	83.3		ng/L		89	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	91.3		ng/L		91	51 - 173

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-625841/2-A
Matrix: Water
Analysis Batch: 628781

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 625841

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
11CI-PF3OUdS	94.4	67.0		ng/L		71	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	ND		ng/L		0	0 - 10
3:3 FTCA	100	ND		ng/L		0	0 - 10
5:3 FTCA	100	ND		ng/L		0	0 - 10
7:3 FTCA	100	ND		ng/L		0	0 - 10
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	100		ng/L		100	70 - 130
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	105		ng/L		105	70 - 130
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	171	*+	ng/L		171	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	89.2	85.2		ng/L		95	70 - 130

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C8 FOSA	85		25 - 150
13C4 PFBA	88		25 - 150
13C5 PFPeA	88		25 - 150
13C2 PFHxA	95		25 - 150
13C4 PFHpA	94		25 - 150
13C4 PFOA	98		25 - 150
13C5 PFNA	93		25 - 150
13C2 PFDA	93		25 - 150
13C2 PFUnA	99		25 - 150
13C2 PFDoA	92		25 - 150
13C2 PFTeDA	98		25 - 150
13C3 PFBS	92		25 - 150
18O2 PFHxS	104		25 - 150
13C4 PFOS	94		25 - 150
d3-NMeFOSAA	89		25 - 150
d5-NEtFOSAA	96		25 - 150
13C2 4:2 FTS	0		0 - 10
13C2 6:2 FTS	108		25 - 150
13C2 8:2 FTS	98		25 - 150
d-N-MeFOSA-M	33		25 - 150
d-N-EtFOSA-M	28		25 - 150
d7-N-MeFOSE-M	29		25 - 150
d9-N-EtFOSE-M	29		25 - 150
13C3 HFPO-DA	95		25 - 150
13C-6:2 FTCA	73		25 - 150
13C-8:2 FTCA	72		25 - 150

Lab Sample ID: LCSD 320-625841/3-A
Matrix: Water
Analysis Batch: 628781

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 625841

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	100	304	*+	ng/L		304	93 - 153	1	30
Perfluoropentanoic acid (PFPeA)	100	256	*+	ng/L		256	85 - 145	7	30

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-625841/3-A
Matrix: Water
Analysis Batch: 628781

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 625841

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	RPD Limit
							Limits	RPD		
Perfluorohexanoic acid (PFHxA)	100	381	*+	ng/L		381	81 - 141	2	30	
Perfluoroheptanoic acid (PFHpA)	100	262	*+	ng/L		262	104 - 171	1	30	
Perfluorooctanoic acid (PFOA)	100	538	*+	ng/L		538	158 - 454	17	30	
Perfluorononanoic acid (PFNA)	100	181	*+	ng/L		181	66 - 126	3	30	
Perfluorodecanoic acid (PFDA)	100	197	*+	ng/L		197	65 - 125	6	30	
Perfluoroundecanoic acid (PFUnA)	100	103		ng/L		103	57 - 117	1	30	
Perfluorododecanoic acid (PFDoA)	100	100		ng/L		100	66 - 126	3	30	
Perfluorotridecanoic acid (PFTrDA)	100	110		ng/L		110	65 - 136	7	30	
Perfluorotetradecanoic acid (PFTeA)	100	96.3		ng/L		96	63 - 123	3	30	
Perfluorobutanesulfonic acid (PFBS)	88.8	90.6		ng/L		102	75 - 135	1	30	
Perfluoropentanesulfonic acid (PFPeS)	93.8	100		ng/L		107	70 - 130	2	30	
Perfluorohexanesulfonic acid (PFHxS)	91.2	100		ng/L		110	64 - 124	4	30	
Perfluoroheptanesulfonic acid (PFHpS)	95.4	105		ng/L		110	70 - 131	3	30	
Perfluorooctanesulfonic acid (PFOS)	93.0	112		ng/L		120	68 - 128	17	30	
Perfluorononanesulfonic acid (PFNS)	96.2	92.1		ng/L		96	70 - 130	3	30	
Perfluorodecanesulfonic acid (PFDS)	96.4	94.2		ng/L		98	66 - 126	2	30	
Perfluorododecanesulfonic acid (PFDoS)	97.0	103		ng/L		106	67 - 127	7	30	
Perfluorooctanesulfonamide (FOSA)	100	ND		ng/L		0	0 - 10	NC	30	
N-methylperfluorooctanesulfonamide (NMeFOSAA)	100	ND		ng/L		0	0 - 10	NC	30	
N-ethylperfluorooctanesulfonamide (NEtFOSAA)	100	ND		ng/L		0	0 - 10	NC	30	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	ND		ng/L		0	0 - 10	NC	30	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	ND		ng/L		0	0 - 10	NC	30	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	ND		ng/L		0	0 - 10	NC	30	
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	ND		ng/L		0	0 - 10	NC	30	
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	ND		ng/L		0	0 - 10	NC	30	
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	ND		ng/L		0	0 - 10	NC	30	
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	ND		ng/L		0	0 - 10	NC	30	
9CI-PF3ONS	93.4	78.0		ng/L		84	75 - 135	6	30	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	89.9		ng/L		90	51 - 173	2	30	
11CI-PF3OUdS	94.4	70.1		ng/L		74	54 - 114	5	30	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	ND		ng/L		0	0 - 10	NC	30	

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-625841/3-A
Matrix: Water
Analysis Batch: 628781

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 625841

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
3:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
5:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
7:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	101		ng/L		101	70 - 130	1	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	111		ng/L		111	70 - 130	6	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	182	*+	ng/L		182	70 - 130	6	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	89.2	85.8		ng/L		96	70 - 130	1	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	LCSD Limits
13C8 FOSA	90		25 - 150
13C4 PFBA	91		25 - 150
13C5 PFPeA	87		25 - 150
13C2 PFHxA	98		25 - 150
13C4 PFHpA	100		25 - 150
13C4 PFOA	103		25 - 150
13C5 PFNA	93		25 - 150
13C2 PFDA	94		25 - 150
13C2 PFUnA	103		25 - 150
13C2 PFDoA	96		25 - 150
13C2 PFTeDA	100		25 - 150
13C3 PFBS	99		25 - 150
18O2 PFHxS	106		25 - 150
13C4 PFOS	99		25 - 150
d3-NMeFOSAA	92		25 - 150
d5-NEtFOSAA	99		25 - 150
13C2 4:2 FTS	0		0 - 10
13C2 6:2 FTS	120		25 - 150
13C2 8:2 FTS	104		25 - 150
d-N-MeFOSA-M	41		25 - 150
d-N-EtFOSA-M	32		25 - 150
d7-N-MeFOSE-M	33		25 - 150
d9-N-EtFOSE-M	33		25 - 150
13C3 HFPO-DA	99		25 - 150
13C-6:2 FTCA	78		25 - 150
13C-8:2 FTCA	76		25 - 150

QC Association Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

LCMS

Prep Batch: 625840

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-93078-1	NAS_J_t0	Pre-Treatment	Water	TOP Pre - Prep	
320-93078-2	NAS_O_t0	Pre-Treatment	Water	TOP Pre - Prep	
320-93078-2 - DL	NAS_O_t0	Pre-Treatment	Water	TOP Pre - Prep	
320-93078-3	ANG_1_t0	Pre-Treatment	AFFF	TOP Pre - Prep	
320-93078-3 - DL	ANG_1_t0	Pre-Treatment	AFFF	TOP Pre - Prep	
320-93078-4 - DL	ANG_5_t0	Pre-Treatment	AFFF	TOP Pre - Prep	
320-93078-4	ANG_5_t0	Pre-Treatment	AFFF	TOP Pre - Prep	
320-93078-5 - DL	NAS_WG_t0	Pre-Treatment	Water	TOP Pre - Prep	
320-93078-5	NAS_WG_t0	Pre-Treatment	Water	TOP Pre - Prep	
MB 320-625840/1-A	Method Blank	Pre-Treatment	Water	TOP Pre - Prep	
LCS 320-625840/2-A	Lab Control Sample	Pre-Treatment	Water	TOP Pre - Prep	
LCSD 320-625840/3-A	Lab Control Sample Dup	Pre-Treatment	Water	TOP Pre - Prep	

Prep Batch: 625841

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-93078-1	NAS_J_t0	Post-Treatment	Water	TOP Post Prep	
320-93078-2	NAS_O_t0	Post-Treatment	Water	TOP Post Prep	
320-93078-2 - DL	NAS_O_t0	Post-Treatment	Water	TOP Post Prep	
320-93078-3 - DL	ANG_1_t0	Post-Treatment	AFFF	TOP Post Prep	
320-93078-3	ANG_1_t0	Post-Treatment	AFFF	TOP Post Prep	
320-93078-4	ANG_5_t0	Post-Treatment	AFFF	TOP Post Prep	
320-93078-5 - DL	NAS_WG_t0	Post-Treatment	Water	TOP Post Prep	
320-93078-5	NAS_WG_t0	Post-Treatment	Water	TOP Post Prep	
MB 320-625841/1-A	Method Blank	Post-Treatment	Water	TOP Post Prep	
LCS 320-625841/2-A	Lab Control Sample	Post-Treatment	Water	TOP Post Prep	
LCSD 320-625841/3-A	Lab Control Sample Dup	Post-Treatment	Water	TOP Post Prep	

Analysis Batch: 628774

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-93078-1	NAS_J_t0	Pre-Treatment	Water	537 (modified)	625840
320-93078-2	NAS_O_t0	Pre-Treatment	Water	537 (modified)	625840
320-93078-3	ANG_1_t0	Pre-Treatment	AFFF	537 (modified)	625840
320-93078-4	ANG_5_t0	Pre-Treatment	AFFF	537 (modified)	625840
320-93078-5	NAS_WG_t0	Pre-Treatment	Water	537 (modified)	625840
MB 320-625840/1-A	Method Blank	Pre-Treatment	Water	537 (modified)	625840
LCS 320-625840/2-A	Lab Control Sample	Pre-Treatment	Water	537 (modified)	625840
LCSD 320-625840/3-A	Lab Control Sample Dup	Pre-Treatment	Water	537 (modified)	625840

Analysis Batch: 628781

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-93078-1	NAS_J_t0	Post-Treatment	Water	537 (modified)	625841
320-93078-2	NAS_O_t0	Post-Treatment	Water	537 (modified)	625841
320-93078-3	ANG_1_t0	Post-Treatment	AFFF	537 (modified)	625841
320-93078-4	ANG_5_t0	Post-Treatment	AFFF	537 (modified)	625841
320-93078-5	NAS_WG_t0	Post-Treatment	Water	537 (modified)	625841
MB 320-625841/1-A	Method Blank	Post-Treatment	Water	537 (modified)	625841
LCS 320-625841/2-A	Lab Control Sample	Post-Treatment	Water	537 (modified)	625841
LCSD 320-625841/3-A	Lab Control Sample Dup	Post-Treatment	Water	537 (modified)	625841

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QC Association Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

LCMS

Analysis Batch: 632828

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-93078-2 - DL	NAS_O_t0	Post-Treatment	Water	537 (modified)	625841
320-93078-2 - DL	NAS_O_t0	Pre-Treatment	Water	537 (modified)	625840
320-93078-3 - DL	ANG_1_t0	Post-Treatment	AFFF	537 (modified)	625841
320-93078-3 - DL	ANG_1_t0	Pre-Treatment	AFFF	537 (modified)	625840
320-93078-4 - DL	ANG_5_t0	Pre-Treatment	AFFF	537 (modified)	625840
320-93078-5 - DL	NAS_WG_t0	Post-Treatment	Water	537 (modified)	625841
320-93078-5 - DL	NAS_WG_t0	Pre-Treatment	Water	537 (modified)	625840

Prep Batch: 633658

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-93078-4 - RE	ANG_5_t0	Pre-Treatment	AFFF	TOP Pre - Prep	
MB 320-633658/1-A	Method Blank	Pre-Treatment	Water	TOP Pre - Prep	
LCS 320-633658/2-A	Lab Control Sample	Pre-Treatment	Water	TOP Pre - Prep	
LCSD 320-633658/3-A	Lab Control Sample Dup	Pre-Treatment	Water	TOP Pre - Prep	

Analysis Batch: 635844

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-633658/1-A	Method Blank	Pre-Treatment	Water	537 (modified)	633658
LCS 320-633658/2-A	Lab Control Sample	Pre-Treatment	Water	537 (modified)	633658
LCSD 320-633658/3-A	Lab Control Sample Dup	Pre-Treatment	Water	537 (modified)	633658

Analysis Batch: 636803

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-93078-4 - RE	ANG_5_t0	Pre-Treatment	AFFF	537 (modified)	633658

Analysis Batch: 644815

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-93078-1	NAS_J_t0	Pre-Treatment	Water	Total PFCA-Sum	
320-93078-2	NAS_O_t0	Pre-Treatment	Water	Total PFCA-Sum	
320-93078-3	ANG_1_t0	Pre-Treatment	AFFF	Total PFCA-Sum	
320-93078-4	ANG_5_t0	Pre-Treatment	AFFF	Total PFCA-Sum	
320-93078-5	NAS_WG_t0	Pre-Treatment	Water	Total PFCA-Sum	

Analysis Batch: 644816

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-93078-1	NAS_J_t0	Post-Treatment	Water	Total PFCA-Sum	
320-93078-2	NAS_O_t0	Post-Treatment	Water	Total PFCA-Sum	
320-93078-3	ANG_1_t0	Post-Treatment	AFFF	Total PFCA-Sum	
320-93078-4	ANG_5_t0	Post-Treatment	AFFF	Total PFCA-Sum	
320-93078-5	NAS_WG_t0	Post-Treatment	Water	Total PFCA-Sum	

Analysis Batch: 644817

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-93078-1	NAS_J_t0	Total/NA	Water	Total PFCA-Dif	
320-93078-2	NAS_O_t0	Total/NA	Water	Total PFCA-Dif	
320-93078-3	ANG_1_t0	Total/NA	AFFF	Total PFCA-Dif	
320-93078-4	ANG_5_t0	Total/NA	AFFF	Total PFCA-Dif	
320-93078-5	NAS_WG_t0	Total/NA	Water	Total PFCA-Dif	

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Lab Chronicle

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: NAS_J_t0

Lab Sample ID: 320-93078-1

Date Collected: 10/06/22 09:35

Matrix: Water

Date Received: 10/11/22 10:22

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Post-Treatment	Prep	TOP Post Prep			0.2 mL	10.0 mL	625841	10/18/22 21:48	JER	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	628781	10/28/22 19:33	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			0.2 mL	10.0 mL	625840	10/18/22 20:59	JER	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	628774	10/28/22 06:41	D1R	EET SAC
Total/NA	Analysis	Total PFCA-Dif		1			644817	01/05/23 15:01	MEO	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			644816	01/05/23 15:00	MEO	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			644815	01/05/23 14:58	MEO	EET SAC

Client Sample ID: NAS_O_t0

Lab Sample ID: 320-93078-2

Date Collected: 10/06/22 09:40

Matrix: Water

Date Received: 10/11/22 10:22

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Post-Treatment	Prep	TOP Post Prep			0.02 mL	10.0 mL	625841	10/18/22 21:48	JER	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	628781	10/28/22 19:43	D1R	EET SAC
Post-Treatment	Prep	TOP Post Prep	DL		0.02 mL	10.0 mL	625841	10/18/22 21:48	JER	EET SAC
Post-Treatment	Analysis	537 (modified)	DL	10	1 mL	1 mL	632828	11/12/22 21:52	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			0.02 mL	10.0 mL	625840	10/18/22 20:59	JER	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	628774	10/28/22 06:51	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep	DL		0.02 mL	10.0 mL	625840	10/18/22 20:59	JER	EET SAC
Pre-Treatment	Analysis	537 (modified)	DL	10	1 mL	1 mL	632828	11/12/22 20:21	D1R	EET SAC
Total/NA	Analysis	Total PFCA-Dif		1			644817	01/05/23 15:01	MEO	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			644816	01/05/23 15:00	MEO	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			644815	01/05/23 14:58	MEO	EET SAC

Client Sample ID: ANG_1_t0

Lab Sample ID: 320-93078-3

Date Collected: 10/06/22 09:45

Matrix: AFFF

Date Received: 10/11/22 10:22

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Post-Treatment	Prep	TOP Post Prep			0.002 mL	10.0 mL	625841	10/18/22 21:48	JER	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	628781	10/28/22 19:54	D1R	EET SAC
Post-Treatment	Prep	TOP Post Prep	DL		0.002 mL	10.0 mL	625841	10/18/22 21:48	JER	EET SAC
Post-Treatment	Analysis	537 (modified)	DL	100	1 mL	1 mL	632828	11/12/22 22:13	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			0.002 mL	10.0 mL	625840	10/18/22 20:59	JER	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	628774	10/28/22 07:01	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep	DL		0.002 mL	10.0 mL	625840	10/18/22 20:59	JER	EET SAC
Pre-Treatment	Analysis	537 (modified)	DL	100	1 mL	1 mL	632828	11/12/22 20:52	D1R	EET SAC
Total/NA	Analysis	Total PFCA-Dif		1			644817	01/05/23 15:01	MEO	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			644816	01/05/23 15:00	MEO	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			644815	01/05/23 14:58	MEO	EET SAC

Eurofins Sacramento

Lab Chronicle

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Client Sample ID: ANG_5_t0

Lab Sample ID: 320-93078-4

Date Collected: 10/06/22 09:50

Matrix: AFFF

Date Received: 10/11/22 10:22

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Post-Treatment	Prep	TOP Post Prep			0.00002 mL	10.0 mL	625841	10/18/22 21:48	JER	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	628781	10/28/22 18:53	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			0.02 mL	10.0 mL	625840	10/18/22 20:59	JER	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	628774	10/28/22 07:11	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep	DL		0.02 mL	10.0 mL	625840	10/18/22 20:59	JER	EET SAC
Pre-Treatment	Analysis	537 (modified)	DL	10	1 mL	1 mL	632828	11/12/22 20:32	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep	RE		0.02 mL	100.0 mL	633658	11/17/22 12:23	LN	EET SAC
Pre-Treatment	Analysis	537 (modified)	RE	1	1 mL	1 mL	636803	11/30/22 06:11	D1R	EET SAC
Total/NA	Analysis	Total PFCA-Dif		1			644817	01/05/23 15:01	MEO	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			644816	01/05/23 15:00	MEO	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			644815	01/05/23 14:58	MEO	EET SAC

Client Sample ID: NAS_WG_t0

Lab Sample ID: 320-93078-5

Date Collected: 10/06/22 09:55

Matrix: Water

Date Received: 10/11/22 10:22

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Post-Treatment	Prep	TOP Post Prep			0.002 mL	10.0 mL	625841	10/18/22 21:48	JER	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	628781	10/28/22 20:14	D1R	EET SAC
Post-Treatment	Prep	TOP Post Prep	DL		0.002 mL	10.0 mL	625841	10/18/22 21:48	JER	EET SAC
Post-Treatment	Analysis	537 (modified)	DL	10	1 mL	1 mL	632828	11/12/22 22:03	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			0.002 mL	10.0 mL	625840	10/18/22 20:59	JER	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	628774	10/28/22 07:21	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep	DL		0.002 mL	10.0 mL	625840	10/18/22 20:59	JER	EET SAC
Pre-Treatment	Analysis	537 (modified)	DL	10	1 mL	1 mL	632828	11/12/22 20:42	D1R	EET SAC
Total/NA	Analysis	Total PFCA-Dif		1			644817	01/05/23 15:01	MEO	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			644816	01/05/23 15:00	MEO	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			644815	01/05/23 14:58	MEO	EET SAC

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Laboratory: Eurofins Sacramento

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 (UST)	State	17-020	02-20-24
ANAB	Dept. of Defense ELAP	L2468	04-09-23
ANAB	Dept. of Energy	L2468.01	07-11-23
ANAB	ISO/IEC 17025	L2468	04-09-23
Arizona	State	AZ0708	08-11-23
Arkansas DEQ	State	88-0691	06-17-23
California	State	2897	01-19-23
Colorado	State	CA00044	08-31-23
Florida	NELAP	E87570	06-30-23
Georgia	State	4040	01-29-23
Hawaii	State	<cert No.>	01-29-23
Illinois	NELAP	200060	03-09-23
Kansas	NELAP	E-10375	10-31-23
Louisiana	NELAP	01944	06-30-23
Louisiana (All)	NELAP	01944	06-30-23
Maine	State	CA00004	09-19-23
Michigan	State	9947	01-31-23
Nevada	State	CA00044	07-31-23
New Hampshire	NELAP	2997	04-18-23
New Jersey	NELAP	CA005	06-30-23
New York	NELAP	11666	03-29-23
Ohio	State	41252	01-16-23
Oregon	NELAP	4040	01-29-23
Texas	NELAP	T104704399-23-17	05-31-23
US Fish & Wildlife	US Federal Programs	58448	04-30-23
USDA	US Federal Programs	P330-18-00239	01-23-23
Utah	NELAP	CA000442023-16	02-28-23
Virginia	NELAP	460278	03-14-23
Washington	State	C581	05-05-23
West Virginia (DW)	State	9930C	12-31-23
Wisconsin	State	998204680	08-14-23
Wyoming	State Program	8TMS-L	01-28-19 *

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

Method Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	EET SAC
Total PFCA-Dif	Total PFCA (Treatment Difference)	TAL SOP	EET SAC
Total PFCA-Sum	Total PFCA (Summary)	TAL SOP	EET SAC
TOP Post Prep	Solid-Phase Extraction (SPE)	SW846	EET SAC
TOP Pre - Prep	Solid-Phase Extraction (SPE)	SW846	EET SAC

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600



Sample Summary

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-93078-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-93078-1	NAS_J_t0	Water	10/06/22 09:35	10/11/22 10:22
320-93078-2	NAS_O_t0	Water	10/06/22 09:40	10/11/22 10:22
320-93078-3	ANG_1_t0	AFFF	10/06/22 09:45	10/11/22 10:22
320-93078-4	ANG_5_t0	AFFF	10/06/22 09:50	10/11/22 10:22
320-93078-5	NAS_WG_t0	Water	10/06/22 09:55	10/11/22 10:22

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Address: 4942 Dawn St.
Suite 104
East Lansing, MI 48823

Regulatory Program: DW NPDES RCRA Other: SUBMUNE TOX

Company Name: Enspired Solutions
 Address: 4942 Dawn St. Suite 104
 City/State/Zip: East Lansing, MI 48823
 Phone: 937-470-9410
 Fax: _____
 Project Name: ER21-ED-7569
 Site: _____
 P O #: _____

Project Manager: LAURE TURPEN Site Contact: SUZANNE WITT
 Tel/Email: SUZANNE.WITH@ENSPiRED.COM Date: 10/16/22
 Analysis Turnaround Time: _____
 TAT if different from Below: _____
 CALENDAR DAYS WORKING DAYS
 2 weeks 1 week 2 days 1 day

COC No: _____ of _____ COCs
 Sampler: _____
 For Lab Use Only:
 Walk-in Client: _____
 Lab Sampling: _____
 Job / SDG No.: _____

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Other
NAS-J-to	10/16/22	9:35	G	water	3	NN	TOP Assay (40 analysis)	see included data sheet
NAS-O-to	10/16/22	9:40	G	water	3	NN	300.0 Fluoride	
ANG-1-to	10/16/22	9:45	G	APFF	3	NN		
ANG-5-to	10/16/22	9:50	G	APFF	3	NN		
NAS-WG-to	10/16/22	9:55	G	water	3	NN		



320-93078 Chain of Custody

Preservation Used: 1=Ice 2=HCl; 3=H2SO4; 4=HNO3; 5=NaOH; 6=Other _____
 Possible Hazard Identification: _____
 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
 Non-Hazard Flammable Skin Irritant Poison B Unknown
 Special Instructions/QC Requirements & Comments: PLEASE USE MDL values as reporting limits

Relinquished by: Suzanne Witt Date/Time: 10/16/22 11:00
 Relinquished by: _____ Date/Time: _____
 Relinquished by: _____ Date/Time: _____
 Received by: Enspired Solutions Date/Time: 10/16/22 10:11:22
 Received by: _____ Date/Time: _____
 Received in Laboratory by: _____ Date/Time: _____

Therm ID No.: COB
 Date/Time: 10-11-22
 Date/Time: 10:11:22
 Date/Time: _____



Sample ID	Approximate total [PFAS] (ppm)	Approximate [Fluoride] (ppm)	Approximate [organic Fluorine] (ppm)	Other known constituents/notes
NAS_J_t0	0.236	0.097	0.169	This is a groundwater sample
NAS_O_t0	81.2	0.433	50	This is the foamate collected from groundwater foam fractionation
ANG_1_t0	3644	202	2337	This is a pure AFFF solution
ANG_5_t0	127	6.36	81	This is a pure AFFF solution
NAS_WG_t0	1053	1.17	702	This is an ion exchange still bottom sample. The regenerate solution was 90%/10%/2% methanol/water/NaCl, and the spent regenerate was distilled to reduce the solution volume by 92%.



Login Sample Receipt Checklist

Client: Enspired Solutions

Job Number: 320-93078-3

Login Number: 93078

List Source: Eurofins Sacramento

List Number: 1

Creator: Oropeza, Salvador

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	1845734
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Water present in cooler; indicates evidence of melted ice.
Cooler Temperature is acceptable.	False	Refer to Job Narrative for details.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
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.	False	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

PREPARED FOR

Attn: Suzanne Witt
Enspired Solutions
9047 West Scenic Lake Dr
Laingsburg, Michigan 48848

Generated 12/22/2022 3:40:04 PM

JOB DESCRIPTION

PFAS PRD Destruction Technology

JOB NUMBER

320-94306-1

Job Notes

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The data in the report relate to the field sample(s) as received by the laboratory and associated QC. All results have been reviewed and have been found to be compliant with laboratory and accreditation requirements, with the exception of the noted deviation(s). For questions, please contact the Project Manager.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northern California, LLC Project Manager.

Authorization



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12/22/2022 3:40:04 PM

Authorized for release by
Laura Turpen, Project Manager I
Laura.Turpen@et.eurofinsus.com
(916)374-4414



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Definitions/Glossary

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
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

Case Narrative

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-1

Job ID: 320-94306-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative 320-94306-1

Comments

No additional comments.

Receipt

The samples were received on 11/11/2022 9:35 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 13.4° C.

Receipt Exceptions

The following samples were received at the laboratory outside the required temperature criteria: WPAFB-t0 (320-94306-1) and TAFB-t0 (320-94306-2). There was 1 bag of water present suggesting that any ice melted during shipping.

LCMS

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

General Chemistry

Method 300.0: The method blank for analytical batch 320-638363 contained Fluoride above the method detection limit. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

Method 300.0: The following samples in analytical batch 320-638363 were analyzed outside of analytical holding time. WPAFB-t0 (320-94306-1) and TAFB-t0 (320-94306-2).

Method 300.0: The following samples in analytical batch 320-638363 were diluted due to the nature of the sample matrix: WPAFB-t0 (320-94306-1) and TAFB-t0 (320-94306-2). Elevated reporting limits (RLs) are provided.

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

Organic Prep

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

Detection Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-1

Client Sample ID: WPAFB-t0

Lab Sample ID: 320-94306-1

No Detections.

Client Sample ID: TAFB-t0

Lab Sample ID: 320-94306-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Fluorine (TF)	16000		5000		ug/L	1		ELLE SOP	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-1

Client Sample ID: WPAFB-t0

Lab Sample ID: 320-94306-1

Date Collected: 11/09/22 01:30

Matrix: Water

Date Received: 11/11/22 09:35

Method: MCAWW 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	H	2.5		mg/L			12/08/22 12:39	5

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	ND		500		ug/L		11/17/22 14:29	11/17/22 18:20	1

Client Sample ID: TAFB-t0

Lab Sample ID: 320-94306-2

Date Collected: 11/09/22 01:33

Matrix: Water

Date Received: 11/11/22 09:35

Method: MCAWW 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	H	2.5		mg/L			12/08/22 12:58	5

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	16000		5000		ug/L		11/30/22 12:09	12/01/22 00:28	1

QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 320-638363/3
Matrix: Water
Analysis Batch: 638363

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.50		mg/L			12/08/22 11:40	1

Lab Sample ID: LCS 320-638363/4
Matrix: Water
Analysis Batch: 638363

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	7.50	7.70		mg/L		103	90 - 110

Lab Sample ID: LCSD 320-638363/5
Matrix: Water
Analysis Batch: 638363

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Fluoride	7.50	7.72		mg/L		103	90 - 110	0	10

Method: ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Lab Sample ID: MB 410-318736/1-A
Matrix: Water
Analysis Batch: 317597

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 318736

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	ND		500		ug/L		11/17/22 14:29	11/17/22 15:23	1

Lab Sample ID: LCS 410-318736/2-A
Matrix: Water
Analysis Batch: 317597

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 318736

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Fluorine (TF)	1010	990		ug/L		98	50 - 150

Lab Sample ID: LCSD 410-318736/3-A
Matrix: Water
Analysis Batch: 317597

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 318736

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Fluorine (TF)	1010	1060		ug/L		105	50 - 150	7	20

Lab Sample ID: MB 410-322161/1-A
Matrix: Water
Analysis Batch: 322594

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 322161

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	ND		500		ug/L		11/30/22 12:09	11/30/22 19:10	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-1

Method: ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography (Continued)

Lab Sample ID: LCS 410-322161/2-A
Matrix: Water
Analysis Batch: 322594

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 322161

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Fluorine (TF)	1010	972		ug/L		96	50 - 150

Lab Sample ID: LCSD 410-322161/3-A
Matrix: Water
Analysis Batch: 322594

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 322161

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Fluorine (TF)	1010	1000		ug/L		99	50 - 150	3	20

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QC Association Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-1

HPLC/IC

Analysis Batch: 638363

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94306-1	WPAFB-t0	Total/NA	Water	300.0	
320-94306-2	TAFB-t0	Total/NA	Water	300.0	
MB 320-638363/3	Method Blank	Total/NA	Water	300.0	
LCS 320-638363/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 320-638363/5	Lab Control Sample Dup	Total/NA	Water	300.0	

LCMS

Analysis Batch: 317597

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94306-1	WPAFB-t0	Total/NA	Water	ELLE SOP	318736
MB 410-318736/1-A	Method Blank	Total/NA	Water	ELLE SOP	318736
LCS 410-318736/2-A	Lab Control Sample	Total/NA	Water	ELLE SOP	318736
LCSD 410-318736/3-A	Lab Control Sample Dup	Total/NA	Water	ELLE SOP	318736

Prep Batch: 318736

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94306-1	WPAFB-t0	Total/NA	Water	CIC Prep	
MB 410-318736/1-A	Method Blank	Total/NA	Water	CIC Prep	
LCS 410-318736/2-A	Lab Control Sample	Total/NA	Water	CIC Prep	
LCSD 410-318736/3-A	Lab Control Sample Dup	Total/NA	Water	CIC Prep	

Prep Batch: 322161

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94306-2	TAFB-t0	Total/NA	Water	CIC Prep	
MB 410-322161/1-A	Method Blank	Total/NA	Water	CIC Prep	
LCS 410-322161/2-A	Lab Control Sample	Total/NA	Water	CIC Prep	
LCSD 410-322161/3-A	Lab Control Sample Dup	Total/NA	Water	CIC Prep	

Analysis Batch: 322594

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94306-2	TAFB-t0	Total/NA	Water	ELLE SOP	322161
MB 410-322161/1-A	Method Blank	Total/NA	Water	ELLE SOP	322161
LCS 410-322161/2-A	Lab Control Sample	Total/NA	Water	ELLE SOP	322161
LCSD 410-322161/3-A	Lab Control Sample Dup	Total/NA	Water	ELLE SOP	322161

Lab Chronicle

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-1

Client Sample ID: WPAFB-t0

Lab Sample ID: 320-94306-1

Date Collected: 11/09/22 01:30

Matrix: Water

Date Received: 11/11/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	10 mL	10 mL	638363	12/08/22 12:39	Y1S	EET SAC
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	318736	11/17/22 14:29	F9DU	ELLE
Total/NA	Analysis	ELLE SOP		1			317597	11/17/22 18:20	F9DU	ELLE

Client Sample ID: TAFB-t0

Lab Sample ID: 320-94306-2

Date Collected: 11/09/22 01:33

Matrix: Water

Date Received: 11/11/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	10 mL	10 mL	638363	12/08/22 12:58	Y1S	EET SAC
Total/NA	Prep	CIC Prep			0.02 g	0.2 mL	322161	11/30/22 12:09	URGB	ELLE
Total/NA	Analysis	ELLE SOP		1			322594	12/01/22 00:28	URGB	ELLE

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

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

Accreditation/Certification Summary

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-1

Laboratory: Eurofins Sacramento

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 (UST)	State	17-020	02-20-24
ANAB	Dept. of Defense ELAP	L2468	01-20-24
ANAB	Dept. of Energy	L2468.01	01-20-24
ANAB	ISO/IEC 17025	L2468	01-20-24
Arizona	State	AZ0708	08-11-23
Arkansas DEQ	State	88-0691	06-17-23
California	State	2897	01-31-23
Colorado	State	CA0004	08-31-23
Florida	NELAP	E87570	06-30-23
Georgia	State	4040	01-30-23
Hawaii	State	<cert No.>	01-29-23
Illinois	NELAP	200060	03-17-24
Kansas	NELAP	E-10375	10-31-23
Louisiana	NELAP	01944	06-30-23
Louisiana (All)	NELAP	01944	06-30-23
Maine	State	CA00004	04-14-24
Michigan	State	9947	01-31-23
Nevada	State	CA00044	07-31-23
New Hampshire	NELAP	2997	04-18-23
New Jersey	NELAP	CA005	06-30-23
New York	NELAP	11666	04-01-23
Ohio	State	41252	01-29-23
Oregon	NELAP	4040	01-29-23
Texas	NELAP	T104704399-19-13	05-31-23
US Fish & Wildlife	US Federal Programs	58448	04-30-23
USDA	US Federal Programs	P330-18-00239	01-23-23
Utah	NELAP	CA000442021-12	02-28-23
Virginia	NELAP	460278	03-14-23
Washington	State	C581	05-05-23
West Virginia (DW)	State	9930C	12-13-22
Wisconsin	State	998204680	08-31-23
Wyoming	State Program	8TMS-L	01-28-19 *

Laboratory: Eurofins Lancaster Laboratories Environment Testing, 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
A2LA	Dept. of Defense ELAP	0001.01	11-30-24
A2LA	ISO/IEC 17025	0001.01	11-30-24
Alaska	State	PA00009	12-08-22
Alaska (UST)	State	17-027	02-28-23
Arizona	State	AZ0780	03-12-23
Arkansas DEQ	State	88-00660	08-09-23
California	State	2792	11-30-22 *
Colorado	State	PA00009	06-30-23
Connecticut	State	PH-0746	06-30-23
DE Haz. Subst. Cleanup Act (HSCA)	State	019-006 (PA cert)	01-31-23
Delaware (DW)	State	N/A	01-31-23
Florida	NELAP	E87997	06-30-23
Georgia (DW)	State	C048	01-31-23

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

Eurofins Sacramento

Accreditation/Certification Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-1

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC (Continued)

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

Authority	Program	Identification Number	Expiration Date
Hawaii	State	N/A	01-31-23
Illinois	NELAP	200027	01-31-23
Iowa	State	361	03-01-24
Kansas	NELAP	E-10151	10-31-23
Kentucky (DW)	State	KY90088	12-31-22
Kentucky (UST)	State	0001.01	11-30-24
Kentucky (WW)	State	KY90088	12-31-22
Louisiana (All)	NELAP	02055	06-30-23
Maine	State	2019012	03-12-23
Maryland	State	100	06-30-23
Massachusetts	State	M-PA009	06-30-23
Michigan	State	9930	01-31-23
Minnesota	NELAP	042-999-487	12-12-22
Mississippi	State	022	01-31-23
Missouri	State	450	01-31-25
Montana (DW)	State	0098	01-01-23
Montana (UST)	State	<cert No.>	02-01-23
Nebraska	State	NE-OS-32-17	01-31-23
New Hampshire	NELAP	2730	01-10-23
New Jersey	NELAP	PA011	06-30-23
New York	NELAP	10670	04-01-23
North Carolina (DW)	State	42705	07-31-23
North Carolina (WW/SW)	State	521	12-31-22
North Dakota	State	R-205	01-31-23
Oklahoma	NELAP	R-205	08-31-23
Oregon	NELAP	PA200001	09-11-23
PALA	Canada	1978	09-16-24
Pennsylvania	NELAP	36-00037	01-31-23
Rhode Island	State	LAO00338	12-30-22
South Carolina	State	89002	01-31-23
Tennessee	State	02838	01-31-23
Texas	NELAP	T104704194-22-45	08-31-23
USDA	US Federal Programs	P330-19-00197	08-09-23
Vermont	State	VT - 36037	10-28-23
Virginia	NELAP	460182	06-14-23
Washington	State	C457	04-11-23
West Virginia (DW)	State	9906 C	12-31-22
West Virginia DEP	State	055	07-31-23
Wyoming	State	8TMS-L	01-31-23
Wyoming (UST)	A2LA	0001.01	11-30-24

Method Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	EET SAC
ELLE SOP	Total or Organic Fluorine by Combustion Ion Chromatography	ELLE - Lancaster	ELLE
CIC Prep	Preparation, Fluorine	ELLE - Lancaster	ELLE

Protocol References:

ELLE - Lancaster = Eurofins Lancaster, Facility Standard Operating Procedure.

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

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



Sample Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-94306-1	WPAFB-t0	Water	11/09/22 01:30	11/11/22 09:35
320-94306-2	TAFB-t0	Water	11/09/22 01:33	11/11/22 09:35

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Chain of Custody Record

588163



Environment Testing
TestAmerica

Address: 4942 Dawn St.
Suite 104
East Lansing, MI 48823

TAL-8210

Regulatory Program: DW NPDES RCRA Other:

Project Manager: <u>Laura Turpen</u> Tel/Email: <u>suzanne.witt@enspiredsolutions.com</u>		Site Contact: <u>Suzanne Witt</u> Lab Contact: <u>Lab Cogtadta</u>		Date: <u>11/19/2022</u> Carrier:		COC No: <u>1</u> of <u>1</u> COCs	
Analysis Turnaround Time <input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		Filtered Sample (Y / N)		Perform MS / MSD (Y / N)		For Lab Use Only: Walk-in Client: <input type="checkbox"/> Lab Sampling: <input type="checkbox"/> Job / SDG No.:	
Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sample Specific Notes:		
<u>11/19/22</u>	<u>1:30PM</u>	<u>G</u>	<u>water</u>	<u>3</u>	<u>See included</u>		
<u>11/19/22</u>	<u>1:33PM</u>	<u>G</u>	<u>water</u>	<u>3</u>	<u>data sheet</u>		
11/19/22		G	water				
11/19/22		G	water				
11/19/22		G	water				
11/19/22		G	water				



320-94306 Chain of Custody

Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other
 Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison B Unknown
 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return to Client Disposal by Lab Archive for _____ Months

Special Instructions/QC Requirements & Comments:
Please use MDL values as reporting limits

Relinquished by: <u>Suzanne Witt</u>	Company: <u>Enspired Solutions</u>	Date/Time: <u>11/19 1:41PM</u>	Custody Seal No.:
Relinquished by:	Company:	Date/Time:	Received by:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:

Therm ID No: 64
 Corrd: 13.4
 Company: EBI SEC
 Date/Time: 11/11/22 9:35



Chain of Custody Record



Client Information (Sub Contract Lab)				Sampler Lab PM: Turpen, Laura	Carrier Tracking No(s):	COC No: 320-290675.1				
Client Contact: Shipping/Receiving		Phone:		E-Mail: Laura.Turpen@et.eurofinsus.com	State of Origin: Michigan		Page: Page 1 of 1			
Company: Eurofins Lancaster Laboratories Environm				Accreditations Required (See note)			Job #: 320-94306-1			
Address: 2425 New Holland Pike,		Due Date Requested: 12/12/2022		Analysis Requested			Preservation Codes: A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Y - Trizma Z - other (specify)			
City: Lancaster		TAT Requested (days):								
State, Zip: PA, 17601		PO #:								
Phone: 717-656-2300(Tel)		WO #:		<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; text-align: center;">Field Filtered Sample (Yes or No)</td> <td style="width:50%; text-align: center;">Perform MS/MSD (Yes or No)</td> </tr> <tr> <td style="width:50%; text-align: center;">CIC_Fluorine/CIC_W_Prep Total Fluorine</td> <td style="width:50%; text-align: center;">Total Number of Containers</td> </tr> </table>		Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	CIC_Fluorine/CIC_W_Prep Total Fluorine	Total Number of Containers	
Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)									
CIC_Fluorine/CIC_W_Prep Total Fluorine	Total Number of Containers									
Email:		Project #: 32020425								
Project Name: PFAS PRD Destruction Technology		SSOW#:								
Site:		Other:		Special Instructions/Note:						
Site:		SSOW#:								
Sample Identification - Client ID (Lab ID)				Sample Date	Sample Time	Sample Type (C=Comp, G=grab) <small>BT=Tissue, A=Air</small>	Matrix (W=water, S=sed, D=waste/oil) <small>BT=Tissue, A=Air</small>	Preservation Code:		
X				X	X	X	X	X		
WPAFB-I0 (320-94306-1)				11/9/22	01:30 Eastern	Water	Water	X	1	TF expected ~.009ppm
TAFB-I0 (320-94306-2)				11/9/22	01:33 Eastern	Water	Water	X	1	TF expected ~96ppm
Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northern California, LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northern California, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northern California, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Northern California, LLC.										
Possible Hazard Identification						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)				
Unconfirmed						<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months				
Deliverable Requested: I, II, III, IV, Other (specify)				Primary Deliverable Rank: 2		Special Instructions/QC Requirements:				
Empty Kit Relinquished by:				Date:		Time:		Method of Shipment:		
Relinquished by: <i>[Signature]</i>				Date/Time: 11-14-22 / 16:30		Company: EETSAC		Received by: <i>[Signature]</i>		Company:
Relinquished by: <i>[Signature]</i>				Date/Time:		Company:		Received by: <i>[Signature]</i>		Company:
Relinquished by: <i>[Signature]</i>				Date/Time:		Company:		Received by: <i>[Signature]</i>		Company: EUE
Custody Seals Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 0.8						

[Handwritten mark]

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Login Sample Receipt Checklist

Client: Enspired Solutions

Job Number: 320-94306-1

Login Number: 94306

List Source: Eurofins Sacramento

List Number: 1

Creator: Pratali, Sandra A

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	1838835
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Water present in cooler; indicates evidence of melted ice.
Cooler Temperature is acceptable.	False	Refer to Job Narrative for details.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
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	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Enspired Solutions

Job Number: 320-94306-1

Login Number: 94306
List Number: 2
Creator: McBeth, Jessica

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC
List Creation: 11/15/22 04:09 PM

Question	Answer	Comment
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 ($\leq 6^{\circ}\text{C}$, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable ($\leq 6^{\circ}\text{C}$, 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	
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	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	N/A	



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ANALYTICAL REPORT

PREPARED FOR

Attn: Suzanne Witt
Enspired Solutions
9047 West Scenic Lake Dr
Laingsburg, Michigan 48848

Generated 11/7/2023 10:42:29 AM Revision 1

JOB DESCRIPTION

PFAS PRD Destruction Technology

JOB NUMBER

320-94306-2

Job Notes

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The data in the report relate to the field sample(s) as received by the laboratory and associated QC. All results have been reviewed and have been found to be compliant with laboratory and accreditation requirements, with the exception of the noted deviation(s). For questions, please contact the Project Manager.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northern California, LLC Project Manager.

Authorization



Generated
11/7/2023 10:42:29 AM
Revision 1

Authorized for release by
Laura Turpen, Project Manager I
Laura.Turpen@et.eurofinsus.com
(916)374-4414



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Definitions/Glossary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Qualifiers

LCMS

Qualifier	Qualifier Description
*-	LCS and/or LCSD is outside acceptance limits, low biased.
*+	LCS and/or LCSD is outside acceptance limits, high biased.
*5-	Isotope dilution analyte is outside acceptance limits, low biased.
*5+	Isotope dilution analyte is outside acceptance limits, high biased.
B	Compound was found in the blank and sample.
H	Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
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

Case Narrative

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Job ID: 320-94306-2

Laboratory: Eurofins Sacramento

Narrative

Job Narrative 320-94306-2

Revision

This report and the associated EDD were revised on November 7, 2023 to provide data reported to the MDL. MDL studies have not been performed for TOPS assay, but values for our standard PFAS modified 537 method have been applied. Data did change as a result of this revision.

Receipt

The samples were received on 11/11/2022 9:35 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 13.4° C.

Receipt Exceptions

The following samples were received at the laboratory outside the required temperature criteria: WPAFB-t0 (320-94306-1) and TAFB-t0 (320-94306-2). Samples were received out of temp at 13.4C. There was 1 bag of water likely indicating that any ice melted en route to lab.

LCMS

Method 537 (modified): Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the following samples: WPAFB-t0 (320-94306-1), TAFB-t0 (320-94306-2), (LCS 320-641110/2-A), (LCS 320-641111/2-A), (LCSD 320-641110/3-A), (LCSD 320-641111/3-A), (MB 320-641110/1-A) and (MB 320-641111/1-A). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method 537 (modified): The continuing calibration verification (CCV) associated with batch 320-642941 recovered above the upper control limit for 4:2 Fluorotelomer sulfonic acid (4:2 FTS). The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

Method 537 (modified): The laboratory control sample (LCS) for preparation batch 320-641111 and analytical batch 320-642941 recovered outside control limits for the following analytes: Perfluorotetradecanoic acid (PFTeA) and Perfluorododecanesulfonic acid (PFDoS). The associated samples were re-prepared and re-analyzed outside holding time with concurring results; therefore, the data have been reported.

Method 537 (modified): The laboratory control sample (LCS) for preparation batch 320-641110 and analytical batch 320-642941 recovered outside control limits for the following analytes: N-ethylperfluorooctane sulfonamide (NEtFOSA). The associated samples were re-prepared and re-analyzed outside holding time with concurring results; therefore, the data have been reported.

Method 537 (modified): The labeled analyte M2-4:2 FTS is converted to PFBA during the oxidation step of the TOP assay. The PFBA results in the Post-Treatment Method Blank (MB) indicates how much of a field sample's Post-Treatment PFBA results are contributed by the Reverse Surrogate, when adjusted for dilution factors. WPAFB-t0 (320-94306-1), TAFB-t0 (320-94306-2) and (MB 320-641111/1-A)

Method 537 (modified): The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for preparation batch 320-641110 and analytical batch 320-642941 recovered outside control limits for 4:2 Fluorotelomer sulfonic acid (4:2 FTS) . This analyte was biased high in the LCS/LCSD and was not detected in the associated samples; therefore, the data have been reported.

Method 537 (modified): The continuing calibration verification (CCVIS) and continuing calibration blank (CCB) IDA recovery limits for M2-4:2 FTS are 25 to 150%. (CCB 320-642941/1), (CCV 320-642941/4) and (CCV 320-642941/3)

Method 537 (modified): Zero percent recovery of precursor analytes (such as 4:2 FTS, 6:2 FTS, 8:2 FTS, FOSA, NMeFOSAA, NEtFOSAA, etc.) and enhanced recoveries of PFCA is observed in the Post-Treatment Laboratory Control Sample (LCS) and Post-Treatment Laboratory Control Sample Duplicate (LCSD) associated with these samples, consistent with the expected oxidation of precursor analytes. The existing LCS control limits are based upon our historical performance for a set of 24-36 analytes in the LCS solution. We have recently expanded to 70+ analytes. As the LCS solution now contains new/additional precursor analytes we are seeing enhanced recoveries for some PFCA vs. the historical limits as a result. The LCS results are flagged as being high and outside of the established limits for some analytes; however, this is a function of the new analytes in the LCS solution and not indicative of an "out of control" process.

Case Narrative

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Job ID: 320-94306-2 (Continued)

Laboratory: Eurofins Sacramento (Continued)

WPAFB-t0 (320-94306-1), TAFB-t0 (320-94306-2), (LCS 320-641111/2-A) and (LCSD 320-641111/3-A)

Method 537 (modified): The "I" qualifier means the transition mass ratio for the indicated analyte was above the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty, and the reported value may have some high bias. However, analyst judgment was used to positively identify the analyte. TAFB-t0 (320-94306-2)

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

Organic Prep

Method TOP Post Prep: The following samples were prepared outside of hold time due to laboratory error.: WPAFB-t0 (320-94306-1) and TAFB-t0 (320-94306-2). They were re-prepared outside of preparation holding time due to low LCS recovery for PFDoS and PFTrDA.

Method TOP Post Prep: Due to the matrix being foamy, the initial volume used for the following sample deviated from the standard procedure: WPAFB-t0 (320-94306-1). A 500x and 5000x dilution was made on the sample, then fortified with IDA and extracted. The reporting limits (RLs) have been adjusted proportionately.

Method TOP Post Prep: Due to the matrix being foamy, the initial volume used for the following sample deviated from the standard procedure: TAFB-t0 (320-94306-2). A 50,000x and 50,000,000x dilution was made on the sample, then fortified with IDA and extracted. The reporting limits (RLs) have been adjusted proportionately.

Method TOP Pre - Prep: The following samples were prepared outside of hold time due to laboratory error.: WPAFB-t0 (320-94306-1) and TAFB-t0 (320-94306-2). They were re-prepared outside of preparation holding time due to low LCS recovery for PFDoS and PFTrDA.

Method TOP Pre - Prep: Due to the matrix being foamy, the initial volume used for the following sample deviated from the standard procedure: WPAFB-t0 (320-94306-1). A 500x and 5000x dilution was made on the sample, then fortified with IDA and extracted. The reporting limits (RLs) have been adjusted proportionately.

Method TOP Pre - Prep: Due to the matrix being foamy, the initial volume used for the following sample deviated from the standard procedure: TAFB-t0 (320-94306-2). A 50,000x and 50,000,000x dilution was made on the sample, then fortified with IDA and extracted. The reporting

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

VOA Prep

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

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Client Sample ID: WPAFB-t0

Lab Sample ID: 320-94306-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoropentanoic acid (PFPeA)	4600	H	2500	600	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	3600	H	2500	700	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	1500	J H	2500	320	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanoic acid (PFOA)	5300	H	2500	1100	ng/L	1		537 (modified)	Pre-Treatment
Perfluorononanoic acid (PFNA)	1200	J H	2500	340	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS)	2200	J H	2500	250	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanesulfonic acid (PFPeS)	790	J H	2500	380	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	12000	H	2500	220	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	620	J H	2500	240	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS)	29000	H	2500	400	ng/L	1		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	6100	J H	6300	3100	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	4700	J H **	6300	3000	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA)	10000	H **	2500	600	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA)	15000	H **	2500	700	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	2000	J H **	2500	320	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanoic acid (PFOA)	5000	H	2500	1100	ng/L	1		537 (modified)	Post-Treatment
Perfluorononanoic acid (PFNA)	910	J H **	2500	340	ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS)	2200	J H I	2500	250	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanesulfonic acid (PFPeS)	840	J H	2500	380	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS)	11000	H B	2500	220	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS)	22000	H B	2500	400	ng/L	1		537 (modified)	Post-Treatment
PFBA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	5900				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	12000				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	17000				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	0.00	H			ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	4600	H			ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	3600	H			ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	0.00	H			ng/L	1		Total PFCA-Sum	Pre-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Client Sample ID: WPAFB-t0 (Continued)

Lab Sample ID: 320-94306-1

Analyte	Result	Qualifier	NONE	NONE	Unit	Dil Fac	D	Method	Prep Type
PFOA	5300	H			ng/L	1		Total PFCA-Sum	Pre-Treatment
PFNA	0.00	H			ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	14000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	0.00	H			ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	10000	H			ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	15000	H			ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	0.00	H			ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	5000	H			ng/L	1		Total PFCA-Sum	Post-Treatment
PFNA	0.00	H			ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	30000				ng/L	1		Total PFCA-Sum	Post-Treatment

Client Sample ID: TAFB-t0

Lab Sample ID: 320-94306-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoropentanoic acid (PFPeA)	110000	J H	250000	60000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	320000	H	250000	70000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	64000	J H	250000	32000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanoic acid (PFOA)	190000	J H	250000	110000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS)	340000	H	250000	25000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanesulfonic acid (PFPeS)	360000	H	250000	38000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	2100000	H	250000	22000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	280000	H	250000	24000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS)	17000000	H	250000	40000	ng/L	1		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	1200000	H	630000	310000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	7000000	H **	630000	300000	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA)	15000000	H **	250000	60000	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA)	12000000	H **	250000	70000	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	1900000	H **	250000	32000	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanoic acid (PFOA)	820000	H	250000	110000	ng/L	1		537 (modified)	Post-Treatment
Perfluorononanoic acid (PFNA)	70000	J H **	250000	34000	ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS)	360000	H I	250000	25000	ng/L	1		537 (modified)	Post-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Client Sample ID: TAFB-t0 (Continued)

Lab Sample ID: 320-94306-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoropentanesulfonic acid (PFPeS)	400000	H	250000	38000	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS)	2100000	H B	250000	22000	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	210000	J H	250000	24000	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS)	13000000	H B	250000	40000	ng/L	1		537 (modified)	Post-Treatment
PFBA	7000000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	15000000				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	12000000				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	1900000				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	820000				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	36000000				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	0.00	H			ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	0.00	H			ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	320000	H			ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	0.00	H			ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	0.00	H			ng/L	1		Total PFCA-Sum	Pre-Treatment
PFNA	0.00	H			ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	320000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	7000000	H			ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	15000000	H			ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	12000000	H			ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	1900000	H			ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	820000	H			ng/L	1		Total PFCA-Sum	Post-Treatment
PFNA	0.00	H			ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	37000000				ng/L	1		Total PFCA-Sum	Post-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Total Oxidation Precursors

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

TestAmerica Job ID: 320-94306-2

Client Sample ID: WPAFB-t0

Lab Sample ID: 320-94306-1
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	0.00		ng/L	0.00		ng/L	0.00	ng/L
Perfluorobutanoic acid (PFBA)	ND		ng/L	4700	J	ng/L	0.00	ng/L
PFPA	4600		ng/L	10000		ng/L	5900	ng/L
Perfluoropentanoic acid (PFPeA)	4600		ng/L	10000		ng/L	5900	ng/L
PFHxA	3600		ng/L	15000		ng/L	12000	ng/L
Perfluorohexanoic acid (PFHxA)	3600		ng/L	15000		ng/L	12000	ng/L
PFHpA	0.00		ng/L	0.00		ng/L	0.00	ng/L
Perfluoroheptanoic acid (PFHpA)	1500	J	ng/L	2000	J	ng/L	0.00	ng/L
PFOA	5300		ng/L	5000		ng/L	0.00	ng/L
Perfluorooctanoic acid (PFOA)	5300		ng/L	5000		ng/L	0.00	ng/L
PFNA	0.00		ng/L	0.00		ng/L	0.00	ng/L
Perfluorononanoic acid (PFNA)	1200	J	ng/L	910	J	ng/L	0.00	ng/L
Total PFCA	14000		ng/L	30000		ng/L	17000	ng/L

Client Sample ID: TAFB-t0

Lab Sample ID: 320-94306-2
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	0.00		ng/L	7000000		ng/L	7000000	ng/L
Perfluorobutanoic acid (PFBA)	ND		ng/L	7000000		ng/L	7000000	ng/L
PFPA	0.00		ng/L	15000000		ng/L	15000000	ng/L
Perfluoropentanoic acid (PFPeA)	110000	J	ng/L	15000000		ng/L	15000000	ng/L
PFHxA	320000		ng/L	12000000		ng/L	12000000	ng/L
Perfluorohexanoic acid (PFHxA)	320000		ng/L	12000000		ng/L	12000000	ng/L
PFHpA	0.00		ng/L	1900000		ng/L	1900000	ng/L
Perfluoroheptanoic acid (PFHpA)	64000	J	ng/L	1900000		ng/L	1900000	ng/L
PFOA	0.00		ng/L	820000		ng/L	820000	ng/L
Perfluorooctanoic acid (PFOA)	190000	J	ng/L	820000		ng/L	820000	ng/L
PFNA	0.00		ng/L	0.00		ng/L	0.00	ng/L
Perfluorononanoic acid (PFNA)	ND		ng/L	70000	J	ng/L	0.00	ng/L
Total PFCA	320000		ng/L	37000000		ng/L	36000000	ng/L

¹ Difference = Post-Treatment - Pre-Treatment

Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Client Sample ID: WPAFB-t0

Lab Sample ID: 320-94306-1

Date Collected: 11/09/22 01:30

Matrix: Water

Date Received: 11/11/22 09:35

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND	H	6300	3000	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluoropentanoic acid (PFPeA)	4600	H	2500	600	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluorohexanoic acid (PFHxA)	3600	H	2500	700	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluoroheptanoic acid (PFHpA)	1500	J H	2500	320	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluorooctanoic acid (PFOA)	5300	H	2500	1100	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluorononanoic acid (PFNA)	1200	J H	2500	340	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluorodecanoic acid (PFDA)	ND	H	2500	390	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluoroundecanoic acid (PFUnA)	ND	H	2500	1400	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluorododecanoic acid (PFDoA)	ND	H	2500	700	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluorotridecanoic acid (PFTrDA)	ND	H	2500	1600	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluorotetradecanoic acid (PFTeA)	ND	H	2500	370	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluorobutanesulfonic acid (PFBS)	2200	J H	2500	250	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluoropentanesulfonic acid (PFPeS)	790	J H	2500	380	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluorohexanesulfonic acid (PFHxS)	12000	H	2500	220	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluoroheptanesulfonic acid (PFHpS)	620	J H	2500	240	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluorooctanesulfonic acid (PFOS)	29000	H	2500	400	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluorononanesulfonic acid (PFNS)	ND	H	2500	200	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluorodecanesulfonic acid (PFDS)	ND	H	2500	700	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluorododecanesulfonic acid (PFDoS)	ND	H	2500	1200	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluorooctanesulfonamide (FOSA)	ND	H	2500	440	ng/L		12/18/22 11:23	12/28/22 01:34	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	6300	1500	ng/L		12/18/22 11:23	12/28/22 01:34	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	6300	1600	ng/L		12/18/22 11:23	12/28/22 01:34	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND	H *	2500	300	ng/L		12/18/22 11:23	12/28/22 01:34	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	6100	J H	6300	3100	ng/L		12/18/22 11:23	12/28/22 01:34	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND	H	2500	580	ng/L		12/18/22 11:23	12/28/22 01:34	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H *	2500	1100	ng/L		12/18/22 11:23	12/28/22 01:34	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H	5000	1800	ng/L		12/18/22 11:23	12/28/22 01:34	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H	2500	1100	ng/L		12/18/22 11:23	12/28/22 01:34	1
9CI-PF3ONS	ND	H	2500	300	ng/L		12/18/22 11:23	12/28/22 01:34	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	5000	1900	ng/L		12/18/22 11:23	12/28/22 01:34	1
11CI-PF3OUdS	ND	H	2500	400	ng/L		12/18/22 11:23	12/28/22 01:34	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	2500	500	ng/L		12/18/22 11:23	12/28/22 01:34	1
3:3 FTCA	ND	H	2500	550	ng/L		12/18/22 11:23	12/28/22 01:34	1
5:3 FTCA	ND	H	2500	400	ng/L		12/18/22 11:23	12/28/22 01:34	1
7:3 FTCA	ND	H	2500	700	ng/L		12/18/22 11:23	12/28/22 01:34	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	2500	800	ng/L		12/18/22 11:23	12/28/22 01:34	1

Eurofins Sacramento

Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Client Sample ID: WPAFB-t0

Lab Sample ID: 320-94306-1

Date Collected: 11/09/22 01:30

Matrix: Water

Date Received: 11/11/22 09:35

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	H	2500	350	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	H	2500	350	ng/L		12/18/22 11:23	12/28/22 01:34	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND	H	2500	350	ng/L		12/18/22 11:23	12/28/22 01:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	98		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C4 PFBA	109		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C5 PFPeA	107		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C2 PFHxA	105		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C4 PFHpA	111		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C4 PFOA	104		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C5 PFNA	106		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C2 PFDA	114		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C2 PFUnA	117		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C2 PFDoA	107		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C2 PFTeDA	107		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C3 PFBS	103		25 - 150				12/18/22 11:23	12/28/22 01:34	1
18O2 PFHxS	101		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C4 PFOS	90		25 - 150				12/18/22 11:23	12/28/22 01:34	1
d3-NMeFOSAA	137		25 - 150				12/18/22 11:23	12/28/22 01:34	1
d5-NEtFOSAA	139		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C2 4:2 FTS	171	*5+	25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C2 6:2 FTS	166	*5+	25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C2 8:2 FTS	166	*5+	25 - 150				12/18/22 11:23	12/28/22 01:34	1
d-N-EtFOSA-M	38		25 - 150				12/18/22 11:23	12/28/22 01:34	1
d7-N-MeFOSE-M	30		25 - 150				12/18/22 11:23	12/28/22 01:34	1
d9-N-EtFOSE-M	27		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C3 HFPO-DA	119		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C-6:2 FTCA	106		25 - 150				12/18/22 11:23	12/28/22 01:34	1
13C-8:2 FTCA	131		25 - 150				12/18/22 11:23	12/28/22 01:34	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H	2500	550	ng/L		01/11/23 17:12	01/14/23 03:40	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
d-N-MeFOSA-M	55		25 - 150				01/11/23 17:12	01/14/23 03:40	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	4700	J H *+	6300	3000	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluoropentanoic acid (PFPeA)	10000	H *+	2500	600	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluorohexanoic acid (PFHxA)	15000	H *+	2500	700	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluoroheptanoic acid (PFHpA)	2000	J H *+	2500	320	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluorooctanoic acid (PFOA)	5000	H	2500	1100	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluorononanoic acid (PFNA)	910	J H *+	2500	340	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluorodecanoic acid (PFDA)	ND	H *+	2500	390	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluoroundecanoic acid (PFUnA)	ND	H	2500	1400	ng/L		12/18/22 11:25	12/27/22 23:53	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Client Sample ID: WPAFB-t0

Lab Sample ID: 320-94306-1

Date Collected: 11/09/22 01:30

Matrix: Water

Date Received: 11/11/22 09:35

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorododecanoic acid (PFDoA)	ND	H	2500	700	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluorotridecanoic acid (PFTrDA)	ND	H	2500	1600	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluorotetradecanoic acid (PFTeA)	ND	H *	2500	370	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluorobutanesulfonic acid (PFBS)	2200	J H I	2500	250	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluoropentanesulfonic acid (PFPeS)	840	J H	2500	380	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluorohexanesulfonic acid (PFHxS)	11000	H B	2500	220	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluoroheptanesulfonic acid (PFHpS)	ND	H	2500	240	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluorooctanesulfonic acid (PFOS)	22000	H B	2500	400	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluorononanesulfonic acid (PFNS)	ND	H	2500	200	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluorodecanesulfonic acid (PFDS)	ND	H	2500	700	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluorododecanesulfonic acid (PFDoS)	ND	H *	2500	1200	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluorooctanesulfonamide (FOSA)	ND	H	2500	440	ng/L		12/18/22 11:25	12/27/22 23:53	1
N-methylperfluorooctanesulfonamide cetic acid (NMeFOSAA)	ND	H	6300	1500	ng/L		12/18/22 11:25	12/27/22 23:53	1
N-ethylperfluorooctanesulfonamide cetic acid (NEtFOSAA)	ND	H	6300	1600	ng/L		12/18/22 11:25	12/27/22 23:53	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND	H	2500	300	ng/L		12/18/22 11:25	12/27/22 23:53	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND	H	6300	3100	ng/L		12/18/22 11:25	12/27/22 23:53	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND	H	2500	580	ng/L		12/18/22 11:25	12/27/22 23:53	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H	2500	1100	ng/L		12/18/22 11:25	12/27/22 23:53	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H	2500	550	ng/L		12/18/22 11:25	12/27/22 23:53	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H	5000	1800	ng/L		12/18/22 11:25	12/27/22 23:53	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H	2500	1100	ng/L		12/18/22 11:25	12/27/22 23:53	1
9CI-PF3ONS	ND	H	2500	300	ng/L		12/18/22 11:25	12/27/22 23:53	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	5000	1900	ng/L		12/18/22 11:25	12/27/22 23:53	1
11CI-PF3OUdS	ND	H	2500	400	ng/L		12/18/22 11:25	12/27/22 23:53	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	2500	500	ng/L		12/18/22 11:25	12/27/22 23:53	1
3:3 FTCA	ND	H	2500	550	ng/L		12/18/22 11:25	12/27/22 23:53	1
5:3 FTCA	ND	H	2500	400	ng/L		12/18/22 11:25	12/27/22 23:53	1
7:3 FTCA	ND	H	2500	700	ng/L		12/18/22 11:25	12/27/22 23:53	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	2500	800	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	H	2500	350	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	H *	2500	350	ng/L		12/18/22 11:25	12/27/22 23:53	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND	H	2500	350	ng/L		12/18/22 11:25	12/27/22 23:53	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Client Sample ID: WPAFB-t0

Lab Sample ID: 320-94306-1

Date Collected: 11/09/22 01:30

Matrix: Water

Date Received: 11/11/22 09:35

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	102		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C4 PFBA	109		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C5 PFPeA	108		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C2 PFHxA	111		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C4 PFHpA	122		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C4 PFOA	114		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C5 PFNA	116		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C2 PFDA	121		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C2 PFUnA	128		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C2 PFDoA	117		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C2 PFTeDA	115		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C3 PFBS	109		25 - 150	12/18/22 11:25	12/27/22 23:53	1
18O2 PFHxS	106		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C4 PFOS	95		25 - 150	12/18/22 11:25	12/27/22 23:53	1
d3-NMeFOSAA	144		25 - 150	12/18/22 11:25	12/27/22 23:53	1
d5-NEtFOSAA	143		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C2 4:2 FTS	0		0 - 10	12/18/22 11:25	12/27/22 23:53	1
13C2 6:2 FTS	192	*5+	25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C2 8:2 FTS	191	*5+	25 - 150	12/18/22 11:25	12/27/22 23:53	1
d-N-MeFOSA-M	52		25 - 150	12/18/22 11:25	12/27/22 23:53	1
d-N-EtFOSA-M	49		25 - 150	12/18/22 11:25	12/27/22 23:53	1
d7-N-MeFOSE-M	44		25 - 150	12/18/22 11:25	12/27/22 23:53	1
d9-N-EtFOSE-M	38		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C3 HFPO-DA	122		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C-6:2 FTCA	119		25 - 150	12/18/22 11:25	12/27/22 23:53	1
13C-8:2 FTCA	130		25 - 150	12/18/22 11:25	12/27/22 23:53	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	0.00				ng/L			01/18/23 09:53	1
PFPA	5900				ng/L			01/18/23 09:53	1
PFHxA	12000				ng/L			01/18/23 09:53	1
PFHpA	0.00				ng/L			01/18/23 09:53	1
PFOA	0.00				ng/L			01/18/23 09:53	1
PFNA	0.00				ng/L			01/18/23 09:53	1
Total PFCA	17000				ng/L			01/18/23 09:53	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	0.00	H			ng/L			01/18/23 09:46	1
PFPA	4600	H			ng/L			01/18/23 09:46	1
PFHxA	3600	H			ng/L			01/18/23 09:46	1
PFHpA	0.00	H			ng/L			01/18/23 09:46	1
PFOA	5300	H			ng/L			01/18/23 09:46	1
PFNA	0.00	H			ng/L			01/18/23 09:46	1
Total PFCA	14000				ng/L			01/18/23 09:46	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	0.00	H			ng/L			01/18/23 09:48	1
PFPA	10000	H			ng/L			01/18/23 09:48	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Client Sample ID: WPAFB-t0

Lab Sample ID: 320-94306-1

Date Collected: 11/09/22 01:30

Matrix: Water

Date Received: 11/11/22 09:35

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment (Continued)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFHxA	15000	H			ng/L			01/18/23 09:48	1
PFHpA	0.00	H			ng/L			01/18/23 09:48	1
PFOA	5000	H			ng/L			01/18/23 09:48	1
PFNA	0.00	H			ng/L			01/18/23 09:48	1
Total PFCA	30000				ng/L			01/18/23 09:48	1

Client Sample ID: TAFB-t0

Lab Sample ID: 320-94306-2

Date Collected: 11/09/22 01:33

Matrix: Water

Date Received: 11/11/22 09:35

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND	H	630000	300000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluoropentanoic acid (PFPeA)	110000	J H	250000	60000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluorohexanoic acid (PFHxA)	320000	H	250000	70000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluoroheptanoic acid (PFHpA)	64000	J H	250000	32000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluorooctanoic acid (PFOA)	190000	J H	250000	110000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluorononanoic acid (PFNA)	ND	H	250000	34000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluorodecanoic acid (PFDA)	ND	H	250000	39000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluoroundecanoic acid (PFUnA)	ND	H	250000	140000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluorododecanoic acid (PFDoA)	ND	H	250000	70000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluorotridecanoic acid (PFTrDA)	ND	H	250000	160000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluorotetradecanoic acid (PFTeA)	ND	H	250000	37000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluorobutanesulfonic acid (PFBS)	340000	H	250000	25000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluoropentanesulfonic acid (PFPeS)	360000	H	250000	38000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluorohexanesulfonic acid (PFHxS)	2100000	H	250000	22000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluoroheptanesulfonic acid (PFHpS)	280000	H	250000	24000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluorooctanesulfonic acid (PFOS)	17000000	H	250000	40000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluorononanesulfonic acid (PFNS)	ND	H	250000	20000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluorodecanesulfonic acid (PFDS)	ND	H	250000	70000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluorododecanesulfonic acid (PFDoS)	ND	H	250000	120000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluorooctanesulfonamide (FOSA)	ND	H	250000	44000	ng/L		12/18/22 11:23	12/28/22 01:54	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	630000	150000	ng/L		12/18/22 11:23	12/28/22 01:54	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	630000	160000	ng/L		12/18/22 11:23	12/28/22 01:54	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND	H *	250000	30000	ng/L		12/18/22 11:23	12/28/22 01:54	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	1200000	H	630000	310000	ng/L		12/18/22 11:23	12/28/22 01:54	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND	H	250000	58000	ng/L		12/18/22 11:23	12/28/22 01:54	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H *	250000	110000	ng/L		12/18/22 11:23	12/28/22 01:54	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H	500000	180000	ng/L		12/18/22 11:23	12/28/22 01:54	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Client Sample ID: TAFB-t0

Lab Sample ID: 320-94306-2

Date Collected: 11/09/22 01:33

Matrix: Water

Date Received: 11/11/22 09:35

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H	250000	110000	ng/L		12/18/22 11:23	12/28/22 01:54	1
9CI-PF3ONS	ND	H	250000	30000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	500000	190000	ng/L		12/18/22 11:23	12/28/22 01:54	1
11CI-PF3OUdS	ND	H	250000	40000	ng/L		12/18/22 11:23	12/28/22 01:54	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	250000	50000	ng/L		12/18/22 11:23	12/28/22 01:54	1
3:3 FTCA	ND	H	250000	55000	ng/L		12/18/22 11:23	12/28/22 01:54	1
5:3 FTCA	ND	H	250000	40000	ng/L		12/18/22 11:23	12/28/22 01:54	1
7:3 FTCA	ND	H	250000	70000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	250000	80000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	H	250000	35000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	H	250000	35000	ng/L		12/18/22 11:23	12/28/22 01:54	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND	H	250000	35000	ng/L		12/18/22 11:23	12/28/22 01:54	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	90		25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C4 PFBA	118		25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C5 PFPeA	112		25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C2 PFHxA	108		25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C4 PFHpA	117		25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C4 PFOA	110		25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C5 PFNA	111		25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C2 PFDA	118		25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C2 PFUnA	119		25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C2 PFDoA	112		25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C2 PFTeDA	109		25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C3 PFBS	103		25 - 150	12/18/22 11:23	12/28/22 01:54	1
18O2 PFHxS	103		25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C4 PFOS	90		25 - 150	12/18/22 11:23	12/28/22 01:54	1
d3-NMeFOSAA	128		25 - 150	12/18/22 11:23	12/28/22 01:54	1
d5-NEtFOSAA	133		25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C2 4:2 FTS	173	*5+	25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C2 6:2 FTS	159	*5+	25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C2 8:2 FTS	164	*5+	25 - 150	12/18/22 11:23	12/28/22 01:54	1
d-N-EtFOSA-M	38		25 - 150	12/18/22 11:23	12/28/22 01:54	1
d7-N-MeFOSE-M	25		25 - 150	12/18/22 11:23	12/28/22 01:54	1
d9-N-EtFOSE-M	24	*5-	25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C3 HFPO-DA	117		25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C-6:2 FTCA	125		25 - 150	12/18/22 11:23	12/28/22 01:54	1
13C-8:2 FTCA	132		25 - 150	12/18/22 11:23	12/28/22 01:54	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H	250000	55000	ng/L		01/11/23 17:12	01/14/23 04:00	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Client Sample ID: TAFB-t0

Lab Sample ID: 320-94306-2

Date Collected: 11/09/22 01:33

Matrix: Water

Date Received: 11/11/22 09:35

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
d-N-MeFOSA-M	65		25 - 150	01/11/23 17:12	01/14/23 04:00	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	7000000	H **	630000	300000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluoropentanoic acid (PFPeA)	15000000	H **	250000	60000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluorohexanoic acid (PFHxA)	12000000	H **	250000	70000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluoroheptanoic acid (PFHpA)	1900000	H **	250000	32000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluorooctanoic acid (PFOA)	820000	H	250000	110000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluorononanoic acid (PFNA)	70000	J H **	250000	34000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluorodecanoic acid (PFDA)	ND	H **	250000	39000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluoroundecanoic acid (PFUnA)	ND	H	250000	140000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluorododecanoic acid (PFDoA)	ND	H	250000	70000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluorotridecanoic acid (PFTrDA)	ND	H	250000	160000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluorotetradecanoic acid (PFTeA)	ND	H *	250000	37000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluorobutanesulfonic acid (PFBS)	360000	H I	250000	25000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluoropentanesulfonic acid (PFPeS)	400000	H	250000	38000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluorohexanesulfonic acid (PFHxS)	2100000	H B	250000	22000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluoroheptanesulfonic acid (PFHpS)	210000	J H	250000	24000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluorooctanesulfonic acid (PFOS)	13000000	H B	250000	40000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluorononanesulfonic acid (PFNS)	ND	H	250000	20000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluorodecanesulfonic acid (PFDS)	ND	H	250000	70000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluorododecanesulfonic acid (PFDoS)	ND	H *	250000	120000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluorooctanesulfonamide (FOSA)	ND	H	250000	44000	ng/L		12/18/22 11:25	12/28/22 00:33	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	630000	150000	ng/L		12/18/22 11:25	12/28/22 00:33	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	630000	160000	ng/L		12/18/22 11:25	12/28/22 00:33	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND	H	250000	30000	ng/L		12/18/22 11:25	12/28/22 00:33	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND	H	630000	310000	ng/L		12/18/22 11:25	12/28/22 00:33	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND	H	250000	58000	ng/L		12/18/22 11:25	12/28/22 00:33	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H	250000	110000	ng/L		12/18/22 11:25	12/28/22 00:33	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H	250000	55000	ng/L		12/18/22 11:25	12/28/22 00:33	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H	500000	180000	ng/L		12/18/22 11:25	12/28/22 00:33	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H	250000	110000	ng/L		12/18/22 11:25	12/28/22 00:33	1
9Cl-PF3ONS	ND	H	250000	30000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	500000	190000	ng/L		12/18/22 11:25	12/28/22 00:33	1
11Cl-PF3OUdS	ND	H	250000	40000	ng/L		12/18/22 11:25	12/28/22 00:33	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	250000	50000	ng/L		12/18/22 11:25	12/28/22 00:33	1
3:3 FTCA	ND	H	250000	55000	ng/L		12/18/22 11:25	12/28/22 00:33	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Client Sample ID: TAFB-t0

Lab Sample ID: 320-94306-2

Date Collected: 11/09/22 01:33

Matrix: Water

Date Received: 11/11/22 09:35

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
5:3 FTCA	ND	H	250000	40000	ng/L		12/18/22 11:25	12/28/22 00:33	1
7:3 FTCA	ND	H	250000	70000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	250000	80000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	H	250000	35000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	H *	250000	35000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND	H	250000	35000	ng/L		12/18/22 11:25	12/28/22 00:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	105		25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C4 PFBA	107		25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C5 PFPeA	109		25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C2 PFHxA	109		25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C4 PFHpA	122		25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C4 PFOA	110		25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C5 PFNA	113		25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C2 PFDA	121		25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C2 PFUnA	127		25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C2 PFDoA	112		25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C2 PFTeDA	108		25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C3 PFBS	105		25 - 150				12/18/22 11:25	12/28/22 00:33	1
18O2 PFHxS	104		25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C4 PFOS	95		25 - 150				12/18/22 11:25	12/28/22 00:33	1
d3-NMeFOSAA	141		25 - 150				12/18/22 11:25	12/28/22 00:33	1
d5-NEtFOSAA	153	*5+	25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C2 4:2 FTS	0		0 - 10				12/18/22 11:25	12/28/22 00:33	1
13C2 6:2 FTS	209	*5+	25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C2 8:2 FTS	199	*5+	25 - 150				12/18/22 11:25	12/28/22 00:33	1
d-N-MeFOSA-M	49		25 - 150				12/18/22 11:25	12/28/22 00:33	1
d-N-EtFOSA-M	41		25 - 150				12/18/22 11:25	12/28/22 00:33	1
d7-N-MeFOSE-M	39		25 - 150				12/18/22 11:25	12/28/22 00:33	1
d9-N-EtFOSE-M	35		25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C3 HFPO-DA	112		25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C-6:2 FTCA	120		25 - 150				12/18/22 11:25	12/28/22 00:33	1
13C-8:2 FTCA	136		25 - 150				12/18/22 11:25	12/28/22 00:33	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	7000000				ng/L			01/18/23 09:53	1
PFPA	15000000				ng/L			01/18/23 09:53	1
PFHxA	12000000				ng/L			01/18/23 09:53	1
PFHpA	1900000				ng/L			01/18/23 09:53	1
PFOA	820000				ng/L			01/18/23 09:53	1
PFNA	0.00				ng/L			01/18/23 09:53	1
Total PFCA	36000000				ng/L			01/18/23 09:53	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	0.00	H			ng/L			01/18/23 09:46	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Client Sample ID: TAFB-t0
 Date Collected: 11/09/22 01:33
 Date Received: 11/11/22 09:35

Lab Sample ID: 320-94306-2
 Matrix: Water

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment (Continued)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFPA	0.00	H			ng/L			01/18/23 09:46	1
PFHxA	320000	H			ng/L			01/18/23 09:46	1
PFHpA	0.00	H			ng/L			01/18/23 09:46	1
PFOA	0.00	H			ng/L			01/18/23 09:46	1
PFNA	0.00	H			ng/L			01/18/23 09:46	1
Total PFCA	320000				ng/L			01/18/23 09:46	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	7000000	H			ng/L			01/18/23 09:48	1
PFPA	15000000	H			ng/L			01/18/23 09:48	1
PFHxA	12000000	H			ng/L			01/18/23 09:48	1
PFHpA	1900000	H			ng/L			01/18/23 09:48	1
PFOA	820000	H			ng/L			01/18/23 09:48	1
PFNA	0.00	H			ng/L			01/18/23 09:48	1
Total PFCA	37000000				ng/L			01/18/23 09:48	1



Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Pre-Treatment

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-94306-1	WPAFB-t0	98	109	107	105	111	104	106	114
320-94306-2	TAFB-t0	90	118	112	108	117	110	111	118
LCS 320-641110/2-A	Lab Control Sample	96	114	107	103	119	106	106	114
LCSD 320-641110/3-A	Lab Control Sample Dup	95	113	106	103	117	103	106	111
MB 320-641110/1-A	Method Blank	97	114	106	108	119	110	106	117

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-94306-1	WPAFB-t0	117	107	107	103	101	90	137	139
320-94306-2	TAFB-t0	119	112	109	103	103	90	128	133
LCS 320-641110/2-A	Lab Control Sample	119	108	106	102	102	92	133	132
LCSD 320-641110/3-A	Lab Control Sample Dup	119	106	107	104	101	92	135	134
MB 320-641110/1-A	Method Blank	121	113	105	103	100	93	140	131

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	M242FTS (25-150)	M262FTS (25-150)	M282FTS (25-150)	dEtFOSA (25-150)	NMFM (25-150)	NEFM (25-150)	HFPODA (25-150)	MFHEA (25-150)
320-94306-1	WPAFB-t0	171 *5+	166 *5+	166 *5+	38	30	27	119	106
320-94306-2	TAFB-t0	173 *5+	159 *5+	164 *5+	38	25	24 *5-	117	125
LCS 320-641110/2-A	Lab Control Sample	175 *5+	159 *5+	161 *5+	32	29	27	123	117
LCSD 320-641110/3-A	Lab Control Sample Dup	170 *5+	170 *5+	163 *5+	36	28	27	120	116
MB 320-641110/1-A	Method Blank	160 *5+	169 *5+	169 *5+	39	26	25	121	120

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	MFOEA (25-150)							
320-94306-1	WPAFB-t0	131							
320-94306-2	TAFB-t0	132							
LCS 320-641110/2-A	Lab Control Sample	122							
LCSD 320-641110/3-A	Lab Control Sample Dup	123							
MB 320-641110/1-A	Method Blank	137							

Surrogate Legend

- PFOSA = 13C8 FOSA
- PFBA = 13C4 PFBA
- PFPeA = 13C5 PFPeA
- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHxA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDoA = 13C2 PFDoA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- M242FTS = 13C2 4:2 FTS
- M262FTS = 13C2 6:2 FTS

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

M282FTS = 13C2 8:2 FTS
 dEtFOSA = d-N-EtFOSA-M
 NMFM = d7-N-MeFOSE-M
 NEFM = d9-N-EtFOSE-M
 HFPODA = 13C3 HFPO-DA
 MFHEA = 13C-6:2 FTCA
 MFOEA = 13C-8:2 FTCA

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Pre-Treatment

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	dMeFOSA (25-150)
320-94306-1 - RE	WPAFB-t0	55
320-94306-2 - RE	TAFB-t0	65
LCS 320-646403/2-A	Lab Control Sample	71
LCSD 320-646403/3-A	Lab Control Sample Dup	73
MB 320-646403/1-A	Method Blank	77

Surrogate Legend

dMeFOSA = d-N-MeFOSA-M

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Post-Treatment

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-94306-1	WPAFB-t0	102	109	108	111	122	114	116	121
320-94306-2	TAFB-t0	105	107	109	109	122	110	113	121
LCS 320-641111/2-A	Lab Control Sample	106	104	108	104	120	109	112	119
LCSD 320-641111/3-A	Lab Control Sample Dup	93	105	106	107	116	106	109	115
MB 320-641111/1-A	Method Blank	103	106	108	102	119	109	111	120

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-94306-1	WPAFB-t0	128	117	115	109	106	95	144	143
320-94306-2	TAFB-t0	127	112	108	105	104	95	141	153 *5+
LCS 320-641111/2-A	Lab Control Sample	123	109	104	105	102	92	143	145
LCSD 320-641111/3-A	Lab Control Sample Dup	121	108	102	103	99	92	131	139
MB 320-641111/1-A	Method Blank	120	111	104	104	101	92	145	156 *5+

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	M242FTS (0-10)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFM (25-150)	NEFM (25-150)	HFPODA (25-150)
320-94306-1	WPAFB-t0	0	192 *5+	191 *5+	52	49	44	38	122
320-94306-2	TAFB-t0	0	209 *5+	199 *5+	49	41	39	35	112
LCS 320-641111/2-A	Lab Control Sample	0	195 *5+	190 *5+	40	35	30	27	115
LCSD 320-641111/3-A	Lab Control Sample Dup	0	173 *5+	174 *5+	53	48	52	44	116
MB 320-641111/1-A	Method Blank	0	199 *5+	191 *5+	56	49	52	44	113

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	MFHEA (25-150)	MFOEA (25-150)
320-94306-1	WPAFB-t0	119	130
320-94306-2	TAFB-t0	120	136
LCS 320-641111/2-A	Lab Control Sample	120	138
LCSD 320-641111/3-A	Lab Control Sample Dup	114	124

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Isotope Dilution Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Water

Prep Type: Post-Treatment

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	MFHEA (25-150)	MFOEA (25-150)
MB 320-641111/1-A	Method Blank	118	143

Surrogate Legend

PFOSA = 13C8 FOSA
PFBA = 13C4 PFBA
PFPeA = 13C5 PFPeA
PFHxA = 13C2 PFHxA
C4PFHA = 13C4 PFHpA
PFOA = 13C4 PFOA
PFNA = 13C5 PFNA
PFDA = 13C2 PFDA
PFUnA = 13C2 PFUnA
PFDoA = 13C2 PFDoA
PFTDA = 13C2 PFTeDA
C3PFBS = 13C3 PFBS
PFHxS = 18O2 PFHxS
PFOS = 13C4 PFOS
d3NMFOS = d3-NMeFOSAA
d5NEFOS = d5-NEtFOSAA
M242FTS = 13C2 4:2 FTS
M262FTS = 13C2 6:2 FTS
M282FTS = 13C2 8:2 FTS
dMeFOSA = d-N-MeFOSA-M
dEtFOSA = d-N-EtFOSA-M
NMFm = d7-N-MeFOSE-M
NEFM = d9-N-EtFOSE-M
HFPODA = 13C3 HFPO-DA
MFHEA = 13C-6:2 FTCA
MFOEA = 13C-8:2 FTCA

QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-641110/1-A
Matrix: Water
Analysis Batch: 642941

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 641110

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorobutanoic acid (PFBA)	ND		13	6.0	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluoropentanoic acid (PFPeA)	ND		5.0	1.2	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluorohexanoic acid (PFHxA)	ND		5.0	1.4	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluoroheptanoic acid (PFHpA)	ND		5.0	0.63	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluorooctanoic acid (PFOA)	ND		5.0	2.1	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluorononanoic acid (PFNA)	ND		5.0	0.68	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluorodecanoic acid (PFDA)	ND		5.0	0.78	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0	2.8	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluorododecanoic acid (PFDoA)	ND		5.0	1.4	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluorotridecanoic acid (PFTrDA)	ND		5.0	3.2	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluorotetradecanoic acid (PFTeA)	0.837	J	5.0	0.73	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluorobutanesulfonic acid (PFBS)	ND		5.0	0.50	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0	0.75	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluorohexanesulfonic acid (PFHxS)	ND		5.0	0.43	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0	0.48	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluorooctanesulfonic acid (PFOS)	ND		5.0	0.80	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0	0.40	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0	1.4	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0	2.4	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0	0.88	ng/L		12/18/22 11:23	12/28/22 01:04	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13	3.0	ng/L		12/18/22 11:23	12/28/22 01:04	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13	3.3	ng/L		12/18/22 11:23	12/28/22 01:04	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0	0.60	ng/L		12/18/22 11:23	12/28/22 01:04	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13	6.3	ng/L		12/18/22 11:23	12/28/22 01:04	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0	1.2	ng/L		12/18/22 11:23	12/28/22 01:04	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0	2.2	ng/L		12/18/22 11:23	12/28/22 01:04	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10	3.5	ng/L		12/18/22 11:23	12/28/22 01:04	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0	2.2	ng/L		12/18/22 11:23	12/28/22 01:04	1
9CI-PF3ONS	ND		5.0	0.60	ng/L		12/18/22 11:23	12/28/22 01:04	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10	3.8	ng/L		12/18/22 11:23	12/28/22 01:04	1
11CI-PF3OUdS	ND		5.0	0.80	ng/L		12/18/22 11:23	12/28/22 01:04	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0	1.0	ng/L		12/18/22 11:23	12/28/22 01:04	1
3:3 FTCA	ND		5.0	1.1	ng/L		12/18/22 11:23	12/28/22 01:04	1
5:3 FTCA	ND		5.0	0.80	ng/L		12/18/22 11:23	12/28/22 01:04	1
7:3 FTCA	ND		5.0	1.4	ng/L		12/18/22 11:23	12/28/22 01:04	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0	1.6	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		5.0	0.70	ng/L		12/18/22 11:23	12/28/22 01:04	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-641110/1-A
Matrix: Water
Analysis Batch: 642941

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 641110

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0	0.70	ng/L		12/18/22 11:23	12/28/22 01:04	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		5.0	0.70	ng/L		12/18/22 11:23	12/28/22 01:04	1
Isotope Dilution	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	97		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C4 PFBA	114		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C5 PFPeA	106		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C2 PFHxA	108		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C4 PFHpA	119		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C4 PFOA	110		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C5 PFNA	106		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C2 PFDA	117		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C2 PFUnA	121		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C2 PFDoA	113		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C2 PFTeDA	105		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C3 PFBS	103		25 - 150				12/18/22 11:23	12/28/22 01:04	1
18O2 PFHxS	100		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C4 PFOS	93		25 - 150				12/18/22 11:23	12/28/22 01:04	1
d3-NMeFOSAA	140		25 - 150				12/18/22 11:23	12/28/22 01:04	1
d5-NEtFOSAA	131		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C2 4:2 FTS	160	*5+	25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C2 6:2 FTS	169	*5+	25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C2 8:2 FTS	169	*5+	25 - 150				12/18/22 11:23	12/28/22 01:04	1
d-N-EtFOSA-M	39		25 - 150				12/18/22 11:23	12/28/22 01:04	1
d7-N-MeFOSE-M	26		25 - 150				12/18/22 11:23	12/28/22 01:04	1
d9-N-EtFOSE-M	25		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C3 HFPO-DA	121		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C-6:2 FTCA	120		25 - 150				12/18/22 11:23	12/28/22 01:04	1
13C-8:2 FTCA	137		25 - 150				12/18/22 11:23	12/28/22 01:04	1

Lab Sample ID: LCS 320-641110/2-A
Matrix: Water
Analysis Batch: 642941

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 641110

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	100	91.1		ng/L		91	76 - 136
Perfluoropentanoic acid (PFPeA)	100	98.3		ng/L		98	71 - 131
Perfluorohexanoic acid (PFHxA)	100	106		ng/L		106	73 - 133
Perfluoroheptanoic acid (PFHpA)	100	94.8		ng/L		95	72 - 132
Perfluorooctanoic acid (PFOA)	100	107		ng/L		107	70 - 130
Perfluorononanoic acid (PFNA)	100	109		ng/L		109	75 - 135
Perfluorodecanoic acid (PFDA)	100	105		ng/L		105	76 - 136
Perfluoroundecanoic acid (PFUnA)	100	101		ng/L		101	68 - 128
Perfluorododecanoic acid (PFDoA)	100	105		ng/L		105	71 - 131
Perfluorotridecanoic acid (PFTTrDA)	100	92.9		ng/L		93	71 - 131

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-641110/2-A
Matrix: Water
Analysis Batch: 642941

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 641110

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorotetradecanoic acid (PFTeA)	100	96.0		ng/L		96	70 - 130
Perfluorobutanesulfonic acid (PFBS)	88.8	88.2		ng/L		99	67 - 127
Perfluoropentanesulfonic acid (PFPeS)	94.0	93.9		ng/L		100	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	91.2	85.4		ng/L		94	59 - 119
Perfluoroheptanesulfonic acid (PFHpS)	95.4	101		ng/L		105	76 - 136
Perfluorooctanesulfonic acid (PFOS)	93.0	96.8		ng/L		104	70 - 130
Perfluorononanesulfonic acid (PFNS)	96.2	103		ng/L		108	75 - 135
Perfluorodecanesulfonic acid (PFDS)	96.4	104		ng/L		107	71 - 131
Perfluorododecanesulfonic acid (PFDoS)	97.0	88.5		ng/L		91	67 - 127
Perfluorooctanesulfonamide (FOSA)	100	91.0		ng/L		91	73 - 133
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	97.7		ng/L		98	76 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	97.3		ng/L		97	76 - 136
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	160	*+	ng/L		171	79 - 139
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	99.3		ng/L		104	59 - 175
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	100		ng/L		104	75 - 135
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	46.9	*-	ng/L		47	78 - 138
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	72.9		ng/L		73	70 - 130
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	74.7		ng/L		75	71 - 131
9CI-PF3ONS	93.4	103		ng/L		110	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	86.0		ng/L		86	51 - 173
11CI-PF3OUdS	94.4	101		ng/L		107	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	113		ng/L		120	79 - 139
3:3 FTCA	100	104		ng/L		104	70 - 130
5:3 FTCA	100	87.5		ng/L		88	70 - 130
7:3 FTCA	100	85.3		ng/L		85	70 - 130
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	111		ng/L		111	70 - 130
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	101		ng/L		101	70 - 130
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	103		ng/L		103	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	89.2	89.0		ng/L		100	70 - 130

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QC Sample Results

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

<i>Isotope Dilution</i>	<i>LCS</i>	<i>LCS</i>	<i>Limits</i>
<i>%Recovery</i>	<i>Qualifier</i>		
13C8 FOSA	96		25 - 150
13C4 PFBA	114		25 - 150
13C5 PFPeA	107		25 - 150
13C2 PFHxA	103		25 - 150
13C4 PFHpA	119		25 - 150
13C4 PFOA	106		25 - 150
13C5 PFNA	106		25 - 150
13C2 PFDA	114		25 - 150
13C2 PFUnA	119		25 - 150
13C2 PFDoA	108		25 - 150
13C2 PFTeDA	106		25 - 150
13C3 PFBS	102		25 - 150
18O2 PFHxS	102		25 - 150
13C4 PFOS	92		25 - 150
d3-NMeFOSAA	133		25 - 150
d5-NEtFOSAA	132		25 - 150
13C2 4:2 FTS	175	*5+	25 - 150
13C2 6:2 FTS	159	*5+	25 - 150
13C2 8:2 FTS	161	*5+	25 - 150
d-N-EtFOSA-M	32		25 - 150
d7-N-MeFOSE-M	29		25 - 150
d9-N-EtFOSE-M	27		25 - 150
13C3 HFPO-DA	123		25 - 150
13C-6:2 FTCA	117		25 - 150
13C-8:2 FTCA	122		25 - 150

Lab Sample ID: LCSD 320-641110/3-A
Matrix: Water
Analysis Batch: 642941

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 641110

<i>Analyte</i>	<i>Spike</i>	<i>LCSD</i>	<i>LCSD</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec</i>	<i>RPD</i>	<i>RPD</i>
	<i>Added</i>	<i>Result</i>	<i>Qualifier</i>				<i>Limits</i>	<i>RPD</i>	<i>Limit</i>
Perfluorobutanoic acid (PFBA)	100	93.2		ng/L		93	76 - 136	2	30
Perfluoropentanoic acid (PFPeA)	100	94.1		ng/L		94	71 - 131	4	30
Perfluorohexanoic acid (PFHxA)	100	99.8		ng/L		100	73 - 133	6	30
Perfluoroheptanoic acid (PFHpA)	100	91.3		ng/L		91	72 - 132	4	30
Perfluorooctanoic acid (PFOA)	100	105		ng/L		105	70 - 130	2	30
Perfluorononanoic acid (PFNA)	100	104		ng/L		104	75 - 135	5	30
Perfluorodecanoic acid (PFDA)	100	110		ng/L		110	76 - 136	5	30
Perfluoroundecanoic acid (PFUnA)	100	101		ng/L		101	68 - 128	0	30
Perfluorododecanoic acid (PFDoA)	100	111		ng/L		111	71 - 131	5	30
Perfluorotridecanoic acid (PFTTrDA)	100	110		ng/L		110	71 - 131	17	30
Perfluorotetradecanoic acid (PFTeA)	100	89.0		ng/L		89	70 - 130	8	30
Perfluorobutanesulfonic acid (PFBS)	88.8	82.7		ng/L		93	67 - 127	6	30
Perfluoropentanesulfonic acid (PFPeS)	94.0	91.5		ng/L		97	66 - 126	3	30
Perfluorohexanesulfonic acid (PFHxS)	91.2	87.7		ng/L		96	59 - 119	3	30
Perfluoroheptanesulfonic acid (PFHpS)	95.4	100		ng/L		105	76 - 136	0	30

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-641110/3-A
Matrix: Water
Analysis Batch: 642941

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 641110

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)	93.0	95.7		ng/L		103	70 - 130	1	30
Perfluorononanesulfonic acid (PFNS)	96.2	100		ng/L		104	75 - 135	3	30
Perfluorodecanesulfonic acid (PFDS)	96.4	105		ng/L		109	71 - 131	1	30
Perfluorododecanesulfonic acid (PFDoS)	97.0	96.1		ng/L		99	67 - 127	8	30
Perfluorooctanesulfonamide (FOSA)	100	91.8		ng/L		92	73 - 133	1	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	99.0		ng/L		99	76 - 136	1	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	100		ng/L		100	76 - 136	3	30
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	153	*+	ng/L		163	79 - 139	5	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	95.6		ng/L		100	59 - 175	4	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	95.4		ng/L		99	75 - 135	5	30
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	48.7	*-	ng/L		49	78 - 138	4	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	76.2		ng/L		76	70 - 130	4	30
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	77.8		ng/L		78	71 - 131	4	30
9CI-PF3ONS	93.4	102		ng/L		109	75 - 135	1	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	91.7		ng/L		92	51 - 173	6	30
11CI-PF3OUdS	94.4	101		ng/L		107	54 - 114	0	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	106		ng/L		113	79 - 139	6	30
3:3 FTCA	100	99.1		ng/L		99	70 - 130	5	30
5:3 FTCA	100	90.8		ng/L		91	70 - 130	4	30
7:3 FTCA	100	83.7		ng/L		84	70 - 130	2	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	107		ng/L		107	70 - 130	4	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	96.6		ng/L		97	70 - 130	4	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	99.5		ng/L		100	70 - 130	3	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	89.2	86.0		ng/L		96	70 - 130	3	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	LCSD Limits
¹³ C8 FOSA	95		25 - 150
¹³ C4 PFBA	113		25 - 150
¹³ C5 PFPeA	106		25 - 150
¹³ C2 PFHxA	103		25 - 150
¹³ C4 PFHpA	117		25 - 150
¹³ C4 PFOA	103		25 - 150
¹³ C5 PFNA	106		25 - 150
¹³ C2 PFDA	111		25 - 150

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-641110/3-A
Matrix: Water
Analysis Batch: 642941

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 641110

Isotope Dilution	LCSD LCSD		Limits
	%Recovery	Qualifier	
13C2 PFUnA	119		25 - 150
13C2 PFDoA	106		25 - 150
13C2 PFTeDA	107		25 - 150
13C3 PFBS	104		25 - 150
18O2 PFHxS	101		25 - 150
13C4 PFOS	92		25 - 150
d3-NMeFOSAA	135		25 - 150
d5-NEtFOSAA	134		25 - 150
13C2 4:2 FTS	170	*5+	25 - 150
13C2 6:2 FTS	170	*5+	25 - 150
13C2 8:2 FTS	163	*5+	25 - 150
d-N-EtFOSA-M	36		25 - 150
d7-N-MeFOSE-M	28		25 - 150
d9-N-EtFOSE-M	27		25 - 150
13C3 HFPO-DA	120		25 - 150
13C-6:2 FTCA	116		25 - 150
13C-8:2 FTCA	123		25 - 150

Lab Sample ID: MB 320-646403/1-A
Matrix: Water
Analysis Batch: 646992

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 646403

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0	1.1	ng/L		01/11/23 17:12	01/14/23 03:10	1

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
d-N-MeFOSA-M	77		25 - 150	01/11/23 17:12	01/14/23 03:10	1

Lab Sample ID: LCS 320-646403/2-A
Matrix: Water
Analysis Batch: 646992

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 646403

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	70.3		ng/L		70	67 - 154

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
d-N-MeFOSA-M	71		25 - 150

Lab Sample ID: LCSD 320-646403/3-A
Matrix: Water
Analysis Batch: 646992

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 646403

Analyte	Spike Added	LCSD LCSD		Unit	D	%Rec	%Rec Limits	RPD	
		Result	Qualifier					RPD	Limit
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	83.9		ng/L		84	67 - 154	18	30

Isotope Dilution	LCSD LCSD		Limits
	%Recovery	Qualifier	
d-N-MeFOSA-M	73		25 - 150

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-641111/1-A
Matrix: Water
Analysis Batch: 642941

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 641111

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorobutanoic acid (PFBA)	ND		13	6.0	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluoropentanoic acid (PFPeA)	ND		5.0	1.2	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluorohexanoic acid (PFHxA)	ND		5.0	1.4	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluoroheptanoic acid (PFHpA)	ND		5.0	0.63	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluorooctanoic acid (PFOA)	ND		5.0	2.1	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluorononanoic acid (PFNA)	ND		5.0	0.68	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluorodecanoic acid (PFDA)	ND		5.0	0.78	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0	2.8	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluorododecanoic acid (PFDoA)	ND		5.0	1.4	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluorotridecanoic acid (PFTrDA)	ND		5.0	3.2	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0	0.73	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluorobutanesulfonic acid (PFBS)	ND		5.0	0.50	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0	0.75	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluorohexanesulfonic acid (PFHxS)	0.622	J	5.0	0.43	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0	0.48	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluorooctanesulfonic acid (PFOS)	2.11	J	5.0	0.80	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0	0.40	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0	1.4	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0	2.4	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0	0.88	ng/L		12/18/22 11:25	12/27/22 23:22	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13	3.0	ng/L		12/18/22 11:25	12/27/22 23:22	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13	3.3	ng/L		12/18/22 11:25	12/27/22 23:22	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0	0.60	ng/L		12/18/22 11:25	12/27/22 23:22	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13	6.3	ng/L		12/18/22 11:25	12/27/22 23:22	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0	1.2	ng/L		12/18/22 11:25	12/27/22 23:22	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0	2.2	ng/L		12/18/22 11:25	12/27/22 23:22	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0	1.1	ng/L		12/18/22 11:25	12/27/22 23:22	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10	3.5	ng/L		12/18/22 11:25	12/27/22 23:22	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0	2.2	ng/L		12/18/22 11:25	12/27/22 23:22	1
9Cl-PF3ONS	ND		5.0	0.60	ng/L		12/18/22 11:25	12/27/22 23:22	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10	3.8	ng/L		12/18/22 11:25	12/27/22 23:22	1
11Cl-PF3OUdS	ND		5.0	0.80	ng/L		12/18/22 11:25	12/27/22 23:22	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0	1.0	ng/L		12/18/22 11:25	12/27/22 23:22	1
3:3 FTCA	ND		5.0	1.1	ng/L		12/18/22 11:25	12/27/22 23:22	1
5:3 FTCA	ND		5.0	0.80	ng/L		12/18/22 11:25	12/27/22 23:22	1
7:3 FTCA	ND		5.0	1.4	ng/L		12/18/22 11:25	12/27/22 23:22	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0	1.6	ng/L		12/18/22 11:25	12/27/22 23:22	1

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-641111/1-A
Matrix: Water
Analysis Batch: 642941

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 641111

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		5.0	0.70	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0	0.70	ng/L		12/18/22 11:25	12/27/22 23:22	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		5.0	0.70	ng/L		12/18/22 11:25	12/27/22 23:22	1
Isotope Dilution	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	103		25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C4 PFBA	106		25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C5 PFPeA	108		25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C2 PFHxA	102		25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C4 PFHpA	119		25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C4 PFOA	109		25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C5 PFNA	111		25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C2 PFDA	120		25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C2 PFUnA	120		25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C2 PFDaA	111		25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C2 PFTeDA	104		25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C3 PFBS	104		25 - 150				12/18/22 11:25	12/27/22 23:22	1
18O2 PFHxS	101		25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C4 PFOS	92		25 - 150				12/18/22 11:25	12/27/22 23:22	1
d3-NMeFOSAA	145		25 - 150				12/18/22 11:25	12/27/22 23:22	1
d5-NEtFOSAA	156	*5+	25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C2 4:2 FTS	0		0 - 10				12/18/22 11:25	12/27/22 23:22	1
13C2 6:2 FTS	199	*5+	25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C2 8:2 FTS	191	*5+	25 - 150				12/18/22 11:25	12/27/22 23:22	1
d-N-MeFOSA-M	56		25 - 150				12/18/22 11:25	12/27/22 23:22	1
d-N-EtFOSA-M	49		25 - 150				12/18/22 11:25	12/27/22 23:22	1
d7-N-MeFOSE-M	52		25 - 150				12/18/22 11:25	12/27/22 23:22	1
d9-N-EtFOSE-M	44		25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C3 HFPO-DA	113		25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C-6:2 FTCA	118		25 - 150				12/18/22 11:25	12/27/22 23:22	1
13C-8:2 FTCA	143		25 - 150				12/18/22 11:25	12/27/22 23:22	1

Lab Sample ID: LCS 320-641111/2-A
Matrix: Water
Analysis Batch: 642941

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 641111

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	100	176	*+	ng/L		176	93 - 153
Perfluoropentanoic acid (PFPeA)	100	177	*+	ng/L		177	85 - 145
Perfluorohexanoic acid (PFHxA)	100	221	*+	ng/L		221	81 - 141
Perfluoroheptanoic acid (PFHpA)	100	175	*+	ng/L		175	104 - 171
Perfluorooctanoic acid (PFOA)	100	265		ng/L		265	158 - 454
Perfluorononanoic acid (PFNA)	100	132	*+	ng/L		132	66 - 126
Perfluorodecanoic acid (PFDA)	100	126	*+	ng/L		126	65 - 125
Perfluoroundecanoic acid (PFUnA)	100	94.4		ng/L		94	57 - 117

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-641111/2-A
Matrix: Water
Analysis Batch: 642941

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 641111

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorododecanoic acid (PFDoA)	100	96.6		ng/L		97	66 - 126
Perfluorotridecanoic acid (PFTrDA)	100	70.7		ng/L		71	65 - 136
Perfluorotetradecanoic acid (PFTeA)	100	52.2	*-	ng/L		52	63 - 123
Perfluorobutanesulfonic acid (PFBS)	88.8	84.9		ng/L		96	75 - 135
Perfluoropentanesulfonic acid (PFPeS)	94.0	86.0		ng/L		92	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	91.2	84.1		ng/L		92	64 - 124
Perfluoroheptanesulfonic acid (PFHpS)	95.4	82.4		ng/L		86	70 - 131
Perfluorooctanesulfonic acid (PFOS)	93.0	82.3		ng/L		89	68 - 128
Perfluorononanesulfonic acid (PFNS)	96.2	93.0		ng/L		97	70 - 130
Perfluorodecanesulfonic acid (PFDS)	96.4	95.1		ng/L		99	66 - 126
Perfluorododecanesulfonic acid (PFDoS)	97.0	55.9	*-	ng/L		58	67 - 127
Perfluorooctanesulfonamide (FOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctanesulfonamide (NMeFOSAA)	100	ND		ng/L		0	0 - 10
N-ethylperfluorooctanesulfonamide (NEtFOSAA)	100	ND		ng/L		0	0 - 10
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	ND		ng/L		0	0 - 10
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	ND		ng/L		0	0 - 10
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	ND		ng/L		0	0 - 10
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	ND		ng/L		0	0 - 10
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	ND		ng/L		0	0 - 10
9CI-PF3ONS	93.4	83.4		ng/L		89	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	74.3		ng/L		74	51 - 173
11CI-PF3OUdS	94.4	84.8		ng/L		90	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	ND		ng/L		0	0 - 10
3:3 FTCA	100	ND		ng/L		0	0 - 10
5:3 FTCA	100	ND		ng/L		0	0 - 10
7:3 FTCA	100	ND		ng/L		0	0 - 10
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	109		ng/L		109	70 - 130
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	87.5		ng/L		88	70 - 130

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-641111/2-A
Matrix: Water
Analysis Batch: 642941

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 641111

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	145	*+	ng/L		145	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	89.2	81.9		ng/L		92	70 - 130

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
13C8 FOSA	106		25 - 150
13C4 PFBA	104		25 - 150
13C5 PFPeA	108		25 - 150
13C2 PFHxA	104		25 - 150
13C4 PFHpA	120		25 - 150
13C4 PFOA	109		25 - 150
13C5 PFNA	112		25 - 150
13C2 PFDA	119		25 - 150
13C2 PFUnA	123		25 - 150
13C2 PFDoA	109		25 - 150
13C2 PFTeDA	104		25 - 150
13C3 PFBS	105		25 - 150
18O2 PFHxS	102		25 - 150
13C4 PFOS	92		25 - 150
d3-NMeFOSAA	143		25 - 150
d5-NEtFOSAA	145		25 - 150
13C2 4:2 FTS	0		0 - 10
13C2 6:2 FTS	195	*5+	25 - 150
13C2 8:2 FTS	190	*5+	25 - 150
d-N-MeFOSA-M	40		25 - 150
d-N-EtFOSA-M	35		25 - 150
d7-N-MeFOSE-M	30		25 - 150
d9-N-EtFOSE-M	27		25 - 150
13C3 HFPO-DA	115		25 - 150
13C-6:2 FTCA	120		25 - 150
13C-8:2 FTCA	138		25 - 150

Lab Sample ID: LCSD 320-641111/3-A
Matrix: Water
Analysis Batch: 642941

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 641111

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	RPD Limit
							Limits	RPD		
Perfluorobutanoic acid (PFBA)	100	181	*+	ng/L		181	93 - 153	3	30	
Perfluoropentanoic acid (PFPeA)	100	178	*+	ng/L		178	85 - 145	1	30	
Perfluorohexanoic acid (PFHxA)	100	225	*+	ng/L		225	81 - 141	2	30	
Perfluoroheptanoic acid (PFHpA)	100	182	*+	ng/L		182	104 - 171	4	30	
Perfluorooctanoic acid (PFOA)	100	279		ng/L		279	158 - 454	5	30	
Perfluorononanoic acid (PFNA)	100	139	*+	ng/L		139	66 - 126	6	30	
Perfluorodecanoic acid (PFDA)	100	134	*+	ng/L		134	65 - 125	6	30	
Perfluoroundecanoic acid (PFUnA)	100	93.8		ng/L		94	57 - 117	1	30	
Perfluorododecanoic acid (PFDoA)	100	95.5		ng/L		95	66 - 126	1	30	

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-641111/3-A
Matrix: Water
Analysis Batch: 642941

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 641111

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorotridecanoic acid (PFTTrDA)	100	80.4		ng/L		80	65 - 136	13	30
Perfluorotetradecanoic acid (PFTeA)	100	67.3		ng/L		67	63 - 123	25	30
Perfluorobutanesulfonic acid (PFBS)	88.8	84.4		ng/L		95	75 - 135	1	30
Perfluoropentanesulfonic acid (PFPeS)	94.0	90.3		ng/L		96	70 - 130	5	30
Perfluorohexanesulfonic acid (PFHxS)	91.2	81.1		ng/L		89	64 - 124	4	30
Perfluoroheptanesulfonic acid (PFHpS)	95.4	80.9		ng/L		85	70 - 131	2	30
Perfluorooctanesulfonic acid (PFOS)	93.0	85.1		ng/L		92	68 - 128	3	30
Perfluorononanesulfonic acid (PFNS)	96.2	88.1		ng/L		92	70 - 130	5	30
Perfluorodecanesulfonic acid (PFDS)	96.4	91.6		ng/L		95	66 - 126	4	30
Perfluorododecanesulfonic acid (PFDoS)	97.0	66.0		ng/L		68	67 - 127	17	30
Perfluorooctanesulfonamide (FOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctanesulfonamide (NMeFOSAA)	100	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctanesulfonamide (NEtFOSAA)	100	ND		ng/L		0	0 - 10	NC	30
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	ND		ng/L		0	0 - 10	NC	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	ND		ng/L		0	0 - 10	NC	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	ND		ng/L		0	0 - 10	NC	30
9CI-PF3ONS	93.4	83.2		ng/L		89	75 - 135	0	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	71.6		ng/L		72	51 - 173	4	30
11CI-PF3OUdS	94.4	79.4		ng/L		84	54 - 114	7	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	ND		ng/L		0	0 - 10	NC	30
3:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
5:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
7:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	93.5		ng/L		94	70 - 130	15	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	86.5		ng/L		86	70 - 130	1	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	145 *+		ng/L		145	70 - 130	0	30

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-641111/3-A
Matrix: Water
Analysis Batch: 642941

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 641111

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	89.2	84.0		ng/L		94	70 - 130	2	30
LCSD LCSD									
Isotope Dilution	%Recovery	Qualifier	Limits						
13C8 FOSA	93		25 - 150						
13C4 PFBA	105		25 - 150						
13C5 PFPeA	106		25 - 150						
13C2 PFHxA	107		25 - 150						
13C4 PFHpA	116		25 - 150						
13C4 PFOA	106		25 - 150						
13C5 PFNA	109		25 - 150						
13C2 PFDA	115		25 - 150						
13C2 PFUnA	121		25 - 150						
13C2 PFDoA	108		25 - 150						
13C2 PFTeDA	102		25 - 150						
13C3 PFBS	103		25 - 150						
18O2 PFHxS	99		25 - 150						
13C4 PFOS	92		25 - 150						
d3-NMeFOSAA	131		25 - 150						
d5-NEtFOSAA	139		25 - 150						
13C2 4:2 FTS	0		0 - 10						
13C2 6:2 FTS	173	*5+	25 - 150						
13C2 8:2 FTS	174	*5+	25 - 150						
d-N-MeFOSA-M	53		25 - 150						
d-N-EtFOSA-M	48		25 - 150						
d7-N-MeFOSE-M	52		25 - 150						
d9-N-EtFOSE-M	44		25 - 150						
13C3 HFPO-DA	116		25 - 150						
13C-6:2 FTCA	114		25 - 150						
13C-8:2 FTCA	124		25 - 150						

QC Association Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

LCMS

Prep Batch: 641110

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94306-1	WPAFB-t0	Pre-Treatment	Water	TOP Pre - Prep	
320-94306-2	TAFB-t0	Pre-Treatment	Water	TOP Pre - Prep	
MB 320-641110/1-A	Method Blank	Pre-Treatment	Water	TOP Pre - Prep	
LCS 320-641110/2-A	Lab Control Sample	Pre-Treatment	Water	TOP Pre - Prep	
LCSD 320-641110/3-A	Lab Control Sample Dup	Pre-Treatment	Water	TOP Pre - Prep	

Prep Batch: 641111

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94306-1	WPAFB-t0	Post-Treatment	Water	TOP Post Prep	
320-94306-2	TAFB-t0	Post-Treatment	Water	TOP Post Prep	
MB 320-641111/1-A	Method Blank	Post-Treatment	Water	TOP Post Prep	
LCS 320-641111/2-A	Lab Control Sample	Post-Treatment	Water	TOP Post Prep	
LCSD 320-641111/3-A	Lab Control Sample Dup	Post-Treatment	Water	TOP Post Prep	

Analysis Batch: 642941

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94306-1	WPAFB-t0	Post-Treatment	Water	537 (modified)	641111
320-94306-1	WPAFB-t0	Pre-Treatment	Water	537 (modified)	641110
320-94306-2	TAFB-t0	Post-Treatment	Water	537 (modified)	641111
320-94306-2	TAFB-t0	Pre-Treatment	Water	537 (modified)	641110
MB 320-641110/1-A	Method Blank	Pre-Treatment	Water	537 (modified)	641110
MB 320-641111/1-A	Method Blank	Post-Treatment	Water	537 (modified)	641111
LCS 320-641110/2-A	Lab Control Sample	Pre-Treatment	Water	537 (modified)	641110
LCS 320-641111/2-A	Lab Control Sample	Post-Treatment	Water	537 (modified)	641111
LCSD 320-641110/3-A	Lab Control Sample Dup	Pre-Treatment	Water	537 (modified)	641110
LCSD 320-641111/3-A	Lab Control Sample Dup	Post-Treatment	Water	537 (modified)	641111

Prep Batch: 646403

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94306-1 - RE	WPAFB-t0	Pre-Treatment	Water	TOP Pre - Prep	
320-94306-2 - RE	TAFB-t0	Pre-Treatment	Water	TOP Pre - Prep	
MB 320-646403/1-A	Method Blank	Pre-Treatment	Water	TOP Pre - Prep	
LCS 320-646403/2-A	Lab Control Sample	Pre-Treatment	Water	TOP Pre - Prep	
LCSD 320-646403/3-A	Lab Control Sample Dup	Pre-Treatment	Water	TOP Pre - Prep	

Analysis Batch: 646992

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94306-1 - RE	WPAFB-t0	Pre-Treatment	Water	537 (modified)	646403
320-94306-2 - RE	TAFB-t0	Pre-Treatment	Water	537 (modified)	646403
MB 320-646403/1-A	Method Blank	Pre-Treatment	Water	537 (modified)	646403
LCS 320-646403/2-A	Lab Control Sample	Pre-Treatment	Water	537 (modified)	646403
LCSD 320-646403/3-A	Lab Control Sample Dup	Pre-Treatment	Water	537 (modified)	646403

Analysis Batch: 647754

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94306-1	WPAFB-t0	Pre-Treatment	Water	Total PFCA-Sum	
320-94306-2	TAFB-t0	Pre-Treatment	Water	Total PFCA-Sum	

Analysis Batch: 647755

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94306-1	WPAFB-t0	Post-Treatment	Water	Total PFCA-Sum	

Eurofins Sacramento

QC Association Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

LCMS (Continued)

Analysis Batch: 647755 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94306-2	TAFB-t0	Post-Treatment	Water	Total PFCA-Sum	

Analysis Batch: 647756

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94306-1	WPAFB-t0	Total/NA	Water	Total PFCA-Dif	
320-94306-2	TAFB-t0	Total/NA	Water	Total PFCA-Dif	

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

Lab Chronicle

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Client Sample ID: WPAFB-t0

Lab Sample ID: 320-94306-1

Date Collected: 11/09/22 01:30

Matrix: Water

Date Received: 11/11/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Post-Treatment	Prep	TOP Post Prep			0.2 mL	10.0 mL	641111	12/18/22 11:25	LN	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	642941	12/27/22 23:53	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			0.2 mL	10.0 mL	641110	12/18/22 11:23	LN	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	642941	12/28/22 01:34	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep	RE		0.2 mL	10.0 mL	646403	01/11/23 17:12	RAC	EET SAC
Pre-Treatment	Analysis	537 (modified)	RE	1	1 mL	1 mL	646992	01/14/23 03:40	AF	EET SAC
Total/NA	Analysis	Total PFCA-Dif		1			647756	01/18/23 09:53	MKW	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			647755	01/18/23 09:48	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			647754	01/18/23 09:46	MKW	EET SAC

Client Sample ID: TAFB-t0

Lab Sample ID: 320-94306-2

Date Collected: 11/09/22 01:33

Matrix: Water

Date Received: 11/11/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Post-Treatment	Prep	TOP Post Prep			0.002 mL	10.0 mL	641111	12/18/22 11:25	LN	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	642941	12/28/22 00:33	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			0.002 mL	10.0 mL	641110	12/18/22 11:23	LN	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	642941	12/28/22 01:54	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep	RE		0.002 mL	10.0 mL	646403	01/11/23 17:12	RAC	EET SAC
Pre-Treatment	Analysis	537 (modified)	RE	1	1 mL	1 mL	646992	01/14/23 04:00	AF	EET SAC
Total/NA	Analysis	Total PFCA-Dif		1			647756	01/18/23 09:53	MKW	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			647755	01/18/23 09:48	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			647754	01/18/23 09:46	MKW	EET SAC

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Laboratory: Eurofins Sacramento

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 (UST)	State	17-020	02-20-24
ANAB	Dept. of Defense ELAP	L2468	04-09-23
ANAB	Dept. of Energy	L2468.01	07-11-23
ANAB	ISO/IEC 17025	L2468	04-09-23
Arizona	State	AZ0708	08-11-23
Arkansas DEQ	State	88-0691	06-17-23
California	State	2897	01-19-23
Colorado	State	CA00044	08-31-23
Florida	NELAP	E87570	06-30-23
Georgia	State	4040	01-29-23
Hawaii	State	<cert No.>	01-29-23
Illinois	NELAP	200060	03-09-23
Kansas	NELAP	E-10375	10-31-23
Louisiana	NELAP	01944	06-30-23
Louisiana (All)	NELAP	01944	06-30-23
Maine	State	CA00004	09-19-23
Michigan	State	9947	01-31-23
Nevada	State	CA00044	07-31-23
New Hampshire	NELAP	2997	04-18-23
New Jersey	NELAP	CA005	06-30-23
New York	NELAP	11666	03-29-23
Ohio	State	41252	01-29-24
Oregon	NELAP	4040	01-29-23
Texas	NELAP	T104704399-23-17	05-31-23
US Fish & Wildlife	US Federal Programs	58448	04-30-23
USDA	US Federal Programs	P330-18-00239	01-23-23
Utah	NELAP	CA000442023-16	02-28-23
Virginia	NELAP	460278	03-14-23
Washington	State	C581	05-05-23
West Virginia (DW)	State	9930C	12-31-23
Wisconsin	State	998204680	08-14-23
Wyoming	State Program	8TMS-L	01-28-19 *

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

Method Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	EET SAC
Total PFCA-Dif	Total PFCA (Treatment Difference)	TAL SOP	EET SAC
Total PFCA-Sum	Total PFCA (Summary)	TAL SOP	EET SAC
TOP Post Prep	Solid-Phase Extraction (SPE)	SW846	EET SAC
TOP Pre - Prep	Solid-Phase Extraction (SPE)	SW846	EET SAC

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600



Sample Summary

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-94306-2

<u>Lab Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Collected</u>	<u>Received</u>
320-94306-1	WPAFB-t0	Water	11/09/22 01:30	11/11/22 09:35
320-94306-2	TAFB-t0	Water	11/09/22 01:33	11/11/22 09:35

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Chain of Custody Record

588163



Environment Testing
TestAmerica

Address: 4942 Dawn St.
Suite 104
East Lansing, MI 48823

Regulatory Program: DW NPDES RCRA Other:

TAL-8210

Company Name: <u>Enspired Solutions</u> Address: <u>4942 Dawn St.</u> City/State/Zip: <u>East Lansing, MI, 48823</u> Phone: <u>937-470-9461</u> Fax: Project Name: <u>ER21-FO-7569</u> Site: P O #		Client Contact Company Name: <u>Enspired Solutions</u> Address: <u>4942 Dawn St.</u> City/State/Zip: <u>East Lansing, MI, 48823</u> Phone: <u>937-470-9461</u> Fax: Project Name: <u>ER21-FO-7569</u> Site: P O #		Project Manager: <u>Laura Turpen</u> Tel/Email: <u>suzanne.witt@enspiredsolutions.com</u> Analysis Turnaround Time <input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		Site Contact: <u>Suzanne Witt</u> Lab Contact: <u>Lab Cogtadtr</u> Date: <u>11/19/2022</u> Carrier:		COC No: <u>1</u> of <u>1</u> COCs Sampler: For Lab Use Only: Walk-in Client: Lab Sampling: Job / SDG No.:											
Sample Identification <u>WPAFB-to</u> <u>TAFB-to</u>		Sample Date <u>11/19/22</u> <u>11/19/22</u> 11/19/22 11/19/22 11/19/22		Sample Time <u>1:30PM</u> <u>1:33PM</u> 1:30PM 1:33PM 1:30PM		Sample Type (C=Comp, G=Grab) <u>G</u> <u>G</u> G G G		Matrix <u>water</u> <u>water</u> water water water		# of Cont. <u>3</u> <u>3</u> 3 3 3		Filtered Sample (Y/N) <u>N</u> <u>N</u> N N N		Perform MS/MSD (Y/N) <u>N</u> <u>N</u> N N N		TOP assay (40 analytes) <u>300.0 Fluoride only</u> <u>Total Fluorine</u>		Sample Specific Notes: <u>See included data sheet</u> ↑	
Preservation Used: <u>1= Ice</u> , <u>2= HCl</u> , <u>3= H2SO4</u> , <u>4= HNO3</u> , <u>5= NaOH</u> , <u>6= Other</u>										Possible Hazard Identification: Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample. <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown									
Special Instructions/QC Requirements & Comments: <u>Please use MDL values as reporting limits</u>										Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months									
Relinquished by: <u>Suzanne Witt</u>		Relinquished by: _____		Relinquished by: _____		Relinquished by: _____		Relinquished by: _____		Relinquished by: _____		Relinquished by: _____		Relinquished by: _____		Relinquished by: _____			
Custody Seal No.: _____		Company: <u>Enspired Solutions</u>		Company: _____		Company: _____		Company: _____		Company: _____		Company: _____		Company: _____		Company: _____			
Date/Time: <u>11/19 1:41PM</u>		Date/Time: _____		Date/Time: _____		Date/Time: _____		Date/Time: _____		Date/Time: _____		Date/Time: _____		Date/Time: _____		Date/Time: _____			
Received by: <u>[Signature]</u>		Received by: _____		Received by: _____		Received by: _____		Received by: _____		Received by: _____		Received by: _____		Received by: _____		Received by: _____			
Cooler Temp. (°C): _____		Obs'd: <u>13.4</u>		Corrd: <u>13.4</u>		Therm ID No.: _____		Therm ID No.: _____		Therm ID No.: _____		Therm ID No.: _____		Therm ID No.: _____		Therm ID No.: _____			



Login Sample Receipt Checklist

Client: Enspired Solutions

Job Number: 320-94306-2

Login Number: 94306

List Source: Eurofins Sacramento

List Number: 1

Creator: Pratali, Sandra A

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	1838835
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Water present in cooler; indicates evidence of melted ice.
Cooler Temperature is acceptable.	False	Refer to Job Narrative for details.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
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	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

PREPARED FOR

Attn: Suzanne Witt
Enspired Solutions
9047 West Scenic Lake Dr
Laingsburg, Michigan 48848

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JOB DESCRIPTION

PFAS PRD Destruction Technology

JOB NUMBER

320-95526-1

Job Notes

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The data in the report relate to the field sample(s) as received by the laboratory and associated QC. All results have been reviewed and have been found to be compliant with laboratory and accreditation requirements, with the exception of the noted deviation(s). For questions, please contact the Project Manager.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northern California, LLC Project Manager.

Authorization



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3/14/2023 12:49:56 PM

Authorized for release by
Laura Turpen, Project Manager I
Laura.Turpen@et.eurofinsus.com
(916)374-4414



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Definitions/Glossary

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Qualifiers

HPLC/IC

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.

LCMS

Qualifier	Qualifier Description
*-	LCS and/or LCSD is outside acceptance limits, low biased.
*+	LCS and/or LCSD is outside acceptance limits, high biased.
*1	LCS/LCSD RPD exceeds control limits.
*5-	Isotope dilution analyte is outside acceptance limits, low biased.
*5+	Isotope dilution analyte is outside acceptance limits, high biased.
B	Compound was found in the blank and sample.
E	Result exceeded calibration range.
H	Sample was prepped or analyzed beyond the specified holding time
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
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

Case Narrative

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Job ID: 320-95526-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative 320-95526-1

Comments

No additional comments.

Receipt

The samples were received on 12/22/2022 9:50 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 1.2° C and 3.1° C.

LCMS

Method 537 (modified): The laboratory control sample (LCS) for preparation batch 320-644488 and analytical batch 320-649396 recovered outside control limits for the following analytes: N-ethylperfluorooctane sulfonamide (NEtFOSA). The associated samples were non-detect for the affected analyte. The LCS was re-analyzed with concurring results. The client was contacted and permission was given to report with qualification and narration.

Method 537 (modified): The laboratory control sample duplicate (LCSD) for preparation batch 320-644488 and analytical batch 320-649396 recovered outside control limits for the following analytes: N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE). The associated samples were non-detect for the affected analyte. The LCSD was re-analyzed with concurring results. The client was contacted and permission was given to report with qualification and narration.

Method 537 (modified): Zero percent recovery of precursor analytes (such as 4:2 FTS, 6:2 FTS, 8:2 FTS, FOSA, NMeFOSAA, NEtFOSAA, etc.) and enhanced recoveries of PFCA is observed in the Post-Treatment Laboratory Control Sample (LCS) and Post-Treatment Laboratory Control Sample Duplicate (LCSD) associated with these samples, consistent with the expected oxidation of precursor analytes. The existing LCS control limits are based upon our historical performance for a set of 24-36 analytes in the LCS solution. We have recently expanded to 70+ analytes. As the LCS solution now contains new/additional precursor analytes we are seeing enhanced recoveries for some PFCA vs. the historical limits as a result. The LCS results are flagged as being high and outside of the established limits for some analytes; however, this is a function of the new analytes in the LCS solution and not indicative of an "out of control" process.

Method 537 (modified): The labeled analyte M2-4:2FTS is employed in this analysis as a "Reverse Surrogate". It is used to monitor the oxidation efficiency of the TOP assay. This analyte is fortified into all sample fractions prior to any processing. The recovery of this analyte should be 0% in Post-Treatment fractions, indicating complete oxidation of the sample.

Method 537 (modified): Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the following samples: NAS_J_tf_10 (320-95526-2), NAS_O_tf_7 (320-95526-4), TAFB_tf_10 (320-95526-5), TAFB_tf_7 (320-95526-6) and (LCS 320-644482/2-A). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method 537 (modified): The concentration of one or more analytes associated with the following samples exceeded the instrument calibration range: TAFB_tf_10 (320-95526-5), TAFB_tf_7 (320-95526-6), TAFB_tf_10_M (320-95526-13) and TAFB_tf_7_M (320-95526-14). These analytes have been qualified; however, the peak(s) did not saturate the instrument detector. Historical data indicate that for the isotope dilution method, dilution and re-analysis will not produce significantly different results from those reported above the calibration range. The client was contacted and permission was given to report with qualification and narration.

Method 537 (modified): The labeled analyte M2-4:2FTS is converted to PFBA during the oxidation step of the TOP assay. The PFBA result in the Post-Treatment Method Blank (MB) indicates how much of a field sample's Post-Treatment PFBA result is contributed by the Reverse Surrogate, when adjusted for dilution factors. (MB 320-644482/1-A)

Method 537 (modified): Results for samples NAS_J_tf_8 (320-95526-1), NAS_J_tf_10 (320-95526-2), TAFB_tf_10 (320-95526-5), TAFB_tf_7 (320-95526-6) and WPAFB_tf_9 (320-95526-7) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits

Method 537 (modified): The laboratory control sample (LCS) for preparation batch 320-646328 and analytical batch 320-647473 recovered outside control limits for the following analyte: Perfluorodecanoic acid (PFDA) and Perfluorododecanesulfonic acid (PFDoS). These

Case Narrative

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Job ID: 320-95526-1 (Continued)

Laboratory: Eurofins Sacramento (Continued)

analytes were biased high and low in the LCS. The client was contacted and gave permission to report.

Method 537 (modified): The laboratory control sample duplicate (LCSD) for preparation batch 320-646328 and analytical batch 320-646992 recovered outside control limits for several analytes. These analytes were biased low in the LCSD. The LCSD was re-analyzed with concurring results. The client was contacted and permission was given to report with qualification and narration.

Method 537 (modified): The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 320-646328 and analytical batch 320-646992 recovered outside control limits for the following analyte: 9CI-PF3ONS.

Method 537 (modified): M2 4:2 FTS was flagged in the following continuing calibration blank (CCB) and continuing calibration verification (CCV) for failing acceptance limits for post-treatment TOPS analysis: (CCB 320-647473/1), (CCV 320-647473/3), (CCB 320-646992/1) and (CCV 320-646992/3). However, this analyte met the method acceptance criteria of 25 - 150% difference.

Method 537 (modified): Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the following samples: NAS_O_tf_10_M (320-95526-11), TAFB_tf_10_M (320-95526-13) and TAFB_tf_7_M (320-95526-14). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method 537 (modified): The following samples were analyzed outside analytical holding time due an analyst oversight: NAS_J_tf_8 (320-95526-1), NAS_J_tf_10 (320-95526-2), TAFB_tf_10 (320-95526-5), TAFB_tf_7 (320-95526-6), WPAFB_tf_9 (320-95526-7) and WPAFB_tf_10 (320-95526-8)

Method 537 (modified): The continuing calibration verification (CCV) associated with batch 320-651596 recovered above the upper control limit for 6:2 Fluorotelomer sulfonic acid (6:2 FTS), 8:2 Fluorotelomer sulfonic acid (8:2 FTS) and Perfluorooctanesulfonic acid (PFOS). The samples associated with this CCV were reanalyzed for the affected analytes. The associated samples are impacted: NAS_O_tf_10_M (320-95526-11), NAS_O_tf_7_M (320-95526-12), WPAFB_tf_9_M (320-95526-15) and (CCV 320-651596/14).

Method ELLE SOP: Reporting limits were raised for the following samples due to interference from the sample matrix. NAS_O_tf_10 (320-95526-3), NAS_O_tf_7 (320-95526-4), TAFB_tf_10 (320-95526-5) and TAFB_tf_7 (320-95526-6)

Method ELLE SOP: Target Analyte Total Fluorine (TF) was detected in the Method blank associated with the following samples NAS_O_tf_10 (320-95526-3), NAS_O_tf_7 (320-95526-4), TAFB_tf_10 (320-95526-5) and TAFB_tf_7 (320-95526-6). Since the result found in the samples is >10x the result found in the method blank the data is reported.

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

General Chemistry

Method 300.0: The following samples in analytical batch 320-646784 were diluted to bring the concentration of target analytes within the calibration range: NAS_O_tf_10 (320-95526-3), NAS_O_tf_7 (320-95526-4), TAFB_tf_10 (320-95526-5), and TAFB_tf_7 (320-95526-6). Elevated reporting limits (RLs) are provided.

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

Organic Prep

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

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_8

Lab Sample ID: 320-95526-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	0.33	J	0.50	0.053	mg/L	1		300.0	Total/NA
Perfluoropentanoic acid (PFPeA)	8500		50	12	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	730		50	6.3	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanoic acid (PFOA)	210		50	21	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS)	17	J	50	5.0	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	73		50	4.3	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS)	33	J	50	8.0	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonamide (FOSA)	10	J	50	8.8	ng/L	1		537 (modified)	Pre-Treatment
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	30	J	50	6.0	ng/L	1		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	380		130	63	ng/L	1		537 (modified)	Pre-Treatment
Perfluoro-4-methoxybutanoic acid (PFMBA)	15	J	50	7.0	ng/L	1		537 (modified)	Pre-Treatment
Perfluoro-3-methoxypropanoic acid (PFMPA)	14	J	50	7.0	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA) - DL	11000	H	630	300	ng/L	5		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA) - DL	14000	H	250	70	ng/L	5		537 (modified)	Pre-Treatment
Perfluoropentanoic acid (PFPeA)	9200	*+	50	12	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	680	*+	50	6.3	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanoic acid (PFOA)	180		50	21	ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS)	23	J	50	5.0	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanesulfonic acid (PFPeS)	11	J	50	7.5	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS)	92		50	4.3	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS)	21	J	50	8.0	ng/L	1		537 (modified)	Post-Treatment
Perfluoro-4-methoxybutanoic acid (PFMBA)	15	J	50	7.0	ng/L	1		537 (modified)	Post-Treatment
Perfluoro-3-methoxypropanoic acid (PFMPA)	16	J*+	50	7.0	ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanoic acid (PFBA) - DL	12000	H B *+	630	300	ng/L	5		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA) - DL	16000	H *+	250	70	ng/L	5		537 (modified)	Post-Treatment
Total Fluorine (TF)	470		200	100	ug/L	1		ELLE SOP	Total/NA
PFBA	1000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	720				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	1400				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	3600				ng/L	1		Total PFCA-Dif	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_8 (Continued)

Lab Sample ID: 320-95526-1

Analyte	Result	Qualifier	NONE	MDL	Unit	Dil Fac	D	Method	Prep Type
PFBA	11000	H	630	300	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	8500		50	12	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	14000	H	250	70	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	730		50	6.3	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	210		50	21	ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	34000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	12000	*+ H B	630	300	ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	9200	*+	50	12	ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	16000	*+ H	250	70	ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	680	*+	50	6.3	ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	180		50	21	ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	38000				ng/L	1		Total PFCA-Sum	Post-Treatment

Client Sample ID: NAS_J_tf_10

Lab Sample ID: 320-95526-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	0.28	J	0.50	0.053	mg/L	1		300.0	Total/NA
Perfluorobutanoic acid (PFBA)	8300		130	60	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanoic acid (PFPeA)	5100		50	12	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	8700		50	14	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	450		50	6.3	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanoic acid (PFOA)	180		50	21	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS)	11	J	50	5.0	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanesulfonic acid (PFPeS)	17	J	50	7.5	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	85		50	4.3	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS)	62		50	8.0	ng/L	1		537 (modified)	Pre-Treatment
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	33	J	50	6.0	ng/L	1		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	300		130	63	ng/L	1		537 (modified)	Pre-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	23	J	50	12	ng/L	1		537 (modified)	Pre-Treatment
Perfluoro-4-methoxybutanoic acid (PFMBA)	10	J	50	7.0	ng/L	1		537 (modified)	Pre-Treatment
Perfluoro-3-methoxypropanoic acid (PFMPA)	10	J	50	7.0	ng/L	1		537 (modified)	Pre-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_10 (Continued)

Lab Sample ID: 320-95526-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	9900	*+ B	130	60	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA)	6500	*+	50	12	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	390	*+	50	6.3	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanoic acid (PFOA)	140		50	21	ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS)	22	J	50	5.0	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanesulfonic acid (PFPeS)	22	J	50	7.5	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS)	76		50	4.3	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS)	47	J	50	8.0	ng/L	1		537 (modified)	Post-Treatment
Perfluoro-4-methoxybutanoic acid (PFMBA)	13	J	50	7.0	ng/L	1		537 (modified)	Post-Treatment
Perfluoro-3-methoxypropanoic acid (PFMPA)	14	J**	50	7.0	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA) - DL	10000	H**	250	70	ng/L	5		537 (modified)	Post-Treatment
Total Fluorine (TF)	400		200	100	ug/L	1		ELLE SOP	Total/NA
PFBA	1600				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	1400				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	1400				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	4200				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	8300		130	60	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	5100		50	12	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	8700		50	14	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	450		50	6.3	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	180		50	21	ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	23000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	9900	*+ B	130	60	ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	6500	*+	50	12	ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	10000	*+ H	250	70	ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	390	*+	50	6.3	ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	140		50	21	ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	27000				ng/L	1		Total PFCA-Sum	Post-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_10

Lab Sample ID: 320-95526-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	18		5.0	0.53	mg/L	10		300.0	Total/NA
Perfluoropentanoic acid (PFPeA)	210000	J	250000	60000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	440000		250000	70000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	35000	J	250000	32000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	40000	J	250000	22000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	530000	J*+ B	630000	300000	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA)	290000	*+	250000	60000	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA)	470000	*+	250000	70000	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	57000	J*+	250000	32000	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS)	32000	J	250000	22000	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS)	76000	J	250000	40000	ng/L	1		537 (modified)	Post-Treatment
Total Fluorine (TF)	29000	B	20000	10000	ug/L	1		ELLE SOP	Total/NA
PFBA	530000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	79000				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	26000				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	22000				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	660000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	210000	J	250000	60000	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	440000		250000	70000	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	35000	J	250000	32000	ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	690000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	530000	J*+ B	630000	300000	ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	290000	*+	250000	60000	ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	470000	*+	250000	70000	ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	57000	J*+	250000	32000	ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	1300000				ng/L	1		Total PFCA-Sum	Post-Treatment

Client Sample ID: NAS_O_tf_7

Lab Sample ID: 320-95526-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	21		5.0	0.53	mg/L	10		300.0	Total/NA
Perfluorobutanoic acid (PFBA)	330000	J	630000	300000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanoic acid (PFPeA)	160000	J	250000	60000	ng/L	1		537 (modified)	Pre-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_7 (Continued)

Lab Sample ID: 320-95526-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	130000	J	250000	70000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	51000	J	250000	32000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	190000	J	250000	22000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	48000	J	250000	24000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS)	590000		250000	40000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	670000	*+ B	630000	300000	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA)	240000	J**	250000	60000	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA)	180000	J**	250000	70000	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	65000	J**	250000	32000	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS)	160000	J	250000	22000	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS)	610000		250000	40000	ng/L	1		537 (modified)	Post-Treatment
Total Fluorine (TF)	32000	B	20000	10000	ug/L	1		ELLE SOP	Total/NA
PFBA	340000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	73000				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	49000				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	14000				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	480000				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	330000	J	630000	300000	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	160000	J	250000	60000	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	130000	J	250000	70000	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	51000	J	250000	32000	ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	670000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	670000	*+ B	630000	300000	ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	240000	J**	250000	60000	ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	180000	J**	250000	70000	ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	65000	J**	250000	32000	ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	1200000				ng/L	1		Total PFCA-Sum	Post-Treatment

Client Sample ID: TAFB_tf_10

Lab Sample ID: 320-95526-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	27		2.5	0.27	mg/L	5		300.0	Total/NA
Perfluorobutanoic acid (PFBA)	1000000	H E	13000	6000	ng/L	100		537 (modified)	Pre-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_10 (Continued)

Lab Sample ID: 320-95526-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoropentanoic acid (PFPeA)	990000	H	5000	1200	ng/L	100		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	1100000	H E	5000	1400	ng/L	100		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	470000	H	5000	630	ng/L	100		537 (modified)	Pre-Treatment
Perfluorooctanoic acid (PFOA)	44000	H	5000	2100	ng/L	100		537 (modified)	Pre-Treatment
Perfluorononanoic acid (PFNA)	4100	J H	5000	680	ng/L	100		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS)	360000	H	5000	500	ng/L	100		537 (modified)	Pre-Treatment
Perfluoropentanesulfonic acid (PFPeS)	240000	H	5000	750	ng/L	100		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	380000	H	5000	430	ng/L	100		537 (modified)	Pre-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	9200	H	5000	480	ng/L	100		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS)	140000	H	5000	800	ng/L	100		537 (modified)	Pre-Treatment
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	17000	H	5000	600	ng/L	100		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	270000	H	13000	6300	ng/L	100		537 (modified)	Pre-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	32000	H	5000	1200	ng/L	100		537 (modified)	Pre-Treatment
Perfluoro-4-methoxybutanoic acid (PFMBA)	1100	J H	5000	700	ng/L	100		537 (modified)	Pre-Treatment
Perfluoro-3-methoxypropanoic acid (PFMPA)	1500	J H	5000	700	ng/L	100		537 (modified)	Pre-Treatment
Perfluorononanoic acid (PFNA)	5200	*+	50	6.8	ng/L	1		537 (modified)	Post-Treatment
Perfluorodecanoic acid (PFDA)	190	*+	50	7.8	ng/L	1		537 (modified)	Post-Treatment
Perfluoroundecanoic acid (PFUnA)	100		50	28	ng/L	1		537 (modified)	Post-Treatment
Perfluorododecanoic acid (PFDoA)	76		50	14	ng/L	1		537 (modified)	Post-Treatment
Perfluorotridecanoic acid (PFTrDA)	51		50	32	ng/L	1		537 (modified)	Post-Treatment
Perfluorotetradecanoic acid (PFTeA)	44	J	50	7.3	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	9300		50	4.8	ng/L	1		537 (modified)	Post-Treatment
Perfluorononanesulfonic acid (PFNS)	91		50	4.0	ng/L	1		537 (modified)	Post-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	2800		130	63	ng/L	1		537 (modified)	Post-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	350		50	12	ng/L	1		537 (modified)	Post-Treatment
Perfluoro-4-methoxybutanoic acid (PFMBA)	5100		50	7.0	ng/L	1		537 (modified)	Post-Treatment
Perfluoro-3-methoxypropanoic acid (PFMPA)	7600	*+	50	7.0	ng/L	1		537 (modified)	Post-Treatment
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	200		50	7.0	ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanoic acid (PFBA) - DL	1500000	H E B *+	13000	6000	ng/L	100		537 (modified)	Post-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_10 (Continued)

Lab Sample ID: 320-95526-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoropentanoic acid (PFPeA) - DL	1600000	H E *+	5000	1200	ng/L	100		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA) - DL	1100000	H E *+	5000	1400	ng/L	100		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA) - DL	570000	H *+	5000	630	ng/L	100		537 (modified)	Post-Treatment
Perfluorooctanoic acid (PFOA) - DL	51000	H	5000	2100	ng/L	100		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS) - DL	350000	H	5000	500	ng/L	100		537 (modified)	Post-Treatment
Perfluoropentanesulfonic acid (PFPeS) - DL	240000	H	5000	750	ng/L	100		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS) - DL	390000	H	5000	430	ng/L	100		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS) - DL	130000	H	5000	800	ng/L	100		537 (modified)	Post-Treatment
Total Fluorine (TF)	58000	B	20000	10000	ug/L		1	ELLE SOP	Total/NA
PFBA	410000				ng/L		1	Total PFCA-Dif	Total/NA
PFPA	600000				ng/L		1	Total PFCA-Dif	Total/NA
PFHxA	16000				ng/L		1	Total PFCA-Dif	Total/NA
PFHpA	100000				ng/L		1	Total PFCA-Dif	Total/NA
PFOA	7500				ng/L		1	Total PFCA-Dif	Total/NA
PFNA	1100				ng/L		1	Total PFCA-Dif	Total/NA
Total PFCA	1200000				ng/L		1	Total PFCA-Dif	Total/NA
PFBA	1000000	H E	13000	6000	ng/L		1	Total PFCA-Sum	Pre-Treatment
PFPA	990000	H	5000	1200	ng/L		1	Total PFCA-Sum	Pre-Treatment
PFHxA	1100000	H E	5000	1400	ng/L		1	Total PFCA-Sum	Pre-Treatment
PFHpA	470000	H	5000	630	ng/L		1	Total PFCA-Sum	Pre-Treatment
PFOA	44000	H	5000	2100	ng/L		1	Total PFCA-Sum	Pre-Treatment
PFNA	4100	J H	5000	680	ng/L		1	Total PFCA-Sum	Pre-Treatment
Total PFCA	3600000				ng/L		1	Total PFCA-Sum	Pre-Treatment
PFBA	1500000	*+ H E B	13000	6000	ng/L		1	Total PFCA-Sum	Post-Treatment
PFPA	1600000	*+ H E	5000	1200	ng/L		1	Total PFCA-Sum	Post-Treatment
PFHxA	1100000	*+ H E	5000	1400	ng/L		1	Total PFCA-Sum	Post-Treatment
PFHpA	570000	*+ H	5000	630	ng/L		1	Total PFCA-Sum	Post-Treatment
PFOA	51000	H	5000	2100	ng/L		1	Total PFCA-Sum	Post-Treatment
PFNA	5200	*+	50	6.8	ng/L		1	Total PFCA-Sum	Post-Treatment
Total PFCA	4800000				ng/L		1	Total PFCA-Sum	Post-Treatment

Client Sample ID: TAFB_tf_7

Lab Sample ID: 320-95526-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	35		5.0	0.53	mg/L	10		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_7 (Continued)

Lab Sample ID: 320-95526-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1800000	H E	13000	6000	ng/L	100		537 (modified)	Pre-Treatment
Perfluoropentanoic acid (PFPeA)	1900000	H E	5000	1200	ng/L	100		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	1300000	H E	5000	1400	ng/L	100		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	2000000	H E	5000	630	ng/L	100		537 (modified)	Pre-Treatment
Perfluorooctanoic acid (PFOA)	160000	H	5000	2100	ng/L	100		537 (modified)	Pre-Treatment
Perfluorononanoic acid (PFNA)	30000	H	5000	680	ng/L	100		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS)	300000	H	5000	500	ng/L	100		537 (modified)	Pre-Treatment
Perfluoropentanesulfonic acid (PFPeS)	96000	H	5000	750	ng/L	100		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	180000	H	5000	430	ng/L	100		537 (modified)	Pre-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	37000	H	5000	480	ng/L	100		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS)	1500000	H E	5000	800	ng/L	100		537 (modified)	Pre-Treatment
Perfluorononanesulfonic acid (PFNS)	1100	J H	5000	400	ng/L	100		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	190000	H	13000	6300	ng/L	100		537 (modified)	Pre-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	16000	H	5000	1200	ng/L	100		537 (modified)	Pre-Treatment
Perfluoro-4-methoxybutanoic acid (PFMBA)	1300	J H	5000	700	ng/L	100		537 (modified)	Pre-Treatment
Perfluoro-3-methoxypropanoic acid (PFMPA)	1900	J H	5000	700	ng/L	100		537 (modified)	Pre-Treatment
Perfluorodecanoic acid (PFDA)	960	*+	50	7.8	ng/L	1		537 (modified)	Post-Treatment
Perfluoroundecanoic acid (PFUnA)	330		50	28	ng/L	1		537 (modified)	Post-Treatment
Perfluorododecanoic acid (PFDoA)	180		50	14	ng/L	1		537 (modified)	Post-Treatment
Perfluorotridecanoic acid (PFTrDA)	86		50	32	ng/L	1		537 (modified)	Post-Treatment
Perfluorotetradecanoic acid (PFTeA)	74		50	7.3	ng/L	1		537 (modified)	Post-Treatment
Perfluorononanesulfonic acid (PFNS)	3300		50	4.0	ng/L	1		537 (modified)	Post-Treatment
Perfluorodecanesulfonic acid (PFDS)	650		50	14	ng/L	1		537 (modified)	Post-Treatment
Perfluorododecanesulfonic acid (PFDoS)	120		50	24	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanesulfonamide (FOSA)	30	J	50	8.8	ng/L	1		537 (modified)	Post-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	990		130	63	ng/L	1		537 (modified)	Post-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	110		50	12	ng/L	1		537 (modified)	Post-Treatment
Perfluoro-4-methoxybutanoic acid (PFMBA)	5800		50	7.0	ng/L	1		537 (modified)	Post-Treatment
Perfluoro-3-methoxypropanoic acid (PFMPA)	8800	*+	50	7.0	ng/L	1		537 (modified)	Post-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_7 (Continued)

Lab Sample ID: 320-95526-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	180		50	7.0	ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanoic acid (PFBA) - DL	1900000	H E B *+	13000	6000	ng/L	100		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA) - DL	2000000	H E *+	5000	1200	ng/L	100		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA) - DL	1100000	H E *+	5000	1400	ng/L	100		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA) - DL	1700000	H E *+	5000	630	ng/L	100		537 (modified)	Post-Treatment
Perfluorooctanoic acid (PFOA) - DL	160000	H	5000	2100	ng/L	100		537 (modified)	Post-Treatment
Perfluorononanoic acid (PFNA) - DL	30000	H *+	5000	680	ng/L	100		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS) - DL	240000	H	5000	500	ng/L	100		537 (modified)	Post-Treatment
Perfluoropentanesulfonic acid (PFPeS) - DL	75000	H	5000	750	ng/L	100		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS) - DL	190000	H	5000	430	ng/L	100		537 (modified)	Post-Treatment
Perfluoroheptanesulfonic acid (PFHpS) - DL	28000	H	5000	480	ng/L	100		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS) - DL	1200000	H E	5000	800	ng/L	100		537 (modified)	Post-Treatment
Total Fluorine (TF)	59000	B	20000	10000	ug/L	1		ELLE SOP	Total/NA
PFBA	170000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	65000				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	1800000	H E	13000	6000	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	1900000	H E	5000	1200	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	1300000	H E	5000	1400	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	2000000	H E	5000	630	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	160000	H	5000	2100	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFNA	30000	H	5000	680	ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	7200000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	1900000	*+ H E B	13000	6000	ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	2000000	*+ H E	5000	1200	ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	1100000	*+ H E	5000	1400	ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	1700000	*+ H E	5000	630	ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	160000	H	5000	2100	ng/L	1		Total PFCA-Sum	Post-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_7 (Continued)

Lab Sample ID: 320-95526-6

Analyte	Result	Qualifier	NONE	MDL	Unit	Dil Fac	D	Method	Prep Type
PFNA	30000	*+ H	5000	680	ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	6900000				ng/L	1		Total PFCA-Sum	Post-Treatment

Client Sample ID: WPAFB_tf_9

Lab Sample ID: 320-95526-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.4		0.50	0.053	mg/L	1		300.0	Total/NA
Perfluorobutanoic acid (PFBA)	2400	H	130	60	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanoic acid (PFPeA)	960	H	50	12	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	1800	H	50	14	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	710	H	50	6.3	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanoic acid (PFOA)	4200	H	50	21	ng/L	1		537 (modified)	Pre-Treatment
Perfluorononanoic acid (PFNA)	120	H	50	6.8	ng/L	1		537 (modified)	Pre-Treatment
Perfluorodecanoic acid (PFDA)	15	J H	50	7.8	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS)	260	H	50	5.0	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanesulfonic acid (PFPeS)	190	H	50	7.5	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	860	H	50	4.3	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	170	H	50	4.8	ng/L	1		537 (modified)	Pre-Treatment
Perfluorononanesulfonic acid (PFNS)	10	J H	50	4.0	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonamide (FOSA)	110	H	50	8.8	ng/L	1		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	1600	H	130	63	ng/L	1		537 (modified)	Pre-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	310	H	50	12	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS) - DL	10000	H	250	40	ng/L	5		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	4100	*+ H	130	60	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA)	3400	*+ H	50	12	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA)	4700	*+ H	50	14	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	1000	*+ H	50	6.3	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanoic acid (PFOA)	3800	H	50	21	ng/L	1		537 (modified)	Post-Treatment
Perfluorononanoic acid (PFNA)	51	*+ H	50	6.8	ng/L	1		537 (modified)	Post-Treatment
Perfluorodecanoic acid (PFDA)	12	J H *+	50	7.8	ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS)	260	H	50	5.0	ng/L	1		537 (modified)	Post-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_9 (Continued)

Lab Sample ID: 320-95526-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoropentanesulfonic acid (PFPeS)	200	H	50	7.5	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS)	770	H	50	4.3	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	86	H	50	4.8	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS)	3700	H	50	8.0	ng/L	1		537 (modified)	Post-Treatment
Total Fluorine (TF)	1900		200	100	ug/L	1		ELLE SOP	Total/NA
PFBA	1800				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	2400				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	2900				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	300				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	6900				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	2400	H	130	60	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	960	H	50	12	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	1800	H	50	14	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	710	H	50	6.3	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	4200	H	50	21	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFNA	120	H	50	6.8	ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	10000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	4100	*+ H	130	60	ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	3400	*+ H	50	12	ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	4700	*+ H	50	14	ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	1000	*+ H	50	6.3	ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	3800	H	50	21	ng/L	1		Total PFCA-Sum	Post-Treatment
PFNA	51	*+ H	50	6.8	ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	17000				ng/L	1		Total PFCA-Sum	Post-Treatment

Client Sample ID: WPAFB_tf_10

Lab Sample ID: 320-95526-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.3		0.50	0.053	mg/L	1		300.0	Total/NA
Perfluorobutanoic acid (PFBA)	4400		130	60	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanoic acid (PFPeA)	3400		50	12	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	1500		50	14	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	330		50	6.3	ng/L	1		537 (modified)	Pre-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_10 (Continued)

Lab Sample ID: 320-95526-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	650		50	21	ng/L	1		537 (modified)	Pre-Treatment
Perfluorononanoic acid (PFNA)	11	J	50	6.8	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS)	1100		50	5.0	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanesulfonic acid (PFPeS)	96		50	7.5	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	220		50	4.3	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS)	500		50	8.0	ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonamide (FOSA)	110		50	8.8	ng/L	1		537 (modified)	Pre-Treatment
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	42	J	50	6.0	ng/L	1		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	380		130	63	ng/L	1		537 (modified)	Pre-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	26	J	50	12	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	4300	*+ H B	130	60	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA)	3300	*+ H	50	12	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA)	1500	*+ H	50	14	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	330	*+ H	50	6.3	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanoic acid (PFOA)	620	H	50	21	ng/L	1		537 (modified)	Post-Treatment
Perfluorononanoic acid (PFNA)	9.3	J *+ H	50	6.8	ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS)	1200	H	50	5.0	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanesulfonic acid (PFPeS)	100	H	50	7.5	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS)	210	H	50	4.3	ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS)	420	H	50	8.0	ng/L	1		537 (modified)	Post-Treatment
Total Fluorine (TF)	1800		200	100	ug/L	1		ELLE SOP	Total/NA
PFBA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	4400		130	60	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	3400		50	12	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	1500		50	14	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	330		50	6.3	ng/L	1		Total PFCA-Sum	Pre-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_10 (Continued)

Lab Sample ID: 320-95526-8

Analyte	Result	Qualifier	NONE	MDL	Unit	Dil Fac	D	Method	Prep Type
PFOA	650		50	21	ng/L	1		Total PFCA-Sum	Pre-Treatment
PFNA	11	J	50	6.8	ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	10000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	4300	*+ H B	130	60	ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	3300	*+ H	50	12	ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	1500	*+ H	50	14	ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	330	*+ H	50	6.3	ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	620	H	50	21	ng/L	1		Total PFCA-Sum	Post-Treatment
PFNA	9.3	J *+ H	50	6.8	ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	10000				ng/L	1		Total PFCA-Sum	Post-Treatment

Client Sample ID: NAS_J_tf_8_M

Lab Sample ID: 320-95526-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	940		200	35	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	1100		200	49	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	2600		200	58	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	370		200	25	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	3000		200	85	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	34	J	200	31	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	280		200	17	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	450		200	54	ng/L	1		537 (modified)	Total/NA
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	910	J	2000	200	ng/L	1		537 (modified)	Total/NA

Client Sample ID: NAS_J_tf_10_M

Lab Sample ID: 320-95526-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	2000		200	35	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	2100		200	49	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	3800		200	58	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	530		200	25	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1400		200	85	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	72	J	200	27	ng/L	1		537 (modified)	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	58	J	200	30	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	770		200	17	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	11000		200	54	ng/L	1		537 (modified)	Total/NA
Perfluorononanesulfonic acid (PFNS)	26	J	200	16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonamide (FOSA)	91	J	200	35	ng/L	1		537 (modified)	Total/NA
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	2100		2000	200	ng/L	1		537 (modified)	Total/NA
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	1300	J	2000	200	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_10_M

Lab Sample ID: 320-95526-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	22000		200	85	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	7900		200	27	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	39	J	200	31	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	4700		200	20	ng/L	1		537 (modified)	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	15000		200	30	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonamide (FOSA)	36	J	200	35	ng/L	1		537 (modified)	Total/NA
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	730	J	2000	520	ng/L	1		537 (modified)	Total/NA
Perfluoro-4-methoxybutanoic acid (PFMBA)	230		200	26	ng/L	1		537 (modified)	Total/NA
Perfluoro-3-methoxypropanoic acid (PFMPA)	180	J	200	28	ng/L	1		537 (modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	86000		10000	1800	ng/L	50		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	130000		10000	2500	ng/L	50		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	320000		10000	2900	ng/L	50		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	200000		10000	1300	ng/L	50		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	200000		10000	850	ng/L	50		537 (modified)	Total/NA
Perfluoroheptanesulfonic acid (PFHpS) - DL	17000		10000	950	ng/L	50		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	410000		10000	2700	ng/L	50		537 (modified)	Total/NA
6:2 Fluorotelomer sulfonic acid (6:2 FTS) - DL	480000		100000	10000	ng/L	50		537 (modified)	Total/NA

Client Sample ID: NAS_O_tf_7_M

Lab Sample ID: 320-95526-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	39000		200	35	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	35000		200	49	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	31000		200	58	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	19000		200	25	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	19000		200	85	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	1700		200	27	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	120	J	200	31	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1500		200	20	ng/L	1		537 (modified)	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	3800		200	30	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonamide (FOSA)	100	J	200	35	ng/L	1		537 (modified)	Total/NA
Perfluoro-4-methoxybutanoic acid (PFMBA)	86	J	200	26	ng/L	1		537 (modified)	Total/NA
Perfluoro-3-methoxypropanoic acid (PFMPA)	170	J	200	28	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	150000		20000	1700	ng/L	100		537 (modified)	Total/NA
Perfluoroheptanesulfonic acid (PFHpS) - DL	64000		20000	1900	ng/L	100		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	3200000		20000	5400	ng/L	100		537 (modified)	Total/NA
6:2 Fluorotelomer sulfonic acid (6:2 FTS) - DL	99000	J	200000	20000	ng/L	100		537 (modified)	Total/NA
8:2 Fluorotelomer sulfonic acid (8:2 FTS) - DL	26000	J	200000	20000	ng/L	100		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_10_M

Lab Sample ID: 320-95526-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	280000		20000	3500	ng/L	100		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	650000		20000	4900	ng/L	100		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	1700000		20000	5800	ng/L	100		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1200000		20000	2500	ng/L	100		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	550000		20000	8500	ng/L	100		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	180000		20000	2700	ng/L	100		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	6500	J	20000	3100	ng/L	100		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	150000		20000	2000	ng/L	100		537 (modified)	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	350000		20000	3000	ng/L	100		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2300000		20000	1700	ng/L	100		537 (modified)	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	420000		20000	1900	ng/L	100		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	14000000	E	20000	5400	ng/L	100		537 (modified)	Total/NA
Perfluorononanesulfonic acid (PFNS)	32000		20000	1600	ng/L	100		537 (modified)	Total/NA
Perfluorodecanesulfonic acid (PFDS)	15000	J	20000	3200	ng/L	100		537 (modified)	Total/NA
Perfluorooctanesulfonamide (FOSA)	46000		20000	3500	ng/L	100		537 (modified)	Total/NA
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	540000		200000	20000	ng/L	100		537 (modified)	Total/NA
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	670000		200000	20000	ng/L	100		537 (modified)	Total/NA

Client Sample ID: TAFB_tf_7_M

Lab Sample ID: 320-95526-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	140000		20000	3500	ng/L	100		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	160000		20000	4900	ng/L	100		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	340000		20000	5800	ng/L	100		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	290000		20000	2500	ng/L	100		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	100000		20000	8500	ng/L	100		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	140000		20000	2700	ng/L	100		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	13000	J	20000	3100	ng/L	100		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	40000		20000	2000	ng/L	100		537 (modified)	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	28000		20000	3000	ng/L	100		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	170000		20000	1700	ng/L	100		537 (modified)	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	88000		20000	1900	ng/L	100		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	12000000	E	20000	5400	ng/L	100		537 (modified)	Total/NA
Perfluorononanesulfonic acid (PFNS)	38000		20000	1600	ng/L	100		537 (modified)	Total/NA
Perfluorodecanesulfonic acid (PFDS)	17000	J	20000	3200	ng/L	100		537 (modified)	Total/NA
Perfluorooctanesulfonamide (FOSA)	24000		20000	3500	ng/L	100		537 (modified)	Total/NA
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	1100000		200000	20000	ng/L	100		537 (modified)	Total/NA
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	460000		200000	20000	ng/L	100		537 (modified)	Total/NA

Client Sample ID: WPAFB_tf_9_M

Lab Sample ID: 320-95526-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	660		200	35	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	760		200	49	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	1600		200	58	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1000		200	25	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_9_M (Continued)

Lab Sample ID: 320-95526-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	6400		200	85	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	240		200	27	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	72	J	200	31	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	250		200	20	ng/L	1		537 (modified)	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	350		200	30	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2700		200	17	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	390		200	19	ng/L	1		537 (modified)	Total/NA
Perfluorononanesulfonic acid (PFNS)	37	J	200	16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonamide (FOSA)	44	J	200	35	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	26000		1000	270	ng/L	5		537 (modified)	Total/NA
6:2 Fluorotelomer sulfonic acid (6:2 FTS) - DL	13000		10000	1000	ng/L	5		537 (modified)	Total/NA
8:2 Fluorotelomer sulfonic acid (8:2 FTS) - DL	1700	J	10000	1000	ng/L	5		537 (modified)	Total/NA

Client Sample ID: WPAFB_tf_10_M

Lab Sample ID: 320-95526-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	640		200	35	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	790		200	49	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	1300		200	58	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	950		200	25	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2700		200	85	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	93	J	200	27	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	320		200	20	ng/L	1		537 (modified)	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	250		200	30	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1600		200	17	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	100	J	200	19	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6700		200	54	ng/L	1		537 (modified)	Total/NA
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	16000		2000	200	ng/L	1		537 (modified)	Total/NA
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	1800	J	2000	200	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Total Oxidation Precursors

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

TestAmerica Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_8

Lab Sample ID: 320-95526-1
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	11000		ng/L	12000		ng/L	1000	ng/L
Perfluorobutanoic acid (PFBA)	11000		ng/L	12000		ng/L	1000	ng/L
PFPA	8500		ng/L	9200		ng/L	720	ng/L
Perfluoropentanoic acid (PFPeA)	8500		ng/L	9200		ng/L	720	ng/L
PFHxA	14000		ng/L	16000		ng/L	1400	ng/L
Perfluorohexanoic acid (PFHxA)	14000		ng/L	16000		ng/L	1400	ng/L
PFHpA	730		ng/L	680		ng/L	0.00	ng/L
Perfluoroheptanoic acid (PFHpA)	730		ng/L	680		ng/L	0.00	ng/L
PFOA	210		ng/L	180		ng/L	0.00	ng/L
Perfluorooctanoic acid (PFOA)	210		ng/L	180		ng/L	0.00	ng/L
PFNA	ND		ng/L	ND		ng/L	0.00	ng/L
Perfluorononanoic acid (PFNA)	ND		ng/L	ND		ng/L	0.00	ng/L
Total PFCA	34000		ng/L	38000		ng/L	3600	ng/L

Client Sample ID: NAS_J_tf_10

Lab Sample ID: 320-95526-2
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	8300		ng/L	9900		ng/L	1600	ng/L
Perfluorobutanoic acid (PFBA)	8300		ng/L	9900		ng/L	1600	ng/L
PFPA	5100		ng/L	6500		ng/L	1400	ng/L
Perfluoropentanoic acid (PFPeA)	5100		ng/L	6500		ng/L	1400	ng/L
PFHxA	8700		ng/L	10000		ng/L	1400	ng/L
Perfluorohexanoic acid (PFHxA)	8700		ng/L	10000		ng/L	1400	ng/L
PFHpA	450		ng/L	390		ng/L	0.00	ng/L
Perfluoroheptanoic acid (PFHpA)	450		ng/L	390		ng/L	0.00	ng/L
PFOA	180		ng/L	140		ng/L	0.00	ng/L
Perfluorooctanoic acid (PFOA)	180		ng/L	140		ng/L	0.00	ng/L
PFNA	ND		ng/L	ND		ng/L	0.00	ng/L
Perfluorononanoic acid (PFNA)	ND		ng/L	ND		ng/L	0.00	ng/L
Total PFCA	23000		ng/L	27000		ng/L	4200	ng/L

¹ Difference = Post-Treatment - Pre-Treatment

Total Oxidation Precursors

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

TestAmerica Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_10

Lab Sample ID: 320-95526-3
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	ND		ng/L	530000	J	ng/L	530000	ng/L
Perfluorobutanoic acid (PFBA)	ND		ng/L	530000	J	ng/L	530000	ng/L
PFPA	210000	J	ng/L	290000		ng/L	79000	ng/L
Perfluoropentanoic acid (PFPeA)	210000	J	ng/L	290000		ng/L	79000	ng/L
PFHxA	440000		ng/L	470000		ng/L	26000	ng/L
Perfluorohexanoic acid (PFHxA)	440000		ng/L	470000		ng/L	26000	ng/L
PFHpA	35000	J	ng/L	57000	J	ng/L	22000	ng/L
Perfluoroheptanoic acid (PFHpA)	35000	J	ng/L	57000	J	ng/L	22000	ng/L
PFOA	ND		ng/L	ND		ng/L	0.00	ng/L
Perfluorooctanoic acid (PFOA)	ND		ng/L	ND		ng/L	0.00	ng/L
PFNA	ND		ng/L	ND		ng/L	0.00	ng/L
Perfluorononanoic acid (PFNA)	ND		ng/L	ND		ng/L	0.00	ng/L
Total PFCA	690000		ng/L	1300000		ng/L	660000	ng/L

Client Sample ID: NAS_O_tf_7

Lab Sample ID: 320-95526-4
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	330000	J	ng/L	670000		ng/L	340000	ng/L
Perfluorobutanoic acid (PFBA)	330000	J	ng/L	670000		ng/L	340000	ng/L
PFPA	160000	J	ng/L	240000	J	ng/L	73000	ng/L
Perfluoropentanoic acid (PFPeA)	160000	J	ng/L	240000	J	ng/L	73000	ng/L
PFHxA	130000	J	ng/L	180000	J	ng/L	49000	ng/L
Perfluorohexanoic acid (PFHxA)	130000	J	ng/L	180000	J	ng/L	49000	ng/L
PFHpA	51000	J	ng/L	65000	J	ng/L	14000	ng/L
Perfluoroheptanoic acid (PFHpA)	51000	J	ng/L	65000	J	ng/L	14000	ng/L
PFOA	ND		ng/L	ND		ng/L	0.00	ng/L
Perfluorooctanoic acid (PFOA)	ND		ng/L	ND		ng/L	0.00	ng/L
PFNA	ND		ng/L	ND		ng/L	0.00	ng/L
Perfluorononanoic acid (PFNA)	ND		ng/L	ND		ng/L	0.00	ng/L
Total PFCA	670000		ng/L	1200000		ng/L	480000	ng/L

¹ Difference = Post-Treatment - Pre-Treatment

Total Oxidation Precursors

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

TestAmerica Job ID: 320-95526-1

Client Sample ID: TAFB_tf_10

Lab Sample ID: 320-95526-5
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	1000000		ng/L	1500000		ng/L	410000	ng/L
Perfluorobutanoic acid (PFBA)	1000000		ng/L	1500000		ng/L	410000	ng/L
PFPA	990000		ng/L	1600000		ng/L	600000	ng/L
Perfluoropentanoic acid (PFPeA)	990000		ng/L	1600000		ng/L	600000	ng/L
PFHxA	1100000		ng/L	1100000		ng/L	16000	ng/L
Perfluorohexanoic acid (PFHxA)	1100000		ng/L	1100000		ng/L	16000	ng/L
PFHpA	470000		ng/L	570000		ng/L	100000	ng/L
Perfluoroheptanoic acid (PFHpA)	470000		ng/L	570000		ng/L	100000	ng/L
PFOA	44000		ng/L	51000		ng/L	7500	ng/L
Perfluorooctanoic acid (PFOA)	44000		ng/L	51000		ng/L	7500	ng/L
PFNA	4100	J	ng/L	5200		ng/L	1100	ng/L
Perfluorononanoic acid (PFNA)	4100	J	ng/L	5200		ng/L	1100	ng/L
Total PFCA	3600000		ng/L	4800000		ng/L	1200000	ng/L

Client Sample ID: TAFB_tf_7

Lab Sample ID: 320-95526-6
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	1800000		ng/L	1900000		ng/L	170000	ng/L
Perfluorobutanoic acid (PFBA)	1800000		ng/L	1900000		ng/L	170000	ng/L
PFPA	1900000		ng/L	2000000		ng/L	65000	ng/L
Perfluoropentanoic acid (PFPeA)	1900000		ng/L	2000000		ng/L	65000	ng/L
PFHxA	1300000		ng/L	1100000		ng/L	0.00	ng/L
Perfluorohexanoic acid (PFHxA)	1300000		ng/L	1100000		ng/L	0.00	ng/L
PFHpA	2000000		ng/L	1700000		ng/L	0.00	ng/L
Perfluoroheptanoic acid (PFHpA)	2000000		ng/L	1700000		ng/L	0.00	ng/L
PFOA	160000		ng/L	160000		ng/L	0.00	ng/L
Perfluorooctanoic acid (PFOA)	160000		ng/L	160000		ng/L	0.00	ng/L
PFNA	30000		ng/L	30000		ng/L	0.00	ng/L
Perfluorononanoic acid (PFNA)	30000		ng/L	30000		ng/L	0.00	ng/L
Total PFCA	7200000		ng/L	6900000		ng/L	0.00	ng/L

¹ Difference = Post-Treatment - Pre-Treatment

Total Oxidation Precursors

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

TestAmerica Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_9

Lab Sample ID: 320-95526-7
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	2400		ng/L	4100		ng/L	1800	ng/L
Perfluorobutanoic acid (PFBA)	2400		ng/L	4100		ng/L	1800	ng/L
PFPA	960		ng/L	3400		ng/L	2400	ng/L
Perfluoropentanoic acid (PFPeA)	960		ng/L	3400		ng/L	2400	ng/L
PFHxA	1800		ng/L	4700		ng/L	2900	ng/L
Perfluorohexanoic acid (PFHxA)	1800		ng/L	4700		ng/L	2900	ng/L
PFHpA	710		ng/L	1000		ng/L	300	ng/L
Perfluoroheptanoic acid (PFHpA)	710		ng/L	1000		ng/L	300	ng/L
PFOA	4200		ng/L	3800		ng/L	0.00	ng/L
Perfluorooctanoic acid (PFOA)	4200		ng/L	3800		ng/L	0.00	ng/L
PFNA	120		ng/L	51		ng/L	0.00	ng/L
Perfluorononanoic acid (PFNA)	120		ng/L	51		ng/L	0.00	ng/L
Total PFCA	10000		ng/L	17000		ng/L	6900	ng/L

Client Sample ID: WPAFB_tf_10

Lab Sample ID: 320-95526-8
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	4400		ng/L	4300		ng/L	0.00	ng/L
Perfluorobutanoic acid (PFBA)	4400		ng/L	4300		ng/L	0.00	ng/L
PFPA	3400		ng/L	3300		ng/L	0.00	ng/L
Perfluoropentanoic acid (PFPeA)	3400		ng/L	3300		ng/L	0.00	ng/L
PFHxA	1500		ng/L	1500		ng/L	0.00	ng/L
Perfluorohexanoic acid (PFHxA)	1500		ng/L	1500		ng/L	0.00	ng/L
PFHpA	330		ng/L	330		ng/L	0.00	ng/L
Perfluoroheptanoic acid (PFHpA)	330		ng/L	330		ng/L	0.00	ng/L
PFOA	650		ng/L	620		ng/L	0.00	ng/L
Perfluorooctanoic acid (PFOA)	650		ng/L	620		ng/L	0.00	ng/L
PFNA	11	J	ng/L	9.3	J	ng/L	0.00	ng/L
Perfluorononanoic acid (PFNA)	11	J	ng/L	9.3	J	ng/L	0.00	ng/L
Total PFCA	10000		ng/L	10000		ng/L	0.00	ng/L

¹ Difference = Post-Treatment - Pre-Treatment

Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_8

Lab Sample ID: 320-95526-1

Date Collected: 12/21/22 16:44

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.33	J	0.50	0.053	mg/L			01/13/23 13:49	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanoic acid (PFPeA)	8500		50	12	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluoroheptanoic acid (PFHpA)	730		50	6.3	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluorooctanoic acid (PFOA)	210		50	21	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluorononanoic acid (PFNA)	ND		50	6.8	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluorodecanoic acid (PFDA)	ND		50	7.8	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluoroundecanoic acid (PFUnA)	ND		50	28	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluorododecanoic acid (PFDoA)	ND		50	14	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluorotridecanoic acid (PFTrDA)	ND		50	32	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluorotetradecanoic acid (PFTeA)	ND		50	7.3	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluorobutanesulfonic acid (PFBS)	17	J	50	5.0	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluoropentanesulfonic acid (PFPeS)	ND		50	7.5	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluorohexanesulfonic acid (PFHxS)	73		50	4.3	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		50	4.8	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluorooctanesulfonic acid (PFOS)	33	J	50	8.0	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluorononanesulfonic acid (PFNS)	ND		50	4.0	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluorodecanesulfonic acid (PFDS)	ND		50	14	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluorododecanesulfonic acid (PFDoS)	ND		50	24	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluorooctanesulfonamide (FOSA)	10	J	50	8.8	ng/L		01/04/23 14:13	01/25/23 15:37	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		130	30	ng/L		01/04/23 14:13	01/25/23 15:37	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		130	33	ng/L		01/04/23 14:13	01/25/23 15:37	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	30	J	50	6.0	ng/L		01/04/23 14:13	01/25/23 15:37	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	380		130	63	ng/L		01/04/23 14:13	01/25/23 15:37	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		50	12	ng/L		01/04/23 14:13	01/25/23 15:37	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	*	50	22	ng/L		01/04/23 14:13	01/25/23 15:37	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		50	11	ng/L		01/04/23 14:13	01/25/23 15:37	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		100	35	ng/L		01/04/23 14:13	01/25/23 15:37	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	*	50	22	ng/L		01/04/23 14:13	01/25/23 15:37	1
9CI-PF3ONS	ND		50	6.0	ng/L		01/04/23 14:13	01/25/23 15:37	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		100	38	ng/L		01/04/23 14:13	01/25/23 15:37	1
11CI-PF3OUdS	ND		50	8.0	ng/L		01/04/23 14:13	01/25/23 15:37	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		50	10	ng/L		01/04/23 14:13	01/25/23 15:37	1
3:3 FTCA	ND		50	11	ng/L		01/04/23 14:13	01/25/23 15:37	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_8

Lab Sample ID: 320-95526-1

Date Collected: 12/21/22 16:44

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
5:3 FTCA	ND		50	8.0	ng/L		01/04/23 14:13	01/25/23 15:37	1
7:3 FTCA	ND		50	14	ng/L		01/04/23 14:13	01/25/23 15:37	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		50	16	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	15	J	50	7.0	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	14	J	50	7.0	ng/L		01/04/23 14:13	01/25/23 15:37	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		50	7.0	ng/L		01/04/23 14:13	01/25/23 15:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	95		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C4 PFBA	86		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C5 PFPeA	91		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C2 PFHxA	93		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C4 PFHpA	106		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C4 PFOA	92		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C5 PFNA	101		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C2 PFDA	101		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C2 PFUnA	101		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C2 PFDoA	94		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C2 PFTeDA	96		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C3 PFBS	104		25 - 150				01/04/23 14:13	01/25/23 15:37	1
18O2 PFHxS	102		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C4 PFOS	92		25 - 150				01/04/23 14:13	01/25/23 15:37	1
d3-NMeFOSAA	96		25 - 150				01/04/23 14:13	01/25/23 15:37	1
d5-NEtFOSAA	100		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C2 4:2 FTS	113		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C2 6:2 FTS	116		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C2 8:2 FTS	133		25 - 150				01/04/23 14:13	01/25/23 15:37	1
d-N-MeFOSA-M	77		25 - 150				01/04/23 14:13	01/25/23 15:37	1
d-N-EtFOSA-M	80		25 - 150				01/04/23 14:13	01/25/23 15:37	1
d7-N-MeFOSE-M	90		25 - 150				01/04/23 14:13	01/25/23 15:37	1
d9-N-EtFOSE-M	88		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C3 HFPO-DA	111		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C-6:2 FTCA	97		25 - 150				01/04/23 14:13	01/25/23 15:37	1
13C-8:2 FTCA	116		25 - 150				01/04/23 14:13	01/25/23 15:37	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	11000	H	630	300	ng/L		01/04/23 14:13	02/18/23 01:40	5
Perfluorohexanoic acid (PFHxA)	14000	H	250	70	ng/L		01/04/23 14:13	02/18/23 01:40	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	115		25 - 150				01/04/23 14:13	02/18/23 01:40	5
13C2 PFHxA	112		25 - 150				01/04/23 14:13	02/18/23 01:40	5

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanoic acid (PFPeA)	9200	+	50	12	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluoroheptanoic acid (PFHpA)	680	+	50	6.3	ng/L		01/04/23 14:13	01/25/23 18:19	1

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Client Sample Results

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_8

Lab Sample ID: 320-95526-1

Date Collected: 12/21/22 16:44

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	180		50	21	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluorononanoic acid (PFNA)	ND	+	50	6.8	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluorodecanoic acid (PFDA)	ND	+	50	7.8	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluoroundecanoic acid (PFUnA)	ND		50	28	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluorododecanoic acid (PFDoA)	ND		50	14	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluorotridecanoic acid (PFTrDA)	ND		50	32	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluorotetradecanoic acid (PFTeA)	ND		50	7.3	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluorobutanesulfonic acid (PFBS)	23	J	50	5.0	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluoropentanesulfonic acid (PFPeS)	11	J	50	7.5	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluorohexanesulfonic acid (PFHxS)	92		50	4.3	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		50	4.8	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluorooctanesulfonic acid (PFOS)	21	J	50	8.0	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluorononanesulfonic acid (PFNS)	ND		50	4.0	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluorodecanesulfonic acid (PFDS)	ND		50	14	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluorododecanesulfonic acid (PFDoS)	ND		50	24	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluorooctanesulfonamide (FOSA)	ND		50	8.8	ng/L		01/04/23 14:13	01/25/23 18:19	1
N-methylperfluorooctanesulfonamide acetic acid (NMeFOSAA)	ND		130	30	ng/L		01/04/23 14:13	01/25/23 18:19	1
N-ethylperfluorooctanesulfonamide acetic acid (NEtFOSAA)	ND		130	33	ng/L		01/04/23 14:13	01/25/23 18:19	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		50	6.0	ng/L		01/04/23 14:13	01/25/23 18:19	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		130	63	ng/L		01/04/23 14:13	01/25/23 18:19	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		50	12	ng/L		01/04/23 14:13	01/25/23 18:19	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		50	22	ng/L		01/04/23 14:13	01/25/23 18:19	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		50	11	ng/L		01/04/23 14:13	01/25/23 18:19	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		100	35	ng/L		01/04/23 14:13	01/25/23 18:19	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		50	22	ng/L		01/04/23 14:13	01/25/23 18:19	1
9CI-PF3ONS	ND		50	6.0	ng/L		01/04/23 14:13	01/25/23 18:19	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		100	38	ng/L		01/04/23 14:13	01/25/23 18:19	1
11CI-PF3OUdS	ND		50	8.0	ng/L		01/04/23 14:13	01/25/23 18:19	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		50	10	ng/L		01/04/23 14:13	01/25/23 18:19	1
3:3 FTCA	ND		50	11	ng/L		01/04/23 14:13	01/25/23 18:19	1
5:3 FTCA	ND		50	8.0	ng/L		01/04/23 14:13	01/25/23 18:19	1
7:3 FTCA	ND		50	14	ng/L		01/04/23 14:13	01/25/23 18:19	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		50	16	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	15	J	50	7.0	ng/L		01/04/23 14:13	01/25/23 18:19	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_8

Lab Sample ID: 320-95526-1

Date Collected: 12/21/22 16:44

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoro-3-methoxypropanoic acid (PFMPA)	16	J**	50	7.0	ng/L		01/04/23 14:13	01/25/23 18:19	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		50	7.0	ng/L		01/04/23 14:13	01/25/23 18:19	1
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C8 FOSA	93		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C4 PFBA	79		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C5 PFPeA	85		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C4 PFHpA	106		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C4 PFOA	95		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C5 PFNA	93		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C2 PFDA	94		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C2 PFUnA	100		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C2 PFDoA	95		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C2 PFTeDA	98		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C3 PFBS	97		25 - 150				01/04/23 14:13	01/25/23 18:19	1
18O2 PFHxS	99		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C4 PFOS	89		25 - 150				01/04/23 14:13	01/25/23 18:19	1
d3-NMeFOSAA	102		25 - 150				01/04/23 14:13	01/25/23 18:19	1
d5-NEtFOSAA	107		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C2 4:2 FTS	0		0 - 10				01/04/23 14:13	01/25/23 18:19	1
13C2 6:2 FTS	130		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C2 8:2 FTS	143		25 - 150				01/04/23 14:13	01/25/23 18:19	1
d-N-MeFOSA-M	75		25 - 150				01/04/23 14:13	01/25/23 18:19	1
d-N-EtFOSA-M	69		25 - 150				01/04/23 14:13	01/25/23 18:19	1
d7-N-MeFOSE-M	82		25 - 150				01/04/23 14:13	01/25/23 18:19	1
d9-N-EtFOSE-M	85		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C3 HFPO-DA	99		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C-6:2 FTCA	104		25 - 150				01/04/23 14:13	01/25/23 18:19	1
13C-8:2 FTCA	108		25 - 150				01/04/23 14:13	01/25/23 18:19	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	12000	H B**	630	300	ng/L		01/04/23 14:13	02/18/23 03:11	5
Perfluorohexanoic acid (PFHxA)	16000	H**	250	70	ng/L		01/04/23 14:13	02/18/23 03:11	5
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C4 PFBA	102		25 - 150				01/04/23 14:13	02/18/23 03:11	5
13C2 PFHxA	112		25 - 150				01/04/23 14:13	02/18/23 03:11	5

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	470		200	100	ug/L		03/10/23 09:57	03/10/23 12:31	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	1000				ng/L			03/13/23 13:05	1
PFPA	720				ng/L			03/13/23 13:05	1
PFHxA	1400				ng/L			03/13/23 13:05	1
PFHpA	0.00				ng/L			03/13/23 13:05	1
PFOA	0.00				ng/L			03/13/23 13:05	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_8

Lab Sample ID: 320-95526-1

Date Collected: 12/21/22 16:44

Matrix: Water

Date Received: 12/22/22 09:50

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference) (Continued)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFNA	0.00				ng/L			03/13/23 13:05	1
Total PFCA	3600				ng/L			03/13/23 13:05	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	11000	H	630	300	ng/L			03/13/23 12:57	1
PFPA	8500		50	12	ng/L			03/13/23 12:57	1
PFHxA	14000	H	250	70	ng/L			03/13/23 12:57	1
PFHpA	730		50	6.3	ng/L			03/13/23 12:57	1
PFOA	210		50	21	ng/L			03/13/23 12:57	1
PFNA	ND		50	6.8	ng/L			03/13/23 12:57	1
Total PFCA	34000				ng/L			03/13/23 12:57	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	12000	++ H B	630	300	ng/L			03/13/23 13:01	1
PFPA	9200	++	50	12	ng/L			03/13/23 13:01	1
PFHxA	16000	++ H	250	70	ng/L			03/13/23 13:01	1
PFHpA	680	++	50	6.3	ng/L			03/13/23 13:01	1
PFOA	180		50	21	ng/L			03/13/23 13:01	1
PFNA	ND	++	50	6.8	ng/L			03/13/23 13:01	1
Total PFCA	38000				ng/L			03/13/23 13:01	1

Client Sample ID: NAS_J_tf_10

Lab Sample ID: 320-95526-2

Date Collected: 12/21/22 16:06

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.28	J	0.50	0.053	mg/L			01/13/23 14:09	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	8300		130	60	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluoropentanoic acid (PFPeA)	5100		50	12	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluorohexanoic acid (PFHxA)	8700		50	14	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluoroheptanoic acid (PFHpA)	450		50	6.3	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluorooctanoic acid (PFOA)	180		50	21	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluorononanoic acid (PFNA)	ND		50	6.8	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluorodecanoic acid (PFDA)	ND		50	7.8	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluoroundecanoic acid (PFUnA)	ND		50	28	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluorododecanoic acid (PFDoA)	ND		50	14	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluorotridecanoic acid (PFTrDA)	ND		50	32	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluorotetradecanoic acid (PFTeA)	ND		50	7.3	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluorobutanesulfonic acid (PFBS)	11	J	50	5.0	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluoropentanesulfonic acid (PFPeS)	17	J	50	7.5	ng/L		01/04/23 14:13	01/25/23 15:47	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_10

Lab Sample ID: 320-95526-2

Date Collected: 12/21/22 16:06

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	85		50	4.3	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluoroheptanesulfonic acid (PFHpsS)	ND		50	4.8	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluorooctanesulfonic acid (PFOS)	62		50	8.0	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluorononanesulfonic acid (PFNS)	ND		50	4.0	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluorodecanesulfonic acid (PFDS)	ND		50	14	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluorododecanesulfonic acid (PFDoS)	ND		50	24	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluorooctanesulfonamide (FOSA)	ND		50	8.8	ng/L		01/04/23 14:13	01/25/23 15:47	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		130	30	ng/L		01/04/23 14:13	01/25/23 15:47	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		130	33	ng/L		01/04/23 14:13	01/25/23 15:47	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	33 J		50	6.0	ng/L		01/04/23 14:13	01/25/23 15:47	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	300		130	63	ng/L		01/04/23 14:13	01/25/23 15:47	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	23 J		50	12	ng/L		01/04/23 14:13	01/25/23 15:47	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	*	50	22	ng/L		01/04/23 14:13	01/25/23 15:47	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		50	11	ng/L		01/04/23 14:13	01/25/23 15:47	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		100	35	ng/L		01/04/23 14:13	01/25/23 15:47	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	*	50	22	ng/L		01/04/23 14:13	01/25/23 15:47	1
9Cl-PF3ONS	ND		50	6.0	ng/L		01/04/23 14:13	01/25/23 15:47	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		100	38	ng/L		01/04/23 14:13	01/25/23 15:47	1
11Cl-PF3OUdS	ND		50	8.0	ng/L		01/04/23 14:13	01/25/23 15:47	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		50	10	ng/L		01/04/23 14:13	01/25/23 15:47	1
3:3 FTCA	ND		50	11	ng/L		01/04/23 14:13	01/25/23 15:47	1
5:3 FTCA	ND		50	8.0	ng/L		01/04/23 14:13	01/25/23 15:47	1
7:3 FTCA	ND		50	14	ng/L		01/04/23 14:13	01/25/23 15:47	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		50	16	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	10 J		50	7.0	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	10 J		50	7.0	ng/L		01/04/23 14:13	01/25/23 15:47	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		50	7.0	ng/L		01/04/23 14:13	01/25/23 15:47	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	99		25 - 150				01/04/23 14:13	01/25/23 15:47	1
13C4 PFBA	92		25 - 150				01/04/23 14:13	01/25/23 15:47	1
13C5 PFPeA	102		25 - 150				01/04/23 14:13	01/25/23 15:47	1
13C2 PFHxA	98		25 - 150				01/04/23 14:13	01/25/23 15:47	1
13C4 PFHpA	114		25 - 150				01/04/23 14:13	01/25/23 15:47	1
13C4 PFOA	102		25 - 150				01/04/23 14:13	01/25/23 15:47	1
13C5 PFNA	103		25 - 150				01/04/23 14:13	01/25/23 15:47	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_10

Lab Sample ID: 320-95526-2

Date Collected: 12/21/22 16:06

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDA	108		25 - 150	01/04/23 14:13	01/25/23 15:47	1
13C2 PFUnA	112		25 - 150	01/04/23 14:13	01/25/23 15:47	1
13C2 PFDoA	103		25 - 150	01/04/23 14:13	01/25/23 15:47	1
13C2 PFTeDA	106		25 - 150	01/04/23 14:13	01/25/23 15:47	1
13C3 PFBS	104		25 - 150	01/04/23 14:13	01/25/23 15:47	1
18O2 PFHxS	108		25 - 150	01/04/23 14:13	01/25/23 15:47	1
13C4 PFOS	93		25 - 150	01/04/23 14:13	01/25/23 15:47	1
d3-NMeFOSAA	106		25 - 150	01/04/23 14:13	01/25/23 15:47	1
d5-NEtFOSAA	111		25 - 150	01/04/23 14:13	01/25/23 15:47	1
13C2 4:2 FTS	122		25 - 150	01/04/23 14:13	01/25/23 15:47	1
13C2 6:2 FTS	121		25 - 150	01/04/23 14:13	01/25/23 15:47	1
13C2 8:2 FTS	126		25 - 150	01/04/23 14:13	01/25/23 15:47	1
d-N-MeFOSA-M	83		25 - 150	01/04/23 14:13	01/25/23 15:47	1
d-N-EtFOSA-M	83		25 - 150	01/04/23 14:13	01/25/23 15:47	1
d7-N-MeFOSE-M	97		25 - 150	01/04/23 14:13	01/25/23 15:47	1
d9-N-EtFOSE-M	92		25 - 150	01/04/23 14:13	01/25/23 15:47	1
13C3 HFPO-DA	115		25 - 150	01/04/23 14:13	01/25/23 15:47	1
13C-6:2 FTCA	127		25 - 150	01/04/23 14:13	01/25/23 15:47	1
13C-8:2 FTCA	114		25 - 150	01/04/23 14:13	01/25/23 15:47	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	9900	*+ B	130	60	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluoropentanoic acid (PFPeA)	6500	*+	50	12	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluoroheptanoic acid (PFHpA)	390	*+	50	6.3	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluorooctanoic acid (PFOA)	140		50	21	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluorononanoic acid (PFNA)	ND	*+	50	6.8	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluorodecanoic acid (PFDA)	ND	*+	50	7.8	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluoroundecanoic acid (PFUnA)	ND		50	28	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluorododecanoic acid (PFDoA)	ND		50	14	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluorotridecanoic acid (PFTrDA)	ND		50	32	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluorotetradecanoic acid (PFTeA)	ND		50	7.3	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluorobutanesulfonic acid (PFBS)	22	J	50	5.0	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluoropentanesulfonic acid (PFPeS)	22	J	50	7.5	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluorohexanesulfonic acid (PFHxS)	76		50	4.3	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		50	4.8	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluorooctanesulfonic acid (PFOS)	47	J	50	8.0	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluorononanesulfonic acid (PFNS)	ND		50	4.0	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluorodecanesulfonic acid (PFDS)	ND		50	14	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluorododecanesulfonic acid (PFDoS)	ND		50	24	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluorooctanesulfonamide (FOSA)	ND		50	8.8	ng/L		01/04/23 14:13	01/25/23 18:29	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		130	30	ng/L		01/04/23 14:13	01/25/23 18:29	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		130	33	ng/L		01/04/23 14:13	01/25/23 18:29	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_10

Lab Sample ID: 320-95526-2

Date Collected: 12/21/22 16:06

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		50	6.0	ng/L		01/04/23 14:13	01/25/23 18:29	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		130	63	ng/L		01/04/23 14:13	01/25/23 18:29	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		50	12	ng/L		01/04/23 14:13	01/25/23 18:29	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		50	22	ng/L		01/04/23 14:13	01/25/23 18:29	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		50	11	ng/L		01/04/23 14:13	01/25/23 18:29	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		100	35	ng/L		01/04/23 14:13	01/25/23 18:29	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		50	22	ng/L		01/04/23 14:13	01/25/23 18:29	1
9CI-PF3ONS	ND		50	6.0	ng/L		01/04/23 14:13	01/25/23 18:29	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		100	38	ng/L		01/04/23 14:13	01/25/23 18:29	1
11CI-PF3OUdS	ND		50	8.0	ng/L		01/04/23 14:13	01/25/23 18:29	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		50	10	ng/L		01/04/23 14:13	01/25/23 18:29	1
3:3 FTCA	ND		50	11	ng/L		01/04/23 14:13	01/25/23 18:29	1
5:3 FTCA	ND		50	8.0	ng/L		01/04/23 14:13	01/25/23 18:29	1
7:3 FTCA	ND		50	14	ng/L		01/04/23 14:13	01/25/23 18:29	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		50	16	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	13	J	50	7.0	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	14	J**	50	7.0	ng/L		01/04/23 14:13	01/25/23 18:29	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		50	7.0	ng/L		01/04/23 14:13	01/25/23 18:29	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	110		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C4 PFBA	77		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C5 PFPeA	100		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C4 PFHpA	112		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C4 PFOA	104		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C5 PFNA	110		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C2 PFDA	112		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C2 PFUnA	121		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C2 PFDoA	111		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C2 PFTeDA	113		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C3 PFBS	105		25 - 150	01/04/23 14:13	01/25/23 18:29	1
18O2 PFHxS	106		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C4 PFOS	100		25 - 150	01/04/23 14:13	01/25/23 18:29	1
d3-NMeFOSAA	114		25 - 150	01/04/23 14:13	01/25/23 18:29	1
d5-NEtFOSAA	121		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C2 4:2 FTS	0		0 - 10	01/04/23 14:13	01/25/23 18:29	1
13C2 6:2 FTS	129		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C2 8:2 FTS	163	*5+	25 - 150	01/04/23 14:13	01/25/23 18:29	1
d-N-MeFOSA-M	94		25 - 150	01/04/23 14:13	01/25/23 18:29	1
d-N-EtFOSA-M	89		25 - 150	01/04/23 14:13	01/25/23 18:29	1

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Client Sample Results

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_10

Lab Sample ID: 320-95526-2

Date Collected: 12/21/22 16:06

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
d7-N-MeFOSE-M	99		25 - 150	01/04/23 14:13	01/25/23 18:29	1
d9-N-EtFOSE-M	95		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C3 HFPO-DA	120		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C-6:2 FTCA	117		25 - 150	01/04/23 14:13	01/25/23 18:29	1
13C-8:2 FTCA	123		25 - 150	01/04/23 14:13	01/25/23 18:29	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	10000	H **	250	70	ng/L		01/04/23 14:13	02/18/23 03:21	5

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	112		25 - 150	01/04/23 14:13	02/18/23 03:21	5

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	400		200	100	ug/L		03/10/23 09:57	03/10/23 13:07	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	1600				ng/L			03/13/23 13:05	1
PFPA	1400				ng/L			03/13/23 13:05	1
PFHxA	1400				ng/L			03/13/23 13:05	1
PFHpA	0.00				ng/L			03/13/23 13:05	1
PFOA	0.00				ng/L			03/13/23 13:05	1
PFNA	0.00				ng/L			03/13/23 13:05	1
Total PFCA	4200				ng/L			03/13/23 13:05	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	8300		130	60	ng/L			03/13/23 12:57	1
PFPA	5100		50	12	ng/L			03/13/23 12:57	1
PFHxA	8700		50	14	ng/L			03/13/23 12:57	1
PFHpA	450		50	6.3	ng/L			03/13/23 12:57	1
PFOA	180		50	21	ng/L			03/13/23 12:57	1
PFNA	ND		50	6.8	ng/L			03/13/23 12:57	1
Total PFCA	23000				ng/L			03/13/23 12:57	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	9900	** B	130	60	ng/L			03/13/23 13:01	1
PFPA	6500	**	50	12	ng/L			03/13/23 13:01	1
PFHxA	10000	** H	250	70	ng/L			03/13/23 13:01	1
PFHpA	390	**	50	6.3	ng/L			03/13/23 13:01	1
PFOA	140		50	21	ng/L			03/13/23 13:01	1
PFNA	ND	**	50	6.8	ng/L			03/13/23 13:01	1
Total PFCA	27000				ng/L			03/13/23 13:01	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_10

Lab Sample ID: 320-95526-3

Date Collected: 12/21/22 16:44

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	18		5.0	0.53	mg/L			01/13/23 18:23	10

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		630000	300000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluoropentanoic acid (PFPeA)	210000	J	250000	60000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluorohexanoic acid (PFHxA)	440000		250000	70000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluoroheptanoic acid (PFHpA)	35000	J	250000	32000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluorooctanoic acid (PFOA)	ND		250000	110000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluorononanoic acid (PFNA)	ND		250000	34000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluorodecanoic acid (PFDA)	ND		250000	39000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluoroundecanoic acid (PFUnA)	ND		250000	140000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluorododecanoic acid (PFDoA)	ND		250000	70000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluorotridecanoic acid (PFTrDA)	ND		250000	160000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluorotetradecanoic acid (PFTeA)	ND		250000	37000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluorobutanesulfonic acid (PFBS)	ND		250000	25000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluoropentanesulfonic acid (PFPeS)	ND		250000	38000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluorohexanesulfonic acid (PFHxS)	40000	J	250000	22000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		250000	24000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluorooctanesulfonic acid (PFOS)	ND		250000	40000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluorononanesulfonic acid (PFNS)	ND		250000	20000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluorodecanesulfonic acid (PFDS)	ND		250000	70000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluorododecanesulfonic acid (PFDoS)	ND		250000	120000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluorooctanesulfonamide (FOSA)	ND		250000	44000	ng/L		01/04/23 14:13	01/25/23 15:57	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		630000	150000	ng/L		01/04/23 14:13	01/25/23 15:57	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		630000	160000	ng/L		01/04/23 14:13	01/25/23 15:57	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		250000	30000	ng/L		01/04/23 14:13	01/25/23 15:57	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		630000	310000	ng/L		01/04/23 14:13	01/25/23 15:57	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		250000	58000	ng/L		01/04/23 14:13	01/25/23 15:57	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	*-	250000	110000	ng/L		01/04/23 14:13	01/25/23 15:57	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		250000	55000	ng/L		01/04/23 14:13	01/25/23 15:57	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		500000	180000	ng/L		01/04/23 14:13	01/25/23 15:57	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	*-	250000	110000	ng/L		01/04/23 14:13	01/25/23 15:57	1
9CI-PF3ONS	ND		250000	30000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		500000	190000	ng/L		01/04/23 14:13	01/25/23 15:57	1
11CI-PF3OUdS	ND		250000	40000	ng/L		01/04/23 14:13	01/25/23 15:57	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		250000	50000	ng/L		01/04/23 14:13	01/25/23 15:57	1
3:3 FTCA	ND		250000	55000	ng/L		01/04/23 14:13	01/25/23 15:57	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_10

Lab Sample ID: 320-95526-3

Date Collected: 12/21/22 16:44

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
5:3 FTCA	ND		250000	40000	ng/L		01/04/23 14:13	01/25/23 15:57	1
7:3 FTCA	ND		250000	70000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		250000	80000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		250000	35000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		250000	35000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		250000	35000	ng/L		01/04/23 14:13	01/25/23 15:57	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	96		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C4 PFBA	96		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C5 PFPeA	97		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C2 PFHxA	90		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C4 PFHpA	108		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C4 PFOA	100		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C5 PFNA	95		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C2 PFDA	99		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C2 PFUnA	107		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C2 PFDoA	92		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C2 PFTeDA	103		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C3 PFBS	101		25 - 150				01/04/23 14:13	01/25/23 15:57	1
18O2 PFHxS	99		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C4 PFOS	92		25 - 150				01/04/23 14:13	01/25/23 15:57	1
d3-NMeFOSAA	97		25 - 150				01/04/23 14:13	01/25/23 15:57	1
d5-NEtFOSAA	105		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C2 4:2 FTS	113		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C2 6:2 FTS	115		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C2 8:2 FTS	145		25 - 150				01/04/23 14:13	01/25/23 15:57	1
d-N-MeFOSA-M	83		25 - 150				01/04/23 14:13	01/25/23 15:57	1
d-N-EtFOSA-M	81		25 - 150				01/04/23 14:13	01/25/23 15:57	1
d7-N-MeFOSE-M	88		25 - 150				01/04/23 14:13	01/25/23 15:57	1
d9-N-EtFOSE-M	88		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C3 HFPO-DA	116		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C-6:2 FTCA	110		25 - 150				01/04/23 14:13	01/25/23 15:57	1
13C-8:2 FTCA	109		25 - 150				01/04/23 14:13	01/25/23 15:57	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	530000	J** B	630000	300000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluoropentanoic acid (PFPeA)	290000	*+	250000	60000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluorohexanoic acid (PFHxA)	470000	*+	250000	70000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluoroheptanoic acid (PFHpA)	57000	J**	250000	32000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluorooctanoic acid (PFOA)	ND		250000	110000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluorononanoic acid (PFNA)	ND	*+	250000	34000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluorodecanoic acid (PFDA)	ND	*+	250000	39000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluoroundecanoic acid (PFUnA)	ND		250000	140000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluorododecanoic acid (PFDoA)	ND		250000	70000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluorotridecanoic acid (PFTTrDA)	ND		250000	160000	ng/L		01/04/23 14:13	01/25/23 18:39	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_10

Lab Sample ID: 320-95526-3

Date Collected: 12/21/22 16:44

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorotetradecanoic acid (PFTeA)	ND		250000	37000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluorobutanesulfonic acid (PFBS)	ND		250000	25000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluoropentanesulfonic acid (PFPeS)	ND		250000	38000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluorohexanesulfonic acid (PFHxS)	32000	J	250000	22000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		250000	24000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluorooctanesulfonic acid (PFOS)	76000	J	250000	40000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluorononanesulfonic acid (PFNS)	ND		250000	20000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluorodecanesulfonic acid (PFDS)	ND		250000	70000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluorododecanesulfonic acid (PFDoS)	ND		250000	120000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluorooctanesulfonamide (FOSA)	ND		250000	44000	ng/L		01/04/23 14:13	01/25/23 18:39	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		630000	150000	ng/L		01/04/23 14:13	01/25/23 18:39	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		630000	160000	ng/L		01/04/23 14:13	01/25/23 18:39	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		250000	30000	ng/L		01/04/23 14:13	01/25/23 18:39	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		630000	310000	ng/L		01/04/23 14:13	01/25/23 18:39	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		250000	58000	ng/L		01/04/23 14:13	01/25/23 18:39	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		250000	110000	ng/L		01/04/23 14:13	01/25/23 18:39	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		250000	55000	ng/L		01/04/23 14:13	01/25/23 18:39	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		500000	180000	ng/L		01/04/23 14:13	01/25/23 18:39	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		250000	110000	ng/L		01/04/23 14:13	01/25/23 18:39	1
9CI-PF3ONS	ND		250000	30000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		500000	190000	ng/L		01/04/23 14:13	01/25/23 18:39	1
11CI-PF3OUdS	ND		250000	40000	ng/L		01/04/23 14:13	01/25/23 18:39	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		250000	50000	ng/L		01/04/23 14:13	01/25/23 18:39	1
3:3 FTCA	ND		250000	55000	ng/L		01/04/23 14:13	01/25/23 18:39	1
5:3 FTCA	ND		250000	40000	ng/L		01/04/23 14:13	01/25/23 18:39	1
7:3 FTCA	ND		250000	70000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		250000	80000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		250000	35000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	*+	250000	35000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		250000	35000	ng/L		01/04/23 14:13	01/25/23 18:39	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	97		25 - 150				01/04/23 14:13	01/25/23 18:39	1
13C4 PFBA	93		25 - 150				01/04/23 14:13	01/25/23 18:39	1
13C5 PFPeA	100		25 - 150				01/04/23 14:13	01/25/23 18:39	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_10

Lab Sample ID: 320-95526-3

Date Collected: 12/21/22 16:44

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	101		25 - 150	01/04/23 14:13	01/25/23 18:39	1
13C4 PFHpA	105		25 - 150	01/04/23 14:13	01/25/23 18:39	1
13C4 PFOA	107		25 - 150	01/04/23 14:13	01/25/23 18:39	1
13C5 PFNA	104		25 - 150	01/04/23 14:13	01/25/23 18:39	1
13C2 PFDA	105		25 - 150	01/04/23 14:13	01/25/23 18:39	1
13C2 PFUnA	109		25 - 150	01/04/23 14:13	01/25/23 18:39	1
13C2 PFDoA	98		25 - 150	01/04/23 14:13	01/25/23 18:39	1
13C2 PFTeDA	103		25 - 150	01/04/23 14:13	01/25/23 18:39	1
13C3 PFBS	96		25 - 150	01/04/23 14:13	01/25/23 18:39	1
18O2 PFHxS	100		25 - 150	01/04/23 14:13	01/25/23 18:39	1
13C4 PFOS	94		25 - 150	01/04/23 14:13	01/25/23 18:39	1
d3-NMeFOSAA	101		25 - 150	01/04/23 14:13	01/25/23 18:39	1
d5-NEtFOSAA	112		25 - 150	01/04/23 14:13	01/25/23 18:39	1
13C2 4:2 FTS	0		0 - 10	01/04/23 14:13	01/25/23 18:39	1
13C2 6:2 FTS	137		25 - 150	01/04/23 14:13	01/25/23 18:39	1
13C2 8:2 FTS	141		25 - 150	01/04/23 14:13	01/25/23 18:39	1
d-N-MeFOSA-M	77		25 - 150	01/04/23 14:13	01/25/23 18:39	1
d-N-EtFOSA-M	72		25 - 150	01/04/23 14:13	01/25/23 18:39	1
d7-N-MeFOSE-M	86		25 - 150	01/04/23 14:13	01/25/23 18:39	1
d9-N-EtFOSE-M	86		25 - 150	01/04/23 14:13	01/25/23 18:39	1
13C3 HFPO-DA	114		25 - 150	01/04/23 14:13	01/25/23 18:39	1
13C-6:2 FTCA	111		25 - 150	01/04/23 14:13	01/25/23 18:39	1
13C-8:2 FTCA	126		25 - 150	01/04/23 14:13	01/25/23 18:39	1

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	29000	B	20000	10000	ug/L		03/09/23 14:14	03/09/23 21:05	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	530000				ng/L			03/13/23 13:05	1
PFPA	79000				ng/L			03/13/23 13:05	1
PFHxA	26000				ng/L			03/13/23 13:05	1
PFHpA	22000				ng/L			03/13/23 13:05	1
PFOA	0.00				ng/L			03/13/23 13:05	1
PFNA	0.00				ng/L			03/13/23 13:05	1
Total PFCA	660000				ng/L			03/13/23 13:05	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	ND		630000	300000	ng/L			03/13/23 12:57	1
PFPA	210000	J	250000	60000	ng/L			03/13/23 12:57	1
PFHxA	440000		250000	70000	ng/L			03/13/23 12:57	1
PFHpA	35000	J	250000	32000	ng/L			03/13/23 12:57	1
PFOA	ND		250000	110000	ng/L			03/13/23 12:57	1
PFNA	ND		250000	34000	ng/L			03/13/23 12:57	1
Total PFCA	690000				ng/L			03/13/23 12:57	1

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Client Sample Results

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_10

Lab Sample ID: 320-95526-3

Date Collected: 12/21/22 16:44

Matrix: Water

Date Received: 12/22/22 09:50

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	530000	J** B	630000	300000	ng/L			03/13/23 13:01	1
PFPA	290000	+	250000	60000	ng/L			03/13/23 13:01	1
PFHxA	470000	+	250000	70000	ng/L			03/13/23 13:01	1
PFHpA	57000	J**	250000	32000	ng/L			03/13/23 13:01	1
PFOA	ND		250000	110000	ng/L			03/13/23 13:01	1
PFNA	ND	+	250000	34000	ng/L			03/13/23 13:01	1
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	1300000				ng/L			03/13/23 13:01	1

Client Sample ID: NAS_O_tf_7

Lab Sample ID: 320-95526-4

Date Collected: 12/21/22 16:24

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	21		5.0	0.53	mg/L			01/13/23 18:43	10

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	330000	J	630000	300000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluoropentanoic acid (PFPeA)	160000	J	250000	60000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluorohexanoic acid (PFHxA)	130000	J	250000	70000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluoroheptanoic acid (PFHpA)	51000	J	250000	32000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluorooctanoic acid (PFOA)	ND		250000	110000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluorononanoic acid (PFNA)	ND		250000	34000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluorodecanoic acid (PFDA)	ND		250000	39000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluoroundecanoic acid (PFUnA)	ND		250000	140000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluorododecanoic acid (PFDoA)	ND		250000	70000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluorotridecanoic acid (PFTrDA)	ND		250000	160000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluorotetradecanoic acid (PFTeA)	ND		250000	37000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluorobutanesulfonic acid (PFBS)	ND		250000	25000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluoropentanesulfonic acid (PFPeS)	ND		250000	38000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluorohexanesulfonic acid (PFHxS)	190000	J	250000	22000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluoroheptanesulfonic acid (PFHpS)	48000	J	250000	24000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluorooctanesulfonic acid (PFOS)	590000		250000	40000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluorononanesulfonic acid (PFNS)	ND		250000	20000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluorodecanesulfonic acid (PFDS)	ND		250000	70000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluorododecanesulfonic acid (PFDoS)	ND		250000	120000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluorooctanesulfonamide (FOSA)	ND		250000	44000	ng/L		01/04/23 14:13	01/25/23 16:07	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		630000	150000	ng/L		01/04/23 14:13	01/25/23 16:07	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		630000	160000	ng/L		01/04/23 14:13	01/25/23 16:07	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		250000	30000	ng/L		01/04/23 14:13	01/25/23 16:07	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		630000	310000	ng/L		01/04/23 14:13	01/25/23 16:07	1

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Client Sample Results

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_7

Lab Sample ID: 320-95526-4

Date Collected: 12/21/22 16:24

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		250000	58000	ng/L		01/04/23 14:13	01/25/23 16:07	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	*-	250000	110000	ng/L		01/04/23 14:13	01/25/23 16:07	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		250000	55000	ng/L		01/04/23 14:13	01/25/23 16:07	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		500000	180000	ng/L		01/04/23 14:13	01/25/23 16:07	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	*-	250000	110000	ng/L		01/04/23 14:13	01/25/23 16:07	1
9CI-PF3ONS	ND		250000	30000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		500000	190000	ng/L		01/04/23 14:13	01/25/23 16:07	1
11CI-PF3OUdS	ND		250000	40000	ng/L		01/04/23 14:13	01/25/23 16:07	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		250000	50000	ng/L		01/04/23 14:13	01/25/23 16:07	1
3:3 FTCA	ND		250000	55000	ng/L		01/04/23 14:13	01/25/23 16:07	1
5:3 FTCA	ND		250000	40000	ng/L		01/04/23 14:13	01/25/23 16:07	1
7:3 FTCA	ND		250000	70000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		250000	80000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		250000	35000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		250000	35000	ng/L		01/04/23 14:13	01/25/23 16:07	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		250000	35000	ng/L		01/04/23 14:13	01/25/23 16:07	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	99		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C4 PFBA	99		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C5 PFPeA	105		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C2 PFHxA	100		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C4 PFHpA	109		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C4 PFOA	97		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C5 PFNA	101		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C2 PFDA	103		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C2 PFUnA	108		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C2 PFDoA	100		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C2 PFTeDA	104		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C3 PFBS	107		25 - 150	01/04/23 14:13	01/25/23 16:07	1
18O2 PFHxS	105		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C4 PFOS	103		25 - 150	01/04/23 14:13	01/25/23 16:07	1
d3-NMeFOSAA	107		25 - 150	01/04/23 14:13	01/25/23 16:07	1
d5-NEtFOSAA	109		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C2 4:2 FTS	133		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C2 6:2 FTS	119		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C2 8:2 FTS	158	*5+	25 - 150	01/04/23 14:13	01/25/23 16:07	1
d-N-MeFOSA-M	86		25 - 150	01/04/23 14:13	01/25/23 16:07	1
d-N-EtFOSA-M	88		25 - 150	01/04/23 14:13	01/25/23 16:07	1
d7-N-MeFOSE-M	92		25 - 150	01/04/23 14:13	01/25/23 16:07	1
d9-N-EtFOSE-M	94		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C3 HFPO-DA	120		25 - 150	01/04/23 14:13	01/25/23 16:07	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_7

Lab Sample ID: 320-95526-4

Date Collected: 12/21/22 16:24

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-6:2 FTCA	113		25 - 150	01/04/23 14:13	01/25/23 16:07	1
13C-8:2 FTCA	118		25 - 150	01/04/23 14:13	01/25/23 16:07	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	670000	*+ B	630000	300000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluoropentanoic acid (PFPeA)	240000	J**	250000	60000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluorohexanoic acid (PFHxA)	180000	J**	250000	70000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluoroheptanoic acid (PFHpA)	65000	J**	250000	32000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluorooctanoic acid (PFOA)	ND		250000	110000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluorononanoic acid (PFNA)	ND	*+	250000	34000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluorodecanoic acid (PFDA)	ND	*+	250000	39000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluoroundecanoic acid (PFUnA)	ND		250000	140000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluorododecanoic acid (PFDoA)	ND		250000	70000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluorotridecanoic acid (PFTrDA)	ND		250000	160000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluorotetradecanoic acid (PFTeA)	ND		250000	37000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluorobutanesulfonic acid (PFBS)	ND		250000	25000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluoropentanesulfonic acid (PFPeS)	ND		250000	38000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluorohexanesulfonic acid (PFHxS)	160000	J	250000	22000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		250000	24000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluorooctanesulfonic acid (PFOS)	610000		250000	40000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluoronanesulfonic acid (PFNS)	ND		250000	20000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluorodecanesulfonic acid (PFDS)	ND		250000	70000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluorododecanesulfonic acid (PFDoS)	ND		250000	120000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluorooctanesulfonamide (FOSA)	ND		250000	44000	ng/L		01/04/23 14:13	01/25/23 18:49	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		630000	150000	ng/L		01/04/23 14:13	01/25/23 18:49	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		630000	160000	ng/L		01/04/23 14:13	01/25/23 18:49	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		250000	30000	ng/L		01/04/23 14:13	01/25/23 18:49	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		630000	310000	ng/L		01/04/23 14:13	01/25/23 18:49	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		250000	58000	ng/L		01/04/23 14:13	01/25/23 18:49	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		250000	110000	ng/L		01/04/23 14:13	01/25/23 18:49	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		250000	55000	ng/L		01/04/23 14:13	01/25/23 18:49	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		500000	180000	ng/L		01/04/23 14:13	01/25/23 18:49	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		250000	110000	ng/L		01/04/23 14:13	01/25/23 18:49	1
9CI-PF3ONS	ND		250000	30000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		500000	190000	ng/L		01/04/23 14:13	01/25/23 18:49	1
11CI-PF3OUdS	ND		250000	40000	ng/L		01/04/23 14:13	01/25/23 18:49	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		250000	50000	ng/L		01/04/23 14:13	01/25/23 18:49	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_7

Lab Sample ID: 320-95526-4

Date Collected: 12/21/22 16:24

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
3:3 FTCA	ND		250000	55000	ng/L		01/04/23 14:13	01/25/23 18:49	1
5:3 FTCA	ND		250000	40000	ng/L		01/04/23 14:13	01/25/23 18:49	1
7:3 FTCA	ND		250000	70000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		250000	80000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		250000	35000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	*	250000	35000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		250000	35000	ng/L		01/04/23 14:13	01/25/23 18:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	95		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C4 PFBA	95		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C5 PFPeA	106		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C2 PFHxA	100		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C4 PFHpA	115		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C4 PFOA	105		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C5 PFNA	100		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C2 PFDA	105		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C2 PFUnA	113		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C2 PFDoA	101		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C2 PFTeDA	99		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C3 PFBS	101		25 - 150				01/04/23 14:13	01/25/23 18:49	1
18O2 PFHxS	105		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C4 PFOS	94		25 - 150				01/04/23 14:13	01/25/23 18:49	1
d3-NMeFOSAA	104		25 - 150				01/04/23 14:13	01/25/23 18:49	1
d5-NEtFOSAA	113		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C2 4:2 FTS	0		0 - 10				01/04/23 14:13	01/25/23 18:49	1
13C2 6:2 FTS	137		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C2 8:2 FTS	151	*5+	25 - 150				01/04/23 14:13	01/25/23 18:49	1
d-N-MeFOSA-M	80		25 - 150				01/04/23 14:13	01/25/23 18:49	1
d-N-EtFOSA-M	75		25 - 150				01/04/23 14:13	01/25/23 18:49	1
d7-N-MeFOSE-M	90		25 - 150				01/04/23 14:13	01/25/23 18:49	1
d9-N-EtFOSE-M	95		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C3 HFPO-DA	118		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C-6:2 FTCA	98		25 - 150				01/04/23 14:13	01/25/23 18:49	1
13C-8:2 FTCA	108		25 - 150				01/04/23 14:13	01/25/23 18:49	1

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	32000	B	20000	10000	ug/L		03/09/23 14:14	03/09/23 21:41	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	340000				ng/L			03/13/23 13:05	1
PFPA	73000				ng/L			03/13/23 13:05	1
PFHxA	49000				ng/L			03/13/23 13:05	1
PFHpA	14000				ng/L			03/13/23 13:05	1
PFOA	0.00				ng/L			03/13/23 13:05	1
PFNA	0.00				ng/L			03/13/23 13:05	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_7

Lab Sample ID: 320-95526-4

Date Collected: 12/21/22 16:24

Matrix: Water

Date Received: 12/22/22 09:50

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference) (Continued)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	480000				ng/L			03/13/23 13:05	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	330000	J	630000	300000	ng/L			03/13/23 12:57	1
PFPA	160000	J	250000	60000	ng/L			03/13/23 12:57	1
PFHxA	130000	J	250000	70000	ng/L			03/13/23 12:57	1
PFHpA	51000	J	250000	32000	ng/L			03/13/23 12:57	1
PFOA	ND		250000	110000	ng/L			03/13/23 12:57	1
PFNA	ND		250000	34000	ng/L			03/13/23 12:57	1
Total PFCA	670000				ng/L			03/13/23 12:57	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	670000	*+ B	630000	300000	ng/L			03/13/23 13:01	1
PFPA	240000	J**	250000	60000	ng/L			03/13/23 13:01	1
PFHxA	180000	J**	250000	70000	ng/L			03/13/23 13:01	1
PFHpA	65000	J**	250000	32000	ng/L			03/13/23 13:01	1
PFOA	ND		250000	110000	ng/L			03/13/23 13:01	1
PFNA	ND	*+	250000	34000	ng/L			03/13/23 13:01	1
Total PFCA	1200000				ng/L			03/13/23 13:01	1

Client Sample ID: TAFB_tf_10

Lab Sample ID: 320-95526-5

Date Collected: 12/21/22 16:12

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	27		2.5	0.27	mg/L			01/13/23 15:08	5

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1000000	H E	13000	6000	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluoropentanoic acid (PFPeA)	990000	H	5000	1200	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluorohexanoic acid (PFHxA)	1100000	H E	5000	1400	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluoroheptanoic acid (PFHpA)	470000	H	5000	630	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluorooctanoic acid (PFOA)	44000	H	5000	2100	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluorononanoic acid (PFNA)	4100	J H	5000	680	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluorodecanoic acid (PFDA)	ND	H	5000	780	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluoroundecanoic acid (PFUnA)	ND	H	5000	2800	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluorododecanoic acid (PFDoA)	ND	H	5000	1400	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluorotridecanoic acid (PFTrDA)	ND	H	5000	3200	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluorotetradecanoic acid (PFTeA)	ND	H	5000	730	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluorobutanesulfonic acid (PFBS)	360000	H	5000	500	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluoropentanesulfonic acid (PFPeS)	240000	H	5000	750	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluorohexanesulfonic acid (PFHxS)	380000	H	5000	430	ng/L		01/04/23 14:13	02/18/23 02:10	100

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_10

Lab Sample ID: 320-95526-5

Date Collected: 12/21/22 16:12

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanesulfonic acid (PFHpS)	9200	H	5000	480	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluorooctanesulfonic acid (PFOS)	140000	H	5000	800	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluorononanesulfonic acid (PFNS)	ND	H	5000	400	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluorodecanesulfonic acid (PFDS)	ND	H	5000	1400	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluorododecanesulfonic acid (PFDoS)	ND	H	5000	2400	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluorooctanesulfonamide (FOSA)	ND	H	5000	880	ng/L		01/04/23 14:13	02/18/23 02:10	100
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	13000	3000	ng/L		01/04/23 14:13	02/18/23 02:10	100
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	13000	3300	ng/L		01/04/23 14:13	02/18/23 02:10	100
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	17000	H	5000	600	ng/L		01/04/23 14:13	02/18/23 02:10	100
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	270000	H	13000	6300	ng/L		01/04/23 14:13	02/18/23 02:10	100
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	32000	H	5000	1200	ng/L		01/04/23 14:13	02/18/23 02:10	100
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H *	5000	2200	ng/L		01/04/23 14:13	02/18/23 02:10	100
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H	5000	1100	ng/L		01/04/23 14:13	02/18/23 02:10	100
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H	10000	3500	ng/L		01/04/23 14:13	02/18/23 02:10	100
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H *	5000	2200	ng/L		01/04/23 14:13	02/18/23 02:10	100
9CI-PF3ONS	ND	H	5000	600	ng/L		01/04/23 14:13	02/18/23 02:10	100
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	10000	3800	ng/L		01/04/23 14:13	02/18/23 02:10	100
11CI-PF3OUdS	ND	H	5000	800	ng/L		01/04/23 14:13	02/18/23 02:10	100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	5000	1000	ng/L		01/04/23 14:13	02/18/23 02:10	100
3:3 FTCA	ND	H	5000	1100	ng/L		01/04/23 14:13	02/18/23 02:10	100
5:3 FTCA	ND	H	5000	800	ng/L		01/04/23 14:13	02/18/23 02:10	100
7:3 FTCA	ND	H	5000	1400	ng/L		01/04/23 14:13	02/18/23 02:10	100
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	5000	1600	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluoro-4-methoxybutanoic acid (PFMBA)	1100	J H	5000	700	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluoro-3-methoxypropanoic acid (PFMPA)	1500	J H	5000	700	ng/L		01/04/23 14:13	02/18/23 02:10	100
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND	H	5000	700	ng/L		01/04/23 14:13	02/18/23 02:10	100

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	103		25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C4 PFBA	98		25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C5 PFPeA	108		25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C2 PFHxA	235	*5+	25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C4 PFHpA	117		25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C4 PFOA	104		25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C5 PFNA	104		25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C2 PFDA	111		25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C2 PFUnA	103		25 - 150	01/04/23 14:13	02/18/23 02:10	100

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_10

Lab Sample ID: 320-95526-5

Date Collected: 12/21/22 16:12

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	102		25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C2 PFTeDA	100		25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C3 PFBS	103		25 - 150	01/04/23 14:13	02/18/23 02:10	100
18O2 PFHxS	115		25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C4 PFOS	89		25 - 150	01/04/23 14:13	02/18/23 02:10	100
d3-NMeFOSAA	72		25 - 150	01/04/23 14:13	02/18/23 02:10	100
d5-NEtFOSAA	96		25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C2 4:2 FTS	16	*5-	25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C2 6:2 FTS	620	*5+	25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C2 8:2 FTS	145		25 - 150	01/04/23 14:13	02/18/23 02:10	100
d-N-MeFOSA-M	82		25 - 150	01/04/23 14:13	02/18/23 02:10	100
d-N-EtFOSA-M	86		25 - 150	01/04/23 14:13	02/18/23 02:10	100
d7-N-MeFOSE-M	93		25 - 150	01/04/23 14:13	02/18/23 02:10	100
d9-N-EtFOSE-M	122		25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C3 HFPO-DA	103		25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C-6:2 FTCA	155	*5+	25 - 150	01/04/23 14:13	02/18/23 02:10	100
13C-8:2 FTCA	89		25 - 150	01/04/23 14:13	02/18/23 02:10	100

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoronanoic acid (PFNA)	5200	++	50	6.8	ng/L		01/04/23 14:13	01/25/23 19:00	1
Perfluorodecanoic acid (PFDA)	190	++	50	7.8	ng/L		01/04/23 14:13	01/25/23 19:00	1
Perfluoroundecanoic acid (PFUnA)	100		50	28	ng/L		01/04/23 14:13	01/25/23 19:00	1
Perfluorododecanoic acid (PFDoA)	76		50	14	ng/L		01/04/23 14:13	01/25/23 19:00	1
Perfluorotridecanoic acid (PFTTrDA)	51		50	32	ng/L		01/04/23 14:13	01/25/23 19:00	1
Perfluorotetradecanoic acid (PFTTeA)	44	J	50	7.3	ng/L		01/04/23 14:13	01/25/23 19:00	1
Perfluoroheptanesulfonic acid (PFHps)	9300		50	4.8	ng/L		01/04/23 14:13	01/25/23 19:00	1
Perfluorononanesulfonic acid (PFNS)	91		50	4.0	ng/L		01/04/23 14:13	01/25/23 19:00	1
Perfluorodecanesulfonic acid (PFDS)	ND		50	14	ng/L		01/04/23 14:13	01/25/23 19:00	1
Perfluorododecanesulfonic acid (PFDoS)	ND		50	24	ng/L		01/04/23 14:13	01/25/23 19:00	1
Perfluorooctanesulfonamide (FOSA)	ND		50	8.8	ng/L		01/04/23 14:13	01/25/23 19:00	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		130	30	ng/L		01/04/23 14:13	01/25/23 19:00	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		130	33	ng/L		01/04/23 14:13	01/25/23 19:00	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		50	6.0	ng/L		01/04/23 14:13	01/25/23 19:00	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	2800		130	63	ng/L		01/04/23 14:13	01/25/23 19:00	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	350		50	12	ng/L		01/04/23 14:13	01/25/23 19:00	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		50	22	ng/L		01/04/23 14:13	01/25/23 19:00	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		50	11	ng/L		01/04/23 14:13	01/25/23 19:00	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_10

Lab Sample ID: 320-95526-5

Date Collected: 12/21/22 16:12

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		100	35	ng/L		01/04/23 14:13	01/25/23 19:00	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		50	22	ng/L		01/04/23 14:13	01/25/23 19:00	1
9CI-PF3ONS	ND		50	6.0	ng/L		01/04/23 14:13	01/25/23 19:00	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		100	38	ng/L		01/04/23 14:13	01/25/23 19:00	1
11CI-PF3OUdS	ND		50	8.0	ng/L		01/04/23 14:13	01/25/23 19:00	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		50	10	ng/L		01/04/23 14:13	01/25/23 19:00	1
3:3 FTCA	ND		50	11	ng/L		01/04/23 14:13	01/25/23 19:00	1
5:3 FTCA	ND		50	8.0	ng/L		01/04/23 14:13	01/25/23 19:00	1
7:3 FTCA	ND		50	14	ng/L		01/04/23 14:13	01/25/23 19:00	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		50	16	ng/L		01/04/23 14:13	01/25/23 19:00	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	5100		50	7.0	ng/L		01/04/23 14:13	01/25/23 19:00	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	7600	*+	50	7.0	ng/L		01/04/23 14:13	01/25/23 19:00	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	200		50	7.0	ng/L		01/04/23 14:13	01/25/23 19:00	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	120		25 - 150	01/04/23 14:13	01/25/23 19:00	1
13C4 PFBA	25		25 - 150	01/04/23 14:13	01/25/23 19:00	1
13C5 PFPeA	26		25 - 150	01/04/23 14:13	01/25/23 19:00	1
13C4 PFOA	99		25 - 150	01/04/23 14:13	01/25/23 19:00	1
13C5 PFNA	85		25 - 150	01/04/23 14:13	01/25/23 19:00	1
13C2 PFDA	132		25 - 150	01/04/23 14:13	01/25/23 19:00	1
13C2 PFUnA	140		25 - 150	01/04/23 14:13	01/25/23 19:00	1
13C2 PFDoA	127		25 - 150	01/04/23 14:13	01/25/23 19:00	1
13C2 PFTeDA	140		25 - 150	01/04/23 14:13	01/25/23 19:00	1
13C4 PFOS	76		25 - 150	01/04/23 14:13	01/25/23 19:00	1
d3-NMeFOSAA	140		25 - 150	01/04/23 14:13	01/25/23 19:00	1
d5-NEtFOSAA	144		25 - 150	01/04/23 14:13	01/25/23 19:00	1
13C2 4:2 FTS	0		0 - 10	01/04/23 14:13	01/25/23 19:00	1
13C2 6:2 FTS	122		25 - 150	01/04/23 14:13	01/25/23 19:00	1
13C2 8:2 FTS	182	*5+	25 - 150	01/04/23 14:13	01/25/23 19:00	1
d-N-MeFOSA-M	108		25 - 150	01/04/23 14:13	01/25/23 19:00	1
d-N-EtFOSA-M	100		25 - 150	01/04/23 14:13	01/25/23 19:00	1
d7-N-MeFOSE-M	124		25 - 150	01/04/23 14:13	01/25/23 19:00	1
d9-N-EtFOSE-M	122		25 - 150	01/04/23 14:13	01/25/23 19:00	1
13C3 HFPO-DA	139		25 - 150	01/04/23 14:13	01/25/23 19:00	1
13C-6:2 FTCA	142		25 - 150	01/04/23 14:13	01/25/23 19:00	1
13C-8:2 FTCA	132		25 - 150	01/04/23 14:13	01/25/23 19:00	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1500000	H E B *+	13000	6000	ng/L		01/04/23 14:13	02/18/23 03:31	100
Perfluoropentanoic acid (PFPeA)	1600000	H E *+	5000	1200	ng/L		01/04/23 14:13	02/18/23 03:31	100
Perfluorohexanoic acid (PFHxA)	1100000	H E *+	5000	1400	ng/L		01/04/23 14:13	02/18/23 03:31	100
Perfluoroheptanoic acid (PFHpA)	570000	H *+	5000	630	ng/L		01/04/23 14:13	02/18/23 03:31	100

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_10

Lab Sample ID: 320-95526-5

Date Collected: 12/21/22 16:12

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment - DL (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	51000	H	5000	2100	ng/L		01/04/23 14:13	02/18/23 03:31	100
Perfluorobutanesulfonic acid (PFBS)	350000	H	5000	500	ng/L		01/04/23 14:13	02/18/23 03:31	100
Perfluoropentanesulfonic acid (PFPeS)	240000	H	5000	750	ng/L		01/04/23 14:13	02/18/23 03:31	100
Perfluorohexanesulfonic acid (PFHxS)	390000	H	5000	430	ng/L		01/04/23 14:13	02/18/23 03:31	100
Perfluorooctanesulfonic acid (PFOS)	130000	H	5000	800	ng/L		01/04/23 14:13	02/18/23 03:31	100
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	103		25 - 150				01/04/23 14:13	02/18/23 03:31	100
13C5 PFPeA	107		25 - 150				01/04/23 14:13	02/18/23 03:31	100
13C2 PFHxA	261	*5+	25 - 150				01/04/23 14:13	02/18/23 03:31	100
13C4 PFHpA	115		25 - 150				01/04/23 14:13	02/18/23 03:31	100
13C4 PFOA	107		25 - 150				01/04/23 14:13	02/18/23 03:31	100
13C3 PFBS	114		25 - 150				01/04/23 14:13	02/18/23 03:31	100
18O2 PFHxS	127		25 - 150				01/04/23 14:13	02/18/23 03:31	100
13C4 PFOS	98		25 - 150				01/04/23 14:13	02/18/23 03:31	100

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	58000	B	20000	10000	ug/L		03/09/23 14:14	03/09/23 22:16	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	410000				ng/L			03/13/23 13:05	1
PFPA	600000				ng/L			03/13/23 13:05	1
PFHxA	16000				ng/L			03/13/23 13:05	1
PFHpA	100000				ng/L			03/13/23 13:05	1
PFOA	7500				ng/L			03/13/23 13:05	1
PFNA	1100				ng/L			03/13/23 13:05	1
Total PFCA	1200000				ng/L			03/13/23 13:05	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	1000000	H E	13000	6000	ng/L			03/13/23 12:57	1
PFPA	990000	H	5000	1200	ng/L			03/13/23 12:57	1
PFHxA	1100000	H E	5000	1400	ng/L			03/13/23 12:57	1
PFHpA	470000	H	5000	630	ng/L			03/13/23 12:57	1
PFOA	44000	H	5000	2100	ng/L			03/13/23 12:57	1
PFNA	4100	J H	5000	680	ng/L			03/13/23 12:57	1
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	3600000				ng/L			03/13/23 12:57	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	1500000	*+ H E B	13000	6000	ng/L			03/13/23 13:01	1
PFPA	1600000	*+ H E	5000	1200	ng/L			03/13/23 13:01	1
PFHxA	1100000	*+ H E	5000	1400	ng/L			03/13/23 13:01	1
PFHpA	570000	*+ H	5000	630	ng/L			03/13/23 13:01	1
PFOA	51000	H	5000	2100	ng/L			03/13/23 13:01	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_10

Lab Sample ID: 320-95526-5

Date Collected: 12/21/22 16:12

Matrix: Water

Date Received: 12/22/22 09:50

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment (Continued)

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFNA	5200	++	50	6.8	ng/L			03/13/23 13:01	1
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	4800000				ng/L			03/13/23 13:01	1

Client Sample ID: TAFB_tf_7

Lab Sample ID: 320-95526-6

Date Collected: 12/21/22 16:18

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	35		5.0	0.53	mg/L			01/13/23 19:02	10

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1800000	H E	13000	6000	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluoropentanoic acid (PFPeA)	1900000	H E	5000	1200	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluorohexanoic acid (PFHxA)	1300000	H E	5000	1400	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluoroheptanoic acid (PFHpA)	2000000	H E	5000	630	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluorooctanoic acid (PFOA)	160000	H	5000	2100	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluorononanoic acid (PFNA)	30000	H	5000	680	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluorodecanoic acid (PFDA)	ND	H	5000	780	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluoroundecanoic acid (PFUnA)	ND	H	5000	2800	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluorododecanoic acid (PFDoA)	ND	H	5000	1400	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluorotridecanoic acid (PFTrDA)	ND	H	5000	3200	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluorotetradecanoic acid (PFTeA)	ND	H	5000	730	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluorobutanesulfonic acid (PFBS)	300000	H	5000	500	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluoropentanesulfonic acid (PFPeS)	96000	H	5000	750	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluorohexanesulfonic acid (PFHxS)	180000	H	5000	430	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluoroheptanesulfonic acid (PFHpS)	37000	H	5000	480	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluorooctanesulfonic acid (PFOS)	1500000	H E	5000	800	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluorononanesulfonic acid (PFNS)	1100	J H	5000	400	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluorodecanesulfonic acid (PFDS)	ND	H	5000	1400	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluorododecanesulfonic acid (PFDoS)	ND	H	5000	2400	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluorooctanesulfonamide (FOSA)	ND	H	5000	880	ng/L		01/04/23 14:13	02/18/23 02:21	100
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	13000	3000	ng/L		01/04/23 14:13	02/18/23 02:21	100
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	13000	3300	ng/L		01/04/23 14:13	02/18/23 02:21	100
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND	H	5000	600	ng/L		01/04/23 14:13	02/18/23 02:21	100
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	190000	H	13000	6300	ng/L		01/04/23 14:13	02/18/23 02:21	100
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	16000	H	5000	1200	ng/L		01/04/23 14:13	02/18/23 02:21	100
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H *	5000	2200	ng/L		01/04/23 14:13	02/18/23 02:21	100

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_7

Lab Sample ID: 320-95526-6

Date Collected: 12/21/22 16:18

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H	5000	1100	ng/L		01/04/23 14:13	02/18/23 02:21	100
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H	10000	3500	ng/L		01/04/23 14:13	02/18/23 02:21	100
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H *	5000	2200	ng/L		01/04/23 14:13	02/18/23 02:21	100
9CI-PF3ONS	ND	H	5000	600	ng/L		01/04/23 14:13	02/18/23 02:21	100
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	10000	3800	ng/L		01/04/23 14:13	02/18/23 02:21	100
11CI-PF3OUdS	ND	H	5000	800	ng/L		01/04/23 14:13	02/18/23 02:21	100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	5000	1000	ng/L		01/04/23 14:13	02/18/23 02:21	100
3:3 FTCA	ND	H	5000	1100	ng/L		01/04/23 14:13	02/18/23 02:21	100
5:3 FTCA	ND	H	5000	800	ng/L		01/04/23 14:13	02/18/23 02:21	100
7:3 FTCA	ND	H	5000	1400	ng/L		01/04/23 14:13	02/18/23 02:21	100
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	5000	1600	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluoro-4-methoxybutanoic acid (PFMBA)	1300	J H	5000	700	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluoro-3-methoxypropanoic acid (PFMPA)	1900	J H	5000	700	ng/L		01/04/23 14:13	02/18/23 02:21	100
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND	H	5000	700	ng/L		01/04/23 14:13	02/18/23 02:21	100

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	102		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C4 PFBA	89		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C5 PFPeA	98		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C2 PFHxA	236	*5+	25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C4 PFHpA	94		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C4 PFOA	105		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C5 PFNA	90		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C2 PFDA	97		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C2 PFUnA	103		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C2 PFDoA	100		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C2 PFTeDA	105		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C3 PFBS	91		25 - 150	01/04/23 14:13	02/18/23 02:21	100
18O2 PFHxS	112		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C4 PFOS	74		25 - 150	01/04/23 14:13	02/18/23 02:21	100
d3-NMeFOSAA	101		25 - 150	01/04/23 14:13	02/18/23 02:21	100
d5-NEtFOSAA	75		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C2 4:2 FTS	97		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C2 6:2 FTS	167	*5+	25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C2 8:2 FTS	97		25 - 150	01/04/23 14:13	02/18/23 02:21	100
d-N-MeFOSA-M	129		25 - 150	01/04/23 14:13	02/18/23 02:21	100
d-N-EtFOSA-M	90		25 - 150	01/04/23 14:13	02/18/23 02:21	100
d7-N-MeFOSE-M	114		25 - 150	01/04/23 14:13	02/18/23 02:21	100
d9-N-EtFOSE-M	86		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C3 HFPO-DA	91		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C-6:2 FTCA	95		25 - 150	01/04/23 14:13	02/18/23 02:21	100
13C-8:2 FTCA	77		25 - 150	01/04/23 14:13	02/18/23 02:21	100

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_7

Lab Sample ID: 320-95526-6

Date Collected: 12/21/22 16:18

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanoic acid (PFDA)	960	*+	50	7.8	ng/L		01/04/23 14:13	01/25/23 19:10	1
Perfluoroundecanoic acid (PFUnA)	330		50	28	ng/L		01/04/23 14:13	01/25/23 19:10	1
Perfluorododecanoic acid (PFDoA)	180		50	14	ng/L		01/04/23 14:13	01/25/23 19:10	1
Perfluorotridecanoic acid (PFTTrDA)	86		50	32	ng/L		01/04/23 14:13	01/25/23 19:10	1
Perfluorotetradecanoic acid (PFTTeA)	74		50	7.3	ng/L		01/04/23 14:13	01/25/23 19:10	1
Perfluorononanesulfonic acid (PFNS)	3300		50	4.0	ng/L		01/04/23 14:13	01/25/23 19:10	1
Perfluorodecanesulfonic acid (PFDS)	650		50	14	ng/L		01/04/23 14:13	01/25/23 19:10	1
Perfluorododecanesulfonic acid (PFDoS)	120		50	24	ng/L		01/04/23 14:13	01/25/23 19:10	1
Perfluorooctanesulfonamide (FOSA)	30	J	50	8.8	ng/L		01/04/23 14:13	01/25/23 19:10	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		130	30	ng/L		01/04/23 14:13	01/25/23 19:10	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		130	33	ng/L		01/04/23 14:13	01/25/23 19:10	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		50	6.0	ng/L		01/04/23 14:13	01/25/23 19:10	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	990		130	63	ng/L		01/04/23 14:13	01/25/23 19:10	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	110		50	12	ng/L		01/04/23 14:13	01/25/23 19:10	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		50	22	ng/L		01/04/23 14:13	01/25/23 19:10	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		50	11	ng/L		01/04/23 14:13	01/25/23 19:10	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		100	35	ng/L		01/04/23 14:13	01/25/23 19:10	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		50	22	ng/L		01/04/23 14:13	01/25/23 19:10	1
9CI-PF3ONS	ND		50	6.0	ng/L		01/04/23 14:13	01/25/23 19:10	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		100	38	ng/L		01/04/23 14:13	01/25/23 19:10	1
11CI-PF3OUdS	ND		50	8.0	ng/L		01/04/23 14:13	01/25/23 19:10	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		50	10	ng/L		01/04/23 14:13	01/25/23 19:10	1
3:3 FTCA	ND		50	11	ng/L		01/04/23 14:13	01/25/23 19:10	1
5:3 FTCA	ND		50	8.0	ng/L		01/04/23 14:13	01/25/23 19:10	1
7:3 FTCA	ND		50	14	ng/L		01/04/23 14:13	01/25/23 19:10	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		50	16	ng/L		01/04/23 14:13	01/25/23 19:10	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	5800		50	7.0	ng/L		01/04/23 14:13	01/25/23 19:10	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	8800	*+	50	7.0	ng/L		01/04/23 14:13	01/25/23 19:10	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	180		50	7.0	ng/L		01/04/23 14:13	01/25/23 19:10	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	162	*5+	25 - 150				01/04/23 14:13	01/25/23 19:10	1
13C4 PFBA	27		25 - 150				01/04/23 14:13	01/25/23 19:10	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_7

Lab Sample ID: 320-95526-6

Date Collected: 12/21/22 16:18

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFPeA	31		25 - 150	01/04/23 14:13	01/25/23 19:10	1
13C2 PFDA	165	*5+	25 - 150	01/04/23 14:13	01/25/23 19:10	1
13C2 PFUnA	186	*5+	25 - 150	01/04/23 14:13	01/25/23 19:10	1
13C2 PFDoA	170	*5+	25 - 150	01/04/23 14:13	01/25/23 19:10	1
13C2 PFTeDA	173	*5+	25 - 150	01/04/23 14:13	01/25/23 19:10	1
13C4 PFOS	41		25 - 150	01/04/23 14:13	01/25/23 19:10	1
d3-NMeFOSAA	178	*5+	25 - 150	01/04/23 14:13	01/25/23 19:10	1
d5-NEtFOSAA	192	*5+	25 - 150	01/04/23 14:13	01/25/23 19:10	1
13C2 4:2 FTS	0		0 - 10	01/04/23 14:13	01/25/23 19:10	1
13C2 6:2 FTS	108		25 - 150	01/04/23 14:13	01/25/23 19:10	1
13C2 8:2 FTS	240	*5+	25 - 150	01/04/23 14:13	01/25/23 19:10	1
d-N-MeFOSA-M	138		25 - 150	01/04/23 14:13	01/25/23 19:10	1
d-N-EtFOSA-M	134		25 - 150	01/04/23 14:13	01/25/23 19:10	1
d7-N-MeFOSE-M	152	*5+	25 - 150	01/04/23 14:13	01/25/23 19:10	1
d9-N-EtFOSE-M	159	*5+	25 - 150	01/04/23 14:13	01/25/23 19:10	1
13C3 HFPO-DA	181	*5+	25 - 150	01/04/23 14:13	01/25/23 19:10	1
13C-6:2 FTCA	160	*5+	25 - 150	01/04/23 14:13	01/25/23 19:10	1
13C-8:2 FTCA	183	*5+	25 - 150	01/04/23 14:13	01/25/23 19:10	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1900000	H E B **	13000	6000	ng/L		01/04/23 14:13	02/18/23 03:42	100
Perfluoropentanoic acid (PFPeA)	2000000	H E **	5000	1200	ng/L		01/04/23 14:13	02/18/23 03:42	100
Perfluorohexanoic acid (PFHxA)	1100000	H E **	5000	1400	ng/L		01/04/23 14:13	02/18/23 03:42	100
Perfluoroheptanoic acid (PFHpA)	1700000	H E **	5000	630	ng/L		01/04/23 14:13	02/18/23 03:42	100
Perfluorooctanoic acid (PFOA)	160000	H	5000	2100	ng/L		01/04/23 14:13	02/18/23 03:42	100
Perfluorononanoic acid (PFNA)	30000	H **	5000	680	ng/L		01/04/23 14:13	02/18/23 03:42	100
Perfluorobutanesulfonic acid (PFBS)	240000	H	5000	500	ng/L		01/04/23 14:13	02/18/23 03:42	100
Perfluoropentanesulfonic acid (PFPeS)	75000	H	5000	750	ng/L		01/04/23 14:13	02/18/23 03:42	100
Perfluorohexanesulfonic acid (PFHxS)	190000	H	5000	430	ng/L		01/04/23 14:13	02/18/23 03:42	100
Perfluoroheptanesulfonic acid (PFHpS)	28000	H	5000	480	ng/L		01/04/23 14:13	02/18/23 03:42	100
Perfluorooctanesulfonic acid (PFOS)	1200000	H E	5000	800	ng/L		01/04/23 14:13	02/18/23 03:42	100

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	79		25 - 150	01/04/23 14:13	02/18/23 03:42	100
13C5 PFPeA	91		25 - 150	01/04/23 14:13	02/18/23 03:42	100
13C2 PFHxA	238	*5+	25 - 150	01/04/23 14:13	02/18/23 03:42	100
13C4 PFHpA	99		25 - 150	01/04/23 14:13	02/18/23 03:42	100
13C4 PFOA	99		25 - 150	01/04/23 14:13	02/18/23 03:42	100
13C5 PFNA	90		25 - 150	01/04/23 14:13	02/18/23 03:42	100
13C3 PFBS	107		25 - 150	01/04/23 14:13	02/18/23 03:42	100
18O2 PFHxS	97		25 - 150	01/04/23 14:13	02/18/23 03:42	100
13C4 PFOS	85		25 - 150	01/04/23 14:13	02/18/23 03:42	100

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	59000	B	20000	10000	ug/L		03/09/23 14:14	03/09/23 22:51	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_7

Lab Sample ID: 320-95526-6

Date Collected: 12/21/22 16:18

Matrix: Water

Date Received: 12/22/22 09:50

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	170000				ng/L			03/13/23 13:05	1
PFPA	65000				ng/L			03/13/23 13:05	1
PFHxA	0.00				ng/L			03/13/23 13:05	1
PFHpA	0.00				ng/L			03/13/23 13:05	1
PFOA	0.00				ng/L			03/13/23 13:05	1
PFNA	0.00				ng/L			03/13/23 13:05	1
Total PFCA	0.00				ng/L			03/13/23 13:05	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	1800000	H E	13000	6000	ng/L			03/13/23 12:57	1
PFPA	1900000	H E	5000	1200	ng/L			03/13/23 12:57	1
PFHxA	1300000	H E	5000	1400	ng/L			03/13/23 12:57	1
PFHpA	2000000	H E	5000	630	ng/L			03/13/23 12:57	1
PFOA	160000	H	5000	2100	ng/L			03/13/23 12:57	1
PFNA	30000	H	5000	680	ng/L			03/13/23 12:57	1
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	7200000				ng/L			03/13/23 12:57	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	1900000	*+ H E B	13000	6000	ng/L			03/13/23 13:01	1
PFPA	2000000	*+ H E	5000	1200	ng/L			03/13/23 13:01	1
PFHxA	1100000	*+ H E	5000	1400	ng/L			03/13/23 13:01	1
PFHpA	1700000	*+ H E	5000	630	ng/L			03/13/23 13:01	1
PFOA	160000	H	5000	2100	ng/L			03/13/23 13:01	1
PFNA	30000	*+ H	5000	680	ng/L			03/13/23 13:01	1
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	6900000				ng/L			03/13/23 13:01	1

Client Sample ID: WPAFB_tf_9

Lab Sample ID: 320-95526-7

Date Collected: 12/21/22 16:05

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.4		0.50	0.053	mg/L			01/13/23 15:47	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	2400	H	130	60	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluoropentanoic acid (PFPeA)	960	H	50	12	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluorohexanoic acid (PFHxA)	1800	H	50	14	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluoroheptanoic acid (PFHpA)	710	H	50	6.3	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluorooctanoic acid (PFOA)	4200	H	50	21	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluorononanoic acid (PFNA)	120	H	50	6.8	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluorodecanoic acid (PFDA)	15	J H	50	7.8	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluoroundecanoic acid (PFUnA)	ND	H	50	28	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluorododecanoic acid (PFDoA)	ND	H	50	14	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluorotridecanoic acid (PFTTrDA)	ND	H	50	32	ng/L		01/04/23 14:13	02/18/23 02:00	1

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Client Sample Results

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_9

Lab Sample ID: 320-95526-7

Date Collected: 12/21/22 16:05

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorotetradecanoic acid (PFTeA)	ND	H	50	7.3	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluorobutanesulfonic acid (PFBS)	260	H	50	5.0	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluoropentanesulfonic acid (PFPeS)	190	H	50	7.5	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluorohexanesulfonic acid (PFHxS)	860	H	50	4.3	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluoroheptanesulfonic acid (PFHpS)	170	H	50	4.8	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluorononanesulfonic acid (PFNS)	10	J H	50	4.0	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluorodecanesulfonic acid (PFDS)	ND	H	50	14	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluorododecanesulfonic acid (PFDoS)	ND	H	50	24	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluorooctanesulfonamide (FOSA)	110	H	50	8.8	ng/L		01/04/23 14:13	02/18/23 02:00	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	130	30	ng/L		01/04/23 14:13	02/18/23 02:00	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	130	33	ng/L		01/04/23 14:13	02/18/23 02:00	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND	H	50	6.0	ng/L		01/04/23 14:13	02/18/23 02:00	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	1600	H	130	63	ng/L		01/04/23 14:13	02/18/23 02:00	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	310	H	50	12	ng/L		01/04/23 14:13	02/18/23 02:00	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H *	50	22	ng/L		01/04/23 14:13	02/18/23 02:00	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H	50	11	ng/L		01/04/23 14:13	02/18/23 02:00	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H	100	35	ng/L		01/04/23 14:13	02/18/23 02:00	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H *	50	22	ng/L		01/04/23 14:13	02/18/23 02:00	1
9CI-PF3ONS	ND	H	50	6.0	ng/L		01/04/23 14:13	02/18/23 02:00	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	100	38	ng/L		01/04/23 14:13	02/18/23 02:00	1
11CI-PF3OUdS	ND	H	50	8.0	ng/L		01/04/23 14:13	02/18/23 02:00	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	50	10	ng/L		01/04/23 14:13	02/18/23 02:00	1
3:3 FTCA	ND	H	50	11	ng/L		01/04/23 14:13	02/18/23 02:00	1
5:3 FTCA	ND	H	50	8.0	ng/L		01/04/23 14:13	02/18/23 02:00	1
7:3 FTCA	ND	H	50	14	ng/L		01/04/23 14:13	02/18/23 02:00	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	50	16	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	H	50	7.0	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	H	50	7.0	ng/L		01/04/23 14:13	02/18/23 02:00	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND	H	50	7.0	ng/L		01/04/23 14:13	02/18/23 02:00	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	106		25 - 150				01/04/23 14:13	02/18/23 02:00	1
13C4 PFBA	111		25 - 150				01/04/23 14:13	02/18/23 02:00	1
13C5 PFPeA	116		25 - 150				01/04/23 14:13	02/18/23 02:00	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_9

Lab Sample ID: 320-95526-7

Date Collected: 12/21/22 16:05

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	114		25 - 150	01/04/23 14:13	02/18/23 02:00	1
13C4 PFHpA	123		25 - 150	01/04/23 14:13	02/18/23 02:00	1
13C4 PFOA	110		25 - 150	01/04/23 14:13	02/18/23 02:00	1
13C5 PFNA	102		25 - 150	01/04/23 14:13	02/18/23 02:00	1
13C2 PFDA	116		25 - 150	01/04/23 14:13	02/18/23 02:00	1
13C2 PFUnA	116		25 - 150	01/04/23 14:13	02/18/23 02:00	1
13C2 PFDoA	106		25 - 150	01/04/23 14:13	02/18/23 02:00	1
13C2 PFTeDA	106		25 - 150	01/04/23 14:13	02/18/23 02:00	1
13C3 PFBS	116		25 - 150	01/04/23 14:13	02/18/23 02:00	1
18O2 PFHxS	114		25 - 150	01/04/23 14:13	02/18/23 02:00	1
13C4 PFOS	97		25 - 150	01/04/23 14:13	02/18/23 02:00	1
d3-NMeFOSAA	90		25 - 150	01/04/23 14:13	02/18/23 02:00	1
d5-NEtFOSAA	100		25 - 150	01/04/23 14:13	02/18/23 02:00	1
13C2 4:2 FTS	91		25 - 150	01/04/23 14:13	02/18/23 02:00	1
13C2 6:2 FTS	92		25 - 150	01/04/23 14:13	02/18/23 02:00	1
13C2 8:2 FTS	112		25 - 150	01/04/23 14:13	02/18/23 02:00	1
d-N-MeFOSA-M	96		25 - 150	01/04/23 14:13	02/18/23 02:00	1
d-N-EtFOSA-M	87		25 - 150	01/04/23 14:13	02/18/23 02:00	1
d7-N-MeFOSE-M	103		25 - 150	01/04/23 14:13	02/18/23 02:00	1
d9-N-EtFOSE-M	103		25 - 150	01/04/23 14:13	02/18/23 02:00	1
13C3 HFPO-DA	104		25 - 150	01/04/23 14:13	02/18/23 02:00	1
13C-6:2 FTCA	92		25 - 150	01/04/23 14:13	02/18/23 02:00	1
13C-8:2 FTCA	94		25 - 150	01/04/23 14:13	02/18/23 02:00	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	10000	H	250	40	ng/L		01/04/23 14:13	02/18/23 01:50	5

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	98		25 - 150	01/04/23 14:13	02/18/23 01:50	5

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	4100	*+ H	130	60	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluoropentanoic acid (PFPeA)	3400	*+ H	50	12	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluorohexanoic acid (PFHxA)	4700	*+ H	50	14	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluoroheptanoic acid (PFHpA)	1000	*+ H	50	6.3	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluorooctanoic acid (PFOA)	3800	H	50	21	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluorononanoic acid (PFNA)	51	*+ H	50	6.8	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluorodecanoic acid (PFDA)	12	J H *+	50	7.8	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluoroundecanoic acid (PFUnA)	ND	H	50	28	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluorododecanoic acid (PFDoA)	ND	H	50	14	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluorotridecanoic acid (PFTTrDA)	ND	H *	50	32	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluorotetradecanoic acid (PFTeA)	ND	H	50	7.3	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluorobutanesulfonic acid (PFBS)	260	H	50	5.0	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluoropentanesulfonic acid (PFPeS)	200	H	50	7.5	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluorohexanesulfonic acid (PFHxS)	770	H	50	4.3	ng/L		01/11/23 15:47	01/14/23 01:59	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_9

Lab Sample ID: 320-95526-7

Date Collected: 12/21/22 16:05

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanesulfonic acid (PFHpS)	86	H	50	4.8	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluorooctanesulfonic acid (PFOS)	3700	H	50	8.0	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluorononanesulfonic acid (PFNS)	ND	H	50	4.0	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluorodecanesulfonic acid (PFDS)	ND	H	50	14	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluorododecanesulfonic acid (PFDoS)	ND	H *	50	24	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluorooctanesulfonamide (FOSA)	ND	H *1	50	8.8	ng/L		01/11/23 15:47	01/14/23 01:59	1
N-methylperfluorooctanesulfonamide acetic acid (NMeFOSAA)	ND	H	130	30	ng/L		01/11/23 15:47	01/14/23 01:59	1
N-ethylperfluorooctanesulfonamide acetic acid (NEtFOSAA)	ND	H	130	33	ng/L		01/11/23 15:47	01/14/23 01:59	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND	H	50	6.0	ng/L		01/11/23 15:47	01/14/23 01:59	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND	H	130	63	ng/L		01/11/23 15:47	01/14/23 01:59	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND	H *1	50	12	ng/L		01/11/23 15:47	01/14/23 01:59	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H	50	22	ng/L		01/11/23 15:47	01/14/23 01:59	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H	50	11	ng/L		01/11/23 15:47	01/14/23 01:59	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H	100	35	ng/L		01/11/23 15:47	01/14/23 01:59	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H	50	22	ng/L		01/11/23 15:47	01/14/23 01:59	1
9CI-PF3ONS	ND	H	50	6.0	ng/L		01/11/23 15:47	01/14/23 01:59	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	100	38	ng/L		01/11/23 15:47	01/14/23 01:59	1
11CI-PF3OUdS	ND	H * - *1	50	8.0	ng/L		01/11/23 15:47	01/14/23 01:59	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	50	10	ng/L		01/11/23 15:47	01/14/23 01:59	1
3:3 FTCA	ND	H	50	11	ng/L		01/11/23 15:47	01/14/23 01:59	1
5:3 FTCA	ND	H	50	8.0	ng/L		01/11/23 15:47	01/14/23 01:59	1
7:3 FTCA	ND	H	50	14	ng/L		01/11/23 15:47	01/14/23 01:59	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	50	16	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	H	50	7.0	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	*+ H	50	7.0	ng/L		01/11/23 15:47	01/14/23 01:59	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND	H	50	7.0	ng/L		01/11/23 15:47	01/14/23 01:59	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	101		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C4 PFBA	96		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C5 PFPeA	104		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C2 PFHxA	102		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C4 PFHpA	112		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C4 PFOA	109		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C5 PFNA	104		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C2 PFDA	103		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C2 PFUnA	109		25 - 150	01/11/23 15:47	01/14/23 01:59	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_9

Lab Sample ID: 320-95526-7

Date Collected: 12/21/22 16:05

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	94		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C2 PFTeDA	103		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C3 PFBS	115		25 - 150	01/11/23 15:47	01/14/23 01:59	1
18O2 PFHxS	119		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C4 PFOS	101		25 - 150	01/11/23 15:47	01/14/23 01:59	1
d3-NMeFOSAA	97		25 - 150	01/11/23 15:47	01/14/23 01:59	1
d5-NEtFOSAA	104		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C2 4:2 FTS	0		0 - 10	01/11/23 15:47	01/14/23 01:59	1
13C2 6:2 FTS	108		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C2 8:2 FTS	121		25 - 150	01/11/23 15:47	01/14/23 01:59	1
d-N-MeFOSA-M	55		25 - 150	01/11/23 15:47	01/14/23 01:59	1
d-N-EtFOSA-M	48		25 - 150	01/11/23 15:47	01/14/23 01:59	1
d7-N-MeFOSE-M	43		25 - 150	01/11/23 15:47	01/14/23 01:59	1
d9-N-EtFOSE-M	36		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C3 HFPO-DA	103		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C-6:2 FTCA	99		25 - 150	01/11/23 15:47	01/14/23 01:59	1
13C-8:2 FTCA	108		25 - 150	01/11/23 15:47	01/14/23 01:59	1

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	1900		200	100	ug/L		03/10/23 09:57	03/10/23 13:42	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	1800				ng/L			03/13/23 13:05	1
PFPA	2400				ng/L			03/13/23 13:05	1
PFHxA	2900				ng/L			03/13/23 13:05	1
PFHpA	300				ng/L			03/13/23 13:05	1
PFOA	0.00				ng/L			03/13/23 13:05	1
PFNA	0.00				ng/L			03/13/23 13:05	1
Total PFCA	6900				ng/L			03/13/23 13:05	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	2400	H	130	60	ng/L			03/13/23 12:57	1
PFPA	960	H	50	12	ng/L			03/13/23 12:57	1
PFHxA	1800	H	50	14	ng/L			03/13/23 12:57	1
PFHpA	710	H	50	6.3	ng/L			03/13/23 12:57	1
PFOA	4200	H	50	21	ng/L			03/13/23 12:57	1
PFNA	120	H	50	6.8	ng/L			03/13/23 12:57	1
Total PFCA	10000				ng/L			03/13/23 12:57	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	4100	++ H	130	60	ng/L			03/13/23 13:01	1
PFPA	3400	++ H	50	12	ng/L			03/13/23 13:01	1
PFHxA	4700	++ H	50	14	ng/L			03/13/23 13:01	1
PFHpA	1000	++ H	50	6.3	ng/L			03/13/23 13:01	1
PFOA	3800	H	50	21	ng/L			03/13/23 13:01	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_9

Lab Sample ID: 320-95526-7

Date Collected: 12/21/22 16:05

Matrix: Water

Date Received: 12/22/22 09:50

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment (Continued)

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFNA	51	*+ H	50	6.8	ng/L			03/13/23 13:01	1
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	17000				ng/L			03/13/23 13:01	1

Client Sample ID: WPAFB_tf_10

Lab Sample ID: 320-95526-8

Date Collected: 12/21/22 16:05

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.3		0.50	0.053	mg/L			01/13/23 16:45	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	4400		130	60	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluoropentanoic acid (PFPeA)	3400		50	12	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluorohexanoic acid (PFHxA)	1500		50	14	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluoroheptanoic acid (PFHpA)	330		50	6.3	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluorooctanoic acid (PFOA)	650		50	21	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluorononanoic acid (PFNA)	11	J	50	6.8	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluorodecanoic acid (PFDA)	ND		50	7.8	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluoroundecanoic acid (PFUnA)	ND		50	28	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluorododecanoic acid (PFDoA)	ND		50	14	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluorotridecanoic acid (PFTTrDA)	ND		50	32	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluorotetradecanoic acid (PFTTeA)	ND		50	7.3	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluorobutanesulfonic acid (PFBS)	1100		50	5.0	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluoropentanesulfonic acid (PFPeS)	96		50	7.5	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluorohexanesulfonic acid (PFHxS)	220		50	4.3	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		50	4.8	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluorooctanesulfonic acid (PFOS)	500		50	8.0	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluorononanesulfonic acid (PFNS)	ND		50	4.0	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluorodecanesulfonic acid (PFDS)	ND		50	14	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluorododecanesulfonic acid (PFDoS)	ND		50	24	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluorooctanesulfonamide (FOSA)	110		50	8.8	ng/L		01/04/23 14:13	01/25/23 17:08	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		130	30	ng/L		01/04/23 14:13	01/25/23 17:08	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		130	33	ng/L		01/04/23 14:13	01/25/23 17:08	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	42	J	50	6.0	ng/L		01/04/23 14:13	01/25/23 17:08	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	380		130	63	ng/L		01/04/23 14:13	01/25/23 17:08	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	26	J	50	12	ng/L		01/04/23 14:13	01/25/23 17:08	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	*-	50	22	ng/L		01/04/23 14:13	01/25/23 17:08	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_10

Lab Sample ID: 320-95526-8

Date Collected: 12/21/22 16:05

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		50	11	ng/L		01/04/23 14:13	01/25/23 17:08	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		100	35	ng/L		01/04/23 14:13	01/25/23 17:08	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	*	50	22	ng/L		01/04/23 14:13	01/25/23 17:08	1
9CI-PF3ONS	ND		50	6.0	ng/L		01/04/23 14:13	01/25/23 17:08	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		100	38	ng/L		01/04/23 14:13	01/25/23 17:08	1
11CI-PF3OUdS	ND		50	8.0	ng/L		01/04/23 14:13	01/25/23 17:08	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		50	10	ng/L		01/04/23 14:13	01/25/23 17:08	1
3:3 FTCA	ND		50	11	ng/L		01/04/23 14:13	01/25/23 17:08	1
5:3 FTCA	ND		50	8.0	ng/L		01/04/23 14:13	01/25/23 17:08	1
7:3 FTCA	ND		50	14	ng/L		01/04/23 14:13	01/25/23 17:08	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		50	16	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		50	7.0	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		50	7.0	ng/L		01/04/23 14:13	01/25/23 17:08	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		50	7.0	ng/L		01/04/23 14:13	01/25/23 17:08	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	97		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C4 PFBA	89		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C5 PFPeA	88		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C2 PFHxA	93		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C4 PFHpA	108		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C4 PFOA	99		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C5 PFNA	92		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C2 PFDA	94		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C2 PFUnA	110		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C2 PFDoA	98		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C2 PFTeDA	95		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C3 PFBS	100		25 - 150	01/04/23 14:13	01/25/23 17:08	1
18O2 PFHxS	96		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C4 PFOS	92		25 - 150	01/04/23 14:13	01/25/23 17:08	1
d3-NMeFOSAA	105		25 - 150	01/04/23 14:13	01/25/23 17:08	1
d5-NEtFOSAA	111		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C2 4:2 FTS	115		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C2 6:2 FTS	120		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C2 8:2 FTS	176	*5+	25 - 150	01/04/23 14:13	01/25/23 17:08	1
d-N-MeFOSA-M	82		25 - 150	01/04/23 14:13	01/25/23 17:08	1
d-N-EtFOSA-M	72		25 - 150	01/04/23 14:13	01/25/23 17:08	1
d7-N-MeFOSE-M	87		25 - 150	01/04/23 14:13	01/25/23 17:08	1
d9-N-EtFOSE-M	89		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C3 HFPO-DA	112		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C-6:2 FTCA	94		25 - 150	01/04/23 14:13	01/25/23 17:08	1
13C-8:2 FTCA	90		25 - 150	01/04/23 14:13	01/25/23 17:08	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_10

Lab Sample ID: 320-95526-8

Date Collected: 12/21/22 16:05

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	4300	*+ H B	130	60	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluoropentanoic acid (PFPeA)	3300	*+ H	50	12	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluorohexanoic acid (PFHxA)	1500	*+ H	50	14	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluoroheptanoic acid (PFHpA)	330	*+ H	50	6.3	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluorooctanoic acid (PFOA)	620	H	50	21	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluorononanoic acid (PFNA)	9.3	J *+ H	50	6.8	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluorodecanoic acid (PFDA)	ND	*+ H	50	7.8	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluoroundecanoic acid (PFUnA)	ND	H	50	28	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluorododecanoic acid (PFDoA)	ND	H	50	14	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluorotridecanoic acid (PFTrDA)	ND	H	50	32	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluorotetradecanoic acid (PFTeA)	ND	H	50	7.3	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluorobutanesulfonic acid (PFBS)	1200	H	50	5.0	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluoropentanesulfonic acid (PFPeS)	100	H	50	7.5	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluorohexanesulfonic acid (PFHxS)	210	H	50	4.3	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluoroheptanesulfonic acid (PFHpS)	ND	H	50	4.8	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluorooctanesulfonic acid (PFOS)	420	H	50	8.0	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluorononanesulfonic acid (PFNS)	ND	H	50	4.0	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluorodecanesulfonic acid (PFDS)	ND	H	50	14	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluorododecanesulfonic acid (PFDoS)	ND	H	50	24	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluorooctanesulfonamide (FOSA)	ND	H	50	8.8	ng/L		01/04/23 14:13	02/18/23 03:01	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	130	30	ng/L		01/04/23 14:13	02/18/23 03:01	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	130	33	ng/L		01/04/23 14:13	02/18/23 03:01	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND	H	50	6.0	ng/L		01/04/23 14:13	02/18/23 03:01	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND	H	130	63	ng/L		01/04/23 14:13	02/18/23 03:01	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND	H	50	12	ng/L		01/04/23 14:13	02/18/23 03:01	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H	50	22	ng/L		01/04/23 14:13	02/18/23 03:01	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H	50	11	ng/L		01/04/23 14:13	02/18/23 03:01	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H	100	35	ng/L		01/04/23 14:13	02/18/23 03:01	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H	50	22	ng/L		01/04/23 14:13	02/18/23 03:01	1
9Cl-PF3ONS	ND	H	50	6.0	ng/L		01/04/23 14:13	02/18/23 03:01	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	100	38	ng/L		01/04/23 14:13	02/18/23 03:01	1
11Cl-PF3OUdS	ND	H	50	8.0	ng/L		01/04/23 14:13	02/18/23 03:01	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	50	10	ng/L		01/04/23 14:13	02/18/23 03:01	1
3:3 FTCA	ND	H	50	11	ng/L		01/04/23 14:13	02/18/23 03:01	1
5:3 FTCA	ND	H	50	8.0	ng/L		01/04/23 14:13	02/18/23 03:01	1
7:3 FTCA	ND	H	50	14	ng/L		01/04/23 14:13	02/18/23 03:01	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_10

Lab Sample ID: 320-95526-8

Date Collected: 12/21/22 16:05

Matrix: Water

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	50	16	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	H	50	7.0	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	*+ H	50	7.0	ng/L		01/04/23 14:13	02/18/23 03:01	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND	H	50	7.0	ng/L		01/04/23 14:13	02/18/23 03:01	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	110		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C4 PFBA	104		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C5 PFPeA	117		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C2 PFHxA	115		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C4 PFHpA	125		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C4 PFOA	112		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C5 PFNA	110		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C2 PFDA	114		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C2 PFUnA	119		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C2 PFDoA	106		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C2 PFTeDA	108		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C3 PFBS	116		25 - 150	01/04/23 14:13	02/18/23 03:01	1
18O2 PFHxS	120		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C4 PFOS	104		25 - 150	01/04/23 14:13	02/18/23 03:01	1
d3-NMeFOSAA	95		25 - 150	01/04/23 14:13	02/18/23 03:01	1
d5-NEtFOSAA	101		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C2 4:2 FTS	0		0 - 10	01/04/23 14:13	02/18/23 03:01	1
13C2 6:2 FTS	105		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C2 8:2 FTS	107		25 - 150	01/04/23 14:13	02/18/23 03:01	1
d-N-MeFOSA-M	102		25 - 150	01/04/23 14:13	02/18/23 03:01	1
d-N-EtFOSA-M	95		25 - 150	01/04/23 14:13	02/18/23 03:01	1
d7-N-MeFOSE-M	105		25 - 150	01/04/23 14:13	02/18/23 03:01	1
d9-N-EtFOSE-M	107		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C3 HFPO-DA	100		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C-6:2 FTCA	95		25 - 150	01/04/23 14:13	02/18/23 03:01	1
13C-8:2 FTCA	98		25 - 150	01/04/23 14:13	02/18/23 03:01	1

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	1800		200	100	ug/L		03/10/23 09:57	03/10/23 14:17	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	0.00				ng/L			03/13/23 13:05	1
PFPA	0.00				ng/L			03/13/23 13:05	1
PFHxA	0.00				ng/L			03/13/23 13:05	1
PFHpA	0.00				ng/L			03/13/23 13:05	1
PFOA	0.00				ng/L			03/13/23 13:05	1
PFNA	0.00				ng/L			03/13/23 13:05	1
Total PFCA	0.00				ng/L			03/13/23 13:05	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_10

Lab Sample ID: 320-95526-8

Date Collected: 12/21/22 16:05

Matrix: Water

Date Received: 12/22/22 09:50

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	4400		130	60	ng/L			03/13/23 12:57	1
PFPA	3400		50	12	ng/L			03/13/23 12:57	1
PFHxA	1500		50	14	ng/L			03/13/23 12:57	1
PFHpA	330		50	6.3	ng/L			03/13/23 12:57	1
PFOA	650		50	21	ng/L			03/13/23 12:57	1
PFNA	11	J	50	6.8	ng/L			03/13/23 12:57	1

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	10000				ng/L			03/13/23 12:57	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	4300	++ H B	130	60	ng/L			03/13/23 13:01	1
PFPA	3300	++ H	50	12	ng/L			03/13/23 13:01	1
PFHxA	1500	++ H	50	14	ng/L			03/13/23 13:01	1
PFHpA	330	++ H	50	6.3	ng/L			03/13/23 13:01	1
PFOA	620	H	50	21	ng/L			03/13/23 13:01	1
PFNA	9.3	J ++ H	50	6.8	ng/L			03/13/23 13:01	1

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	10000				ng/L			03/13/23 13:01	1

Client Sample ID: NAS_J_tf_8_M

Lab Sample ID: 320-95526-9

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	940		200	35	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluoropentanoic acid (PFPeA)	1100		200	49	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluorohexanoic acid (PFHxA)	2600		200	58	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluoroheptanoic acid (PFHpA)	370		200	25	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluorooctanoic acid (PFOA)	3000		200	85	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluorononanoic acid (PFNA)	ND		200	27	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluorodecanoic acid (PFDA)	34	J	200	31	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluoroundecanoic acid (PFUnA)	ND		200	110	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluorododecanoic acid (PFDoA)	ND		200	55	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluorotridecanoic acid (PFTTrDA)	ND		200	130	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluorotetradecanoic acid (PFTeA)	ND		200	29	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluorobutanesulfonic acid (PFBS)	ND		200	20	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluoropentanesulfonic acid (PFPeS)	ND		200	30	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluorohexanesulfonic acid (PFHxS)	280		200	17	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		200	19	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluorooctanesulfonic acid (PFOS)	450		200	54	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluorononanesulfonic acid (PFNS)	ND		200	16	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluorodecanesulfonic acid (PFDS)	ND		200	32	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluorododecanesulfonic acid (PFDoS)	ND		200	45	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluorooctanesulfonamide (FOSA)	ND		200	35	ng/L		01/04/23 22:48	02/09/23 14:12	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_8_M

Lab Sample ID: 320-95526-9

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2000	310	ng/L		01/04/23 22:48	02/09/23 14:12	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2000	190	ng/L		01/04/23 22:48	02/09/23 14:12	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		2000	520	ng/L		01/04/23 22:48	02/09/23 14:12	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	910	J	2000	200	ng/L		01/04/23 22:48	02/09/23 14:12	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		2000	200	ng/L		01/04/23 22:48	02/09/23 14:12	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		200	87	ng/L		01/04/23 22:48	02/09/23 14:12	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		200	43	ng/L		01/04/23 22:48	02/09/23 14:12	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		200	140	ng/L		01/04/23 22:48	02/09/23 14:12	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		200	85	ng/L		01/04/23 22:48	02/09/23 14:12	1
9CI-PF3ONS	ND		200	24	ng/L		01/04/23 22:48	02/09/23 14:12	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		400	150	ng/L		01/04/23 22:48	02/09/23 14:12	1
11CI-PF3OUdS	ND		200	32	ng/L		01/04/23 22:48	02/09/23 14:12	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		200	18	ng/L		01/04/23 22:48	02/09/23 14:12	1
3:3 FTCA	ND		200	43	ng/L		01/04/23 22:48	02/09/23 14:12	1
5:3 FTCA	ND		200	33	ng/L		01/04/23 22:48	02/09/23 14:12	1
7:3 FTCA	ND		200	55	ng/L		01/04/23 22:48	02/09/23 14:12	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		200	62	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		200	26	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		200	28	ng/L		01/04/23 22:48	02/09/23 14:12	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		200	29	ng/L		01/04/23 22:48	02/09/23 14:12	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	135		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C4 PFBA	136		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C5 PFPeA	129		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C2 PFHxA	134		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C4 PFHpA	135		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C4 PFOA	127		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C5 PFNA	129		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C2 PFDA	125		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C2 PFUnA	136		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C2 PFDoA	125		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C2 PFTeDA	117		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C3 PFBS	127		25 - 150	01/04/23 22:48	02/09/23 14:12	1
18O2 PFHxS	130		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C4 PFOS	121		25 - 150	01/04/23 22:48	02/09/23 14:12	1
d3-NMeFOSAA	116		25 - 150	01/04/23 22:48	02/09/23 14:12	1
d5-NEtFOSAA	127		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C2 4:2 FTS	121		25 - 150	01/04/23 22:48	02/09/23 14:12	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_8_M

Lab Sample ID: 320-95526-9

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 6:2 FTS	111		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C2 8:2 FTS	109		25 - 150	01/04/23 22:48	02/09/23 14:12	1
d-N-MeFOSA-M	117		25 - 150	01/04/23 22:48	02/09/23 14:12	1
d-N-EtFOSA-M	119		25 - 150	01/04/23 22:48	02/09/23 14:12	1
d7-N-MeFOSE-M	119		25 - 150	01/04/23 22:48	02/09/23 14:12	1
d9-N-EtFOSE-M	123		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C3 HFPO-DA	128		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C-6:2 FTCA	119		25 - 150	01/04/23 22:48	02/09/23 14:12	1
13C-8:2 FTCA	127		25 - 150	01/04/23 22:48	02/09/23 14:12	1

Client Sample ID: NAS_J_tf_10_M

Lab Sample ID: 320-95526-10

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	2000		200	35	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluoropentanoic acid (PFPeA)	2100		200	49	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluorohexanoic acid (PFHxA)	3800		200	58	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluoroheptanoic acid (PFHpA)	530		200	25	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluorooctanoic acid (PFOA)	1400		200	85	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluorononanoic acid (PFNA)	72	J	200	27	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluorodecanoic acid (PFDA)	ND		200	31	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluoroundecanoic acid (PFUnA)	ND		200	110	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluorododecanoic acid (PFDoA)	ND		200	55	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluorotridecanoic acid (PFTrDA)	ND		200	130	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluorotetradecanoic acid (PFTeA)	ND		200	29	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluorobutanesulfonic acid (PFBS)	ND		200	20	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluoropentanesulfonic acid (PFPeS)	58	J	200	30	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluorohexanesulfonic acid (PFHxS)	770		200	17	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		200	19	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluorooctanesulfonic acid (PFOS)	11000		200	54	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluorononanesulfonic acid (PFNS)	26	J	200	16	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluorodecanesulfonic acid (PFDS)	ND		200	32	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluorododecanesulfonic acid (PFDoS)	ND		200	45	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluorooctanesulfonamide (FOSA)	91	J	200	35	ng/L		01/04/23 22:48	02/09/23 14:22	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2000	310	ng/L		01/04/23 22:48	02/09/23 14:22	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2000	190	ng/L		01/04/23 22:48	02/09/23 14:22	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		2000	520	ng/L		01/04/23 22:48	02/09/23 14:22	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	2100		2000	200	ng/L		01/04/23 22:48	02/09/23 14:22	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	1300	J	2000	200	ng/L		01/04/23 22:48	02/09/23 14:22	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_10_M

Lab Sample ID: 320-95526-10

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		200	87	ng/L		01/04/23 22:48	02/09/23 14:22	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		200	43	ng/L		01/04/23 22:48	02/09/23 14:22	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		200	140	ng/L		01/04/23 22:48	02/09/23 14:22	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		200	85	ng/L		01/04/23 22:48	02/09/23 14:22	1
9CI-PF3ONS	ND		200	24	ng/L		01/04/23 22:48	02/09/23 14:22	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		400	150	ng/L		01/04/23 22:48	02/09/23 14:22	1
11CI-PF3OUdS	ND		200	32	ng/L		01/04/23 22:48	02/09/23 14:22	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		200	18	ng/L		01/04/23 22:48	02/09/23 14:22	1
3:3 FTCA	ND		200	43	ng/L		01/04/23 22:48	02/09/23 14:22	1
5:3 FTCA	ND		200	33	ng/L		01/04/23 22:48	02/09/23 14:22	1
7:3 FTCA	ND		200	55	ng/L		01/04/23 22:48	02/09/23 14:22	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		200	62	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		200	26	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		200	28	ng/L		01/04/23 22:48	02/09/23 14:22	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		200	29	ng/L		01/04/23 22:48	02/09/23 14:22	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	133		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C4 PFBA	129		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C5 PFPeA	129		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C2 PFHxA	130		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C4 PFHpA	130		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C4 PFOA	126		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C5 PFNA	125		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C2 PFDA	122		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C2 PFUnA	129		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C2 PFDoA	122		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C2 PFTeDA	113		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C3 PFBS	125		25 - 150	01/04/23 22:48	02/09/23 14:22	1
18O2 PFHxS	128		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C4 PFOS	119		25 - 150	01/04/23 22:48	02/09/23 14:22	1
d3-NMeFOSAA	110		25 - 150	01/04/23 22:48	02/09/23 14:22	1
d5-NEtFOSAA	119		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C2 4:2 FTS	118		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C2 6:2 FTS	107		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C2 8:2 FTS	110		25 - 150	01/04/23 22:48	02/09/23 14:22	1
d-N-MeFOSA-M	117		25 - 150	01/04/23 22:48	02/09/23 14:22	1
d-N-EtFOSA-M	118		25 - 150	01/04/23 22:48	02/09/23 14:22	1
d7-N-MeFOSE-M	128		25 - 150	01/04/23 22:48	02/09/23 14:22	1
d9-N-EtFOSE-M	124		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C3 HFPO-DA	129		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C-6:2 FTCA	122		25 - 150	01/04/23 22:48	02/09/23 14:22	1
13C-8:2 FTCA	126		25 - 150	01/04/23 22:48	02/09/23 14:22	1

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Client Sample Results

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_10_M

Lab Sample ID: 320-95526-11

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	22000		200	85	ng/L		01/04/23 22:48	02/03/23 19:05	1
Perfluorononanoic acid (PFNA)	7900		200	27	ng/L		01/04/23 22:48	02/03/23 19:05	1
Perfluorodecanoic acid (PFDA)	39	J	200	31	ng/L		01/04/23 22:48	02/03/23 19:05	1
Perfluoroundecanoic acid (PFUnA)	ND		200	110	ng/L		01/04/23 22:48	02/03/23 19:05	1
Perfluorododecanoic acid (PFDoA)	ND		200	55	ng/L		01/04/23 22:48	02/03/23 19:05	1
Perfluorotridecanoic acid (PFTrDA)	ND		200	130	ng/L		01/04/23 22:48	02/03/23 19:05	1
Perfluorotetradecanoic acid (PFTeA)	ND		200	29	ng/L		01/04/23 22:48	02/03/23 19:05	1
Perfluorobutanesulfonic acid (PFBS)	4700		200	20	ng/L		01/04/23 22:48	02/03/23 19:05	1
Perfluoropentanesulfonic acid (PFPeS)	15000		200	30	ng/L		01/04/23 22:48	02/03/23 19:05	1
Perfluorodecanesulfonic acid (PFDS)	ND		200	32	ng/L		01/04/23 22:48	02/03/23 19:05	1
Perfluorooctanesulfonamide (FOSA)	36	J	200	35	ng/L		01/04/23 22:48	02/03/23 19:05	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2000	310	ng/L		01/04/23 22:48	02/03/23 19:05	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2000	190	ng/L		01/04/23 22:48	02/03/23 19:05	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	730	J	2000	520	ng/L		01/04/23 22:48	02/03/23 19:05	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		200	87	ng/L		01/04/23 22:48	02/03/23 19:05	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		200	43	ng/L		01/04/23 22:48	02/03/23 19:05	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		200	140	ng/L		01/04/23 22:48	02/03/23 19:05	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		200	85	ng/L		01/04/23 22:48	02/03/23 19:05	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		400	150	ng/L		01/04/23 22:48	02/03/23 19:05	1
3:3 FTCA	ND		200	43	ng/L		01/04/23 22:48	02/03/23 19:05	1
5:3 FTCA	ND		200	33	ng/L		01/04/23 22:48	02/03/23 19:05	1
7:3 FTCA	ND		200	55	ng/L		01/04/23 22:48	02/03/23 19:05	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		200	62	ng/L		01/04/23 22:48	02/03/23 19:05	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	230		200	26	ng/L		01/04/23 22:48	02/03/23 19:05	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	180	J	200	28	ng/L		01/04/23 22:48	02/03/23 19:05	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		200	29	ng/L		01/04/23 22:48	02/03/23 19:05	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	126		25 - 150	01/04/23 22:48	02/03/23 19:05	1
13C4 PFOA	107		25 - 150	01/04/23 22:48	02/03/23 19:05	1
13C5 PFNA	94		25 - 150	01/04/23 22:48	02/03/23 19:05	1
13C2 PFDA	114		25 - 150	01/04/23 22:48	02/03/23 19:05	1
13C2 PFUnA	124		25 - 150	01/04/23 22:48	02/03/23 19:05	1
13C2 PFDoA	106		25 - 150	01/04/23 22:48	02/03/23 19:05	1
13C2 PFTeDA	112		25 - 150	01/04/23 22:48	02/03/23 19:05	1
13C3 PFBS	108		25 - 150	01/04/23 22:48	02/03/23 19:05	1
d3-NMeFOSAA	124		25 - 150	01/04/23 22:48	02/03/23 19:05	1
d5-NEtFOSAA	109		25 - 150	01/04/23 22:48	02/03/23 19:05	1
13C2 4:2 FTS	90		25 - 150	01/04/23 22:48	02/03/23 19:05	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_10_M

Lab Sample ID: 320-95526-11

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
d-N-MeFOSA-M	121		25 - 150	01/04/23 22:48	02/03/23 19:05	1
d-N-EtFOSA-M	116		25 - 150	01/04/23 22:48	02/03/23 19:05	1
d7-N-MeFOSE-M	98		25 - 150	01/04/23 22:48	02/03/23 19:05	1
d9-N-EtFOSE-M	94		25 - 150	01/04/23 22:48	02/03/23 19:05	1
13C3 HFPO-DA	140		25 - 150	01/04/23 22:48	02/03/23 19:05	1
13C-6:2 FTCA	81		25 - 150	01/04/23 22:48	02/03/23 19:05	1
13C-8:2 FTCA	127		25 - 150	01/04/23 22:48	02/03/23 19:05	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	86000		10000	1800	ng/L		01/04/23 22:48	02/09/23 14:53	50
Perfluoropentanoic acid (PFPeA)	130000		10000	2500	ng/L		01/04/23 22:48	02/09/23 14:53	50
Perfluorohexanoic acid (PFHxA)	320000		10000	2900	ng/L		01/04/23 22:48	02/09/23 14:53	50
Perfluoroheptanoic acid (PFHpA)	200000		10000	1300	ng/L		01/04/23 22:48	02/09/23 14:53	50
Perfluorohexanesulfonic acid (PFHxS)	200000		10000	850	ng/L		01/04/23 22:48	02/09/23 14:53	50
Perfluoroheptanesulfonic acid (PFHpS)	17000		10000	950	ng/L		01/04/23 22:48	02/09/23 14:53	50
Perfluorooctanesulfonic acid (PFOS)	410000		10000	2700	ng/L		01/04/23 22:48	02/09/23 14:53	50
Perfluorononanesulfonic acid (PFNS)	ND		10000	800	ng/L		01/04/23 22:48	02/09/23 14:53	50
Perfluorododecanesulfonic acid (PFDoS)	ND		10000	2300	ng/L		01/04/23 22:48	02/09/23 14:53	50
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	480000		100000	10000	ng/L		01/04/23 22:48	02/09/23 14:53	50
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		100000	10000	ng/L		01/04/23 22:48	02/09/23 14:53	50
9Cl-PF3ONS	ND		10000	1200	ng/L		01/04/23 22:48	02/09/23 14:53	50
11Cl-PF3OUdS	ND		10000	1600	ng/L		01/04/23 22:48	02/09/23 14:53	50
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		10000	900	ng/L		01/04/23 22:48	02/09/23 14:53	50

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	130		25 - 150	01/04/23 22:48	02/09/23 14:53	50
13C5 PFPeA	128		25 - 150	01/04/23 22:48	02/09/23 14:53	50
13C2 PFHxA	134		25 - 150	01/04/23 22:48	02/09/23 14:53	50
13C4 PFHpA	155	*5+	25 - 150	01/04/23 22:48	02/09/23 14:53	50
18O2 PFHxS	131		25 - 150	01/04/23 22:48	02/09/23 14:53	50
13C4 PFOS	128		25 - 150	01/04/23 22:48	02/09/23 14:53	50
13C2 6:2 FTS	183	*5+	25 - 150	01/04/23 22:48	02/09/23 14:53	50
13C2 8:2 FTS	103		25 - 150	01/04/23 22:48	02/09/23 14:53	50

Client Sample ID: NAS_O_tf_7_M

Lab Sample ID: 320-95526-12

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	39000		200	35	ng/L		01/04/23 22:48	02/03/23 19:15	1
Perfluoropentanoic acid (PFPeA)	35000		200	49	ng/L		01/04/23 22:48	02/03/23 19:15	1
Perfluorohexanoic acid (PFHxA)	31000		200	58	ng/L		01/04/23 22:48	02/03/23 19:15	1
Perfluoroheptanoic acid (PFHpA)	19000		200	25	ng/L		01/04/23 22:48	02/03/23 19:15	1
Perfluorooctanoic acid (PFOA)	19000		200	85	ng/L		01/04/23 22:48	02/03/23 19:15	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_7_M

Lab Sample ID: 320-95526-12

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	1700		200	27	ng/L		01/04/23 22:48	02/03/23 19:15	1
Perfluorodecanoic acid (PFDA)	120	J	200	31	ng/L		01/04/23 22:48	02/03/23 19:15	1
Perfluoroundecanoic acid (PFUnA)	ND		200	110	ng/L		01/04/23 22:48	02/03/23 19:15	1
Perfluorododecanoic acid (PFDoA)	ND		200	55	ng/L		01/04/23 22:48	02/03/23 19:15	1
Perfluorotridecanoic acid (PFTrDA)	ND		200	130	ng/L		01/04/23 22:48	02/03/23 19:15	1
Perfluorotetradecanoic acid (PFTeA)	ND		200	29	ng/L		01/04/23 22:48	02/03/23 19:15	1
Perfluorobutanesulfonic acid (PFBS)	1500		200	20	ng/L		01/04/23 22:48	02/03/23 19:15	1
Perfluoropentanesulfonic acid (PFPeS)	3800		200	30	ng/L		01/04/23 22:48	02/03/23 19:15	1
Perfluorooctanesulfonamide (FOSA)	100	J	200	35	ng/L		01/04/23 22:48	02/03/23 19:15	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2000	310	ng/L		01/04/23 22:48	02/03/23 19:15	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2000	190	ng/L		01/04/23 22:48	02/03/23 19:15	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		2000	520	ng/L		01/04/23 22:48	02/03/23 19:15	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		200	87	ng/L		01/04/23 22:48	02/03/23 19:15	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		200	43	ng/L		01/04/23 22:48	02/03/23 19:15	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		200	140	ng/L		01/04/23 22:48	02/03/23 19:15	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		200	85	ng/L		01/04/23 22:48	02/03/23 19:15	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		400	150	ng/L		01/04/23 22:48	02/03/23 19:15	1
3:3 FTCA	ND		200	43	ng/L		01/04/23 22:48	02/03/23 19:15	1
5:3 FTCA	ND		200	33	ng/L		01/04/23 22:48	02/03/23 19:15	1
7:3 FTCA	ND		200	55	ng/L		01/04/23 22:48	02/03/23 19:15	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		200	62	ng/L		01/04/23 22:48	02/03/23 19:15	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	86	J	200	26	ng/L		01/04/23 22:48	02/03/23 19:15	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	170	J	200	28	ng/L		01/04/23 22:48	02/03/23 19:15	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		200	29	ng/L		01/04/23 22:48	02/03/23 19:15	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	115		25 - 150				01/04/23 22:48	02/03/23 19:15	1
13C4 PFBA	106		25 - 150				01/04/23 22:48	02/03/23 19:15	1
13C5 PFPeA	108		25 - 150				01/04/23 22:48	02/03/23 19:15	1
13C2 PFHxA	109		25 - 150				01/04/23 22:48	02/03/23 19:15	1
13C4 PFHpA	102		25 - 150				01/04/23 22:48	02/03/23 19:15	1
13C4 PFOA	108		25 - 150				01/04/23 22:48	02/03/23 19:15	1
13C5 PFNA	37		25 - 150				01/04/23 22:48	02/03/23 19:15	1
13C2 PFDA	106		25 - 150				01/04/23 22:48	02/03/23 19:15	1
13C2 PFUnA	108		25 - 150				01/04/23 22:48	02/03/23 19:15	1
13C2 PFDoA	100		25 - 150				01/04/23 22:48	02/03/23 19:15	1
13C2 PFTeDA	93		25 - 150				01/04/23 22:48	02/03/23 19:15	1
13C3 PFBS	112		25 - 150				01/04/23 22:48	02/03/23 19:15	1
18O2 PFHxS	98		25 - 150				01/04/23 22:48	02/03/23 19:15	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_7_M

Lab Sample ID: 320-95526-12

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	28		25 - 150	01/04/23 22:48	02/03/23 19:15	1
d3-NMeFOSAA	113		25 - 150	01/04/23 22:48	02/03/23 19:15	1
d5-NEtFOSAA	119		25 - 150	01/04/23 22:48	02/03/23 19:15	1
13C2 4:2 FTS	125		25 - 150	01/04/23 22:48	02/03/23 19:15	1
13C2 6:2 FTS	99		25 - 150	01/04/23 22:48	02/03/23 19:15	1
d-N-MeFOSA-M	109		25 - 150	01/04/23 22:48	02/03/23 19:15	1
d-N-EtFOSA-M	108		25 - 150	01/04/23 22:48	02/03/23 19:15	1
d7-N-MeFOSE-M	93		25 - 150	01/04/23 22:48	02/03/23 19:15	1
d9-N-EtFOSE-M	90		25 - 150	01/04/23 22:48	02/03/23 19:15	1
13C3 HFPO-DA	131		25 - 150	01/04/23 22:48	02/03/23 19:15	1
13C-6:2 FTCA	91		25 - 150	01/04/23 22:48	02/03/23 19:15	1
13C-8:2 FTCA	115		25 - 150	01/04/23 22:48	02/03/23 19:15	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	150000		20000	1700	ng/L		01/04/23 22:48	02/09/23 15:13	100
Perfluoroheptanesulfonic acid (PFHpS)	64000		20000	1900	ng/L		01/04/23 22:48	02/09/23 15:13	100
Perfluorooctanesulfonic acid (PFOS)	3200000		20000	5400	ng/L		01/04/23 22:48	02/09/23 15:13	100
Perfluorononanesulfonic acid (PFNS)	ND		20000	1600	ng/L		01/04/23 22:48	02/09/23 15:13	100
Perfluorodecanesulfonic acid (PFDS)	ND		20000	3200	ng/L		01/04/23 22:48	02/09/23 15:13	100
Perfluorododecanesulfonic acid (PFDoS)	ND		20000	4500	ng/L		01/04/23 22:48	02/09/23 15:13	100
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	99000	J	200000	20000	ng/L		01/04/23 22:48	02/09/23 15:13	100
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	26000	J	200000	20000	ng/L		01/04/23 22:48	02/09/23 15:13	100
9CI-PF3ONS	ND		20000	2400	ng/L		01/04/23 22:48	02/09/23 15:13	100
11CI-PF3OUdS	ND		20000	3200	ng/L		01/04/23 22:48	02/09/23 15:13	100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		20000	1800	ng/L		01/04/23 22:48	02/09/23 15:13	100

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	118		25 - 150	01/04/23 22:48	02/09/23 15:13	100
13C2 6:2 FTS	77		25 - 150	01/04/23 22:48	02/09/23 15:13	100
13C2 8:2 FTS	69		25 - 150	01/04/23 22:48	02/09/23 15:13	100

Client Sample ID: TAFB_tf_10_M

Lab Sample ID: 320-95526-13

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	280000		20000	3500	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluoropentanoic acid (PFPeA)	650000		20000	4900	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluorohexanoic acid (PFHxA)	1700000		20000	5800	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluoroheptanoic acid (PFHpA)	1200000		20000	2500	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluorooctanoic acid (PFOA)	550000		20000	8500	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluorononanoic acid (PFNA)	180000		20000	2700	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluorodecanoic acid (PFDA)	6500	J	20000	3100	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluoroundecanoic acid (PFUnA)	ND		20000	11000	ng/L		01/04/23 22:48	02/09/23 15:33	100

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_10_M

Lab Sample ID: 320-95526-13

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorododecanoic acid (PFDoA)	ND		20000	5500	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluorotridecanoic acid (PFTrDA)	ND		20000	13000	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluorotetradecanoic acid (PFTeA)	ND		20000	2900	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluorobutanesulfonic acid (PFBS)	150000		20000	2000	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluoropentanesulfonic acid (PFPeS)	350000		20000	3000	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluorohexanesulfonic acid (PFHxS)	2300000		20000	1700	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluoroheptanesulfonic acid (PFHpS)	420000		20000	1900	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluorooctanesulfonic acid (PFOS)	14000000	E	20000	5400	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluorononanesulfonic acid (PFNS)	32000		20000	1600	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluorodecanesulfonic acid (PFDS)	15000	J	20000	3200	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluorododecanesulfonic acid (PFDoS)	ND		20000	4500	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluorooctanesulfonamide (FOSA)	46000		20000	3500	ng/L		01/04/23 22:48	02/09/23 15:33	100
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		200000	31000	ng/L		01/04/23 22:48	02/09/23 15:33	100
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		200000	19000	ng/L		01/04/23 22:48	02/09/23 15:33	100
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		200000	52000	ng/L		01/04/23 22:48	02/09/23 15:33	100
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	540000		200000	20000	ng/L		01/04/23 22:48	02/09/23 15:33	100
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	670000		200000	20000	ng/L		01/04/23 22:48	02/09/23 15:33	100
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		20000	8700	ng/L		01/04/23 22:48	02/09/23 15:33	100
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		20000	4300	ng/L		01/04/23 22:48	02/09/23 15:33	100
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		20000	14000	ng/L		01/04/23 22:48	02/09/23 15:33	100
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		20000	8500	ng/L		01/04/23 22:48	02/09/23 15:33	100
9CI-PF3ONS	ND		20000	2400	ng/L		01/04/23 22:48	02/09/23 15:33	100
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		40000	15000	ng/L		01/04/23 22:48	02/09/23 15:33	100
11CI-PF3OUdS	ND		20000	3200	ng/L		01/04/23 22:48	02/09/23 15:33	100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		20000	1800	ng/L		01/04/23 22:48	02/09/23 15:33	100
3:3 FTCA	ND		20000	4300	ng/L		01/04/23 22:48	02/09/23 15:33	100
5:3 FTCA	ND		20000	3300	ng/L		01/04/23 22:48	02/09/23 15:33	100
7:3 FTCA	ND		20000	5500	ng/L		01/04/23 22:48	02/09/23 15:33	100
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		20000	6200	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		20000	2600	ng/L		01/04/23 22:48	02/09/23 15:33	100
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		20000	2800	ng/L		01/04/23 22:48	02/09/23 15:33	100

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Client Sample Results

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_10_M

Lab Sample ID: 320-95526-13

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		20000	2900	ng/L		01/04/23 22:48	02/09/23 15:33	100
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	116		25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C4 PFBA	153	*5+	25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C5 PFPeA	131		25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C2 PFHxA	189	*5+	25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C4 PFHpA	144		25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C4 PFOA	131		25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C5 PFNA	125		25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C2 PFDA	139		25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C2 PFUnA	130		25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C2 PFDoA	126		25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C2 PFTeDA	123		25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C3 PFBS	138		25 - 150				01/04/23 22:48	02/09/23 15:33	100
18O2 PFHxS	149		25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C4 PFOS	112		25 - 150				01/04/23 22:48	02/09/23 15:33	100
d3-NMeFOSAA	178	*5+	25 - 150				01/04/23 22:48	02/09/23 15:33	100
d5-NEtFOSAA	139		25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C2 4:2 FTS	109		25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C2 6:2 FTS	6884	*5+	25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C2 8:2 FTS	1417	*5+	25 - 150				01/04/23 22:48	02/09/23 15:33	100
d-N-MeFOSA-M	109		25 - 150				01/04/23 22:48	02/09/23 15:33	100
d-N-EtFOSA-M	109		25 - 150				01/04/23 22:48	02/09/23 15:33	100
d7-N-MeFOSE-M	148		25 - 150				01/04/23 22:48	02/09/23 15:33	100
d9-N-EtFOSE-M	125		25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C3 HFPO-DA	148		25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C-6:2 FTCA	195	*5+	25 - 150				01/04/23 22:48	02/09/23 15:33	100
13C-8:2 FTCA	196	*5+	25 - 150				01/04/23 22:48	02/09/23 15:33	100

Client Sample ID: TAFB_tf_7_M

Lab Sample ID: 320-95526-14

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	140000		20000	3500	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluoropentanoic acid (PFPeA)	160000		20000	4900	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluorohexanoic acid (PFHxA)	340000		20000	5800	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluoroheptanoic acid (PFHpA)	290000		20000	2500	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluorooctanoic acid (PFOA)	100000		20000	8500	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluorononanoic acid (PFNA)	140000		20000	2700	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluorodecanoic acid (PFDA)	13000	J	20000	3100	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluoroundecanoic acid (PFUnA)	ND		20000	11000	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluorododecanoic acid (PFDoA)	ND		20000	5500	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluorotridecanoic acid (PFTTrDA)	ND		20000	13000	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluorotetradecanoic acid (PFTeA)	ND		20000	2900	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluorobutanesulfonic acid (PFBS)	40000		20000	2000	ng/L		01/04/23 22:48	02/09/23 15:53	100

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_7_M

Lab Sample ID: 320-95526-14

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanesulfonic acid (PFPeS)	28000		20000	3000	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluorohexanesulfonic acid (PFHxS)	170000		20000	1700	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluoroheptanesulfonic acid (PFHpS)	88000		20000	1900	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluorooctanesulfonic acid (PFOS)	1200000	E	20000	5400	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluorononanesulfonic acid (PFNS)	38000		20000	1600	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluorodecanesulfonic acid (PFDS)	17000	J	20000	3200	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluorododecanesulfonic acid (PFDoS)	ND		20000	4500	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluorooctanesulfonamide (FOSA)	24000		20000	3500	ng/L		01/04/23 22:48	02/09/23 15:53	100
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		200000	31000	ng/L		01/04/23 22:48	02/09/23 15:53	100
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		200000	19000	ng/L		01/04/23 22:48	02/09/23 15:53	100
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		200000	52000	ng/L		01/04/23 22:48	02/09/23 15:53	100
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	1100000		200000	20000	ng/L		01/04/23 22:48	02/09/23 15:53	100
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	460000		200000	20000	ng/L		01/04/23 22:48	02/09/23 15:53	100
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		20000	8700	ng/L		01/04/23 22:48	02/09/23 15:53	100
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		20000	4300	ng/L		01/04/23 22:48	02/09/23 15:53	100
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		20000	14000	ng/L		01/04/23 22:48	02/09/23 15:53	100
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		20000	8500	ng/L		01/04/23 22:48	02/09/23 15:53	100
9CI-PF3ONS	ND		20000	2400	ng/L		01/04/23 22:48	02/09/23 15:53	100
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		40000	15000	ng/L		01/04/23 22:48	02/09/23 15:53	100
11CI-PF3OUdS	ND		20000	3200	ng/L		01/04/23 22:48	02/09/23 15:53	100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		20000	1800	ng/L		01/04/23 22:48	02/09/23 15:53	100
3:3 FTCA	ND		20000	4300	ng/L		01/04/23 22:48	02/09/23 15:53	100
5:3 FTCA	ND		20000	3300	ng/L		01/04/23 22:48	02/09/23 15:53	100
7:3 FTCA	ND		20000	5500	ng/L		01/04/23 22:48	02/09/23 15:53	100
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		20000	6200	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		20000	2600	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		20000	2800	ng/L		01/04/23 22:48	02/09/23 15:53	100
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		20000	2900	ng/L		01/04/23 22:48	02/09/23 15:53	100
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	128		25 - 150				01/04/23 22:48	02/09/23 15:53	100
13C4 PFBA	131		25 - 150				01/04/23 22:48	02/09/23 15:53	100
13C5 PFPeA	131		25 - 150				01/04/23 22:48	02/09/23 15:53	100

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_7_M

Lab Sample ID: 320-95526-14

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	148		25 - 150	01/04/23 22:48	02/09/23 15:53	100
13C4 PFHpA	126		25 - 150	01/04/23 22:48	02/09/23 15:53	100
13C4 PFOA	122		25 - 150	01/04/23 22:48	02/09/23 15:53	100
13C5 PFNA	99		25 - 150	01/04/23 22:48	02/09/23 15:53	100
13C2 PFDA	102		25 - 150	01/04/23 22:48	02/09/23 15:53	100
13C2 PFUnA	124		25 - 150	01/04/23 22:48	02/09/23 15:53	100
13C2 PFDoA	103		25 - 150	01/04/23 22:48	02/09/23 15:53	100
13C2 PFTeDA	111		25 - 150	01/04/23 22:48	02/09/23 15:53	100
13C3 PFBS	131		25 - 150	01/04/23 22:48	02/09/23 15:53	100
18O2 PFHxS	123		25 - 150	01/04/23 22:48	02/09/23 15:53	100
13C4 PFOS	104		25 - 150	01/04/23 22:48	02/09/23 15:53	100
d3-NMeFOSAA	78		25 - 150	01/04/23 22:48	02/09/23 15:53	100
d5-NEtFOSAA	112		25 - 150	01/04/23 22:48	02/09/23 15:53	100
13C2 4:2 FTS	123		25 - 150	01/04/23 22:48	02/09/23 15:53	100
13C2 6:2 FTS	608	*5+	25 - 150	01/04/23 22:48	02/09/23 15:53	100
13C2 8:2 FTS	241	*5+	25 - 150	01/04/23 22:48	02/09/23 15:53	100
d-N-MeFOSA-M	89		25 - 150	01/04/23 22:48	02/09/23 15:53	100
d-N-EtFOSA-M	93		25 - 150	01/04/23 22:48	02/09/23 15:53	100
d7-N-MeFOSE-M	107		25 - 150	01/04/23 22:48	02/09/23 15:53	100
d9-N-EtFOSE-M	101		25 - 150	01/04/23 22:48	02/09/23 15:53	100
13C3 HFPO-DA	85		25 - 150	01/04/23 22:48	02/09/23 15:53	100
13C-6:2 FTCA	159	*5+	25 - 150	01/04/23 22:48	02/09/23 15:53	100
13C-8:2 FTCA	224	*5+	25 - 150	01/04/23 22:48	02/09/23 15:53	100

Client Sample ID: WPAFB_tf_9_M

Lab Sample ID: 320-95526-15

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	660		200	35	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluoropentanoic acid (PFPeA)	760		200	49	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluorohexanoic acid (PFHxA)	1600		200	58	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluoroheptanoic acid (PFHpA)	1000		200	25	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluorooctanoic acid (PFOA)	6400		200	85	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluorononanoic acid (PFNA)	240		200	27	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluorodecanoic acid (PFDA)	72	J	200	31	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluoroundecanoic acid (PFUnA)	ND		200	110	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluorododecanoic acid (PFDoA)	ND		200	55	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluorotridecanoic acid (PFTTrDA)	ND		200	130	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluorotetradecanoic acid (PFTeA)	ND		200	29	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluorobutanesulfonic acid (PFBS)	250		200	20	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluoropentanesulfonic acid (PFPeS)	350		200	30	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluorohexanesulfonic acid (PFHxS)	2700		200	17	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluoroheptanesulfonic acid (PFHpS)	390		200	19	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluorononanesulfonic acid (PFNS)	37	J	200	16	ng/L		01/04/23 22:48	02/03/23 19:46	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_9_M

Lab Sample ID: 320-95526-15

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanesulfonic acid (PFDS)	ND		200	32	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluorododecanesulfonic acid (PFDoS)	ND		200	45	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluorooctanesulfonamide (FOSA)	44	J	200	35	ng/L		01/04/23 22:48	02/03/23 19:46	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2000	310	ng/L		01/04/23 22:48	02/03/23 19:46	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2000	190	ng/L		01/04/23 22:48	02/03/23 19:46	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		2000	520	ng/L		01/04/23 22:48	02/03/23 19:46	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		200	87	ng/L		01/04/23 22:48	02/03/23 19:46	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		200	43	ng/L		01/04/23 22:48	02/03/23 19:46	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		200	140	ng/L		01/04/23 22:48	02/03/23 19:46	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		200	85	ng/L		01/04/23 22:48	02/03/23 19:46	1
9CI-PF3ONS	ND		200	24	ng/L		01/04/23 22:48	02/03/23 19:46	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		400	150	ng/L		01/04/23 22:48	02/03/23 19:46	1
11CI-PF3OUdS	ND		200	32	ng/L		01/04/23 22:48	02/03/23 19:46	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		200	18	ng/L		01/04/23 22:48	02/03/23 19:46	1
3:3 FTCA	ND		200	43	ng/L		01/04/23 22:48	02/03/23 19:46	1
5:3 FTCA	ND		200	33	ng/L		01/04/23 22:48	02/03/23 19:46	1
7:3 FTCA	ND		200	55	ng/L		01/04/23 22:48	02/03/23 19:46	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		200	62	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		200	26	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		200	28	ng/L		01/04/23 22:48	02/03/23 19:46	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		200	29	ng/L		01/04/23 22:48	02/03/23 19:46	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	111		25 - 150	01/04/23 22:48	02/03/23 19:46	1
13C4 PFBA	107		25 - 150	01/04/23 22:48	02/03/23 19:46	1
13C5 PFPeA	97		25 - 150	01/04/23 22:48	02/03/23 19:46	1
13C2 PFHxA	113		25 - 150	01/04/23 22:48	02/03/23 19:46	1
13C4 PFHpA	103		25 - 150	01/04/23 22:48	02/03/23 19:46	1
13C4 PFOA	105		25 - 150	01/04/23 22:48	02/03/23 19:46	1
13C5 PFNA	110		25 - 150	01/04/23 22:48	02/03/23 19:46	1
13C2 PFDA	104		25 - 150	01/04/23 22:48	02/03/23 19:46	1
13C2 PFUnA	108		25 - 150	01/04/23 22:48	02/03/23 19:46	1
13C2 PFDoA	93		25 - 150	01/04/23 22:48	02/03/23 19:46	1
13C2 PFTeDA	95		25 - 150	01/04/23 22:48	02/03/23 19:46	1
13C3 PFBS	102		25 - 150	01/04/23 22:48	02/03/23 19:46	1
18O2 PFHxS	107		25 - 150	01/04/23 22:48	02/03/23 19:46	1
13C4 PFOS	99		25 - 150	01/04/23 22:48	02/03/23 19:46	1
d3-NMeFOSAA	107		25 - 150	01/04/23 22:48	02/03/23 19:46	1
d5-NEtFOSAA	107		25 - 150	01/04/23 22:48	02/03/23 19:46	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_9_M

Lab Sample ID: 320-95526-15

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 4:2 FTS	102		25 - 150	01/04/23 22:48	02/03/23 19:46	1
d-N-MeFOSA-M	97		25 - 150	01/04/23 22:48	02/03/23 19:46	1
d-N-EtFOSA-M	100		25 - 150	01/04/23 22:48	02/03/23 19:46	1
d7-N-MeFOSE-M	86		25 - 150	01/04/23 22:48	02/03/23 19:46	1
d9-N-EtFOSE-M	82		25 - 150	01/04/23 22:48	02/03/23 19:46	1
13C3 HFPO-DA	125		25 - 150	01/04/23 22:48	02/03/23 19:46	1
13C-6:2 FTCA	87		25 - 150	01/04/23 22:48	02/03/23 19:46	1
13C-8:2 FTCA	121		25 - 150	01/04/23 22:48	02/03/23 19:46	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	26000		1000	270	ng/L		01/04/23 22:48	02/09/23 14:43	5
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	13000		10000	1000	ng/L		01/04/23 22:48	02/09/23 14:43	5
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	1700	J	10000	1000	ng/L		01/04/23 22:48	02/09/23 14:43	5

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	129		25 - 150	01/04/23 22:48	02/09/23 14:43	5
13C2 PFDA	122		25 - 150	01/04/23 22:48	02/09/23 14:43	5
13C2 PFOA	124		25 - 150	01/04/23 22:48	02/09/23 14:43	5
13C2 PFDoA	110		25 - 150	01/04/23 22:48	02/09/23 14:43	5
13C2 PFTeDA	102		25 - 150	01/04/23 22:48	02/09/23 14:43	5
13C4 PFOS	118		25 - 150	01/04/23 22:48	02/09/23 14:43	5
13C2 6:2 FTS	114		25 - 150	01/04/23 22:48	02/09/23 14:43	5
13C2 8:2 FTS	112		25 - 150	01/04/23 22:48	02/09/23 14:43	5

Client Sample ID: WPAFB_tf_10_M

Lab Sample ID: 320-95526-16

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	640		200	35	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluoropentanoic acid (PFPeA)	790		200	49	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluorohexanoic acid (PFHxA)	1300		200	58	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluoroheptanoic acid (PFHpA)	950		200	25	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluorooctanoic acid (PFOA)	2700		200	85	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluorononanoic acid (PFNA)	93	J	200	27	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluorodecanoic acid (PFDA)	ND		200	31	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluoroundecanoic acid (PFUnA)	ND		200	110	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluorododecanoic acid (PFDoA)	ND		200	55	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluorotridecanoic acid (PFTTrDA)	ND		200	130	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluorotetradecanoic acid (PFTeA)	ND		200	29	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluorobutanesulfonic acid (PFBS)	320		200	20	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluoropentanesulfonic acid (PFPeS)	250		200	30	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluorohexanesulfonic acid (PFHxS)	1600		200	17	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluoroheptanesulfonic acid (PFHpS)	100	J	200	19	ng/L		01/04/23 22:48	02/09/23 14:32	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_10_M

Lab Sample ID: 320-95526-16

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	6700		200	54	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluorononanesulfonic acid (PFNS)	ND		200	16	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluorodecanesulfonic acid (PFDS)	ND		200	32	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluorododecanesulfonic acid (PFDoS)	ND		200	45	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluorooctanesulfonamide (FOSA)	ND		200	35	ng/L		01/04/23 22:48	02/09/23 14:32	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2000	310	ng/L		01/04/23 22:48	02/09/23 14:32	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2000	190	ng/L		01/04/23 22:48	02/09/23 14:32	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		2000	520	ng/L		01/04/23 22:48	02/09/23 14:32	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	16000		2000	200	ng/L		01/04/23 22:48	02/09/23 14:32	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	1800 J		2000	200	ng/L		01/04/23 22:48	02/09/23 14:32	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		200	87	ng/L		01/04/23 22:48	02/09/23 14:32	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		200	43	ng/L		01/04/23 22:48	02/09/23 14:32	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		200	140	ng/L		01/04/23 22:48	02/09/23 14:32	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		200	85	ng/L		01/04/23 22:48	02/09/23 14:32	1
9CI-PF3ONS	ND		200	24	ng/L		01/04/23 22:48	02/09/23 14:32	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		400	150	ng/L		01/04/23 22:48	02/09/23 14:32	1
11CI-PF3OUdS	ND		200	32	ng/L		01/04/23 22:48	02/09/23 14:32	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		200	18	ng/L		01/04/23 22:48	02/09/23 14:32	1
3:3 FTCA	ND		200	43	ng/L		01/04/23 22:48	02/09/23 14:32	1
5:3 FTCA	ND		200	33	ng/L		01/04/23 22:48	02/09/23 14:32	1
7:3 FTCA	ND		200	55	ng/L		01/04/23 22:48	02/09/23 14:32	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		200	62	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		200	26	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		200	28	ng/L		01/04/23 22:48	02/09/23 14:32	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		200	29	ng/L		01/04/23 22:48	02/09/23 14:32	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	137		25 - 150				01/04/23 22:48	02/09/23 14:32	1
13C4 PFBA	130		25 - 150				01/04/23 22:48	02/09/23 14:32	1
13C5 PFPeA	125		25 - 150				01/04/23 22:48	02/09/23 14:32	1
13C2 PFHxA	129		25 - 150				01/04/23 22:48	02/09/23 14:32	1
13C4 PFHpA	133		25 - 150				01/04/23 22:48	02/09/23 14:32	1
13C4 PFOA	126		25 - 150				01/04/23 22:48	02/09/23 14:32	1
13C5 PFNA	125		25 - 150				01/04/23 22:48	02/09/23 14:32	1
13C2 PFDA	120		25 - 150				01/04/23 22:48	02/09/23 14:32	1
13C2 PFUnA	131		25 - 150				01/04/23 22:48	02/09/23 14:32	1
13C2 PFDoA	115		25 - 150				01/04/23 22:48	02/09/23 14:32	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_10_M

Lab Sample ID: 320-95526-16

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C2 PFTeDA	100		25 - 150	01/04/23 22:48	02/09/23 14:32	1
13C3 PFBS	124		25 - 150	01/04/23 22:48	02/09/23 14:32	1
18O2 PFHxS	128		25 - 150	01/04/23 22:48	02/09/23 14:32	1
13C4 PFOS	122		25 - 150	01/04/23 22:48	02/09/23 14:32	1
d3-NMeFOSAA	114		25 - 150	01/04/23 22:48	02/09/23 14:32	1
d5-NEtFOSAA	121		25 - 150	01/04/23 22:48	02/09/23 14:32	1
13C2 4:2 FTS	112		25 - 150	01/04/23 22:48	02/09/23 14:32	1
13C2 6:2 FTS	112		25 - 150	01/04/23 22:48	02/09/23 14:32	1
13C2 8:2 FTS	106		25 - 150	01/04/23 22:48	02/09/23 14:32	1
d-N-MeFOSA-M	115		25 - 150	01/04/23 22:48	02/09/23 14:32	1
d-N-EtFOSA-M	114		25 - 150	01/04/23 22:48	02/09/23 14:32	1
d7-N-MeFOSE-M	120		25 - 150	01/04/23 22:48	02/09/23 14:32	1
d9-N-EtFOSE-M	117		25 - 150	01/04/23 22:48	02/09/23 14:32	1
13C3 HFPO-DA	132		25 - 150	01/04/23 22:48	02/09/23 14:32	1
13C-6:2 FTCA	121		25 - 150	01/04/23 22:48	02/09/23 14:32	1
13C-8:2 FTCA	131		25 - 150	01/04/23 22:48	02/09/23 14:32	1

Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Liquid

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
LCS 320-644557/2-A	Lab Control Sample	135	133	138	140	138	130	135	129
LCSD 320-644557/3-A	Lab Control Sample Dup	127	128	128	129	130	125	129	124
MB 320-644557/1-A	Method Blank	131	129	125	130	130	126	127	117

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
LCS 320-644557/2-A	Lab Control Sample	144	125	111	129	135	129	122	129
LCSD 320-644557/3-A	Lab Control Sample Dup	130	122	109	122	125	120	122	122
MB 320-644557/1-A	Method Blank	129	123	109	125	127	123	124	127

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	M242FTS (25-150)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFM (25-150)	NEFM (25-150)	HFPODA (25-150)
LCS 320-644557/2-A	Lab Control Sample	134	116	122	128	124	121	131	135
LCSD 320-644557/3-A	Lab Control Sample Dup	121	111	112	117	116	119	117	132
MB 320-644557/1-A	Method Blank	138	119	118	118	116	118	120	127

		Percent Isotope Dilution Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	MFHEA (25-150)	MFOEA (25-150)
LCS 320-644557/2-A	Lab Control Sample	131	130
LCSD 320-644557/3-A	Lab Control Sample Dup	120	122
MB 320-644557/1-A	Method Blank	129	125

Surrogate Legend

- PFOSA = 13C8 FOSA
- PFBA = 13C4 PFBA
- PFPeA = 13C5 PFPeA
- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDoA = 13C2 PFDoA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- M242FTS = 13C2 4:2 FTS
- M262FTS = 13C2 6:2 FTS
- M282FTS = 13C2 8:2 FTS
- dMeFOSA = d-N-MeFOSA-M
- dEtFOSA = d-N-EtFOSA-M
- NMFM = d7-N-MeFOSE-M
- NEFM = d9-N-EtFOSE-M
- HFPODA = 13C3 HFPO-DA
- MFHEA = 13C-6:2 FTCA
- MFOEA = 13C-8:2 FTCA

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Methanol Extract

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-95526-9	NAS_J_tf_8_M	135	136	129	134	135	127	129	125
320-95526-10	NAS_J_tf_10_M	133	129	129	130	130	126	125	122
320-95526-11	NAS_O_tf_10_M	126					107	94	114
320-95526-11 - DL	NAS_O_tf_10_M		130	128	134	155 *5+			
320-95526-12	NAS_O_tf_7_M	115	106	108	109	102	108	37	106
320-95526-12 - DL	NAS_O_tf_7_M								
320-95526-13	TAFB_tf_10_M	116	153 *5+	131	189 *5+	144	131	125	139
320-95526-14	TAFB_tf_7_M	128	131	131	148	126	122	99	102
320-95526-15	WPAFB_tf_9_M	111	107	97	113	103	105	110	104
320-95526-15 - DL	WPAFB_tf_9_M				129				122
320-95526-16	WPAFB_tf_10_M	137	130	125	129	133	126	125	120

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-95526-9	NAS_J_tf_8_M	136	125	117	127	130	121	116	127
320-95526-10	NAS_J_tf_10_M	129	122	113	125	128	119	110	119
320-95526-11	NAS_O_tf_10_M	124	106	112	108			124	109
320-95526-11 - DL	NAS_O_tf_10_M					131	128		
320-95526-12	NAS_O_tf_7_M	108	100	93	112	98	28	113	119
320-95526-12 - DL	NAS_O_tf_7_M						118		
320-95526-13	TAFB_tf_10_M	130	126	123	138	149	112	178 *5+	139
320-95526-14	TAFB_tf_7_M	124	103	111	131	123	104	78	112
320-95526-15	WPAFB_tf_9_M	108	93	95	102	107	99	107	107
320-95526-15 - DL	WPAFB_tf_9_M	124	110	102			118		
320-95526-16	WPAFB_tf_10_M	131	115	100	124	128	122	114	121

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	M242FTS (25-150)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFM (25-150)	NEFM (25-150)	HFPODA (25-150)
320-95526-9	NAS_J_tf_8_M	121	111	109	117	119	119	123	128
320-95526-10	NAS_J_tf_10_M	118	107	110	117	118	128	124	129
320-95526-11	NAS_O_tf_10_M	90			121	116	98	94	140
320-95526-11 - DL	NAS_O_tf_10_M		183 *5+	103					
320-95526-12	NAS_O_tf_7_M	125	99		109	108	93	90	131
320-95526-12 - DL	NAS_O_tf_7_M		77	69					
320-95526-13	TAFB_tf_10_M	109	6884 *5+	1417 *5+	109	109	148	125	148
320-95526-14	TAFB_tf_7_M	123	608 *5+	241 *5+	89	93	107	101	85
320-95526-15	WPAFB_tf_9_M	102			97	100	86	82	125
320-95526-15 - DL	WPAFB_tf_9_M		114	112					
320-95526-16	WPAFB_tf_10_M	112	112	106	115	114	120	117	132

		Percent Isotope Dilution Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	MFHEA (25-150)	MFOEA (25-150)
320-95526-9	NAS_J_tf_8_M	119	127
320-95526-10	NAS_J_tf_10_M	122	126
320-95526-11	NAS_O_tf_10_M	81	127
320-95526-11 - DL	NAS_O_tf_10_M		
320-95526-12	NAS_O_tf_7_M	91	115
320-95526-12 - DL	NAS_O_tf_7_M		
320-95526-13	TAFB_tf_10_M	195 *5+	196 *5+

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Methanol Extract

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)	
		MFHEA (25-150)	MFOEA (25-150)
320-95526-14	TAFB_tf_7_M	159 *5+	224 *5+
320-95526-15	WPAFB_tf_9_M	87	121
320-95526-15 - DL	WPAFB_tf_9_M		
320-95526-16	WPAFB_tf_10_M	121	131

Surrogate Legend

PFOSA = 13C8 FOSA
 PFBA = 13C4 PFBA
 PFPeA = 13C5 PFPeA
 PFHxA = 13C2 PFHxA
 C4PFHA = 13C4 PFHpA
 PFOA = 13C4 PFOA
 PFNA = 13C5 PFNA
 PFDA = 13C2 PFDA
 PFUnA = 13C2 PFUnA
 PFDaA = 13C2 PFDaA
 PFTDA = 13C2 PFTeDA
 C3PFBS = 13C3 PFBS
 PFHxS = 18O2 PFHxS
 PFOS = 13C4 PFOS
 d3NMFOS = d3-NMeFOSAA
 d5NEFOS = d5-NEtFOSAA
 M242FTS = 13C2 4:2 FTS
 M262FTS = 13C2 6:2 FTS
 M282FTS = 13C2 8:2 FTS
 dMeFOSA = d-N-MeFOSA-M
 dEtFOSA = d-N-EtFOSA-M
 NMFM = d7-N-MeFOSE-M
 NEFM = d9-N-EtFOSE-M
 HFPODA = 13C3 HFPO-DA
 MFHEA = 13C-6:2 FTCA
 MFOEA = 13C-8:2 FTCA

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Pre-Treatment

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-95526-1	NAS_J_tf_8	95	86	91	93	106	92	101	101
320-95526-1 - DL	NAS_J_tf_8		115		112				
320-95526-2	NAS_J_tf_10	99	92	102	98	114	102	103	108
320-95526-3	NAS_O_tf_10	96	96	97	90	108	100	95	99
320-95526-4	NAS_O_tf_7	99	99	105	100	109	97	101	103
320-95526-5	TAFB_tf_10	103	98	108	235 *5+	117	104	104	111
320-95526-6	TAFB_tf_7	102	89	98	236 *5+	94	105	90	97
320-95526-7 - DL	WPAFB_tf_9								
320-95526-7	WPAFB_tf_9	106	111	116	114	123	110	102	116
320-95526-8	WPAFB_tf_10	97	89	88	93	108	99	92	94
LCS 320-644488/2-A	Lab Control Sample	93	92	98	93	104	97	93	99
LCS 320-644488/3-A	Lab Control Sample Dup	99	97	101	97	113	97	100	105

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Water

Prep Type: Pre-Treatment

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
MB 320-644488/1-A	Method Blank	95	99	101	96	114	105	100	103

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-95526-1	NAS_J_tf_8	101	94	96	104	102	92	96	100
320-95526-1 - DL	NAS_J_tf_8								
320-95526-2	NAS_J_tf_10	112	103	106	104	108	93	106	111
320-95526-3	NAS_O_tf_10	107	92	103	101	99	92	97	105
320-95526-4	NAS_O_tf_7	108	100	104	107	105	103	107	109
320-95526-5	TAFB_tf_10	103	102	100	103	115	89	72	96
320-95526-6	TAFB_tf_7	103	100	105	91	112	74	101	75
320-95526-7 - DL	WPAFB_tf_9						98		
320-95526-7	WPAFB_tf_9	116	106	106	116	114	97	90	100
320-95526-8	WPAFB_tf_10	110	98	95	100	96	92	105	111
LCS 320-644488/2-A	Lab Control Sample	104	96	97	99	96	91	94	95
LCSD 320-644488/3-A	Lab Control Sample Dup	109	98	102	106	103	99	104	103
MB 320-644488/1-A	Method Blank	105	94	101	103	108	99	100	107

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	M242FTS (25-150)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFm (25-150)	NEFM (25-150)	HFPODA (25-150)
320-95526-1	NAS_J_tf_8	113	116	133	77	80	90	88	111
320-95526-1 - DL	NAS_J_tf_8								
320-95526-2	NAS_J_tf_10	122	121	126	83	83	97	92	115
320-95526-3	NAS_O_tf_10	113	115	145	83	81	88	88	116
320-95526-4	NAS_O_tf_7	133	119	158 *5+	86	88	92	94	120
320-95526-5	TAFB_tf_10	16 *5-	620 *5+	145	82	86	93	122	103
320-95526-6	TAFB_tf_7	97	167 *5+	97	129	90	114	86	91
320-95526-7 - DL	WPAFB_tf_9								
320-95526-7	WPAFB_tf_9	91	92	112	96	87	103	103	104
320-95526-8	WPAFB_tf_10	115	120	176 *5+	82	72	87	89	112
LCS 320-644488/2-A	Lab Control Sample	123	117	122	76	76	87	83	115
LCSD 320-644488/3-A	Lab Control Sample Dup	116	115	147	81	84	91	97	114
MB 320-644488/1-A	Method Blank	124	114	123	84	80	95	93	116

		Percent Isotope Dilution Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	MFHEA (25-150)	MFOEA (25-150)
320-95526-1	NAS_J_tf_8	97	116
320-95526-1 - DL	NAS_J_tf_8		
320-95526-2	NAS_J_tf_10	127	114
320-95526-3	NAS_O_tf_10	110	109
320-95526-4	NAS_O_tf_7	113	118
320-95526-5	TAFB_tf_10	155 *5+	89
320-95526-6	TAFB_tf_7	95	77
320-95526-7 - DL	WPAFB_tf_9		
320-95526-7	WPAFB_tf_9	92	94
320-95526-8	WPAFB_tf_10	94	90
LCS 320-644488/2-A	Lab Control Sample	100	108
LCSD 320-644488/3-A	Lab Control Sample Dup	108	105
MB 320-644488/1-A	Method Blank	106	111

Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Surrogate Legend

PFOSA = 13C8 FOSA
 PFBA = 13C4 PFBA
 PFPeA = 13C5 PFPeA
 PFHxA = 13C2 PFHxA
 C4PFHA = 13C4 PFHpA
 PFOA = 13C4 PFOA
 PFNA = 13C5 PFNA
 PFDA = 13C2 PFDA
 PFUnA = 13C2 PFUnA
 PFDaA = 13C2 PFDaA
 PFTDA = 13C2 PFTeDA
 C3PFBS = 13C3 PFBS
 PFHxS = 18O2 PFHxS
 PFOS = 13C4 PFOS
 d3NMFOS = d3-NMeFOSAA
 d5NEFOS = d5-NEtFOSAA
 M242FTS = 13C2 4:2 FTS
 M262FTS = 13C2 6:2 FTS
 M282FTS = 13C2 8:2 FTS
 dMeFOSA = d-N-MeFOSA-M
 dEtFOSA = d-N-EtFOSA-M
 NMFM = d7-N-MeFOSE-M
 NEFM = d9-N-EtFOSE-M
 HFPODA = 13C3 HFPO-DA
 MFHEA = 13C-6:2 FTCA
 MFOEA = 13C-8:2 FTCA

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Post-Treatment

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-95526-1	NAS_J_tf_8	93	79	85		106	95	93	94
320-95526-1 - DL	NAS_J_tf_8		102		112				
320-95526-2	NAS_J_tf_10	110	77	100		112	104	110	112
320-95526-2 - DL	NAS_J_tf_10				112				
320-95526-3	NAS_O_tf_10	97	93	100	101	105	107	104	105
320-95526-4	NAS_O_tf_7	95	95	106	100	115	105	100	105
320-95526-5	TAFB_tf_10	120	25	26			99	85	132
320-95526-5 - DL	TAFB_tf_10		103	107	261 *5+	115	107		
320-95526-6	TAFB_tf_7	162 *5+	27	31					165 *5+
320-95526-6 - DL	TAFB_tf_7		79	91	238 *5+	99	99	90	
320-95526-7	WPAFB_tf_9	101	96	104	102	112	109	104	103
320-95526-8	WPAFB_tf_10	110	104	117	115	125	112	110	114
LCS 320-644482/2-A	Lab Control Sample	107	64	102	101	108	104	104	106
LCS 320-644482/3-A	Lab Control Sample Dup	99	92	93	102	113	99	103	99
MB 320-644482/1-A	Method Blank	115	60	122	121	129	115	113	119
MB 320-646328/1-A	Method Blank	89	96	104	99	104	99	97	92

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDaA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-95526-1	NAS_J_tf_8	100	95	98	97	99	89	102	107
320-95526-1 - DL	NAS_J_tf_8								
320-95526-2	NAS_J_tf_10	121	111	113	105	106	100	114	121

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Water

Prep Type: Post-Treatment

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		PfUnA (25-150)	PfDoA (25-150)	PfTDA (25-150)	C3PFBS (25-150)	PfHxS (25-150)	PfOS (25-150)	d3NMfOS (25-150)	d5NEfOS (25-150)
320-95526-2 - DL	NAS_J_tf_10								
320-95526-3	NAS_O_tf_10	109	98	103	96	100	94	101	112
320-95526-4	NAS_O_tf_7	113	101	99	101	105	94	104	113
320-95526-5	TAFB_tf_10	140	127	140			76	140	144
320-95526-5 - DL	TAFB_tf_10				114	127	98		
320-95526-6	TAFB_tf_7	186 *5+	170 *5+	173 *5+			41	178 *5+	192 *5+
320-95526-6 - DL	TAFB_tf_7				107	97	85		
320-95526-7	WPAFB_tf_9	109	94	103	115	119	101	97	104
320-95526-8	WPAFB_tf_10	119	106	108	116	120	104	95	101
LCS 320-644482/2-A	Lab Control Sample	109	95	95	103	110	101	111	116
LCSD 320-644482/3-A	Lab Control Sample Dup	108	99	102	108	104	98	102	111
MB 320-644482/1-A	Method Blank	117	111	105	120	116	107	97	106
MB 320-646328/1-A	Method Blank	95	79	91	107	111	100	74	82

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		M242FTS (0-10)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFM (25-150)	NEFM (25-150)	HFPODA (25-150)
320-95526-1	NAS_J_tf_8	0	130	143	75	69	82	85	99
320-95526-1 - DL	NAS_J_tf_8								
320-95526-2	NAS_J_tf_10	0	129	163 *5+	94	89	99	95	120
320-95526-2 - DL	NAS_J_tf_10								
320-95526-3	NAS_O_tf_10	0	137	141	77	72	86	86	114
320-95526-4	NAS_O_tf_7	0	137	151 *5+	80	75	90	95	118
320-95526-5	TAFB_tf_10	0	122	182 *5+	108	100	124	122	139
320-95526-5 - DL	TAFB_tf_10								
320-95526-6	TAFB_tf_7	0	108	240 *5+	138	134	152 *5+	159 *5+	181 *5+
320-95526-6 - DL	TAFB_tf_7								
320-95526-7	WPAFB_tf_9	0	108	121	55	48	43	36	103
320-95526-8	WPAFB_tf_10	0	105	107	102	95	105	107	100
LCS 320-644482/2-A	Lab Control Sample	0	146	152 *5+	89	83	89	88	108
LCSD 320-644482/3-A	Lab Control Sample Dup	0	135	147	79	75	88	93	112
MB 320-644482/1-A	Method Blank	0	113	125	103	96	100	99	110
MB 320-646328/1-A	Method Blank	0	98	109	46	39	41	34	101

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)	
		MFHEA (25-150)	MFOEA (25-150)
320-95526-1	NAS_J_tf_8	104	108
320-95526-1 - DL	NAS_J_tf_8		
320-95526-2	NAS_J_tf_10	117	123
320-95526-2 - DL	NAS_J_tf_10		
320-95526-3	NAS_O_tf_10	111	126
320-95526-4	NAS_O_tf_7	98	108
320-95526-5	TAFB_tf_10	142	132
320-95526-5 - DL	TAFB_tf_10		
320-95526-6	TAFB_tf_7	160 *5+	183 *5+
320-95526-6 - DL	TAFB_tf_7		
320-95526-7	WPAFB_tf_9	99	108
320-95526-8	WPAFB_tf_10	95	98
LCS 320-644482/2-A	Lab Control Sample	104	117
LCSD 320-644482/3-A	Lab Control Sample Dup	103	119

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Water

Prep Type: Post-Treatment

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	MFHEA (25-150)	MFOEA (25-150)
MB 320-644482/1-A	Method Blank	97	102
MB 320-646328/1-A	Method Blank	94	77

Surrogate Legend

- PFOSA = 13C8 FOSA
- PFBA = 13C4 PFBA
- PFPeA = 13C5 PFPeA
- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDoA = 13C2 PFDoA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- M242FTS = 13C2 4:2 FTS
- M262FTS = 13C2 6:2 FTS
- M282FTS = 13C2 8:2 FTS
- dMeFOSA = d-N-MeFOSA-M
- dEtFOSA = d-N-EtFOSA-M
- NMFM = d7-N-MeFOSE-M
- NEFM = d9-N-EtFOSE-M
- HFPODA = 13C3 HFPO-DA
- MFHEA = 13C-6:2 FTCA
- MFOEA = 13C-8:2 FTCA

QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 320-646784/3
Matrix: Water
Analysis Batch: 646784

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.50	0.053	mg/L			01/13/23 12:51	1

Lab Sample ID: LCS 320-646784/4
Matrix: Water
Analysis Batch: 646784

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	7.50	7.59		mg/L		101	90 - 110

Lab Sample ID: LCSD 320-646784/5
Matrix: Water
Analysis Batch: 646784

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Fluoride	7.50	7.58		mg/L		101	90 - 110	0	10

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-644557/1-A
Matrix: Liquid
Analysis Batch: 653238

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 644557

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		200	35	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluoropentanoic acid (PFPeA)	ND		200	49	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluorohexanoic acid (PFHxA)	ND		200	58	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluoroheptanoic acid (PFHpA)	ND		200	25	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluorooctanoic acid (PFOA)	ND		200	85	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluorononanoic acid (PFNA)	ND		200	27	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluorodecanoic acid (PFDA)	ND		200	31	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluoroundecanoic acid (PFUnA)	ND		200	110	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluorododecanoic acid (PFDoA)	ND		200	55	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluorotridecanoic acid (PFTrDA)	ND		200	130	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluorotetradecanoic acid (PFTeA)	ND		200	29	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluorobutanesulfonic acid (PFBS)	ND		200	20	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluoropentanesulfonic acid (PFPeS)	ND		200	30	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluorohexanesulfonic acid (PFHxS)	ND		200	17	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		200	19	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluorooctanesulfonic acid (PFOS)	ND		200	54	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluorononanesulfonic acid (PFNS)	ND		200	16	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluorodecanesulfonic acid (PFDS)	ND		200	32	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluorododecanesulfonic acid (PFDoS)	ND		200	45	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluorooctanesulfonamide (FOSA)	ND		200	35	ng/L		01/04/23 22:48	02/09/23 13:42	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2000	310	ng/L		01/04/23 22:48	02/09/23 13:42	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2000	190	ng/L		01/04/23 22:48	02/09/23 13:42	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-644557/1-A
Matrix: Liquid
Analysis Batch: 653238

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 644557

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		2000	520	ng/L		01/04/23 22:48	02/09/23 13:42	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		2000	200	ng/L		01/04/23 22:48	02/09/23 13:42	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		2000	200	ng/L		01/04/23 22:48	02/09/23 13:42	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		200	87	ng/L		01/04/23 22:48	02/09/23 13:42	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		200	43	ng/L		01/04/23 22:48	02/09/23 13:42	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		200	140	ng/L		01/04/23 22:48	02/09/23 13:42	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		200	85	ng/L		01/04/23 22:48	02/09/23 13:42	1
9CI-PF3ONS	ND		200	24	ng/L		01/04/23 22:48	02/09/23 13:42	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		400	150	ng/L		01/04/23 22:48	02/09/23 13:42	1
11CI-PF3OUdS	ND		200	32	ng/L		01/04/23 22:48	02/09/23 13:42	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		200	18	ng/L		01/04/23 22:48	02/09/23 13:42	1
3:3 FTCA	ND		200	43	ng/L		01/04/23 22:48	02/09/23 13:42	1
5:3 FTCA	ND		200	33	ng/L		01/04/23 22:48	02/09/23 13:42	1
7:3 FTCA	ND		200	55	ng/L		01/04/23 22:48	02/09/23 13:42	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		200	62	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		200	26	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		200	28	ng/L		01/04/23 22:48	02/09/23 13:42	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		200	29	ng/L		01/04/23 22:48	02/09/23 13:42	1

Isotope Dilution	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C8 FOSA	131		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C4 PFBA	129		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C5 PFPeA	125		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C2 PFHxA	130		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C4 PFHpA	130		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C4 PFOA	126		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C5 PFNA	127		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C2 PFDA	117		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C2 PFUnA	129		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C2 PFDoA	123		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C2 PFTeDA	109		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C3 PFBS	125		25 - 150	01/04/23 22:48	02/09/23 13:42	1
18O2 PFHxS	127		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C4 PFOS	123		25 - 150	01/04/23 22:48	02/09/23 13:42	1
d3-NMeFOSAA	124		25 - 150	01/04/23 22:48	02/09/23 13:42	1
d5-NEtFOSAA	127		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C2 4:2 FTS	138		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C2 6:2 FTS	119		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C2 8:2 FTS	118		25 - 150	01/04/23 22:48	02/09/23 13:42	1

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QC Sample Results

Client: Enspered Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-644557/1-A
Matrix: Liquid
Analysis Batch: 653238

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 644557

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
d-N-MeFOSA-M	118		25 - 150	01/04/23 22:48	02/09/23 13:42	1
d-N-EtFOSA-M	116		25 - 150	01/04/23 22:48	02/09/23 13:42	1
d7-N-MeFOSE-M	118		25 - 150	01/04/23 22:48	02/09/23 13:42	1
d9-N-EtFOSE-M	120		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C3 HFPO-DA	127		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C-6:2 FTCA	129		25 - 150	01/04/23 22:48	02/09/23 13:42	1
13C-8:2 FTCA	125		25 - 150	01/04/23 22:48	02/09/23 13:42	1

Lab Sample ID: LCS 320-644557/2-A
Matrix: Liquid
Analysis Batch: 653238

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 644557

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec
							Limits
Perfluorobutanoic acid (PFBA)	4000	4050		ng/L		101	70 - 130
Perfluoropentanoic acid (PFPeA)	4000	3930		ng/L		98	66 - 126
Perfluorohexanoic acid (PFHxA)	4000	3930		ng/L		98	66 - 126
Perfluoroheptanoic acid (PFHpA)	4000	3980		ng/L		100	66 - 126
Perfluorooctanoic acid (PFOA)	4000	4070		ng/L		102	64 - 124
Perfluorononanoic acid (PFNA)	4000	4070		ng/L		102	68 - 128
Perfluorodecanoic acid (PFDA)	4000	3900		ng/L		98	69 - 129
Perfluoroundecanoic acid (PFUnA)	4000	3770		ng/L		94	60 - 120
Perfluorododecanoic acid (PFDoA)	4000	4060		ng/L		102	71 - 131
Perfluorotridecanoic acid (PFTrDA)	4000	4110		ng/L		103	72 - 132
Perfluorotetradecanoic acid (PFTeA)	4000	3850		ng/L		96	68 - 128
Perfluorobutanesulfonic acid (PFBS)	3550	3990		ng/L		112	73 - 133
Perfluoropentanesulfonic acid (PFPeS)	3760	4000		ng/L		106	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	3650	3450		ng/L		95	63 - 123
Perfluoroheptanesulfonic acid (PFHpS)	3820	4080		ng/L		107	68 - 128
Perfluorooctanesulfonic acid (PFOS)	3720	3600		ng/L		97	67 - 127
Perfluorononanesulfonic acid (PFNS)	3850	4120		ng/L		107	70 - 130
Perfluorodecanesulfonic acid (PFDS)	3860	3850		ng/L		100	68 - 128
Perfluorododecanesulfonic acid (PFDoS)	3880	3610		ng/L		93	70 - 130
Perfluorooctanesulfonamide (FOSA)	4000	4320		ng/L		108	70 - 130
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	4000	4010		ng/L		100	67 - 127
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	4000	3890		ng/L		97	65 - 125
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	3750	3600		ng/L		96	70 - 130

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-644557/2-A
Matrix: Liquid
Analysis Batch: 653238

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 644557

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	3810	4110		ng/L		108	66 - 126
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	3840	3620		ng/L		94	67 - 127
N-ethylperfluorooctane sulfonamide (NEtFOSA)	4000	4130		ng/L		103	60 - 140
N-methylperfluorooctane sulfonamide (NMeFOSA)	4000	4100		ng/L		102	60 - 140
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	4000	3940		ng/L		98	70 - 130
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	4000	3730		ng/L		93	70 - 130
9CI-PF3ONS	3740	3940		ng/L		106	70 - 130
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	4000	4170		ng/L		104	70 - 130
11CI-PF3OUdS	3780	4060		ng/L		107	70 - 130
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	3780	4160		ng/L		110	70 - 130
3:3 FTCA	4000	3780		ng/L		95	70 - 130
5:3 FTCA	4000	4680		ng/L		117	70 - 130
7:3 FTCA	4000	4160		ng/L		104	70 - 130
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	4000	3900		ng/L		98	70 - 130
Perfluoro-4-methoxybutanoic acid (PFMBA)	4000	4020		ng/L		101	70 - 130
Perfluoro-3-methoxypropanoic acid (PFMPA)	4000	3820		ng/L		96	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	3570	4170		ng/L		117	70 - 130

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C8 FOSA	135		25 - 150
13C4 PFBA	133		25 - 150
13C5 PFPeA	138		25 - 150
13C2 PFHxA	140		25 - 150
13C4 PFHpA	138		25 - 150
13C4 PFOA	130		25 - 150
13C5 PFNA	135		25 - 150
13C2 PFDA	129		25 - 150
13C2 PFUnA	144		25 - 150
13C2 PFDoA	125		25 - 150
13C2 PFTeDA	111		25 - 150
13C3 PFBS	129		25 - 150
18O2 PFHxS	135		25 - 150
13C4 PFOS	129		25 - 150
d3-NMeFOSAA	122		25 - 150
d5-NEtFOSAA	129		25 - 150
13C2 4:2 FTS	134		25 - 150
13C2 6:2 FTS	116		25 - 150
13C2 8:2 FTS	122		25 - 150
d-N-MeFOSA-M	128		25 - 150
d-N-EtFOSA-M	124		25 - 150

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-644557/2-A
Matrix: Liquid
Analysis Batch: 653238

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 644557

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
d7-N-MeFOSE-M	121		25 - 150
d9-N-EtFOSE-M	131		25 - 150
13C3 HFPO-DA	135		25 - 150
13C-6:2 FTCA	131		25 - 150
13C-8:2 FTCA	130		25 - 150

Lab Sample ID: LCSD 320-644557/3-A
Matrix: Liquid
Analysis Batch: 653238

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 644557

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	4000	3980		ng/L		99	70 - 130	2	30
Perfluoropentanoic acid (PFPeA)	4000	3910		ng/L		98	66 - 126	1	30
Perfluorohexanoic acid (PFHxA)	4000	3980		ng/L		100	66 - 126	1	30
Perfluoroheptanoic acid (PFHpA)	4000	3970		ng/L		99	66 - 126	0	30
Perfluorooctanoic acid (PFOA)	4000	4200		ng/L		105	64 - 124	3	30
Perfluorononanoic acid (PFNA)	4000	4210		ng/L		105	68 - 128	3	30
Perfluorodecanoic acid (PFDA)	4000	4010		ng/L		100	69 - 129	3	30
Perfluoroundecanoic acid (PFUnA)	4000	3930		ng/L		98	60 - 120	4	30
Perfluorododecanoic acid (PFDoA)	4000	4250		ng/L		106	71 - 131	4	30
Perfluorotridecanoic acid (PFTrDA)	4000	4250		ng/L		106	72 - 132	3	30
Perfluorotetradecanoic acid (PFTeA)	4000	4000		ng/L		100	68 - 128	4	30
Perfluorobutanesulfonic acid (PFBS)	3550	3970		ng/L		112	73 - 133	1	30
Perfluoropentanesulfonic acid (PFPeS)	3760	4170		ng/L		111	70 - 130	4	30
Perfluorohexanesulfonic acid (PFHxS)	3650	3630		ng/L		100	63 - 123	5	30
Perfluoroheptanesulfonic acid (PFHpS)	3820	4320		ng/L		113	68 - 128	6	30
Perfluorooctanesulfonic acid (PFOS)	3720	3930		ng/L		106	67 - 127	9	30
Perfluorononanesulfonic acid (PFNS)	3850	4050		ng/L		105	70 - 130	2	30
Perfluorodecanesulfonic acid (PFDS)	3860	4030		ng/L		105	68 - 128	5	30
Perfluorododecanesulfonic acid (PFDoS)	3880	3930		ng/L		101	70 - 130	8	30
Perfluorooctanesulfonamide (FOSA)	4000	4110		ng/L		103	70 - 130	5	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	4000	3940		ng/L		98	67 - 127	2	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	4000	3750		ng/L		94	65 - 125	4	30
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	3750	3560		ng/L		95	70 - 130	1	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	3810	3840		ng/L		101	66 - 126	7	30

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-644557/3-A
Matrix: Liquid
Analysis Batch: 653238

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 644557

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	3840	3910		ng/L		102	67 - 127	8	30
N-ethylperfluorooctane sulfonamide (NEtFOSA)	4000	4190		ng/L		105	60 - 140	1	30
N-methylperfluorooctane sulfonamide (NMeFOSA)	4000	4300		ng/L		107	60 - 140	5	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	4000	3950		ng/L		99	70 - 130	0	30
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	4000	4000		ng/L		100	70 - 130	7	30
9Cl-PF3ONS	3740	4170		ng/L		112	70 - 130	6	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	4000	3910		ng/L		98	70 - 130	7	30
11Cl-PF3OUdS	3780	4180		ng/L		111	70 - 130	3	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	3780	4410		ng/L		117	70 - 130	6	30
3:3 FTCA	4000	3820		ng/L		96	70 - 130	1	30
5:3 FTCA	4000	4790		ng/L		120	70 - 130	2	30
7:3 FTCA	4000	4080		ng/L		102	70 - 130	2	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	4000	4220		ng/L		105	70 - 130	8	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	4000	3950		ng/L		99	70 - 130	2	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	4000	4090		ng/L		102	70 - 130	7	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	3570	4320		ng/L		121	70 - 130	4	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	LCSD Limits
13C8 FOSA	127		25 - 150
13C4 PFBA	128		25 - 150
13C5 PFPeA	128		25 - 150
13C2 PFHxA	129		25 - 150
13C4 PFHpA	130		25 - 150
13C4 PFOA	125		25 - 150
13C5 PFNA	129		25 - 150
13C2 PFDA	124		25 - 150
13C2 PFUnA	130		25 - 150
13C2 PFDoA	122		25 - 150
13C2 PFTeDA	109		25 - 150
13C3 PFBS	122		25 - 150
18O2 PFHxS	125		25 - 150
13C4 PFOS	120		25 - 150
d3-NMeFOSAA	122		25 - 150
d5-NEtFOSAA	122		25 - 150
13C2 4:2 FTS	121		25 - 150
13C2 6:2 FTS	111		25 - 150
13C2 8:2 FTS	112		25 - 150
d-N-MeFOSA-M	117		25 - 150
d-N-EtFOSA-M	116		25 - 150
d7-N-MeFOSE-M	119		25 - 150

QC Sample Results

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-644557/3-A
Matrix: Liquid
Analysis Batch: 653238

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 644557

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
d9-N-EtFOSE-M	117		25 - 150
13C3 HFPO-DA	132		25 - 150
13C-6:2 FTCA	120		25 - 150
13C-8:2 FTCA	122		25 - 150

Lab Sample ID: MB 320-644488/1-A
Matrix: Water
Analysis Batch: 649396

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 644488

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorobutanoic acid (PFBA)	ND		13	6.0	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluoropentanoic acid (PFPeA)	ND		5.0	1.2	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluorohexanoic acid (PFHxA)	ND		5.0	1.4	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluoroheptanoic acid (PFHpA)	ND		5.0	0.63	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluorooctanoic acid (PFOA)	ND		5.0	2.1	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluorononanoic acid (PFNA)	ND		5.0	0.68	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluorodecanoic acid (PFDA)	ND		5.0	0.78	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0	2.8	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluorododecanoic acid (PFDoA)	ND		5.0	1.4	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluorotridecanoic acid (PFTTrDA)	ND		5.0	3.2	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0	0.73	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluorobutanesulfonic acid (PFBS)	ND		5.0	0.50	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0	0.75	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluorohexanesulfonic acid (PFHxS)	ND		5.0	0.43	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0	0.48	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluorooctanesulfonic acid (PFOS)	ND		5.0	0.80	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0	0.40	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0	1.4	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0	2.4	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0	0.88	ng/L		01/04/23 14:13	01/25/23 15:07	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13	3.0	ng/L		01/04/23 14:13	01/25/23 15:07	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13	3.3	ng/L		01/04/23 14:13	01/25/23 15:07	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0	0.60	ng/L		01/04/23 14:13	01/25/23 15:07	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13	6.3	ng/L		01/04/23 14:13	01/25/23 15:07	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0	1.2	ng/L		01/04/23 14:13	01/25/23 15:07	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0	2.2	ng/L		01/04/23 14:13	01/25/23 15:07	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0	1.1	ng/L		01/04/23 14:13	01/25/23 15:07	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10	3.5	ng/L		01/04/23 14:13	01/25/23 15:07	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0	2.2	ng/L		01/04/23 14:13	01/25/23 15:07	1
9CI-PF3ONS	ND		5.0	0.60	ng/L		01/04/23 14:13	01/25/23 15:07	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-644488/1-A
Matrix: Water
Analysis Batch: 649396

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 644488

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10	3.8	ng/L		01/04/23 14:13	01/25/23 15:07	1
11Cl-PF3OUdS	ND		5.0	0.80	ng/L		01/04/23 14:13	01/25/23 15:07	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0	1.0	ng/L		01/04/23 14:13	01/25/23 15:07	1
3:3 FTCA	ND		5.0	1.1	ng/L		01/04/23 14:13	01/25/23 15:07	1
5:3 FTCA	ND		5.0	0.80	ng/L		01/04/23 14:13	01/25/23 15:07	1
7:3 FTCA	ND		5.0	1.4	ng/L		01/04/23 14:13	01/25/23 15:07	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0	1.6	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		5.0	0.70	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0	0.70	ng/L		01/04/23 14:13	01/25/23 15:07	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		5.0	0.70	ng/L		01/04/23 14:13	01/25/23 15:07	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	95		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C4 PFBA	99		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C5 PFPeA	101		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C2 PFHxA	96		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C4 PFHpA	114		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C4 PFOA	105		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C5 PFNA	100		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C2 PFDA	103		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C2 PFUnA	105		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C2 PFDoA	94		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C2 PFTeDA	101		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C3 PFBS	103		25 - 150	01/04/23 14:13	01/25/23 15:07	1
18O2 PFHxS	108		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C4 PFOS	99		25 - 150	01/04/23 14:13	01/25/23 15:07	1
d3-NMeFOSAA	100		25 - 150	01/04/23 14:13	01/25/23 15:07	1
d5-NEtFOSAA	107		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C2 4:2 FTS	124		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C2 6:2 FTS	114		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C2 8:2 FTS	123		25 - 150	01/04/23 14:13	01/25/23 15:07	1
d-N-MeFOSA-M	84		25 - 150	01/04/23 14:13	01/25/23 15:07	1
d-N-EtFOSA-M	80		25 - 150	01/04/23 14:13	01/25/23 15:07	1
d7-N-MeFOSE-M	95		25 - 150	01/04/23 14:13	01/25/23 15:07	1
d9-N-EtFOSE-M	93		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C3 HFPO-DA	116		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C-6:2 FTCA	106		25 - 150	01/04/23 14:13	01/25/23 15:07	1
13C-8:2 FTCA	111		25 - 150	01/04/23 14:13	01/25/23 15:07	1

QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-644488/2-A
Matrix: Water
Analysis Batch: 649396

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 644488

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	100	106		ng/L		106	76 - 136
Perfluoropentanoic acid (PFPeA)	100	102		ng/L		102	71 - 131
Perfluorohexanoic acid (PFHxA)	100	98.8		ng/L		99	73 - 133
Perfluoroheptanoic acid (PFHpA)	100	98.9		ng/L		99	72 - 132
Perfluorooctanoic acid (PFOA)	100	109		ng/L		109	70 - 130
Perfluorononanoic acid (PFNA)	100	111		ng/L		111	75 - 135
Perfluorodecanoic acid (PFDA)	100	98.8		ng/L		99	76 - 136
Perfluoroundecanoic acid (PFUnA)	100	102		ng/L		102	68 - 128
Perfluorododecanoic acid (PFDoA)	100	108		ng/L		108	71 - 131
Perfluorotridecanoic acid (PFTTrDA)	100	99.5		ng/L		100	71 - 131
Perfluorotetradecanoic acid (PFTeA)	100	95.1		ng/L		95	70 - 130
Perfluorobutanesulfonic acid (PFBS)	88.8	90.2		ng/L		102	67 - 127
Perfluoropentanesulfonic acid (PFPeS)	94.0	93.4		ng/L		99	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	91.2	88.1		ng/L		97	59 - 119
Perfluoroheptanesulfonic acid (PFHpS)	95.4	109		ng/L		114	76 - 136
Perfluorooctanesulfonic acid (PFOS)	93.0	99.4		ng/L		107	70 - 130
Perfluorononanesulfonic acid (PFNS)	96.2	100		ng/L		104	75 - 135
Perfluorodecanesulfonic acid (PFDS)	96.4	108		ng/L		112	71 - 131
Perfluorododecanesulfonic acid (PFDoS)	97.0	90.6		ng/L		93	67 - 127
Perfluorooctanesulfonamide (FOSA)	100	94.4		ng/L		94	73 - 133
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	112		ng/L		112	76 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	103		ng/L		103	76 - 136
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	112		ng/L		120	79 - 139
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	90.9		ng/L		95	59 - 175
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	98.0		ng/L		102	75 - 135
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	68.9	*-	ng/L		69	78 - 138
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	71.5		ng/L		72	67 - 154
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	77.0		ng/L		77	70 - 130
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	75.6		ng/L		76	71 - 131
9CI-PF3ONS	93.4	97.5		ng/L		104	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	94.6		ng/L		95	51 - 173

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-644488/2-A
Matrix: Water
Analysis Batch: 649396

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 644488

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
11CI-PF3OUdS	94.4	101		ng/L		107	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	103		ng/L		109	79 - 139
3:3 FTCA	100	83.7		ng/L		84	70 - 130
5:3 FTCA	100	103		ng/L		103	70 - 130
7:3 FTCA	100	87.9		ng/L		88	70 - 130
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	111		ng/L		111	70 - 130
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	96.1		ng/L		96	70 - 130
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	97.5		ng/L		98	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	89.2	87.5		ng/L		98	70 - 130

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C8 FOSA	93		25 - 150
13C4 PFBA	92		25 - 150
13C5 PFPeA	98		25 - 150
13C2 PFHxA	93		25 - 150
13C4 PFHpA	104		25 - 150
13C4 PFOA	97		25 - 150
13C5 PFNA	93		25 - 150
13C2 PFDA	99		25 - 150
13C2 PFUnA	104		25 - 150
13C2 PFDoA	96		25 - 150
13C2 PFTeDA	97		25 - 150
13C3 PFBS	99		25 - 150
18O2 PFHxS	96		25 - 150
13C4 PFOS	91		25 - 150
d3-NMeFOSAA	94		25 - 150
d5-NEtFOSAA	95		25 - 150
13C2 4:2 FTS	123		25 - 150
13C2 6:2 FTS	117		25 - 150
13C2 8:2 FTS	122		25 - 150
d-N-MeFOSA-M	76		25 - 150
d-N-EtFOSA-M	76		25 - 150
d7-N-MeFOSE-M	87		25 - 150
d9-N-EtFOSE-M	83		25 - 150
13C3 HFPO-DA	115		25 - 150
13C-6:2 FTCA	100		25 - 150
13C-8:2 FTCA	108		25 - 150

Lab Sample ID: LCSD 320-644488/3-A
Matrix: Water
Analysis Batch: 649396

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 644488

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Perfluorobutanoic acid (PFBA)	100	99.3		ng/L		99	76 - 136	7	30
Perfluoropentanoic acid (PFPeA)	100	96.7		ng/L		97	71 - 131	5	30

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-644488/3-A
Matrix: Water
Analysis Batch: 649396

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 644488

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	RPD Limit
							Limits	RPD		
Perfluorohexanoic acid (PFHxA)	100	99.2		ng/L		99	73 - 133	0	30	
Perfluoroheptanoic acid (PFHpA)	100	91.6		ng/L		92	72 - 132	8	30	
Perfluorooctanoic acid (PFOA)	100	109		ng/L		109	70 - 130	1	30	
Perfluorononanoic acid (PFNA)	100	103		ng/L		103	75 - 135	8	30	
Perfluorodecanoic acid (PFDA)	100	96.8		ng/L		97	76 - 136	2	30	
Perfluoroundecanoic acid (PFUnA)	100	95.2		ng/L		95	68 - 128	7	30	
Perfluorododecanoic acid (PFDoA)	100	102		ng/L		102	71 - 131	6	30	
Perfluorotridecanoic acid (PFTrDA)	100	99.4		ng/L		99	71 - 131	0	30	
Perfluorotetradecanoic acid (PFTeA)	100	82.6		ng/L		83	70 - 130	14	30	
Perfluorobutanesulfonic acid (PFBS)	88.8	81.7		ng/L		92	67 - 127	10	30	
Perfluoropentanesulfonic acid (PFPeS)	94.0	85.0		ng/L		90	66 - 126	9	30	
Perfluorohexanesulfonic acid (PFHxS)	91.2	79.7		ng/L		87	59 - 119	10	30	
Perfluoroheptanesulfonic acid (PFHpS)	95.4	97.4		ng/L		102	76 - 136	11	30	
Perfluorooctanesulfonic acid (PFOS)	93.0	95.8		ng/L		103	70 - 130	4	30	
Perfluorononanesulfonic acid (PFNS)	96.2	91.1		ng/L		95	75 - 135	10	30	
Perfluorodecanesulfonic acid (PFDS)	96.4	98.5		ng/L		102	71 - 131	9	30	
Perfluorododecanesulfonic acid (PFDoS)	97.0	86.3		ng/L		89	67 - 127	5	30	
Perfluorooctanesulfonamide (FOSA)	100	89.1		ng/L		89	73 - 133	6	30	
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	94.6		ng/L		95	76 - 136	17	30	
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	92.0		ng/L		92	76 - 136	11	30	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	99.4		ng/L		106	79 - 139	12	30	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	94.2		ng/L		99	59 - 175	4	30	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	92.6		ng/L		96	75 - 135	6	30	
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	80.4		ng/L		80	78 - 138	15	30	
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	84.6		ng/L		85	67 - 154	17	30	
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	81.6		ng/L		82	70 - 130	6	30	
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	68.6	*	ng/L		69	71 - 131	10	30	
9CI-PF3ONS	93.4	95.9		ng/L		103	75 - 135	2	30	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	89.3		ng/L		89	51 - 173	6	30	
11CI-PF3OUdS	94.4	94.3		ng/L		100	54 - 114	7	30	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	95.8		ng/L		101	79 - 139	7	30	

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-644488/3-A
Matrix: Water
Analysis Batch: 649396

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 644488

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
3:3 FTCA	100	76.1		ng/L		76	70 - 130	10	30
5:3 FTCA	100	90.8		ng/L		91	70 - 130	13	30
7:3 FTCA	100	91.3		ng/L		91	70 - 130	4	30
Nonafluoro-3,6-dioxahexanoic acid (NFDHA)	100	114		ng/L		114	70 - 130	2	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	94.2		ng/L		94	70 - 130	2	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	96.2		ng/L		96	70 - 130	1	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	89.2	80.7		ng/L		91	70 - 130	8	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C8 FOSA	99		25 - 150
13C4 PFBA	97		25 - 150
13C5 PFPeA	101		25 - 150
13C2 PFHxA	97		25 - 150
13C4 PFHpA	113		25 - 150
13C4 PFOA	97		25 - 150
13C5 PFNA	100		25 - 150
13C2 PFDA	105		25 - 150
13C2 PFUnA	109		25 - 150
13C2 PFDoA	98		25 - 150
13C2 PFTeDA	102		25 - 150
13C3 PFBS	106		25 - 150
18O2 PFHxS	103		25 - 150
13C4 PFOS	99		25 - 150
d3-NMeFOSAA	104		25 - 150
d5-NEtFOSAA	103		25 - 150
13C2 4:2 FTS	116		25 - 150
13C2 6:2 FTS	115		25 - 150
13C2 8:2 FTS	147		25 - 150
d-N-MeFOSA-M	81		25 - 150
d-N-EtFOSA-M	84		25 - 150
d7-N-MeFOSE-M	91		25 - 150
d9-N-EtFOSE-M	97		25 - 150
13C3 HFPO-DA	114		25 - 150
13C-6:2 FTCA	108		25 - 150
13C-8:2 FTCA	105		25 - 150

Lab Sample ID: MB 320-644482/1-A
Matrix: Water
Analysis Batch: 655190

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 644482

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorobutanoic acid (PFBA)	7.17	J	13	6.0	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluoropentanoic acid (PFPeA)	ND		5.0	1.2	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluorohexanoic acid (PFHxA)	ND		5.0	1.4	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluoroheptanoic acid (PFHpA)	ND		5.0	0.63	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluorooctanoic acid (PFOA)	ND		5.0	2.1	ng/L		01/04/23 14:13	02/18/23 02:51	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-644482/1-A
Matrix: Water
Analysis Batch: 655190

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 644482

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorononanoic acid (PFNA)	ND		5.0	0.68	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluorodecanoic acid (PFDA)	ND		5.0	0.78	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0	2.8	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluorododecanoic acid (PFDoA)	ND		5.0	1.4	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluorotridecanoic acid (PFTTrDA)	ND		5.0	3.2	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0	0.73	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluorobutanesulfonic acid (PFBS)	ND		5.0	0.50	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0	0.75	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluorohexanesulfonic acid (PFHxS)	ND		5.0	0.43	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0	0.48	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluorooctanesulfonic acid (PFOS)	ND		5.0	0.80	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0	0.40	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0	1.4	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0	2.4	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0	0.88	ng/L		01/04/23 14:13	02/18/23 02:51	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13	3.0	ng/L		01/04/23 14:13	02/18/23 02:51	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13	3.3	ng/L		01/04/23 14:13	02/18/23 02:51	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0	0.60	ng/L		01/04/23 14:13	02/18/23 02:51	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13	6.3	ng/L		01/04/23 14:13	02/18/23 02:51	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0	1.2	ng/L		01/04/23 14:13	02/18/23 02:51	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0	2.2	ng/L		01/04/23 14:13	02/18/23 02:51	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0	1.1	ng/L		01/04/23 14:13	02/18/23 02:51	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10	3.5	ng/L		01/04/23 14:13	02/18/23 02:51	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0	2.2	ng/L		01/04/23 14:13	02/18/23 02:51	1
9CI-PF3ONS	ND		5.0	0.60	ng/L		01/04/23 14:13	02/18/23 02:51	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10	3.8	ng/L		01/04/23 14:13	02/18/23 02:51	1
11CI-PF3OUdS	ND		5.0	0.80	ng/L		01/04/23 14:13	02/18/23 02:51	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0	1.0	ng/L		01/04/23 14:13	02/18/23 02:51	1
3:3 FTCA	ND		5.0	1.1	ng/L		01/04/23 14:13	02/18/23 02:51	1
5:3 FTCA	ND		5.0	0.80	ng/L		01/04/23 14:13	02/18/23 02:51	1
7:3 FTCA	ND		5.0	1.4	ng/L		01/04/23 14:13	02/18/23 02:51	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0	1.6	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		5.0	0.70	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0	0.70	ng/L		01/04/23 14:13	02/18/23 02:51	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		5.0	0.70	ng/L		01/04/23 14:13	02/18/23 02:51	1

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QC Sample Results

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

<i>Isotope Dilution</i>	<i>MB</i>	<i>MB</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
	<i>%Recovery</i>	<i>Qualifier</i>				
13C8 FOSA	115		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C4 PFBA	60		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C5 PFPeA	122		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C2 PFHxA	121		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C4 PFHpA	129		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C4 PFOA	115		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C5 PFNA	113		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C2 PFDA	119		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C2 PFUnA	117		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C2 PFDoA	111		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C2 PFTeDA	105		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C3 PFBS	120		25 - 150	01/04/23 14:13	02/18/23 02:51	1
18O2 PFHxS	116		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C4 PFOS	107		25 - 150	01/04/23 14:13	02/18/23 02:51	1
d3-NMeFOSAA	97		25 - 150	01/04/23 14:13	02/18/23 02:51	1
d5-NEtFOSAA	106		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C2 4:2 FTS	0		0 - 10	01/04/23 14:13	02/18/23 02:51	1
13C2 6:2 FTS	113		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C2 8:2 FTS	125		25 - 150	01/04/23 14:13	02/18/23 02:51	1
d-N-MeFOSA-M	103		25 - 150	01/04/23 14:13	02/18/23 02:51	1
d-N-EtFOSA-M	96		25 - 150	01/04/23 14:13	02/18/23 02:51	1
d7-N-MeFOSE-M	100		25 - 150	01/04/23 14:13	02/18/23 02:51	1
d9-N-EtFOSE-M	99		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C3 HFPO-DA	110		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C-6:2 FTCA	97		25 - 150	01/04/23 14:13	02/18/23 02:51	1
13C-8:2 FTCA	102		25 - 150	01/04/23 14:13	02/18/23 02:51	1

Lab Sample ID: LCS 320-644482/2-A
Matrix: Water
Analysis Batch: 649397

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 644482

<i>Analyte</i>	<i>Spike</i>	<i>LCS</i>	<i>LCS</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec</i>
	<i>Added</i>	<i>Result</i>	<i>Qualifier</i>			<i>Limits</i>	
Perfluorobutanoic acid (PFBA)	100	234	*+	ng/L		234	93 - 153
Perfluoropentanoic acid (PFPeA)	100	186	*+	ng/L		186	85 - 145
Perfluorohexanoic acid (PFHxA)	100	224	*+	ng/L		224	81 - 141
Perfluoroheptanoic acid (PFHpA)	100	189	*+	ng/L		189	104 - 171
Perfluorooctanoic acid (PFOA)	100	330		ng/L		330	158 - 454
Perfluorononanoic acid (PFNA)	100	165	*+	ng/L		165	66 - 126
Perfluorodecanoic acid (PFDA)	100	129	*+	ng/L		129	65 - 125
Perfluoroundecanoic acid (PFUnA)	100	99.4		ng/L		99	57 - 117
Perfluorododecanoic acid (PFDoA)	100	106		ng/L		106	66 - 126
Perfluorotridecanoic acid (PFTTrDA)	100	97.0		ng/L		97	65 - 136
Perfluorotetradecanoic acid (PFTeA)	100	84.0		ng/L		84	63 - 123
Perfluorobutanesulfonic acid (PFBS)	88.8	91.7		ng/L		103	75 - 135
Perfluoropentanesulfonic acid (PFPeS)	94.0	93.0		ng/L		99	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	91.2	85.7		ng/L		94	64 - 124

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-644482/2-A
Matrix: Water
Analysis Batch: 649397

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 644482

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluoroheptanesulfonic acid (PFHpS)	95.4	101		ng/L		106	70 - 131
Perfluorooctanesulfonic acid (PFOS)	93.0	97.4		ng/L		105	68 - 128
Perfluorononanesulfonic acid (PFNS)	96.2	89.6		ng/L		93	70 - 130
Perfluorodecanesulfonic acid (PFDS)	96.4	96.3		ng/L		100	66 - 126
Perfluorododecanesulfonic acid (PFDoS)	97.0	73.6		ng/L		76	67 - 127
Perfluorooctanesulfonamide (FOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctanesulfonamide (NMeFOSAA)	100	ND		ng/L		0	0 - 10
N-ethylperfluorooctanesulfonamide (NEtFOSAA)	100	ND		ng/L		0	0 - 10
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	ND		ng/L		0	0 - 10
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	ND		ng/L		0	0 - 10
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	ND		ng/L		0	0 - 10
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	ND		ng/L		0	0 - 10
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	ND		ng/L		0	0 - 10
9Cl-PF3ONS	93.4	90.1		ng/L		96	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	77.1		ng/L		77	51 - 173
11Cl-PF3OUdS	94.4	64.8		ng/L		69	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	ND		ng/L		0	0 - 10
3:3 FTCA	100	ND		ng/L		0	0 - 10
5:3 FTCA	100	ND		ng/L		0	0 - 10
7:3 FTCA	100	ND		ng/L		0	0 - 10
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	101		ng/L		101	70 - 130
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	87.7		ng/L		88	70 - 130
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	126		ng/L		126	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	89.2	86.6		ng/L		97	70 - 130

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C8 FOSA	107		25 - 150
13C4 PFBA	64		25 - 150
13C5 PFPeA	102		25 - 150
13C2 PFHxA	101		25 - 150
13C4 PFHpA	108		25 - 150

QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-644482/2-A
Matrix: Water
Analysis Batch: 649397

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 644482

<i>Isotope Dilution</i>	<i>LCS</i>	<i>LCS</i>	<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C4 PFOA	104		25 - 150
13C5 PFNA	104		25 - 150
13C2 PFDA	106		25 - 150
13C2 PFUnA	109		25 - 150
13C2 PFDoA	95		25 - 150
13C2 PFTeDA	95		25 - 150
13C3 PFBS	103		25 - 150
18O2 PFHxS	110		25 - 150
13C4 PFOS	101		25 - 150
d3-NMeFOSAA	111		25 - 150
d5-NEtFOSAA	116		25 - 150
13C2 4:2 FTS	0		0 - 10
13C2 6:2 FTS	146		25 - 150
13C2 8:2 FTS	152	*5+	25 - 150
d-N-MeFOSA-M	89		25 - 150
d-N-EtFOSA-M	83		25 - 150
d7-N-MeFOSE-M	89		25 - 150
d9-N-EtFOSE-M	88		25 - 150
13C3 HFPO-DA	108		25 - 150
13C-6:2 FTCA	104		25 - 150
13C-8:2 FTCA	117		25 - 150

Lab Sample ID: LCSD 320-644482/3-A
Matrix: Water
Analysis Batch: 649397

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 644482

<i>Analyte</i>	<i>Spike</i>	<i>LCSD</i>	<i>LCSD</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec</i>	<i>RPD</i>	<i>RPD</i>
	<i>Added</i>	<i>Result</i>	<i>Qualifier</i>			<i>Limits</i>	<i>Limits</i>	<i>RPD</i>	<i>Limit</i>
Perfluorobutanoic acid (PFBA)	100	198	*+	ng/L		198	93 - 153	17	30
Perfluoropentanoic acid (PFPeA)	100	176	*+	ng/L		176	85 - 145	5	30
Perfluorohexanoic acid (PFHxA)	100	201	*+	ng/L		201	81 - 141	11	30
Perfluoroheptanoic acid (PFHpA)	100	195	*+	ng/L		195	104 - 171	3	30
Perfluorooctanoic acid (PFOA)	100	321		ng/L		321	158 - 454	3	30
Perfluorononanoic acid (PFNA)	100	157	*+	ng/L		157	66 - 126	5	30
Perfluorodecanoic acid (PFDA)	100	135	*+	ng/L		135	65 - 125	5	30
Perfluoroundecanoic acid (PFUnA)	100	101		ng/L		101	57 - 117	1	30
Perfluorododecanoic acid (PFDoA)	100	97.0		ng/L		97	66 - 126	9	30
Perfluorotridecanoic acid (PFTTrDA)	100	89.1		ng/L		89	65 - 136	8	30
Perfluorotetradecanoic acid (PFTeA)	100	85.2		ng/L		85	63 - 123	1	30
Perfluorobutanesulfonic acid (PFBS)	88.8	85.0		ng/L		96	75 - 135	8	30
Perfluoropentanesulfonic acid (PFPeS)	94.0	88.8		ng/L		94	70 - 130	5	30
Perfluorohexanesulfonic acid (PFHxS)	91.2	85.0		ng/L		93	64 - 124	1	30
Perfluoroheptanesulfonic acid (PFHpS)	95.4	97.7		ng/L		102	70 - 131	3	30

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-644482/3-A
Matrix: Water
Analysis Batch: 649397

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 644482

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)	93.0	109		ng/L		118	68 - 128	11	30
Perfluorononanesulfonic acid (PFNS)	96.2	88.9		ng/L		92	70 - 130	1	30
Perfluorodecanesulfonic acid (PFDS)	96.4	89.4		ng/L		93	66 - 126	7	30
Perfluorododecanesulfonic acid (PFDoS)	97.0	79.2		ng/L		82	67 - 127	7	30
Perfluorooctanesulfonamide (FOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	ND		ng/L		0	0 - 10	NC	30
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	ND		ng/L		0	0 - 10	NC	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	ND		ng/L		0	0 - 10	NC	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	ND		ng/L		0	0 - 10	NC	30
9CI-PF3ONS	93.4	90.1		ng/L		96	75 - 135	0	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	68.0		ng/L		68	51 - 173	13	30
11CI-PF3OUdS	94.4	62.1		ng/L		66	54 - 114	4	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	ND		ng/L		0	0 - 10	NC	30
3:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
5:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
7:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	102		ng/L		102	70 - 130	1	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	93.1		ng/L		93	70 - 130	6	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	150	*+	ng/L		150	70 - 130	17	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	89.2	79.5		ng/L		89	70 - 130	9	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C8 FOSA	99		25 - 150
13C4 PFBA	92		25 - 150
13C5 PFPeA	93		25 - 150
13C2 PFHxA	102		25 - 150
13C4 PFHpA	113		25 - 150
13C4 PFOA	99		25 - 150
13C5 PFNA	103		25 - 150

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-644482/3-A
Matrix: Water
Analysis Batch: 649397

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 644482

<i>Isotope Dilution</i>	<i>LCSD %Recovery</i>	<i>LCSD Qualifier</i>	<i>Limits</i>
13C2 PFDA	99		25 - 150
13C2 PFUnA	108		25 - 150
13C2 PFDoA	99		25 - 150
13C2 PFTeDA	102		25 - 150
13C3 PFBS	108		25 - 150
18O2 PFHxS	104		25 - 150
13C4 PFOS	98		25 - 150
d3-NMeFOSAA	102		25 - 150
d5-NEtFOSAA	111		25 - 150
13C2 4:2 FTS	0		0 - 10
13C2 6:2 FTS	135		25 - 150
13C2 8:2 FTS	147		25 - 150
d-N-MeFOSA-M	79		25 - 150
d-N-EtFOSA-M	75		25 - 150
d7-N-MeFOSE-M	88		25 - 150
d9-N-EtFOSE-M	93		25 - 150
13C3 HFPO-DA	112		25 - 150
13C-6:2 FTCA	103		25 - 150
13C-8:2 FTCA	119		25 - 150

Lab Sample ID: MB 320-646328/1-A
Matrix: Water
Analysis Batch: 646992

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 646328

<i>Analyte</i>	<i>MB Result</i>	<i>MB Qualifier</i>	<i>RL</i>	<i>MDL</i>	<i>Unit</i>	<i>D</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Perfluorobutanoic acid (PFBA)	ND		13	6.0	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluoropentanoic acid (PFPeA)	ND		5.0	1.2	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluorohexanoic acid (PFHxA)	ND		5.0	1.4	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluoroheptanoic acid (PFHpA)	ND		5.0	0.63	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluorooctanoic acid (PFOA)	ND		5.0	2.1	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluorononanoic acid (PFNA)	ND		5.0	0.68	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluorodecanoic acid (PFDA)	ND		5.0	0.78	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0	2.8	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluorododecanoic acid (PFDoA)	ND		5.0	1.4	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluorotridecanoic acid (PFTrDA)	ND		5.0	3.2	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0	0.73	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluorobutanesulfonic acid (PFBS)	ND		5.0	0.50	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0	0.75	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluorohexanesulfonic acid (PFHxS)	ND		5.0	0.43	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0	0.48	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluorooctanesulfonic acid (PFOS)	ND		5.0	0.80	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0	0.40	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0	1.4	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0	2.4	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0	0.88	ng/L		01/11/23 15:47	01/14/23 01:29	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13	3.0	ng/L		01/11/23 15:47	01/14/23 01:29	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-646328/1-A
Matrix: Water
Analysis Batch: 646992

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 646328

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13	3.3	ng/L		01/11/23 15:47	01/14/23 01:29	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0	0.60	ng/L		01/11/23 15:47	01/14/23 01:29	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13	6.3	ng/L		01/11/23 15:47	01/14/23 01:29	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0	1.2	ng/L		01/11/23 15:47	01/14/23 01:29	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0	2.2	ng/L		01/11/23 15:47	01/14/23 01:29	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0	1.1	ng/L		01/11/23 15:47	01/14/23 01:29	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10	3.5	ng/L		01/11/23 15:47	01/14/23 01:29	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0	2.2	ng/L		01/11/23 15:47	01/14/23 01:29	1
9CI-PF3ONS	ND		5.0	0.60	ng/L		01/11/23 15:47	01/14/23 01:29	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10	3.8	ng/L		01/11/23 15:47	01/14/23 01:29	1
11CI-PF3OUdS	ND		5.0	0.80	ng/L		01/11/23 15:47	01/14/23 01:29	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0	1.0	ng/L		01/11/23 15:47	01/14/23 01:29	1
3:3 FTCA	ND		5.0	1.1	ng/L		01/11/23 15:47	01/14/23 01:29	1
5:3 FTCA	ND		5.0	0.80	ng/L		01/11/23 15:47	01/14/23 01:29	1
7:3 FTCA	ND		5.0	1.4	ng/L		01/11/23 15:47	01/14/23 01:29	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0	1.6	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		5.0	0.70	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0	0.70	ng/L		01/11/23 15:47	01/14/23 01:29	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		5.0	0.70	ng/L		01/11/23 15:47	01/14/23 01:29	1

Isotope Dilution	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C8 FOSA	89		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C4 PFBA	96		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C5 PFPeA	104		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C2 PFHxA	99		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C4 PFHpA	104		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C4 PFOA	99		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C5 PFNA	97		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C2 PFDA	92		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C2 PFUnA	95		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C2 PFDoA	79		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C2 PFTeDA	91		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C3 PFBS	107		25 - 150	01/11/23 15:47	01/14/23 01:29	1
18O2 PFHxS	111		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C4 PFOS	100		25 - 150	01/11/23 15:47	01/14/23 01:29	1
d3-NMeFOSAA	74		25 - 150	01/11/23 15:47	01/14/23 01:29	1
d5-NEtFOSAA	82		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C2 4:2 FTS	0		0 - 10	01/11/23 15:47	01/14/23 01:29	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-646328/1-A
Matrix: Water
Analysis Batch: 646992

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 646328

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C2 6:2 FTS	98		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C2 8:2 FTS	109		25 - 150	01/11/23 15:47	01/14/23 01:29	1
d-N-MeFOSA-M	46		25 - 150	01/11/23 15:47	01/14/23 01:29	1
d-N-EtFOSA-M	39		25 - 150	01/11/23 15:47	01/14/23 01:29	1
d7-N-MeFOSE-M	41		25 - 150	01/11/23 15:47	01/14/23 01:29	1
d9-N-EtFOSE-M	34		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C3 HFPO-DA	101		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C-6:2 FTCA	94		25 - 150	01/11/23 15:47	01/14/23 01:29	1
13C-8:2 FTCA	77		25 - 150	01/11/23 15:47	01/14/23 01:29	1

Method: ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Lab Sample ID: MB 410-351979/1-A
Matrix: Water
Analysis Batch: 352245

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 351979

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Fluorine (TF)	205		200	100	ug/L		03/09/23 14:14	03/09/23 18:09	1

Lab Sample ID: LCS 410-351979/2-A
Matrix: Water
Analysis Batch: 352245

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 351979

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits

Lab Sample ID: LCSD 410-351979/3-A
Matrix: Water
Analysis Batch: 352245

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 351979

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit

Lab Sample ID: MB 410-352279/1-A
Matrix: Water
Analysis Batch: 352245

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 352279

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Fluorine (TF)	ND		200	100	ug/L		03/10/23 09:57	03/10/23 10:45	1

Lab Sample ID: LCS 410-352279/2-A
Matrix: Water
Analysis Batch: 352245

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 352279

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits

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QC Sample Results

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method: ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography (Continued)

Lab Sample ID: LCSD 410-352279/3-A
Matrix: Water
Analysis Batch: 352245

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 352279

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Fluorine (TF)	5060	5540		ug/L		110	50 - 150	1	20

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

QC Association Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

HPLC/IC

Analysis Batch: 646784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-1	NAS_J_tf_8	Total/NA	Water	300.0	
320-95526-2	NAS_J_tf_10	Total/NA	Water	300.0	
320-95526-3	NAS_O_tf_10	Total/NA	Water	300.0	
320-95526-4	NAS_O_tf_7	Total/NA	Water	300.0	
320-95526-5	TAFB_tf_10	Total/NA	Water	300.0	
320-95526-6	TAFB_tf_7	Total/NA	Water	300.0	
320-95526-7	WPAFB_tf_9	Total/NA	Water	300.0	
320-95526-8	WPAFB_tf_10	Total/NA	Water	300.0	
MB 320-646784/3	Method Blank	Total/NA	Water	300.0	
LCS 320-646784/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 320-646784/5	Lab Control Sample Dup	Total/NA	Water	300.0	

LCMS

Prep Batch: 351979

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-3	NAS_O_tf_10	Total/NA	Water	CIC Prep	
320-95526-4	NAS_O_tf_7	Total/NA	Water	CIC Prep	
320-95526-5	TAFB_tf_10	Total/NA	Water	CIC Prep	
320-95526-6	TAFB_tf_7	Total/NA	Water	CIC Prep	
MB 410-351979/1-A	Method Blank	Total/NA	Water	CIC Prep	
LCS 410-351979/2-A	Lab Control Sample	Total/NA	Water	CIC Prep	
LCSD 410-351979/3-A	Lab Control Sample Dup	Total/NA	Water	CIC Prep	

Analysis Batch: 352245

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-1	NAS_J_tf_8	Total/NA	Water	ELLE SOP	352279
320-95526-2	NAS_J_tf_10	Total/NA	Water	ELLE SOP	352279
320-95526-3	NAS_O_tf_10	Total/NA	Water	ELLE SOP	351979
320-95526-4	NAS_O_tf_7	Total/NA	Water	ELLE SOP	351979
320-95526-5	TAFB_tf_10	Total/NA	Water	ELLE SOP	351979
320-95526-6	TAFB_tf_7	Total/NA	Water	ELLE SOP	351979
320-95526-7	WPAFB_tf_9	Total/NA	Water	ELLE SOP	352279
320-95526-8	WPAFB_tf_10	Total/NA	Water	ELLE SOP	352279
MB 410-351979/1-A	Method Blank	Total/NA	Water	ELLE SOP	351979
MB 410-352279/1-A	Method Blank	Total/NA	Water	ELLE SOP	352279
LCS 410-351979/2-A	Lab Control Sample	Total/NA	Water	ELLE SOP	351979
LCS 410-352279/2-A	Lab Control Sample	Total/NA	Water	ELLE SOP	352279
LCSD 410-351979/3-A	Lab Control Sample Dup	Total/NA	Water	ELLE SOP	351979
LCSD 410-352279/3-A	Lab Control Sample Dup	Total/NA	Water	ELLE SOP	352279

Prep Batch: 352279

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-1	NAS_J_tf_8	Total/NA	Water	CIC Prep	
320-95526-2	NAS_J_tf_10	Total/NA	Water	CIC Prep	
320-95526-7	WPAFB_tf_9	Total/NA	Water	CIC Prep	
320-95526-8	WPAFB_tf_10	Total/NA	Water	CIC Prep	
MB 410-352279/1-A	Method Blank	Total/NA	Water	CIC Prep	
LCS 410-352279/2-A	Lab Control Sample	Total/NA	Water	CIC Prep	
LCSD 410-352279/3-A	Lab Control Sample Dup	Total/NA	Water	CIC Prep	

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QC Association Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

LCMS

Prep Batch: 644482

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-1 - DL	NAS_J_tf_8	Post-Treatment	Water	TOP Post Prep	
320-95526-1	NAS_J_tf_8	Post-Treatment	Water	TOP Post Prep	
320-95526-2	NAS_J_tf_10	Post-Treatment	Water	TOP Post Prep	
320-95526-2 - DL	NAS_J_tf_10	Post-Treatment	Water	TOP Post Prep	
320-95526-3	NAS_O_tf_10	Post-Treatment	Water	TOP Post Prep	
320-95526-4	NAS_O_tf_7	Post-Treatment	Water	TOP Post Prep	
320-95526-5 - DL	TAFB_tf_10	Post-Treatment	Water	TOP Post Prep	
320-95526-5	TAFB_tf_10	Post-Treatment	Water	TOP Post Prep	
320-95526-6	TAFB_tf_7	Post-Treatment	Water	TOP Post Prep	
320-95526-6 - DL	TAFB_tf_7	Post-Treatment	Water	TOP Post Prep	
320-95526-8	WPAFB_tf_10	Post-Treatment	Water	TOP Post Prep	
MB 320-644482/1-A	Method Blank	Post-Treatment	Water	TOP Post Prep	
LCS 320-644482/2-A	Lab Control Sample	Post-Treatment	Water	TOP Post Prep	
LCSD 320-644482/3-A	Lab Control Sample Dup	Post-Treatment	Water	TOP Post Prep	

Prep Batch: 644488

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-1 - DL	NAS_J_tf_8	Pre-Treatment	Water	TOP Pre - Prep	
320-95526-1	NAS_J_tf_8	Pre-Treatment	Water	TOP Pre - Prep	
320-95526-2	NAS_J_tf_10	Pre-Treatment	Water	TOP Pre - Prep	
320-95526-3	NAS_O_tf_10	Pre-Treatment	Water	TOP Pre - Prep	
320-95526-4	NAS_O_tf_7	Pre-Treatment	Water	TOP Pre - Prep	
320-95526-5	TAFB_tf_10	Pre-Treatment	Water	TOP Pre - Prep	
320-95526-6	TAFB_tf_7	Pre-Treatment	Water	TOP Pre - Prep	
320-95526-7 - DL	WPAFB_tf_9	Pre-Treatment	Water	TOP Pre - Prep	
320-95526-7	WPAFB_tf_9	Pre-Treatment	Water	TOP Pre - Prep	
320-95526-8	WPAFB_tf_10	Pre-Treatment	Water	TOP Pre - Prep	
MB 320-644488/1-A	Method Blank	Pre-Treatment	Water	TOP Pre - Prep	
LCS 320-644488/2-A	Lab Control Sample	Pre-Treatment	Water	TOP Pre - Prep	
LCSD 320-644488/3-A	Lab Control Sample Dup	Pre-Treatment	Water	TOP Pre - Prep	

Prep Batch: 644557

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-9	NAS_J_tf_8_M	Total/NA	Methanol Extract	MeOH Ext Prep	
320-95526-10	NAS_J_tf_10_M	Total/NA	Methanol Extract	MeOH Ext Prep	
320-95526-11	NAS_O_tf_10_M	Total/NA	Methanol Extract	MeOH Ext Prep	
320-95526-11 - DL	NAS_O_tf_10_M	Total/NA	Methanol Extract	MeOH Ext Prep	
320-95526-12	NAS_O_tf_7_M	Total/NA	Methanol Extract	MeOH Ext Prep	
320-95526-12 - DL	NAS_O_tf_7_M	Total/NA	Methanol Extract	MeOH Ext Prep	
320-95526-13	TAFB_tf_10_M	Total/NA	Methanol Extract	MeOH Ext Prep	
320-95526-14	TAFB_tf_7_M	Total/NA	Methanol Extract	MeOH Ext Prep	
320-95526-15	WPAFB_tf_9_M	Total/NA	Methanol Extract	MeOH Ext Prep	
320-95526-15 - DL	WPAFB_tf_9_M	Total/NA	Methanol Extract	MeOH Ext Prep	
320-95526-16	WPAFB_tf_10_M	Total/NA	Methanol Extract	MeOH Ext Prep	
MB 320-644557/1-A	Method Blank	Total/NA	Liquid	MeOH Ext Prep	
LCS 320-644557/2-A	Lab Control Sample	Total/NA	Liquid	MeOH Ext Prep	
LCSD 320-644557/3-A	Lab Control Sample Dup	Total/NA	Liquid	MeOH Ext Prep	

Prep Batch: 646328

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-7	WPAFB_tf_9	Post-Treatment	Water	TOP Post Prep	

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QC Association Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

LCMS (Continued)

Prep Batch: 646328 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-646328/1-A	Method Blank	Post-Treatment	Water	TOP Post Prep	

Analysis Batch: 646992

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-7	WPAFB_tf_9	Post-Treatment	Water	537 (modified)	646328
MB 320-646328/1-A	Method Blank	Post-Treatment	Water	537 (modified)	646328

Analysis Batch: 649396

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-1	NAS_J_tf_8	Pre-Treatment	Water	537 (modified)	644488
320-95526-2	NAS_J_tf_10	Pre-Treatment	Water	537 (modified)	644488
320-95526-3	NAS_O_tf_10	Pre-Treatment	Water	537 (modified)	644488
320-95526-4	NAS_O_tf_7	Pre-Treatment	Water	537 (modified)	644488
320-95526-8	WPAFB_tf_10	Pre-Treatment	Water	537 (modified)	644488
MB 320-644488/1-A	Method Blank	Pre-Treatment	Water	537 (modified)	644488
LCS 320-644488/2-A	Lab Control Sample	Pre-Treatment	Water	537 (modified)	644488
LCSD 320-644488/3-A	Lab Control Sample Dup	Pre-Treatment	Water	537 (modified)	644488

Analysis Batch: 649397

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-1	NAS_J_tf_8	Post-Treatment	Water	537 (modified)	644482
320-95526-2	NAS_J_tf_10	Post-Treatment	Water	537 (modified)	644482
320-95526-3	NAS_O_tf_10	Post-Treatment	Water	537 (modified)	644482
320-95526-4	NAS_O_tf_7	Post-Treatment	Water	537 (modified)	644482
320-95526-5	TAFB_tf_10	Post-Treatment	Water	537 (modified)	644482
320-95526-6	TAFB_tf_7	Post-Treatment	Water	537 (modified)	644482
LCS 320-644482/2-A	Lab Control Sample	Post-Treatment	Water	537 (modified)	644482
LCSD 320-644482/3-A	Lab Control Sample Dup	Post-Treatment	Water	537 (modified)	644482

Analysis Batch: 651596

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-11	NAS_O_tf_10_M	Total/NA	Methanol Extract	537 (modified)	644557
320-95526-12	NAS_O_tf_7_M	Total/NA	Methanol Extract	537 (modified)	644557
320-95526-15	WPAFB_tf_9_M	Total/NA	Methanol Extract	537 (modified)	644557

Analysis Batch: 653238

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-9	NAS_J_tf_8_M	Total/NA	Methanol Extract	537 (modified)	644557
320-95526-10	NAS_J_tf_10_M	Total/NA	Methanol Extract	537 (modified)	644557
320-95526-11 - DL	NAS_O_tf_10_M	Total/NA	Methanol Extract	537 (modified)	644557
320-95526-12 - DL	NAS_O_tf_7_M	Total/NA	Methanol Extract	537 (modified)	644557
320-95526-13	TAFB_tf_10_M	Total/NA	Methanol Extract	537 (modified)	644557
320-95526-14	TAFB_tf_7_M	Total/NA	Methanol Extract	537 (modified)	644557
320-95526-15 - DL	WPAFB_tf_9_M	Total/NA	Methanol Extract	537 (modified)	644557
320-95526-16	WPAFB_tf_10_M	Total/NA	Methanol Extract	537 (modified)	644557
MB 320-644557/1-A	Method Blank	Total/NA	Liquid	537 (modified)	644557
LCS 320-644557/2-A	Lab Control Sample	Total/NA	Liquid	537 (modified)	644557
LCSD 320-644557/3-A	Lab Control Sample Dup	Total/NA	Liquid	537 (modified)	644557

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QC Association Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

LCMS

Analysis Batch: 655190

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-1 - DL	NAS_J_tf_8	Post-Treatment	Water	537 (modified)	644482
320-95526-1 - DL	NAS_J_tf_8	Pre-Treatment	Water	537 (modified)	644488
320-95526-2 - DL	NAS_J_tf_10	Post-Treatment	Water	537 (modified)	644482
320-95526-5 - DL	TAFB_tf_10	Post-Treatment	Water	537 (modified)	644482
320-95526-5	TAFB_tf_10	Pre-Treatment	Water	537 (modified)	644488
320-95526-6 - DL	TAFB_tf_7	Post-Treatment	Water	537 (modified)	644482
320-95526-6	TAFB_tf_7	Pre-Treatment	Water	537 (modified)	644488
320-95526-7 - DL	WPAFB_tf_9	Pre-Treatment	Water	537 (modified)	644488
320-95526-7	WPAFB_tf_9	Pre-Treatment	Water	537 (modified)	644488
320-95526-8	WPAFB_tf_10	Post-Treatment	Water	537 (modified)	644482
MB 320-644482/1-A	Method Blank	Post-Treatment	Water	537 (modified)	644482

Analysis Batch: 660443

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-1	NAS_J_tf_8	Pre-Treatment	Water	Total PFCA-Sum	
320-95526-2	NAS_J_tf_10	Pre-Treatment	Water	Total PFCA-Sum	
320-95526-3	NAS_O_tf_10	Pre-Treatment	Water	Total PFCA-Sum	
320-95526-4	NAS_O_tf_7	Pre-Treatment	Water	Total PFCA-Sum	
320-95526-5	TAFB_tf_10	Pre-Treatment	Water	Total PFCA-Sum	
320-95526-6	TAFB_tf_7	Pre-Treatment	Water	Total PFCA-Sum	
320-95526-7	WPAFB_tf_9	Pre-Treatment	Water	Total PFCA-Sum	
320-95526-8	WPAFB_tf_10	Pre-Treatment	Water	Total PFCA-Sum	

Analysis Batch: 660445

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-1	NAS_J_tf_8	Post-Treatment	Water	Total PFCA-Sum	
320-95526-2	NAS_J_tf_10	Post-Treatment	Water	Total PFCA-Sum	
320-95526-3	NAS_O_tf_10	Post-Treatment	Water	Total PFCA-Sum	
320-95526-4	NAS_O_tf_7	Post-Treatment	Water	Total PFCA-Sum	
320-95526-5	TAFB_tf_10	Post-Treatment	Water	Total PFCA-Sum	
320-95526-6	TAFB_tf_7	Post-Treatment	Water	Total PFCA-Sum	
320-95526-7	WPAFB_tf_9	Post-Treatment	Water	Total PFCA-Sum	
320-95526-8	WPAFB_tf_10	Post-Treatment	Water	Total PFCA-Sum	

Analysis Batch: 660447

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95526-1	NAS_J_tf_8	Total/NA	Water	Total PFCA-Dif	
320-95526-2	NAS_J_tf_10	Total/NA	Water	Total PFCA-Dif	
320-95526-3	NAS_O_tf_10	Total/NA	Water	Total PFCA-Dif	
320-95526-4	NAS_O_tf_7	Total/NA	Water	Total PFCA-Dif	
320-95526-5	TAFB_tf_10	Total/NA	Water	Total PFCA-Dif	
320-95526-6	TAFB_tf_7	Total/NA	Water	Total PFCA-Dif	
320-95526-7	WPAFB_tf_9	Total/NA	Water	Total PFCA-Dif	
320-95526-8	WPAFB_tf_10	Total/NA	Water	Total PFCA-Dif	

Lab Chronicle

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_J_tf_8
Date Collected: 12/21/22 16:44
Date Received: 12/22/22 09:50

Lab Sample ID: 320-95526-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	10 mL	10 mL	646784	01/13/23 13:49	Y1S	EET SAC
Post-Treatment	Prep	TOP Post Prep			10.0 mL	10.0 mL	644482	01/04/23 14:13	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	649397	01/25/23 18:19	RS1	EET SAC
Post-Treatment	Prep	TOP Post Prep	DL		10.0 mL	10.0 mL	644482	01/04/23 14:13	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)	DL	5	1 mL	1 mL	655190	02/18/23 03:11	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			10.0 mL	10.0 mL	644488	01/04/23 14:13	AP	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	649396	01/25/23 15:37	RS1	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep	DL		10.0 mL	10.0 mL	644488	01/04/23 14:13	AP	EET SAC
Pre-Treatment	Analysis	537 (modified)	DL	5	1 mL	1 mL	655190	02/18/23 01:40	D1R	EET SAC
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	352279	03/10/23 09:57	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			352245	03/10/23 12:31	F9DU	ELLE
Total/NA	Analysis	Total PFCA-Dif		1			660447	03/13/23 13:05	MKW	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			660445	03/13/23 13:01	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			660443	03/13/23 12:57	MKW	EET SAC

Client Sample ID: NAS_J_tf_10
Date Collected: 12/21/22 16:06
Date Received: 12/22/22 09:50

Lab Sample ID: 320-95526-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	10 mL	10 mL	646784	01/13/23 14:09	Y1S	EET SAC
Post-Treatment	Prep	TOP Post Prep			10.0 mL	10.0 mL	644482	01/04/23 14:13	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	649397	01/25/23 18:29	RS1	EET SAC
Post-Treatment	Prep	TOP Post Prep	DL		10.0 mL	10.0 mL	644482	01/04/23 14:13	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)	DL	5	1 mL	1 mL	655190	02/18/23 03:21	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			10.0 mL	10.0 mL	644488	01/04/23 14:13	AP	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	649396	01/25/23 15:47	RS1	EET SAC
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	352279	03/10/23 09:57	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			352245	03/10/23 13:07	F9DU	ELLE
Total/NA	Analysis	Total PFCA-Dif		1			660447	03/13/23 13:05	MKW	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			660445	03/13/23 13:01	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			660443	03/13/23 12:57	MKW	EET SAC

Client Sample ID: NAS_O_tf_10
Date Collected: 12/21/22 16:44
Date Received: 12/22/22 09:50

Lab Sample ID: 320-95526-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	10 mL	10 mL	646784	01/13/23 18:23	Y1S	EET SAC
Post-Treatment	Prep	TOP Post Prep			0.002 mL	10.0 mL	644482	01/04/23 14:13	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	649397	01/25/23 18:39	RS1	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			0.002 mL	10.0 mL	644488	01/04/23 14:13	AP	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	649396	01/25/23 15:57	RS1	EET SAC

Eurofins Sacramento

Lab Chronicle

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: NAS_O_tf_10

Lab Sample ID: 320-95526-3

Date Collected: 12/21/22 16:44

Matrix: Water

Date Received: 12/22/22 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	CIC Prep			0.002 g	0.2 mL	351979	03/09/23 14:14	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			352245	03/09/23 21:05	F9DU	ELLE
Total/NA	Analysis	Total PFCA-Dif		1			660447	03/13/23 13:05	MKW	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			660445	03/13/23 13:01	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			660443	03/13/23 12:57	MKW	EET SAC

Client Sample ID: NAS_O_tf_7

Lab Sample ID: 320-95526-4

Date Collected: 12/21/22 16:24

Matrix: Water

Date Received: 12/22/22 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	10 mL	10 mL	646784	01/13/23 18:43	Y1S	EET SAC
Post-Treatment	Prep	TOP Post Prep			0.002 mL	10.0 mL	644482	01/04/23 14:13	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	649397	01/25/23 18:49	RS1	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			0.002 mL	10.0 mL	644488	01/04/23 14:13	AP	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	649396	01/25/23 16:07	RS1	EET SAC
Total/NA	Prep	CIC Prep			0.002 g	0.2 mL	351979	03/09/23 14:14	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			352245	03/09/23 21:41	F9DU	ELLE
Total/NA	Analysis	Total PFCA-Dif		1			660447	03/13/23 13:05	MKW	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			660445	03/13/23 13:01	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			660443	03/13/23 12:57	MKW	EET SAC

Client Sample ID: TAFB_tf_10

Lab Sample ID: 320-95526-5

Date Collected: 12/21/22 16:12

Matrix: Water

Date Received: 12/22/22 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	10 mL	10 mL	646784	01/13/23 15:08	Y1S	EET SAC
Post-Treatment	Prep	TOP Post Prep			10.0 mL	10.0 mL	644482	01/04/23 14:13	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	649397	01/25/23 19:00	RS1	EET SAC
Post-Treatment	Prep	TOP Post Prep	DL		10.0 mL	10.0 mL	644482	01/04/23 14:13	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)	DL	100	1 mL	1 mL	655190	02/18/23 03:31	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			10.0 mL	10.0 mL	644488	01/04/23 14:13	AP	EET SAC
Pre-Treatment	Analysis	537 (modified)		100	1 mL	1 mL	655190	02/18/23 02:10	D1R	EET SAC
Total/NA	Prep	CIC Prep			0.002 g	0.2 mL	351979	03/09/23 14:14	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			352245	03/09/23 22:16	F9DU	ELLE
Total/NA	Analysis	Total PFCA-Dif		1			660447	03/13/23 13:05	MKW	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			660445	03/13/23 13:01	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			660443	03/13/23 12:57	MKW	EET SAC

Lab Chronicle

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_7

Date Collected: 12/21/22 16:18

Date Received: 12/22/22 09:50

Lab Sample ID: 320-95526-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	10 mL	10 mL	646784	01/13/23 19:02	Y1S	EET SAC
Post-Treatment	Prep	TOP Post Prep			10.0 mL	10.0 mL	644482	01/04/23 14:13	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	649397	01/25/23 19:10	RS1	EET SAC
Post-Treatment	Prep	TOP Post Prep	DL		10.0 mL	10.0 mL	644482	01/04/23 14:13	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)	DL	100	1 mL	1 mL	655190	02/18/23 03:42	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			10.0 mL	10.0 mL	644488	01/04/23 14:13	AP	EET SAC
Pre-Treatment	Analysis	537 (modified)		100	1 mL	1 mL	655190	02/18/23 02:21	D1R	EET SAC
Total/NA	Prep	CIC Prep			0.002 g	0.2 mL	351979	03/09/23 14:14	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			352245	03/09/23 22:51	F9DU	ELLE
Total/NA	Analysis	Total PFCA-Dif		1			660447	03/13/23 13:05	MKW	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			660445	03/13/23 13:01	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			660443	03/13/23 12:57	MKW	EET SAC

Client Sample ID: WPAFB_tf_9

Date Collected: 12/21/22 16:05

Date Received: 12/22/22 09:50

Lab Sample ID: 320-95526-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	10 mL	10 mL	646784	01/13/23 15:47	Y1S	EET SAC
Post-Treatment	Prep	TOP Post Prep			10.0 mL	10.0 mL	646328	01/11/23 15:47	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	646992	01/14/23 01:59	AF	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep	DL		10.0 mL	10.0 mL	644488	01/04/23 14:13	AP	EET SAC
Pre-Treatment	Analysis	537 (modified)	DL	5	1 mL	1 mL	655190	02/18/23 01:50	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			10.0 mL	10.0 mL	644488	01/04/23 14:13	AP	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	655190	02/18/23 02:00	D1R	EET SAC
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	352279	03/10/23 09:57	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			352245	03/10/23 13:42	F9DU	ELLE
Total/NA	Analysis	Total PFCA-Dif		1			660447	03/13/23 13:05	MKW	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			660445	03/13/23 13:01	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			660443	03/13/23 12:57	MKW	EET SAC

Client Sample ID: WPAFB_tf_10

Date Collected: 12/21/22 16:05

Date Received: 12/22/22 09:50

Lab Sample ID: 320-95526-8

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	10 mL	10 mL	646784	01/13/23 16:45	Y1S	EET SAC
Post-Treatment	Prep	TOP Post Prep			10.0 mL	10.0 mL	644482	01/04/23 14:13	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	655190	02/18/23 03:01	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			10.0 mL	10.0 mL	644488	01/04/23 14:13	AP	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	649396	01/25/23 17:08	RS1	EET SAC
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	352279	03/10/23 09:57	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			352245	03/10/23 14:17	F9DU	ELLE
Total/NA	Analysis	Total PFCA-Dif		1			660447	03/13/23 13:05	MKW	EET SAC

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Lab Chronicle

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: WPAFB_tf_10

Lab Sample ID: 320-95526-8

Date Collected: 12/21/22 16:05

Matrix: Water

Date Received: 12/22/22 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Post-Treatment	Analysis	Total PFCA-Sum		1			660445	03/13/23 13:01	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			660443	03/13/23 12:57	MKW	EET SAC

Client Sample ID: NAS_J_tf_8_M

Lab Sample ID: 320-95526-9

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	MeOH Ext Prep			2.5 mL	10.0 mL	644557	01/04/23 22:48	FX	EET SAC
Total/NA	Analysis	537 (modified)		1	1 mL	1 mL	653238	02/09/23 14:12	S1M	EET SAC

Client Sample ID: NAS_J_tf_10_M

Lab Sample ID: 320-95526-10

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	MeOH Ext Prep			2.5 mL	10.0 mL	644557	01/04/23 22:48	FX	EET SAC
Total/NA	Analysis	537 (modified)		1	1 mL	1 mL	653238	02/09/23 14:22	S1M	EET SAC

Client Sample ID: NAS_O_tf_10_M

Lab Sample ID: 320-95526-11

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	MeOH Ext Prep			2.5 mL	10.0 mL	644557	01/04/23 22:48	FX	EET SAC
Total/NA	Analysis	537 (modified)		1	1 mL	1 mL	651596	02/03/23 19:05	S1M	EET SAC
Total/NA	Prep	MeOH Ext Prep	DL		2.5 mL	10.0 mL	644557	01/04/23 22:48	FX	EET SAC
Total/NA	Analysis	537 (modified)	DL	50	1 mL	1 mL	653238	02/09/23 14:53	S1M	EET SAC

Client Sample ID: NAS_O_tf_7_M

Lab Sample ID: 320-95526-12

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	MeOH Ext Prep			2.5 mL	10.0 mL	644557	01/04/23 22:48	FX	EET SAC
Total/NA	Analysis	537 (modified)		1	1 mL	1 mL	651596	02/03/23 19:15	S1M	EET SAC
Total/NA	Prep	MeOH Ext Prep	DL		2.5 mL	10.0 mL	644557	01/04/23 22:48	FX	EET SAC
Total/NA	Analysis	537 (modified)	DL	100	1 mL	1 mL	653238	02/09/23 15:13	S1M	EET SAC

Client Sample ID: TAFB_tf_10_M

Lab Sample ID: 320-95526-13

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	MeOH Ext Prep			2.5 mL	10.0 mL	644557	01/04/23 22:48	FX	EET SAC
Total/NA	Analysis	537 (modified)		100	1 mL	1 mL	653238	02/09/23 15:33	S1M	EET SAC

Eurolins Sacramento

Lab Chronicle

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Client Sample ID: TAFB_tf_7_M

Lab Sample ID: 320-95526-14

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	MeOH Ext Prep			2.5 mL	10.0 mL	644557	01/04/23 22:48	FX	EET SAC
Total/NA	Analysis	537 (modified)		100	1 mL	1 mL	653238	02/09/23 15:53	S1M	EET SAC

Client Sample ID: WPAFB_tf_9_M

Lab Sample ID: 320-95526-15

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	MeOH Ext Prep			2.5 mL	10.0 mL	644557	01/04/23 22:48	FX	EET SAC
Total/NA	Analysis	537 (modified)		1	1 mL	1 mL	651596	02/03/23 19:46	S1M	EET SAC
Total/NA	Prep	MeOH Ext Prep	DL		2.5 mL	10.0 mL	644557	01/04/23 22:48	FX	EET SAC
Total/NA	Analysis	537 (modified)	DL	5	1 mL	1 mL	653238	02/09/23 14:43	S1M	EET SAC

Client Sample ID: WPAFB_tf_10_M

Lab Sample ID: 320-95526-16

Date Collected: 12/21/22 16:36

Matrix: Methanol Extract

Date Received: 12/22/22 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	MeOH Ext Prep			2.5 mL	10.0 mL	644557	01/04/23 22:48	FX	EET SAC
Total/NA	Analysis	537 (modified)		1	1 mL	1 mL	653238	02/09/23 14:32	S1M	EET SAC

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

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

Accreditation/Certification Summary

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Laboratory: Eurofins Sacramento

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 (UST)	State	17-020	02-20-24
ANAB	Dept. of Defense ELAP	L2468	01-20-24
ANAB	Dept. of Energy	L2468.01	01-20-24
ANAB	ISO/IEC 17025	L2468	01-20-24
Arizona	State	AZ0708	08-11-23
Arkansas DEQ	State	88-0691	06-17-23
California	State	2897	01-22-24
Colorado	State	CA0004	08-31-23
Florida	NELAP	E87570	06-30-23
Georgia	State	4040	01-29-24
Hawaii	State	<cert No.>	01-29-24
Illinois	NELAP	200060	03-17-24
Kansas	NELAP	E-10375	10-31-23
Louisiana	NELAP	01944	06-30-23
Louisiana (All)	NELAP	01944	06-30-23
Maine	State	CA00004	04-14-24
Michigan	State	9947	01-31-23 *
Nevada	State	CA00044	07-31-23
New Hampshire	NELAP	2997	04-18-23
New Jersey	NELAP	CA005	06-30-23
New York	NELAP	11666	04-01-23
Ohio	State	41252	01-29-24
Oregon	NELAP	4040	01-29-24
Texas	NELAP	T104704399-19-13	05-31-23
US Fish & Wildlife	US Federal Programs	58448	04-30-23
USDA	US Federal Programs	P330-18-00239	02-28-26
Utah	NELAP	CA000442021-12	02-28-23 *
Virginia	NELAP	460278	03-14-23
Washington	State	C581	05-05-23
West Virginia (DW)	State	9930C	12-31-23
Wisconsin	State	998204680	08-31-23
Wyoming	State Program	8TMS-L	01-28-19 *

Laboratory: Eurofins Lancaster Laboratories Environment Testing, 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
A2LA	Dept. of Defense ELAP	0001.01	11-30-24
A2LA	ISO/IEC 17025	0001.01	11-30-24
Alaska	State	PA00009	06-30-23
Arizona	State	AZ0780	03-11-23
Arkansas DEQ	State	88-00660	08-09-23
California	State	2792	11-30-23
Colorado	State	PA00009	06-30-23
Connecticut	State	PH-0746	06-30-23
DE Haz. Subst. Cleanup Act (HSCA)	State	019-006 (PA cert)	01-31-24
Delaware (DW)	State	N/A	01-31-24
Florida	NELAP	E87997	07-02-23
Georgia (DW)	State	C048	01-31-24
Hawaii	State	N/A	01-31-24

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

Eurofins Sacramento

Accreditation/Certification Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC (Continued)

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

Authority	Program	Identification Number	Expiration Date
Illinois	NELAP	200027	01-31-24
Iowa	State	361	03-01-24
Kansas	NELAP	E-10151	10-31-23
Kentucky (DW)	State	KY90088	12-31-23
Kentucky (UST)	State	0001.01	11-30-24
Kentucky (WW)	State	KY90088	12-31-23
Louisiana (All)	NELAP	02055	06-30-23
Maine	State	2019012	03-12-23
Maryland	State	100	06-30-23
Massachusetts	State	M-PA009	06-30-23
Michigan	State	9930	01-31-24
Minnesota	NELAP	042-999-487	12-31-23
Mississippi	State	023	01-31-24
Missouri	State	450	01-31-25
Montana (DW)	State	0098	01-01-24
Nebraska	State	NE-OS-32-17	01-31-24
New Hampshire	NELAP	2730	01-10-24
New Jersey	NELAP	PA011	06-30-23
New York	NELAP	10670	04-01-23
North Carolina (DW)	State	42705	07-31-23
North Carolina (WW/SW)	State	521	12-31-23
North Dakota	State	R-205	01-31-24
Oklahoma	NELAP	R-205	08-31-23
Oregon	NELAP	PA200001	09-11-23
PALA	Canada	1978	09-16-24
Pennsylvania	NELAP	36-00037	01-31-24
Rhode Island	State	LAO00338	12-31-23
South Carolina	State	89002	01-31-24
Tennessee	State	02838	01-31-24
Texas	NELAP	T104704194-22-45	08-31-23
USDA	US Federal Programs	525-22-298-19481	10-25-25
Vermont	State	VT - 36037	10-28-23
Virginia	NELAP	460182	06-14-23
Washington	State	C457	04-11-23
West Virginia (DW)	State	9906 C	12-31-23
West Virginia DEP	State	055	07-31-23
Wyoming	State	8TMS-L	01-31-24
Wyoming (UST)	A2LA	0001.01	11-30-24

Method Summary

Client: Ensplied Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	EPA	EET SAC
537 (modified)	Fluorinated Alkyl Substances	EPA	EET SAC
ELLE SOP	Total or Organic Fluorine by Combustion Ion Chromatography	ELLE - Lancaster	ELLE
Total PFCA-Dif	Total PFCA (Treatment Difference)	TAL SOP	EET SAC
Total PFCA-Sum	Total PFCA (Summary)	TAL SOP	EET SAC
CIC Prep	Preparation, Fluorine	ELLE - Lancaster	ELLE
MeOH Ext Prep	Solid-Phase Extraction (SPE)	None	EET SAC
TOP Post Prep	Solid-Phase Extraction (SPE)	SW846	EET SAC
TOP Pre - Prep	Solid-Phase Extraction (SPE)	SW846	EET SAC

Protocol References:

ELLE - Lancaster = Eurofins Lancaster, Facility Standard Operating Procedure.

EPA = US Environmental Protection Agency

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

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

Sample Summary

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-95526-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-95526-1	NAS_J_tf_8	Water	12/21/22 16:44	12/22/22 09:50
320-95526-2	NAS_J_tf_10	Water	12/21/22 16:06	12/22/22 09:50
320-95526-3	NAS_O_tf_10	Water	12/21/22 16:44	12/22/22 09:50
320-95526-4	NAS_O_tf_7	Water	12/21/22 16:24	12/22/22 09:50
320-95526-5	TAFB_tf_10	Water	12/21/22 16:12	12/22/22 09:50
320-95526-6	TAFB_tf_7	Water	12/21/22 16:18	12/22/22 09:50
320-95526-7	WPAFB_tf_9	Water	12/21/22 16:05	12/22/22 09:50
320-95526-8	WPAFB_tf_10	Water	12/21/22 16:05	12/22/22 09:50
320-95526-9	NAS_J_tf_8_M	Methanol Extract	12/21/22 16:36	12/22/22 09:50
320-95526-10	NAS_J_tf_10_M	Methanol Extract	12/21/22 16:36	12/22/22 09:50
320-95526-11	NAS_O_tf_10_M	Methanol Extract	12/21/22 16:36	12/22/22 09:50
320-95526-12	NAS_O_tf_7_M	Methanol Extract	12/21/22 16:36	12/22/22 09:50
320-95526-13	TAFB_tf_10_M	Methanol Extract	12/21/22 16:36	12/22/22 09:50
320-95526-14	TAFB_tf_7_M	Methanol Extract	12/21/22 16:36	12/22/22 09:50
320-95526-15	WPAFB_tf_9_M	Methanol Extract	12/21/22 16:36	12/22/22 09:50
320-95526-16	WPAFB_tf_10_M	Methanol Extract	12/21/22 16:36	12/22/22 09:50

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Chain of Custody Record



Client Information		Lab PM:	Carrier Tracking No(s)	COC No:	
Client Contact: Suzanne Witt	Address: 4942 Dawn Ave, Suite 104	Sampler: Erin Hoffman	State of Origin: Michigan	Page: 1 of 2	
Company: Enspired Solutions	City: East Lansing	Phone: (937) 470 9461	E-Mail: Suzanne.witt@enspired.com	Job #:	
State Zip: MI, 48823	Due Date Requested:	PWSID:	Analysis Requested		
Phone: (937) 470 9461	TAT Requested (days):	Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> TPA assay (40 analytes) <input checked="" type="checkbox"/> 300.0 - Fluoride only <input checked="" type="checkbox"/> CIC - Total Fluoride PP15 TO analyte		
Email: suzanne.witt@enspiredsolutions.com	PO #:	WO #:	<input checked="" type="checkbox"/> Perform MS/MSD (Yes or No) <input checked="" type="checkbox"/> Field Filtered Sample (Yes or No)		
Project Name: PHAS PRD Destruction Technology	Project #:	Project #:	<input checked="" type="checkbox"/> Total Number of containers		
Site: Enspired Solutions	SSOW#:	SSOW#:	<input checked="" type="checkbox"/> Special Instructions/Note: 320-95526 Chain of Custody		
Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=soil, BT=tissue, AA=air)	Preservation Code:
NAS-J-tf-8	12/21/22	16:44	G	W	
NAS-J-tf-10	12/21/22	16:06	G	W	
NAS-O-tf-10	12/21/22	16:44	G	W	
NAS-O-tf-7	12/21/22	16:24	G	W	
TAFB-tf-10	12/21/22	16:12	G	W	
TAFB-tf-7	12/21/22	16:18	G	W	
WPFB-tf-9	12/21/22	14:05	G	W	
WPFB-tf-10	12/21/22	16:05	G	W	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, IV, Other (specify)					
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Special Instructions/QC Requirements: REPORT MDL'S					
Empty Kit Relinquished by: _____ Date: _____ Time: _____					
Relinquished by: <i>[Signature]</i> Date/Time: 12/21/22 17:00 Company: ES					
Relinquished by: _____ Date/Time: _____ Company: _____					
Relinquished by: _____ Date/Time: _____ Company: _____					
Custody Seals Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No.: 2123452					
Receives by: <i>[Signature]</i> Date/Time: _____ Company: _____					
Receives by: _____ Date/Time: _____ Company: _____					
Receives by: _____ Date/Time: _____ Company: _____					
Cooler Temperature(s) °C and Other Remarks: 1.2 5x1					



Eurofins Sacramento
 880 Riverside Parkway
 West Sacramento, CA 95605
 Phone (916) 373-5600 Phone (916) 372-1059

Chain of Custody Record

Client Information		Sampler: Erin Hoffman	Lab PM:	Carrier Tracking No(s):	COC No:
Client Contact: Suzanne Witt		Phone: (937) 476-9461	E-Mail: Suzanne.witt@enspiredsolutions.com	State of Origin: Michigan	Page 2 of 2
Company: Inspired Solutions		PWSID:	Analysis Requested		
Address: 4942 Dawn Ave Suite 104		Due Date Requested:	Total Number of Containers		
City: East Lansing		TAT Requested (days):	Perform MS/MSD (Yes or No)		
State / Zip: MI, 48823		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Field Filtered Sample (Yes or No)		
Phone: (937) 476-9461		PO #:	Special Instructions/Note:		
Email: Suzanne.witt@enspiredsolutions.com		WO #:	Preservation Codes: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 X - EDTA Y - Trizma Z - other (specify) Other:		
Project Name: Enspired Solutions PFAS-LP D Destruction Technology		SSOW#:	Special Instructions/Note:		
Site: Enspired Solutions					
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Water, Swab, Oil, Other)	Preservation Code
NAS-J-ff-8-M	12/21/22	16:30	G	W	W
NAS-J-ff-10-M	12/21/22	16:36	G	W	W
NAS-O-ff-10-M	12/21/22	16:36	G	W	W
NAS-O-ff-7-M	12/21/22	16:36	G	W	W
TAFB-ff-10-M	12/21/22	16:36	G	W	W
TAFB-ff-7-M	12/21/22	16:36	G	W	W
WPAFB-ff-9-M	12/21/22	16:36	G	W	W
WPAFB-ff-10-M	12/21/22	16:36	G	W	W
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, IV, Other (specify)					
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Special Instructions/QC Requirements: REPORT MDL'S					
Empty Kit Relinquished by: _____ Date: _____					
Relinquished by: Suzanne Witt Date: 12/21/22 17:00 Company: ES					
Relinquished by: _____ Date: _____ Company: _____					
Relinquished by: _____ Date: _____ Company: _____					
Custody Seals Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Custody Seal No: 2123456					
Cooler Temperature(s) °C and Other Remarks: 12 34					



Sample ID	Approximate total [PFAS] (ppm)	Approximate [Fluoride] (ppm)	Approximate [organic Fluorine] (ppm)	Approximate [CTAB] (ppm)	Other known constituents/notes
NAS_J_tf_8	low ppb - ppt	0.300	low ppb - ppt	< 0.1	This is a groundwater sample
NAS_J_tf_10	low ppb - ppt	0.330	low ppb - ppt	< 0.1	This is a groundwater sample
NAS_O_tf_10	45	20	30	< 0.1	This is the foamate collected from groundwater foam fractionation
NAS_O_tf_7	45	20	30	< 0.1	This is the foamate collected from groundwater foam fractionation
TAFB_tf_10	low ppb - ppt	25	25	< 0.1	This is the rinsate from washing out AFFF from a firefighting truck. The truck was rinsed with water.
TAFB_tf_7	low ppb - ppt	35	low ppb - ppt	< 0.1	This is the rinsate from washing out AFFF from a firefighting truck. The truck was rinsed with water.
WPAFB_tf_9	low ppb - ppt	2	low ppb - ppt	< 0.1	This is groundwater that has been treated with nanofiltration to remove PFAS. Sample is the nanofiltration reject/PFAS concentrate.
WPAFB_tf_10	low ppb - ppt	2	low ppb - ppt	< 0.1	This is groundwater that has been treated with nanofiltration to remove PFAS. Sample is the nanofiltration reject/PFAS concentrate.
NAS_J_tf_8_M	n/a	n/a	n/a	n/a	Methanol rinse of reaction vessel
NAS_J_tf_10_M	n/a	n/a	n/a	n/a	Methanol rinse of reaction vessel
NAS_O_tf_10_M	n/a	n/a	n/a	n/a	Methanol rinse of reaction vessel
NAS_O_tf_7_M	n/a	n/a	n/a	n/a	Methanol rinse of reaction vessel
TAFB_tf_10_M	n/a	n/a	n/a	n/a	Methanol rinse of reaction vessel
TAFB_tf_7_M	n/a	n/a	n/a	n/a	Methanol rinse of reaction vessel
WPAFB_tf_9_M	n/a	n/a	n/a	n/a	Methanol rinse of reaction vessel
WPAFB_tf_10_M	n/a	n/a	n/a	n/a	Methanol rinse of reaction vessel



Eurofins Sacramento

880 Riverside Parkway
West Sacramento, CA 95605
Phone: 916-373-5600 Fax: 916-372-1059

Chain of Custody Record



Environment Testing

Client Information (Sub Contract Lab)				Sampler:	Lab PM:	Carrier Tracking No(s):	COC No:	
Client Contact: Shipping/Receiving				Phone:	Turpen, Laura		320-294751.1	
Company: Eurofins Lancaster Laboratories Environm				E-Mail:	Laura.Turpen@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1	
Address: 2425 New Holland Pike,				Accreditations Required (See note):		Michigan	Job #: 320-95526-1	
City: Lancaster				Due Date Requested: 2/13/2023	Analysis Requested			Preservation Codes: A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Y - Trizma Z - other (specify)
State, Zip: PA, 17601				TAT Requested (days):				
Phone: 717-656-2300(Tel)				PO #:	Field Filtered Sample (Yes or No)			Total Number of containers
Email:				WO #:				
Project Name: PFAS PRD Destruction Technology				Project #: 32020425	Perform MS/MSD (Yes or No)			CIC_Fluorine/CIC_DI_Prep Total Fluorine
Site:				SSOW#:				
Sample Identification - Client ID (Lab ID)				Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Special Instructions/Note:
				Preservation Code:				
NAS_J_tf_8 (320-95526-1)				12/21/22	16:44 Eastern		Water	low ppb-ppt Organic Fluorine
NAS_J_tf_10 (320-95526-2)				12/21/22	16:06 Eastern		Water	low ppb-ppt Organic Fluorine
NAS_O_tf_10 (320-95526-3)				12/21/22	16:44 Eastern		Water	-30 ppm organic Fluorine
NAS_O_tf_7 (320-95526-4)				12/21/22	16:24 Eastern		Water	-30 ppm organic Fluorine
TAFB_tf_10 (320-95526-5)				12/21/22	16:12 Eastern		Water	-25 ppm organic Fluorine
TAFB_tf_7 (320-95526-6)				12/21/22	16:18 Eastern		Water	low ppb-ppt Organic Fluorine
WPAFB_tf_9 (320-95526-7)				12/21/22	16:05 Eastern		Water	low ppb-ppt Organic Fluorine
WPAFB_tf_10 (320-95526-8)				12/21/22	16:05 Eastern		Water	low ppb-ppt Organic Fluorine
<p>Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northern California, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northern California, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northern California, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Northern California, LLC.</p>								
Possible Hazard Identification				Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)				
Unconfirmed				<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months				
Deliverable Requested: I, II, III, IV, Other (specify)				Primary Deliverable Rank: 2		Special Instructions/QC Requirements:		
Empty Kit Relinquished by:				Date:	Time:	Method of Shipment:		
Relinquished by: <i>[Signature]</i>				Date/Time: 12-27-22/16:30	Company: <i>[Signature]</i>	Received by: _____ Date/Time: _____ Company: _____		
Relinquished by: _____				Date/Time: _____	Company: _____	Received by: _____ Date/Time: _____ Company: _____		
Relinquished by: _____				Date/Time: _____	Company: _____	Received by: <i>[Signature]</i> Date/Time: 12/30/22 10:21 Company: <i>[Signature]</i>		
Custody Seals Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 0.4				

[Handwritten mark]

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Login Sample Receipt Checklist

Client: Enspired Solutions

Job Number: 320-95526-1

Login Number: 95526

List Source: Eurofins Sacramento

List Number: 1

Creator: Simmons, Jason C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are 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.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	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	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Enspired Solutions

Job Number: 320-95526-1

Login Number: 95526
List Number: 2
Creator: McBeth, Jessica

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC
List Creation: 12/30/22 02:21 PM

Question	Answer	Comment
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 ($\leq 6^{\circ}\text{C}$, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable ($\leq 6^{\circ}\text{C}$, 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	
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	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	N/A	



 **ANALYTICAL REPORT****PREPARED FOR**

Attn: Suzanne Witt
Enspired Solutions
9047 West Scenic Lake Dr
Laingsburg, Michigan 48848

Generated 11/7/2023 10:43:50 AM Revision 1

JOB DESCRIPTION

PFAS PRD Destruction Technology

JOB NUMBER

320-96016-1

Job Notes

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The data in the report relate to the field sample(s) as received by the laboratory and associated QC. All results have been reviewed and have been found to be compliant with laboratory and accreditation requirements, with the exception of the noted deviation(s). For questions, please contact the Project Manager.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northern California, LLC Project Manager.

Authorization



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Revision 1

Authorized for release by
Laura Turpen, Project Manager I
Laura.Turpen@et.eurofinsus.com
(916)374-4414



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Definitions/Glossary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
E	Result exceeded calibration range.
F1	MS and/or MSD recovery exceeds control limits.
H	Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

LCMS

Qualifier	Qualifier Description
*-	LCS and/or LCSD is outside acceptance limits, low biased.
*+	LCS and/or LCSD is outside acceptance limits, high biased.
*1	LCS/LCSD RPD exceeds control limits.
*5-	Isotope dilution analyte is outside acceptance limits, low biased.
*5+	Isotope dilution analyte is outside acceptance limits, high biased.
H	Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
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

Case Narrative

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Job ID: 320-96016-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative 320-96016-1

Revision

This report and the associated EDD were revised November 7, 2023 to provide data reported to the MDL. MDL studies have not been performed for TOPS assay, but values for our standard PFAS modified 537 method have been applied. Data did change as a result of this revision.

Receipt

The samples were received on 1/16/2023 8:50 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 5.1° C.

LCMS

Method 537 (modified): Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the following sample: (MB 320-649930/1-A). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method 537 (modified): The Isotope Dilution Analyte (IDA) recovery associated with the following sample is below the method recommended limit: (MB 320-649929/1-A). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample.

Method 537 (modified): The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 320-649930 and analytical batch 320-654848 recovered outside control limits for the following analytes: N-ethylperfluorooctane sulfonamide (NEtFOSA). The client was contacted and gave permission to report.

Method 537 (modified): The RPD of the laboratory control sample duplicate (LCSD) for preparation batch 320-649930 and analytical batch 320-654848 recovered outside control limits for the following analyte: 6:2 Fluorotelomer sulfonic acid (6:2 FTS).

Method 537 (modified): The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 320-649929 and analytical batch 320-654848 recovered outside control limits for the following analytes: 11Cl-PF3OUdS. The client was contacted and gave permission to report.

Method 537 (modified): The RPD of the laboratory control sample duplicate (LCSD) for preparation batch 320-649929 and analytical batch 320-654848 recovered outside control limits for the following analyte: Perfluorotetradecanoic acid (PFTeA) and Perfluorododecanesulfonic acid (PFDoS).

Method 537 (modified): The laboratory control sample (LCS) for preparation batch 320-649929 and analytical batch 320-654848 recovered outside control limits for the following analytes: Perfluorotridecanoic acid (PFTrDA), Perfluorotetradecanoic acid (PFTeA) and Perfluorododecanesulfonic acid (PFDoS). The client was contacted and gave permission to report.

Method 537 (modified): Zero percent recovery of precursor analytes (such as 4:2 FTS, 6:2 FTS, 8:2 FTS, FOSA, NMeFOSAA, NEtFOSAA, etc.) and enhanced recoveries of PFCA is observed in the Post-Treatment Laboratory Control Sample (LCS) and Post-Treatment Laboratory Control Sample Duplicate (LCSD) associated with these samples, consistent with the expected oxidation of precursor analytes. The existing LCS control limits are based upon our historical performance for a set of 24-36 analytes in the LCS solution. We have recently expanded to 70+ analytes. As the LCS solution now contains new/additional precursor analytes we are seeing enhanced recoveries for some PFCA vs. the historical limits as a result. The LCS results are flagged as being high and outside of the established limits for some analytes; however, this is a function of the new analytes in the LCS solution and not indicative of an "out of control" process.

(LCS 320-649929/2-A) and (LCSD 320-649929/3-A)

Method 537 (modified): Internal standard (ISTD) response for the following samples was outside control limits: ANG_1_tf_10 (320-96016-1) and ANG_1_tf_9 (320-96016-2). The samples were analyzed outside analytical hold and the ISTD was within control limits. However, the in-hold data is being reporting with ISTD failure due to the samples were analyzed outside analytical holding time and quality control failures in continuing calibration verification (CCV). The ISTD is not used to quantitate the target analytes; therefore there is no adverse affect on the data.

Case Narrative

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Job ID: 320-96016-1 (Continued)

Laboratory: Eurofins Sacramento (Continued)

Method 537 (modified): The labeled analyte M2-4:2FTS is employed in this analysis as a "Reverse Surrogate". It is used to monitor the oxidation efficiency of the TOP assay. This analyte is fortified into all sample fractions prior to any processing. The recovery of this analyte should be 0% in Post-Treatment fractions, indicating complete oxidation of the sample. ANG_1_tf_10 (320-96016-1), ANG_1_tf_9 (320-96016-2), (LCS 320-649929/2-A), (LCSD 320-649929/3-A) and (MB 320-649929/1-A)

Method 537 (modified): The "I" qualifier means the transition mass ratio for the indicated analyte was above the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty, and the reported value may have some high bias. However, analyst judgment was used to positively identify the analyte.

Method ELLE SOP: Reporting limits were raised for the following samples due to interference from the sample matrix. ANG_1_tf_10 (320-96016-1) and ANG_1_tf_9 (320-96016-2)

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

General Chemistry

Method 300.0: The following samples were diluted due to the nature of the sample matrix: ANG_1_tf_10 (320-96016-1), ANG_1_tf_9 (320-96016-2), (320-96016-A-1 MS) and (320-96016-A-1 MSD). Elevated reporting limits (RLs) are provided.

Method 300.0: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 320-653424 were outside control limits for fluoride. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

Method 300.0: Reanalysis of the following sample in analytical batch 320-653424 was performed outside of the analytical holding time. The initial, in-hold analysis, was ran at a 5x based on matrix conductivity. The result for fluoride was over the upper calibration range and E flagged. The sample was re-analyzed at a 10x dilution outside of the holding time. Both sets of data are reported.

Method 300.0: The following samples in analytical batch 320-653424 were diluted to bring the concentration of target analytes within the calibration range: ANG_1_tf_10 (320-96016-1), (320-96016-A-1 MS) and (320-96016-A-1 MSD). Elevated reporting limits (RLs) are provided.

Method 300.0: The continuing calibration blank for analytical batch 320-653424 contained Fluoride above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and/or re-analysis of samples was not performed.

Method 300.0: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 320-653084 were outside control limits for one or more analytes, see QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

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

Organic Prep

Method TOP Post Prep: The following samples were prepared outside of preparation holding time due to scheduling error: ANG_1_tf_10 (320-96016-1) and ANG_1_tf_9 (320-96016-2).

Method TOP Post Prep: Due to the matrix, the initial volumes used for the following samples deviated from the standard procedure: ANG_1_tf_10 (320-96016-1) and ANG_1_tf_9 (320-96016-2). A 2,000,000x dilution was made on the sample, then fortified with IDA and extracted. The reporting limits (RLs) have been adjusted proportionately.

Method TOP Pre - Prep: The following samples were prepared outside of preparation holding time due to scheduling error: ANG_1_tf_10 (320-96016-1) and ANG_1_tf_9 (320-96016-2).

Method TOP Pre - Prep: Due to the matrix, the initial volumes used for the following samples deviated from the standard procedure: ANG_1_tf_10 (320-96016-1) and ANG_1_tf_9 (320-96016-2). A 2,000,000x dilution was made on the sample, then fortified with IDA and extracted. The reporting limits (RLs) have been adjusted proportionately.

Case Narrative

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Job ID: 320-96016-1 (Continued)

Laboratory: Eurofins Sacramento (Continued)

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

VOA Prep

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

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Detection Summary

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Client Sample ID: ANG_1_tf_10

Lab Sample ID: 320-96016-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	88	E F1 B	2.5	0.27	mg/L	5		300.0	Total/NA
Fluoride	110	H F1	5.0	0.53	mg/L	10		300.0	Total/NA
Perfluorobutanoic acid (PFBA)	24000000	J	25000000	12000000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanoic acid (PFPeA)	9400000	J	10000000	2400000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	15000000		10000000	2800000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	1400000	J	10000000	1300000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS)	10000000		10000000	1000000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanesulfonic acid (PFPeS)	7400000	J	10000000	1500000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	22000000		10000000	860000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	41000000	*+	25000000	12000000	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA)	14000000	*+	10000000	2400000	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA)	18000000	*+	10000000	2800000	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	2300000	J *+	10000000	1300000	ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS)	11000000		10000000	1000000	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanesulfonic acid (PFPeS)	7200000	J	10000000	1500000	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS)	22000000		10000000	860000	ng/L	1		537 (modified)	Post-Treatment
Total Fluorine (TF)	330000		20000	10000	ug/L	1		ELLE SOP	Total/NA
PFBA	41000000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	14000000				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	2700000				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	58000000				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	0.00				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	0.00				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	15000000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	0.00				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	0.00				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFNA	0.00				ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	15000000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	41000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	14000000				ng/L	1		Total PFCA-Sum	Post-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Client Sample ID: ANG_1_tf_10 (Continued)

Lab Sample ID: 320-96016-1

Analyte	Result	Qualifier	NONE	NONE	Unit	Dil Fac	D	Method	Prep Type
PFHxA	18000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	0.00				ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	0.00				ng/L	1		Total PFCA-Sum	Post-Treatment
PFNA	0.00				ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	73000000				ng/L	1		Total PFCA-Sum	Post-Treatment

Client Sample ID: ANG_1_tf_9

Lab Sample ID: 320-96016-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	64	B	2.5	0.27	mg/L	5		300.0	Total/NA
Perfluorobutanoic acid (PFBA)	26000000		25000000	12000000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanoic acid (PFPeA)	12000000		10000000	2400000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	15000000		10000000	2800000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	1700000	J	10000000	1300000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS)	10000000		10000000	1000000	ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanesulfonic acid (PFPeS)	7700000	J	10000000	1500000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	19000000		10000000	860000	ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	37000000	*+	25000000	12000000	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA)	11000000	*+	10000000	2400000	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA)	18000000	I *+	10000000	2800000	ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	2100000	J *+	10000000	1300000	ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS)	12000000		10000000	1000000	ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanesulfonic acid (PFPeS)	6100000	J	10000000	1500000	ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS)	19000000		10000000	860000	ng/L	1		537 (modified)	Post-Treatment
Total Fluorine (TF)	270000		20000	10000	ug/L	1		ELLE SOP	Total/NA
PFBA	11000000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	2300000				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	13000000				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	26000000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	12000000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	15000000				ng/L	1		Total PFCA-Sum	Pre-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Client Sample ID: ANG_1_tf_9 (Continued)

Lab Sample ID: 320-96016-2

Analyte	Result	Qualifier	NONE	NONE	Unit	Dil Fac	D	Method	Prep Type
PFHpA	0.00				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	0.00				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFNA	0.00				ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	53000000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	37000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	11000000				ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	18000000	I			ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	0.00				ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	0.00				ng/L	1		Total PFCA-Sum	Post-Treatment
PFNA	0.00				ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	66000000				ng/L	1		Total PFCA-Sum	Post-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento



Total Oxidation Precursors

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

TestAmerica Job ID: 320-96016-1

Client Sample ID: ANG_1_tf_10

Lab Sample ID: 320-96016-1
 Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	0.00		ng/L	41000000		ng/L	41000000	ng/L
Perfluorobutanoic acid (PFBA)	24000000	J	ng/L	41000000		ng/L	41000000	ng/L
PFPA	0.00		ng/L	14000000		ng/L	14000000	ng/L
Perfluoropentanoic acid (PFPeA)	9400000	J	ng/L	14000000		ng/L	14000000	ng/L
PFHxA	15000000		ng/L	18000000		ng/L	2700000	ng/L
Perfluorohexanoic acid (PFHxA)	15000000		ng/L	18000000		ng/L	2700000	ng/L
PFHpA	0.00		ng/L	0.00		ng/L	0.00	ng/L
Perfluoroheptanoic acid (PFHpA)	1400000	J	ng/L	2300000	J	ng/L	0.00	ng/L
PFOA	0.00		ng/L	0.00		ng/L	0.00	ng/L
Perfluorooctanoic acid (PFOA)	ND		ng/L	ND		ng/L	0.00	ng/L
PFNA	0.00		ng/L	0.00		ng/L	0.00	ng/L
Perfluorononanoic acid (PFNA)	ND		ng/L	ND		ng/L	0.00	ng/L
Total PFCA	15000000		ng/L	73000000		ng/L	58000000	ng/L

Client Sample ID: ANG_1_tf_9

Lab Sample ID: 320-96016-2
 Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	Total PFCA-Sum			Total PFCA-Sum			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
PFBA	26000000		ng/L	37000000		ng/L	11000000	ng/L
Perfluorobutanoic acid (PFBA)	26000000		ng/L	37000000		ng/L	11000000	ng/L
PFPA	12000000		ng/L	11000000		ng/L	0.00	ng/L
Perfluoropentanoic acid (PFPeA)	12000000		ng/L	11000000		ng/L	0.00	ng/L
PFHxA	15000000		ng/L	18000000		ng/L	2300000	ng/L
Perfluorohexanoic acid (PFHxA)	15000000		ng/L	18000000		ng/L	2300000	ng/L
PFHpA	0.00		ng/L	0.00		ng/L	0.00	ng/L
Perfluoroheptanoic acid (PFHpA)	1700000	J	ng/L	2100000	J	ng/L	0.00	ng/L
PFOA	0.00		ng/L	0.00		ng/L	0.00	ng/L
Perfluorooctanoic acid (PFOA)	ND		ng/L	ND		ng/L	0.00	ng/L
PFNA	0.00		ng/L	0.00		ng/L	0.00	ng/L
Perfluorononanoic acid (PFNA)	ND		ng/L	ND		ng/L	0.00	ng/L
Total PFCA	53000000		ng/L	66000000		ng/L	13000000	ng/L

¹ Difference = Post-Treatment - Pre-Treatment

Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Client Sample ID: ANG_1_tf_10

Lab Sample ID: 320-96016-1

Date Collected: 01/13/23 13:00

Matrix: Water

Date Received: 01/16/23 08:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	88	E F1 B	2.5	0.27	mg/L			02/10/23 14:57	5
Fluoride	110	H F1	5.0	0.53	mg/L			02/13/23 16:05	10

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	24000000	J	25000000	12000000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluoropentanoic acid (PFPeA)	9400000	J	10000000	2400000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluorohexanoic acid (PFHxA)	15000000		10000000	2800000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluoroheptanoic acid (PFHpA)	1400000	J	10000000	1300000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluorooctanoic acid (PFOA)	ND		10000000	4200000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluorononanoic acid (PFNA)	ND		10000000	1400000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluorodecanoic acid (PFDA)	ND		10000000	1600000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluoroundecanoic acid (PFUnA)	ND		10000000	5600000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluorododecanoic acid (PFDoA)	ND		10000000	2800000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluorotridecanoic acid (PFTrDA)	ND		10000000	6400000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluorotetradecanoic acid (PFTeA)	ND		10000000	1500000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluorobutanesulfonic acid (PFBS)	10000000		10000000	1000000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluoropentanesulfonic acid (PFPeS)	7400000	J	10000000	1500000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluorohexanesulfonic acid (PFHxS)	22000000		10000000	860000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		10000000	960000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluorooctanesulfonic acid (PFOS)	ND		10000000	1600000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluorononanesulfonic acid (PFNS)	ND		10000000	800000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluorodecanesulfonic acid (PFDS)	ND		10000000	2800000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluorododecanesulfonic acid (PFDoS)	ND		10000000	4800000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluorooctanesulfonamide (FOSA)	ND		10000000	1800000	ng/L		01/27/23 12:24	02/08/23 14:45	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		25000000	6000000	ng/L		01/27/23 12:24	02/08/23 14:45	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		25000000	6500000	ng/L		01/27/23 12:24	02/08/23 14:45	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		10000000	1200000	ng/L		01/27/23 12:24	02/08/23 14:45	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND *1		25000000	13000000	ng/L		01/27/23 12:24	02/08/23 14:45	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		10000000	2300000	ng/L		01/27/23 12:24	02/08/23 14:45	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND *-		10000000	4400000	ng/L		01/27/23 12:24	02/08/23 14:45	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		10000000	2200000	ng/L		01/27/23 12:24	02/08/23 14:45	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		20000000	7000000	ng/L		01/27/23 12:24	02/08/23 14:45	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		10000000	4400000	ng/L		01/27/23 12:24	02/08/23 14:45	1
9CI-PF3ONS	ND		10000000	1200000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		20000000	7600000	ng/L		01/27/23 12:24	02/08/23 14:45	1
11CI-PF3OUdS	ND		10000000	1600000	ng/L		01/27/23 12:24	02/08/23 14:45	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		10000000	2000000	ng/L		01/27/23 12:24	02/08/23 14:45	1

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Client Sample Results

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Client Sample ID: ANG_1_tf_10

Lab Sample ID: 320-96016-1

Date Collected: 01/13/23 13:00

Matrix: Water

Date Received: 01/16/23 08:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
3:3 FTCA	ND		10000000	2200000	ng/L		01/27/23 12:24	02/08/23 14:45	1
5:3 FTCA	ND		10000000	1600000	ng/L		01/27/23 12:24	02/08/23 14:45	1
7:3 FTCA	ND		10000000	2800000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		10000000	1400000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		10000000	1400000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		10000000	1400000	ng/L		01/27/23 12:24	02/08/23 14:45	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	114		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C4 PFBA	119		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C5 PFPeA	123		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C2 PFHxA	121		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C4 PFHpA	123		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C4 PFOA	117		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C5 PFNA	119		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C2 PFDA	128		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C2 PFUnA	113		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C2 PFDoA	121		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C2 PFTeDA	124		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C3 PFBS	109		25 - 150				01/27/23 12:24	02/08/23 14:45	1
18O2 PFHxS	123		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C4 PFOS	123		25 - 150				01/27/23 12:24	02/08/23 14:45	1
d3-NMeFOSAA	110		25 - 150				01/27/23 12:24	02/08/23 14:45	1
d5-NEtFOSAA	115		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C2 4:2 FTS	117		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C2 6:2 FTS	132		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C2 8:2 FTS	126		25 - 150				01/27/23 12:24	02/08/23 14:45	1
d-N-MeFOSA-M	68		25 - 150				01/27/23 12:24	02/08/23 14:45	1
d-N-EtFOSA-M	54		25 - 150				01/27/23 12:24	02/08/23 14:45	1
d7-N-MeFOSE-M	34		25 - 150				01/27/23 12:24	02/08/23 14:45	1
d9-N-EtFOSE-M	27		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C3 HFPO-DA	123		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C-6:2 FTCA	100		25 - 150				01/27/23 12:24	02/08/23 14:45	1
13C-8:2 FTCA	102		25 - 150				01/27/23 12:24	02/08/23 14:45	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	10000000	3200000	ng/L		01/27/23 12:24	03/18/23 05:39	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	102		25 - 150				01/27/23 12:24	03/18/23 05:39	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	41000000	*+	25000000	12000000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluoropentanoic acid (PFPeA)	14000000	*+	10000000	2400000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluorohexanoic acid (PFHxA)	18000000	*+	10000000	2800000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluoroheptanoic acid (PFHpA)	2300000	J*+	10000000	1300000	ng/L		01/27/23 12:19	02/08/23 15:47	1

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Client Sample Results

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Client Sample ID: ANG_1_tf_10

Lab Sample ID: 320-96016-1

Date Collected: 01/13/23 13:00

Matrix: Water

Date Received: 01/16/23 08:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		10000000	4200000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluorononanoic acid (PFNA)	ND	+	10000000	1400000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluorodecanoic acid (PFDA)	ND	+	10000000	1600000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluoroundecanoic acid (PFUnA)	ND		10000000	5600000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluorododecanoic acid (PFDoA)	ND		10000000	2800000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluorotridecanoic acid (PFTrDA)	ND	-	10000000	6400000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluorotetradecanoic acid (PFTeA)	ND	*- *1	10000000	1500000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluorobutanesulfonic acid (PFBS)	11000000		10000000	1000000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluoropentanesulfonic acid (PFPeS)	7200000	J	10000000	1500000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluorohexanesulfonic acid (PFHxS)	22000000		10000000	860000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		10000000	960000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluorooctanesulfonic acid (PFOS)	ND		10000000	1600000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluorononanesulfonic acid (PFNS)	ND		10000000	800000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluorodecanesulfonic acid (PFDS)	ND		10000000	2800000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluorododecanesulfonic acid (PFDoS)	ND	*- *1	10000000	4800000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluorooctanesulfonamide (FOSA)	ND		10000000	1800000	ng/L		01/27/23 12:19	02/08/23 15:47	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		25000000	6000000	ng/L		01/27/23 12:19	02/08/23 15:47	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		25000000	6500000	ng/L		01/27/23 12:19	02/08/23 15:47	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		10000000	1200000	ng/L		01/27/23 12:19	02/08/23 15:47	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		25000000	13000000	ng/L		01/27/23 12:19	02/08/23 15:47	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		10000000	2300000	ng/L		01/27/23 12:19	02/08/23 15:47	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		10000000	4400000	ng/L		01/27/23 12:19	02/08/23 15:47	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		10000000	2200000	ng/L		01/27/23 12:19	02/08/23 15:47	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		20000000	7000000	ng/L		01/27/23 12:19	02/08/23 15:47	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		10000000	4400000	ng/L		01/27/23 12:19	02/08/23 15:47	1
9Cl-PF3ONS	ND		10000000	1200000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		20000000	7600000	ng/L		01/27/23 12:19	02/08/23 15:47	1
11Cl-PF3OUdS	ND	-	10000000	1600000	ng/L		01/27/23 12:19	02/08/23 15:47	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		10000000	2000000	ng/L		01/27/23 12:19	02/08/23 15:47	1
3:3 FTCA	ND		10000000	2200000	ng/L		01/27/23 12:19	02/08/23 15:47	1
5:3 FTCA	ND		10000000	1600000	ng/L		01/27/23 12:19	02/08/23 15:47	1
7:3 FTCA	ND		10000000	2800000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		10000000	1400000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	+	10000000	1400000	ng/L		01/27/23 12:19	02/08/23 15:47	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		10000000	1400000	ng/L		01/27/23 12:19	02/08/23 15:47	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Client Sample ID: ANG_1_tf_10

Lab Sample ID: 320-96016-1

Date Collected: 01/13/23 13:00

Matrix: Water

Date Received: 01/16/23 08:50

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	112		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C4 PFBA	139		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C5 PFPeA	136		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C2 PFHxA	142		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C4 PFHpA	129		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C4 PFOA	124		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C5 PFNA	126		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C2 PFDA	130		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C2 PFUnA	116		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C2 PFDoA	113		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C2 PFTeDA	120		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C3 PFBS	128		25 - 150	01/27/23 12:19	02/08/23 15:47	1
18O2 PFHxS	144		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C4 PFOS	122		25 - 150	01/27/23 12:19	02/08/23 15:47	1
d3-NMeFOSAA	98		25 - 150	01/27/23 12:19	02/08/23 15:47	1
d5-NEtFOSAA	94		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C2 4:2 FTS	0		0 - 10	01/27/23 12:19	02/08/23 15:47	1
13C2 6:2 FTS	124		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C2 8:2 FTS	116		25 - 150	01/27/23 12:19	02/08/23 15:47	1
d-N-MeFOSA-M	38		25 - 150	01/27/23 12:19	02/08/23 15:47	1
d-N-EtFOSA-M	35		25 - 150	01/27/23 12:19	02/08/23 15:47	1
d7-N-MeFOSE-M	40		25 - 150	01/27/23 12:19	02/08/23 15:47	1
d9-N-EtFOSE-M	37		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C3 HFPO-DA	144		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C-6:2 FTCA	112		25 - 150	01/27/23 12:19	02/08/23 15:47	1
13C-8:2 FTCA	75		25 - 150	01/27/23 12:19	02/08/23 15:47	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	10000000	3200000	ng/L		01/27/23 12:19	03/18/23 04:39	1
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
13C2 PFHxA	105		25 - 150	01/27/23 12:19	03/18/23 04:39	1			

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	330000		20000	10000	ug/L		03/10/23 09:57	03/10/23 14:53	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	41000000				ng/L			03/23/23 08:40	1
PFPA	14000000				ng/L			03/23/23 08:40	1
PFHxA	27000000				ng/L			03/23/23 08:40	1
PFHpA	0.00				ng/L			03/23/23 08:40	1
PFOA	0.00				ng/L			03/23/23 08:40	1
PFNA	0.00				ng/L			03/23/23 08:40	1
Total PFCA	58000000				ng/L			03/23/23 08:40	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	0.00				ng/L			03/23/23 08:32	1

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Client Sample Results

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Client Sample ID: ANG_1_tf_10

Lab Sample ID: 320-96016-1

Date Collected: 01/13/23 13:00

Matrix: Water

Date Received: 01/16/23 08:50

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment (Continued)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFPA	0.00				ng/L			03/23/23 08:32	1
PFHxA	15000000				ng/L			03/23/23 08:32	1
PFHpA	0.00				ng/L			03/23/23 08:32	1
PFOA	0.00				ng/L			03/23/23 08:32	1
PFNA	0.00				ng/L			03/23/23 08:32	1
Total PFCA	15000000				ng/L			03/23/23 08:32	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	41000000				ng/L			03/23/23 08:36	1
PFPA	14000000				ng/L			03/23/23 08:36	1
PFHxA	18000000				ng/L			03/23/23 08:36	1
PFHpA	0.00				ng/L			03/23/23 08:36	1
PFOA	0.00				ng/L			03/23/23 08:36	1
PFNA	0.00				ng/L			03/23/23 08:36	1
Total PFCA	73000000				ng/L			03/23/23 08:36	1

Client Sample ID: ANG_1_tf_9

Lab Sample ID: 320-96016-2

Date Collected: 01/13/23 13:15

Matrix: Water

Date Received: 01/16/23 08:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	64	B	2.5	0.27	mg/L			02/10/23 15:50	5

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	26000000		25000000	12000000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluoropentanoic acid (PFPeA)	12000000		10000000	2400000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluorohexanoic acid (PFHxA)	15000000		10000000	2800000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluoroheptanoic acid (PFHpA)	1700000	J	10000000	1300000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluorooctanoic acid (PFOA)	ND		10000000	4200000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluorononanoic acid (PFNA)	ND		10000000	1400000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluorodecanoic acid (PFDA)	ND		10000000	1600000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluoroundecanoic acid (PFUnA)	ND		10000000	5600000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluorododecanoic acid (PFDoA)	ND		10000000	2800000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluorotridecanoic acid (PFTrDA)	ND		10000000	6400000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluorotetradecanoic acid (PFTeA)	ND		10000000	1500000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluorobutanesulfonic acid (PFBS)	10000000		10000000	1000000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluoropentanesulfonic acid (PFPeS)	7700000	J	10000000	1500000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluorohexanesulfonic acid (PFHxS)	19000000		10000000	860000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		10000000	960000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluorooctanesulfonic acid (PFOS)	ND		10000000	1600000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluorononanesulfonic acid (PFNS)	ND		10000000	800000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluorodecanesulfonic acid (PFDS)	ND		10000000	2800000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluorododecanesulfonic acid (PFDoS)	ND		10000000	4800000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluorooctanesulfonamide (FOSA)	ND		10000000	1800000	ng/L		01/27/23 12:24	02/08/23 14:56	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Client Sample ID: ANG_1_tf_9

Lab Sample ID: 320-96016-2

Date Collected: 01/13/23 13:15

Matrix: Water

Date Received: 01/16/23 08:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		25000000	6000000	ng/L		01/27/23 12:24	02/08/23 14:56	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		25000000	6500000	ng/L		01/27/23 12:24	02/08/23 14:56	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		10000000	1200000	ng/L		01/27/23 12:24	02/08/23 14:56	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND	*1	25000000	13000000	ng/L		01/27/23 12:24	02/08/23 14:56	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		10000000	2300000	ng/L		01/27/23 12:24	02/08/23 14:56	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	*-	10000000	4400000	ng/L		01/27/23 12:24	02/08/23 14:56	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		10000000	2200000	ng/L		01/27/23 12:24	02/08/23 14:56	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		20000000	7000000	ng/L		01/27/23 12:24	02/08/23 14:56	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		10000000	4400000	ng/L		01/27/23 12:24	02/08/23 14:56	1
9CI-PF3ONS	ND		10000000	1200000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		20000000	7600000	ng/L		01/27/23 12:24	02/08/23 14:56	1
11CI-PF3OUdS	ND		10000000	1600000	ng/L		01/27/23 12:24	02/08/23 14:56	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		10000000	2000000	ng/L		01/27/23 12:24	02/08/23 14:56	1
3:3 FTCA	ND		10000000	2200000	ng/L		01/27/23 12:24	02/08/23 14:56	1
5:3 FTCA	ND		10000000	1600000	ng/L		01/27/23 12:24	02/08/23 14:56	1
7:3 FTCA	ND		10000000	2800000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		10000000	1400000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		10000000	1400000	ng/L		01/27/23 12:24	02/08/23 14:56	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		10000000	1400000	ng/L		01/27/23 12:24	02/08/23 14:56	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	108		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C4 PFBA	127		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C5 PFPeA	113		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C2 PFHxA	117		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C4 PFHpA	119		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C4 PFOA	114		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C5 PFNA	108		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C2 PFDA	121		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C2 PFUnA	118		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C2 PFDoA	122		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C2 PFTeDA	114		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C3 PFBS	102		25 - 150	01/27/23 12:24	02/08/23 14:56	1
18O2 PFHxS	121		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C4 PFOS	119		25 - 150	01/27/23 12:24	02/08/23 14:56	1
d3-NMeFOSAA	105		25 - 150	01/27/23 12:24	02/08/23 14:56	1
d5-NEtFOSAA	108		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C2 4:2 FTS	127		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C2 6:2 FTS	122		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C2 8:2 FTS	142		25 - 150	01/27/23 12:24	02/08/23 14:56	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Client Sample ID: ANG_1_tf_9

Lab Sample ID: 320-96016-2

Date Collected: 01/13/23 13:15

Matrix: Water

Date Received: 01/16/23 08:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
d-N-MeFOSA-M	73		25 - 150	01/27/23 12:24	02/08/23 14:56	1
d-N-EtFOSA-M	52		25 - 150	01/27/23 12:24	02/08/23 14:56	1
d7-N-MeFOSE-M	31		25 - 150	01/27/23 12:24	02/08/23 14:56	1
d9-N-EtFOSE-M	30		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C3 HFPO-DA	129		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C-6:2 FTCA	94		25 - 150	01/27/23 12:24	02/08/23 14:56	1
13C-8:2 FTCA	114		25 - 150	01/27/23 12:24	02/08/23 14:56	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment - RA

<i>Analyte</i>	<i>Result</i>	<i>Qualifier</i>	<i>RL</i>	<i>MDL</i>	<i>Unit</i>	<i>D</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	10000000	3200000	ng/L		01/27/23 12:24	03/18/23 05:49	1

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C2 PFHxA	104		25 - 150	01/27/23 12:24	03/18/23 05:49	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

<i>Analyte</i>	<i>Result</i>	<i>Qualifier</i>	<i>RL</i>	<i>MDL</i>	<i>Unit</i>	<i>D</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Perfluorobutanoic acid (PFBA)	37000000	*+	25000000	12000000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluoropentanoic acid (PFPeA)	11000000	*+	10000000	2400000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluorohexanoic acid (PFHxA)	18000000	I *+	10000000	2800000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluoroheptanoic acid (PFHpA)	2100000	J *+	10000000	1300000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluorooctanoic acid (PFOA)	ND		10000000	4200000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluorononanoic acid (PFNA)	ND	*+	10000000	1400000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluorodecanoic acid (PFDA)	ND	*+	10000000	1600000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluoroundecanoic acid (PFUnA)	ND		10000000	5600000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluorododecanoic acid (PFDoA)	ND		10000000	2800000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluorotridecanoic acid (PFTrDA)	ND	*-	10000000	6400000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluorotetradecanoic acid (PFTeA)	ND	*- *1	10000000	1500000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluorobutanesulfonic acid (PFBS)	12000000		10000000	1000000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluoropentanesulfonic acid (PFPeS)	6100000	J	10000000	1500000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluorohexanesulfonic acid (PFHxS)	19000000		10000000	860000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		10000000	960000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluorooctanesulfonic acid (PFOS)	ND		10000000	1600000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluorononanesulfonic acid (PFNS)	ND		10000000	800000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluorodecanesulfonic acid (PFDS)	ND		10000000	2800000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluorododecanesulfonic acid (PFDoS)	ND	*- *1	10000000	4800000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluorooctanesulfonamide (FOSA)	ND		10000000	1800000	ng/L		01/27/23 12:19	02/08/23 15:57	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		25000000	6000000	ng/L		01/27/23 12:19	02/08/23 15:57	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		25000000	6500000	ng/L		01/27/23 12:19	02/08/23 15:57	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		10000000	1200000	ng/L		01/27/23 12:19	02/08/23 15:57	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		25000000	13000000	ng/L		01/27/23 12:19	02/08/23 15:57	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		10000000	2300000	ng/L		01/27/23 12:19	02/08/23 15:57	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Client Sample ID: ANG_1_tf_9

Lab Sample ID: 320-96016-2

Date Collected: 01/13/23 13:15

Matrix: Water

Date Received: 01/16/23 08:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		10000000	4400000	ng/L		01/27/23 12:19	02/08/23 15:57	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		10000000	2200000	ng/L		01/27/23 12:19	02/08/23 15:57	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		20000000	7000000	ng/L		01/27/23 12:19	02/08/23 15:57	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		10000000	4400000	ng/L		01/27/23 12:19	02/08/23 15:57	1
9CI-PF3ONS	ND		10000000	1200000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		20000000	7600000	ng/L		01/27/23 12:19	02/08/23 15:57	1
11CI-PF3OUdS	ND	*	10000000	1600000	ng/L		01/27/23 12:19	02/08/23 15:57	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		10000000	2000000	ng/L		01/27/23 12:19	02/08/23 15:57	1
3:3 FTCA	ND		10000000	2200000	ng/L		01/27/23 12:19	02/08/23 15:57	1
5:3 FTCA	ND		10000000	1600000	ng/L		01/27/23 12:19	02/08/23 15:57	1
7:3 FTCA	ND		10000000	2800000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		10000000	1400000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	+	10000000	1400000	ng/L		01/27/23 12:19	02/08/23 15:57	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		10000000	1400000	ng/L		01/27/23 12:19	02/08/23 15:57	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	111		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C4 PFBA	141		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C5 PFPeA	134		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C2 PFHxA	133		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C4 PFHpA	138		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C4 PFOA	121		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C5 PFNA	123		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C2 PFDA	131		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C2 PFUnA	120		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C2 PFDoA	123		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C2 PFTeDA	108		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C3 PFBS	121		25 - 150	01/27/23 12:19	02/08/23 15:57	1
18O2 PFHxS	127		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C4 PFOS	125		25 - 150	01/27/23 12:19	02/08/23 15:57	1
d3-NMeFOSAA	114		25 - 150	01/27/23 12:19	02/08/23 15:57	1
d5-NEtFOSAA	127		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C2 4:2 FTS	0		0 - 10	01/27/23 12:19	02/08/23 15:57	1
13C2 6:2 FTS	129		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C2 8:2 FTS	132		25 - 150	01/27/23 12:19	02/08/23 15:57	1
d-N-MeFOSA-M	49		25 - 150	01/27/23 12:19	02/08/23 15:57	1
d-N-EtFOSA-M	43		25 - 150	01/27/23 12:19	02/08/23 15:57	1
d7-N-MeFOSE-M	38		25 - 150	01/27/23 12:19	02/08/23 15:57	1
d9-N-EtFOSE-M	34		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C3 HFPO-DA	133		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C-6:2 FTCA	114		25 - 150	01/27/23 12:19	02/08/23 15:57	1
13C-8:2 FTCA	124		25 - 150	01/27/23 12:19	02/08/23 15:57	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Client Sample ID: ANG_1_tf_9

Lab Sample ID: 320-96016-2

Date Collected: 01/13/23 13:15

Matrix: Water

Date Received: 01/16/23 08:50

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	10000000	3200000	ng/L		01/27/23 12:19	03/18/23 04:49	1
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C2 PFHxA	113		25 - 150				01/27/23 12:19	03/18/23 04:49	1

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	270000		20000	10000	ug/L		03/10/23 09:57	03/10/23 15:28	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	11000000				ng/L			03/23/23 08:40	1
PFPA	0.00				ng/L			03/23/23 08:40	1
PFHxA	2300000				ng/L			03/23/23 08:40	1
PFHpA	0.00				ng/L			03/23/23 08:40	1
PFOA	0.00				ng/L			03/23/23 08:40	1
PFNA	0.00				ng/L			03/23/23 08:40	1
Total PFCA	13000000				ng/L			03/23/23 08:40	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	26000000				ng/L			03/23/23 08:32	1
PFPA	12000000				ng/L			03/23/23 08:32	1
PFHxA	15000000				ng/L			03/23/23 08:32	1
PFHpA	0.00				ng/L			03/23/23 08:32	1
PFOA	0.00				ng/L			03/23/23 08:32	1
PFNA	0.00				ng/L			03/23/23 08:32	1
Total PFCA	53000000				ng/L			03/23/23 08:32	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	37000000				ng/L			03/23/23 08:36	1
PFPA	11000000				ng/L			03/23/23 08:36	1
PFHxA	18000000	I			ng/L			03/23/23 08:36	1
PFHpA	0.00				ng/L			03/23/23 08:36	1
PFOA	0.00				ng/L			03/23/23 08:36	1
PFNA	0.00				ng/L			03/23/23 08:36	1
Total PFCA	66000000				ng/L			03/23/23 08:36	1

Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Pre-Treatment

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-96016-1	ANG_1_tf_10	114	119	123	121	123	117	119	128
320-96016-1 - RA	ANG_1_tf_10				102				
320-96016-2	ANG_1_tf_9	108	127	113	117	119	114	108	121
320-96016-2 - RA	ANG_1_tf_9				104				
LCS 320-649930/2-A	Lab Control Sample	117	141	128	137	145	130	124	130
LCS 320-649930/2-A	Lab Control Sample				112				
LCSD 320-649930/3-A	Lab Control Sample Dup	108	139	129	127	136	127	116	125
LCSD 320-649930/3-A	Lab Control Sample Dup				117				
MB 320-649930/1-A	Method Blank	131	159 *5+	150	151 *5+	155 *5+	150	146	150
MB 320-649930/1-A	Method Blank				129				

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-96016-1	ANG_1_tf_10	113	121	124	109	123	123	110	115
320-96016-1 - RA	ANG_1_tf_10								
320-96016-2	ANG_1_tf_9	118	122	114	102	121	119	105	108
320-96016-2 - RA	ANG_1_tf_9								
LCS 320-649930/2-A	Lab Control Sample	119	133	121	120	133	131	111	121
LCS 320-649930/2-A	Lab Control Sample								
LCSD 320-649930/3-A	Lab Control Sample Dup	119	122	111	114	119	125	115	116
LCSD 320-649930/3-A	Lab Control Sample Dup								
MB 320-649930/1-A	Method Blank	144	149	141	140	152 *5+	145	139	126
MB 320-649930/1-A	Method Blank								

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	M242FTS (25-150)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFM (25-150)	NEFM (25-150)	HFPODA (25-150)
320-96016-1	ANG_1_tf_10	117	132	126	68	54	34	27	123
320-96016-1 - RA	ANG_1_tf_10								
320-96016-2	ANG_1_tf_9	127	122	142	73	52	31	30	129
320-96016-2 - RA	ANG_1_tf_9								
LCS 320-649930/2-A	Lab Control Sample	131	146	139	63	47	32	29	141
LCS 320-649930/2-A	Lab Control Sample								
LCSD 320-649930/3-A	Lab Control Sample Dup	114	123	144	62	46	29	28	131
LCSD 320-649930/3-A	Lab Control Sample Dup								
MB 320-649930/1-A	Method Blank	148	132	192 *5+	72	53	30	29	163 *5+
MB 320-649930/1-A	Method Blank								

		Percent Isotope Dilution Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	MFHEA (25-150)	MFOEA (25-150)
320-96016-1	ANG_1_tf_10	100	102
320-96016-1 - RA	ANG_1_tf_10		
320-96016-2	ANG_1_tf_9	94	114
320-96016-2 - RA	ANG_1_tf_9		
LCS 320-649930/2-A	Lab Control Sample	117	143
LCS 320-649930/2-A	Lab Control Sample		
LCSD 320-649930/3-A	Lab Control Sample Dup	106	110
LCSD 320-649930/3-A	Lab Control Sample Dup		
MB 320-649930/1-A	Method Blank	122	134
MB 320-649930/1-A	Method Blank		

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Surrogate Legend

PFOSA = 13C8 FOSA
 PFBA = 13C4 PFBA
 PFPeA = 13C5 PFPeA
 PFHxA = 13C2 PFHxA
 C4PFHA = 13C4 PFHpA
 PFOA = 13C4 PFOA
 PFNA = 13C5 PFNA
 PFDA = 13C2 PFDA
 PFUnA = 13C2 PFUnA
 PFDaA = 13C2 PFDaA
 PFTDA = 13C2 PFTeDA
 C3PFBS = 13C3 PFBS
 PFHxS = 18O2 PFHxS
 PFOS = 13C4 PFOS
 d3NMFOS = d3-NMeFOSAA
 d5NEFOS = d5-NEtFOSAA
 M242FTS = 13C2 4:2 FTS
 M262FTS = 13C2 6:2 FTS
 M282FTS = 13C2 8:2 FTS
 dMeFOSA = d-N-MeFOSA-M
 dEtFOSA = d-N-EtFOSA-M
 NMFm = d7-N-MeFOSE-M
 NEFM = d9-N-EtFOSE-M
 HFPODA = 13C3 HFPO-DA
 MFHEA = 13C-6:2 FTCA
 MFOEA = 13C-8:2 FTCA

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Post-Treatment

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-96016-1	ANG_1_tf_10	112	139	136	142	129	124	126	130
320-96016-1 - RA	ANG_1_tf_10				105				
320-96016-2	ANG_1_tf_9	111	141	134	133	138	121	123	131
320-96016-2 - RA	ANG_1_tf_9				113				
LCS 320-649929/2-A	Lab Control Sample	100	113	124	136	129	126	118	117
LCS 320-649929/2-A	Lab Control Sample				114				
LCSD 320-649929/3-A	Lab Control Sample Dup	124	107	123	132	124	120	114	124
LCSD 320-649929/3-A	Lab Control Sample Dup				111				
MB 320-649929/1-A	Method Blank	78	115	120	119	113	102	103	92
MB 320-649929/1-A	Method Blank				102				

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDaA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-96016-1	ANG_1_tf_10	116	113	120	128	144	122	98	94
320-96016-1 - RA	ANG_1_tf_10								
320-96016-2	ANG_1_tf_9	120	123	108	121	127	125	114	127
320-96016-2 - RA	ANG_1_tf_9								
LCS 320-649929/2-A	Lab Control Sample	112	108	106	114	126	113	108	109
LCS 320-649929/2-A	Lab Control Sample								
LCSD 320-649929/3-A	Lab Control Sample Dup	123	128	121	110	120	120	111	122
LCSD 320-649929/3-A	Lab Control Sample Dup								
MB 320-649929/1-A	Method Blank	84	75	85	111	118	96	70	66

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Water

Prep Type: Post-Treatment

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
MB 320-649929/1-A	Method Blank								

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	M242FTS (0-10)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFM (25-150)	NEFM (25-150)	HFPODA (25-150)
320-96016-1	ANG_1_tf_10	0	124	116	38	35	40	37	144
320-96016-1 - RA	ANG_1_tf_10								
320-96016-2	ANG_1_tf_9	0	129	132	49	43	38	34	133
320-96016-2 - RA	ANG_1_tf_9								
LCS 320-649929/2-A	Lab Control Sample	0	89	111	38	31	33	31	135
LCS 320-649929/2-A	Lab Control Sample								
LCS 320-649929/3-A	Lab Control Sample Dup	0	113	131	77	64	42	37	134
LCS 320-649929/3-A	Lab Control Sample Dup								
MB 320-649929/1-A	Method Blank	0	99	90	28	26	29	24 *5-	119
MB 320-649929/1-A	Method Blank								

		Percent Isotope Dilution Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	MFHEA (25-150)	MFOEA (25-150)
320-96016-1	ANG_1_tf_10	112	75
320-96016-1 - RA	ANG_1_tf_10		
320-96016-2	ANG_1_tf_9	114	124
320-96016-2 - RA	ANG_1_tf_9		
LCS 320-649929/2-A	Lab Control Sample	125	119
LCS 320-649929/2-A	Lab Control Sample		
LCS 320-649929/3-A	Lab Control Sample Dup	117	104
LCS 320-649929/3-A	Lab Control Sample Dup		
MB 320-649929/1-A	Method Blank	83	66
MB 320-649929/1-A	Method Blank		

Surrogate Legend

- PFOSA = 13C8 FOSA
- PFBA = 13C4 PFBA
- PFPeA = 13C5 PFPeA
- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDoA = 13C2 PFDoA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- M242FTS = 13C2 4:2 FTS
- M262FTS = 13C2 6:2 FTS
- M282FTS = 13C2 8:2 FTS
- dMeFOSA = d-N-MeFOSA-M
- dEtFOSA = d-N-EtFOSA-M

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Isotope Dilution Summary

Client: Enspired Solutions

Project/Site: PFAS PRD Destruction Technology

NMFM = d7-N-MeFOSE-M

NEFM = d9-N-EtFOSE-M

HFPODA = 13C3 HFPO-DA

MFHEA = 13C-6:2 FTCA

MFOEA = 13C-8:2 FTCA

Job ID: 320-96016-1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 320-653084/7
Matrix: Water
Analysis Batch: 653084

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.0769	J	0.50	0.053	mg/L			02/10/23 16:07	1

Lab Sample ID: LCS 320-653084/8
Matrix: Water
Analysis Batch: 653084

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	7.50	7.78		mg/L		104	90 - 110

Lab Sample ID: 320-96016-1 MS
Matrix: Water
Analysis Batch: 653084

Client Sample ID: ANG_1_tf_10
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	88	E F1 B	25.0	102	E F1	mg/L		59	90 - 110

Lab Sample ID: 320-96016-1 MSD
Matrix: Water
Analysis Batch: 653084

Client Sample ID: ANG_1_tf_10
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Fluoride	88	E F1 B	25.0	103	E F1	mg/L		61	90 - 110	0	10

Lab Sample ID: MB 320-653424/3
Matrix: Water
Analysis Batch: 653424

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.50	0.053	mg/L			02/13/23 15:26	1

Lab Sample ID: LCS 320-653424/4
Matrix: Water
Analysis Batch: 653424

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	7.50	7.66		mg/L		102	90 - 110

Lab Sample ID: 320-96016-1 MS
Matrix: Water
Analysis Batch: 653424

Client Sample ID: ANG_1_tf_10
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	110	H F1	50.0	147	F1	mg/L		73	90 - 110

Lab Sample ID: 320-96016-1 MSD
Matrix: Water
Analysis Batch: 653424

Client Sample ID: ANG_1_tf_10
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Fluoride	110	H F1	50.0	146	F1	mg/L		70	90 - 110	1	10

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-649930/1-A
Matrix: Water
Analysis Batch: 654848

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 649930

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorobutanoic acid (PFBA)	ND		13	6.0	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluoropentanoic acid (PFPeA)	ND		5.0	1.2	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluorohexanoic acid (PFHxA)	ND		5.0	1.4	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluoroheptanoic acid (PFHpA)	ND		5.0	0.63	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluorooctanoic acid (PFOA)	ND		5.0	2.1	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluorononanoic acid (PFNA)	ND		5.0	0.68	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluorodecanoic acid (PFDA)	ND		5.0	0.78	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0	2.8	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluorododecanoic acid (PFDoA)	ND		5.0	1.4	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluorotridecanoic acid (PFTrDA)	ND		5.0	3.2	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0	0.73	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluorobutanesulfonic acid (PFBS)	ND		5.0	0.50	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0	0.75	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluorohexanesulfonic acid (PFHxS)	ND		5.0	0.43	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0	0.48	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluorooctanesulfonic acid (PFOS)	ND		5.0	0.80	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0	0.40	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0	1.4	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0	2.4	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0	0.88	ng/L		01/27/23 12:24	02/08/23 14:14	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13	3.0	ng/L		01/27/23 12:24	02/08/23 14:14	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13	3.3	ng/L		01/27/23 12:24	02/08/23 14:14	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0	0.60	ng/L		01/27/23 12:24	02/08/23 14:14	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13	6.3	ng/L		01/27/23 12:24	02/08/23 14:14	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0	1.2	ng/L		01/27/23 12:24	02/08/23 14:14	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0	2.2	ng/L		01/27/23 12:24	02/08/23 14:14	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0	1.1	ng/L		01/27/23 12:24	02/08/23 14:14	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10	3.5	ng/L		01/27/23 12:24	02/08/23 14:14	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0	2.2	ng/L		01/27/23 12:24	02/08/23 14:14	1
9Cl-PF3ONS	ND		5.0	0.60	ng/L		01/27/23 12:24	02/08/23 14:14	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10	3.8	ng/L		01/27/23 12:24	02/08/23 14:14	1
11Cl-PF3OUdS	ND		5.0	0.80	ng/L		01/27/23 12:24	02/08/23 14:14	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0	1.0	ng/L		01/27/23 12:24	02/08/23 14:14	1
3:3 FTCA	ND		5.0	1.1	ng/L		01/27/23 12:24	02/08/23 14:14	1
5:3 FTCA	ND		5.0	0.80	ng/L		01/27/23 12:24	02/08/23 14:14	1
7:3 FTCA	ND		5.0	1.4	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		5.0	0.70	ng/L		01/27/23 12:24	02/08/23 14:14	1

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-649930/1-A
Matrix: Water
Analysis Batch: 654848

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 649930

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0	0.70	ng/L		01/27/23 12:24	02/08/23 14:14	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		5.0	0.70	ng/L		01/27/23 12:24	02/08/23 14:14	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	131		25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C4 PFBA	159	*5+	25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C5 PFPeA	150		25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C2 PFHxA	151	*5+	25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C4 PFHpA	155	*5+	25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C4 PFOA	150		25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C5 PFNA	146		25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C2 PFDA	150		25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C2 PFUnA	144		25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C2 PFDoA	149		25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C2 PFTeDA	141		25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C3 PFBS	140		25 - 150	01/27/23 12:24	02/08/23 14:14	1
18O2 PFHxS	152	*5+	25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C4 PFOS	145		25 - 150	01/27/23 12:24	02/08/23 14:14	1
d3-NMeFOSAA	139		25 - 150	01/27/23 12:24	02/08/23 14:14	1
d5-NEtFOSAA	126		25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C2 4:2 FTS	148		25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C2 6:2 FTS	132		25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C2 8:2 FTS	192	*5+	25 - 150	01/27/23 12:24	02/08/23 14:14	1
d-N-MeFOSA-M	72		25 - 150	01/27/23 12:24	02/08/23 14:14	1
d-N-EtFOSA-M	53		25 - 150	01/27/23 12:24	02/08/23 14:14	1
d7-N-MeFOSE-M	30		25 - 150	01/27/23 12:24	02/08/23 14:14	1
d9-N-EtFOSE-M	29		25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C3 HFPO-DA	163	*5+	25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C-6:2 FTCA	122		25 - 150	01/27/23 12:24	02/08/23 14:14	1
13C-8:2 FTCA	134		25 - 150	01/27/23 12:24	02/08/23 14:14	1

Lab Sample ID: MB 320-649930/1-A
Matrix: Water
Analysis Batch: 661935

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 649930

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0	1.6	ng/L		01/27/23 12:24	03/18/23 05:09	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	129		25 - 150	01/27/23 12:24	03/18/23 05:09	1

Lab Sample ID: LCS 320-649930/2-A
Matrix: Water
Analysis Batch: 654848

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 649930

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	100	99.5		ng/L		99	76 - 136

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-649930/2-A
Matrix: Water
Analysis Batch: 654848

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 649930

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluoropentanoic acid (PFPeA)	100	98.2		ng/L		98	71 - 131
Perfluorohexanoic acid (PFHxA)	100	88.3		ng/L		88	73 - 133
Perfluoroheptanoic acid (PFHpA)	100	90.5		ng/L		90	72 - 132
Perfluorooctanoic acid (PFOA)	100	95.2		ng/L		95	70 - 130
Perfluorononanoic acid (PFNA)	100	106		ng/L		106	75 - 135
Perfluorodecanoic acid (PFDA)	100	99.5		ng/L		99	76 - 136
Perfluoroundecanoic acid (PFUnA)	100	105		ng/L		105	68 - 128
Perfluorododecanoic acid (PFDoA)	100	94.8		ng/L		95	71 - 131
Perfluorotridecanoic acid (PFTrDA)	100	88.5		ng/L		89	71 - 131
Perfluorotetradecanoic acid (PFTeA)	100	94.4		ng/L		94	70 - 130
Perfluorobutanesulfonic acid (PFBS)	88.8	94.4		ng/L		106	67 - 127
Perfluoropentanesulfonic acid (PFPeS)	94.0	109		ng/L		116	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	91.2	80.1		ng/L		88	59 - 119
Perfluoroheptanesulfonic acid (PFHpS)	95.4	91.2		ng/L		96	76 - 136
Perfluorooctanesulfonic acid (PFOS)	93.0	100		ng/L		108	70 - 130
Perfluorononanesulfonic acid (PFNS)	96.2	90.7		ng/L		94	75 - 135
Perfluorodecanesulfonic acid (PFDS)	96.4	92.4		ng/L		96	71 - 131
Perfluorododecanesulfonic acid (PFDoS)	97.0	89.3		ng/L		92	67 - 127
Perfluorooctanesulfonamide (FOSA)	100	94.1		ng/L		94	73 - 133
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	96.8		ng/L		97	76 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	95.0		ng/L		95	76 - 136
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	96.7		ng/L		103	79 - 139
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	77.3		ng/L		81	59 - 175
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	97.1		ng/L		101	75 - 135
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	73.8	*-	ng/L		74	78 - 138
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	79.3		ng/L		79	67 - 154
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	73.6		ng/L		74	70 - 130
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	70.6		ng/L		71	71 - 131
9CI-PF3ONS	93.4	87.6		ng/L		94	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	91.4		ng/L		91	51 - 173
11CI-PF3OUdS	94.4	86.6		ng/L		92	54 - 114

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-649930/2-A
Matrix: Water
Analysis Batch: 654848

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 649930

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	99.5		ng/L		105	79 - 139
3:3 FTCA	100	108		ng/L		108	70 - 130
5:3 FTCA	100	111		ng/L		111	70 - 130
7:3 FTCA	100	88.6		ng/L		89	70 - 130
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	104		ng/L		104	70 - 130
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	96.3		ng/L		96	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	89.2	101		ng/L		114	70 - 130

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C8 FOSA	117		25 - 150
13C4 PFBA	141		25 - 150
13C5 PFPeA	128		25 - 150
13C2 PFHxA	137		25 - 150
13C4 PFHpA	145		25 - 150
13C4 PFOA	130		25 - 150
13C5 PFNA	124		25 - 150
13C2 PFDA	130		25 - 150
13C2 PFUnA	119		25 - 150
13C2 PFDoA	133		25 - 150
13C2 PFTeDA	121		25 - 150
13C3 PFBS	120		25 - 150
18O2 PFHxS	133		25 - 150
13C4 PFOS	131		25 - 150
d3-NMeFOSAA	111		25 - 150
d5-NEtFOSAA	121		25 - 150
13C2 4:2 FTS	131		25 - 150
13C2 6:2 FTS	146		25 - 150
13C2 8:2 FTS	139		25 - 150
d-N-MeFOSA-M	63		25 - 150
d-N-EtFOSA-M	47		25 - 150
d7-N-MeFOSE-M	32		25 - 150
d9-N-EtFOSE-M	29		25 - 150
13C3 HFPO-DA	141		25 - 150
13C-6:2 FTCA	117		25 - 150
13C-8:2 FTCA	143		25 - 150

Lab Sample ID: LCS 320-649930/2-A
Matrix: Water
Analysis Batch: 661935

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 649930

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	101		ng/L		101	70 - 130

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C2 PFHxA	112		25 - 150

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-649930/3-A
Matrix: Water
Analysis Batch: 654848

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 649930

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
							Limits	RPD		
Perfluorobutanoic acid (PFBA)	100	94.2		ng/L		94	76 - 136	6	30	
Perfluoropentanoic acid (PFPeA)	100	97.5		ng/L		97	71 - 131	1	30	
Perfluorohexanoic acid (PFHxA)	100	103		ng/L		103	73 - 133	16	30	
Perfluoroheptanoic acid (PFHpA)	100	97.0		ng/L		97	72 - 132	7	30	
Perfluorooctanoic acid (PFOA)	100	95.9		ng/L		96	70 - 130	1	30	
Perfluorononanoic acid (PFNA)	100	103		ng/L		103	75 - 135	3	30	
Perfluorodecanoic acid (PFDA)	100	93.7		ng/L		94	76 - 136	6	30	
Perfluoroundecanoic acid (PFUnA)	100	89.3		ng/L		89	68 - 128	16	30	
Perfluorododecanoic acid (PFDoA)	100	79.5		ng/L		80	71 - 131	17	30	
Perfluorotridecanoic acid (PFTTrDA)	100	90.4		ng/L		90	71 - 131	2	30	
Perfluorotetradecanoic acid (PFTeA)	100	89.1		ng/L		89	70 - 130	6	30	
Perfluorobutanesulfonic acid (PFBS)	88.8	87.9		ng/L		99	67 - 127	7	30	
Perfluoropentanesulfonic acid (PFPeS)	94.0	95.0		ng/L		101	66 - 126	14	30	
Perfluorohexanesulfonic acid (PFHxS)	91.2	82.8		ng/L		91	59 - 119	3	30	
Perfluoroheptanesulfonic acid (PFHpS)	95.4	91.8		ng/L		96	76 - 136	1	30	
Perfluorooctanesulfonic acid (PFOS)	93.0	85.5		ng/L		92	70 - 130	16	30	
Perfluorononanesulfonic acid (PFNS)	96.2	84.9		ng/L		88	75 - 135	7	30	
Perfluorodecanesulfonic acid (PFDS)	96.4	78.7		ng/L		82	71 - 131	16	30	
Perfluorododecanesulfonic acid (PFDoS)	97.0	77.0		ng/L		79	67 - 127	15	30	
Perfluorooctanesulfonamide (FOSA)	100	89.3		ng/L		89	73 - 133	5	30	
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	86.4		ng/L		86	76 - 136	11	30	
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	84.8		ng/L		85	76 - 136	11	30	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	98.6		ng/L		105	79 - 139	2	30	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	116 *1		ng/L		122	59 - 175	40	30	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	98.3		ng/L		102	75 - 135	1	30	
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	72.9 *-		ng/L		73	78 - 138	1	30	
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	80.8		ng/L		81	67 - 154	2	30	
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	80.2		ng/L		80	70 - 130	9	30	
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	80.0		ng/L		80	71 - 131	13	30	
9CI-PF3ONS	93.4	89.7		ng/L		96	75 - 135	2	30	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	94.7		ng/L		95	51 - 173	4	30	

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-649930/3-A
Matrix: Water
Analysis Batch: 654848

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 649930

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
11CI-PF3OUdS	94.4	74.6		ng/L		79	54 - 114	15	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	104		ng/L		110	79 - 139	4	30
3:3 FTCA	100	110		ng/L		110	70 - 130	3	30
5:3 FTCA	100	116		ng/L		116	70 - 130	4	30
7:3 FTCA	100	97.7		ng/L		98	70 - 130	10	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	99.6		ng/L		100	70 - 130	4	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	99.0		ng/L		99	70 - 130	3	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	89.2	97.9		ng/L		110	70 - 130	4	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	LCSD Limits
13C8 FOSA	108		25 - 150
13C4 PFBA	139		25 - 150
13C5 PFPeA	129		25 - 150
13C2 PFHxA	127		25 - 150
13C4 PFHpA	136		25 - 150
13C4 PFOA	127		25 - 150
13C5 PFNA	116		25 - 150
13C2 PFDA	125		25 - 150
13C2 PFUnA	119		25 - 150
13C2 PFDoA	122		25 - 150
13C2 PFTeDA	111		25 - 150
13C3 PFBS	114		25 - 150
18O2 PFHxS	119		25 - 150
13C4 PFOS	125		25 - 150
d3-NMeFOSAA	115		25 - 150
d5-NEtFOSAA	116		25 - 150
13C2 4:2 FTS	114		25 - 150
13C2 6:2 FTS	123		25 - 150
13C2 8:2 FTS	144		25 - 150
d-N-MeFOSA-M	62		25 - 150
d-N-EtFOSA-M	46		25 - 150
d7-N-MeFOSE-M	29		25 - 150
d9-N-EtFOSE-M	28		25 - 150
13C3 HFPO-DA	131		25 - 150
13C-6:2 FTCA	106		25 - 150
13C-8:2 FTCA	110		25 - 150

Lab Sample ID: LCSD 320-649930/3-A
Matrix: Water
Analysis Batch: 661935

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 649930

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	96.8		ng/L		97	70 - 130	4	30

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

<i>Isotope Dilution</i>	<i>LCS D</i>	<i>LCS D</i>	<i>Limits</i>
<i>13C2 PFHxA</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>25 - 150</i>
	117		

Lab Sample ID: MB 320-649929/1-A
Matrix: Water
Analysis Batch: 654848

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 649929

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		13	6.0	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluoropentanoic acid (PFPeA)	ND		5.0	1.2	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluorohexanoic acid (PFHxA)	ND		5.0	1.4	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluoroheptanoic acid (PFHpA)	ND		5.0	0.63	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluorooctanoic acid (PFOA)	ND		5.0	2.1	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluorononanoic acid (PFNA)	ND		5.0	0.68	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluorodecanoic acid (PFDA)	ND		5.0	0.78	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0	2.8	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluorododecanoic acid (PFDoA)	ND		5.0	1.4	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluorotridecanoic acid (PFTrDA)	ND		5.0	3.2	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0	0.73	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluorobutanesulfonic acid (PFBS)	ND		5.0	0.50	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0	0.75	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluorohexanesulfonic acid (PFHxS)	ND		5.0	0.43	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0	0.48	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluorooctanesulfonic acid (PFOS)	ND		5.0	0.80	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0	0.40	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0	1.4	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0	2.4	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0	0.88	ng/L		01/27/23 12:19	02/08/23 15:16	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13	3.0	ng/L		01/27/23 12:19	02/08/23 15:16	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13	3.3	ng/L		01/27/23 12:19	02/08/23 15:16	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0	0.60	ng/L		01/27/23 12:19	02/08/23 15:16	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13	6.3	ng/L		01/27/23 12:19	02/08/23 15:16	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0	1.2	ng/L		01/27/23 12:19	02/08/23 15:16	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0	2.2	ng/L		01/27/23 12:19	02/08/23 15:16	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0	1.1	ng/L		01/27/23 12:19	02/08/23 15:16	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10	3.5	ng/L		01/27/23 12:19	02/08/23 15:16	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0	2.2	ng/L		01/27/23 12:19	02/08/23 15:16	1
9CI-PF3ONS	ND		5.0	0.60	ng/L		01/27/23 12:19	02/08/23 15:16	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10	3.8	ng/L		01/27/23 12:19	02/08/23 15:16	1
11CI-PF3OUdS	ND		5.0	0.80	ng/L		01/27/23 12:19	02/08/23 15:16	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0	1.0	ng/L		01/27/23 12:19	02/08/23 15:16	1
3:3 FTCA	ND		5.0	1.1	ng/L		01/27/23 12:19	02/08/23 15:16	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-649929/1-A
Matrix: Water
Analysis Batch: 654848

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 649929

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
5:3 FTCA	ND		5.0	0.80	ng/L		01/27/23 12:19	02/08/23 15:16	1
7:3 FTCA	ND		5.0	1.4	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		5.0	0.70	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0	0.70	ng/L		01/27/23 12:19	02/08/23 15:16	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		5.0	0.70	ng/L		01/27/23 12:19	02/08/23 15:16	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	78		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C4 PFBA	115		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C5 PFPeA	120		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C2 PFHxA	119		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C4 PFHpA	113		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C4 PFOA	102		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C5 PFNA	103		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C2 PFDA	92		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C2 PFUnA	84		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C2 PFDoA	75		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C2 PFTeDA	85		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C3 PFBS	111		25 - 150	01/27/23 12:19	02/08/23 15:16	1
18O2 PFHxS	118		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C4 PFOS	96		25 - 150	01/27/23 12:19	02/08/23 15:16	1
d3-NMeFOSAA	70		25 - 150	01/27/23 12:19	02/08/23 15:16	1
d5-NEtFOSAA	66		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C2 4:2 FTS	0		0 - 10	01/27/23 12:19	02/08/23 15:16	1
13C2 6:2 FTS	99		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C2 8:2 FTS	90		25 - 150	01/27/23 12:19	02/08/23 15:16	1
d-N-MeFOSA-M	28		25 - 150	01/27/23 12:19	02/08/23 15:16	1
d-N-EtFOSA-M	26		25 - 150	01/27/23 12:19	02/08/23 15:16	1
d7-N-MeFOSE-M	29		25 - 150	01/27/23 12:19	02/08/23 15:16	1
d9-N-EtFOSE-M	24	*5-	25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C3 HFPO-DA	119		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C-6:2 FTCA	83		25 - 150	01/27/23 12:19	02/08/23 15:16	1
13C-8:2 FTCA	66		25 - 150	01/27/23 12:19	02/08/23 15:16	1

Lab Sample ID: MB 320-649929/1-A
Matrix: Water
Analysis Batch: 661935

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 649929

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0	1.6	ng/L		01/27/23 12:19	03/18/23 04:08	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	102		25 - 150	01/27/23 12:19	03/18/23 04:08	1

QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-649929/2-A
Matrix: Water
Analysis Batch: 654848

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 649929

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	100	191	*+	ng/L		191	93 - 153
Perfluoropentanoic acid (PFPeA)	100	187	*+	ng/L		187	85 - 145
Perfluorohexanoic acid (PFHxA)	100	194	*+	ng/L		194	81 - 141
Perfluoroheptanoic acid (PFHpA)	100	209	*+	ng/L		209	104 - 171
Perfluorooctanoic acid (PFOA)	100	298		ng/L		298	158 - 454
Perfluorononanoic acid (PFNA)	100	137	*+	ng/L		137	66 - 126
Perfluorodecanoic acid (PFDA)	100	125		ng/L		125	65 - 125
Perfluoroundecanoic acid (PFUnA)	100	89.2		ng/L		89	57 - 117
Perfluorododecanoic acid (PFDoA)	100	82.0		ng/L		82	66 - 126
Perfluorotridecanoic acid (PFTTrDA)	100	60.8	*-	ng/L		61	65 - 136
Perfluorotetradecanoic acid (PFTeA)	100	52.3	*-	ng/L		52	63 - 123
Perfluorobutanesulfonic acid (PFBS)	88.8	87.0		ng/L		98	75 - 135
Perfluoropentanesulfonic acid (PFPeS)	94.0	91.3		ng/L		97	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	91.2	81.1		ng/L		89	64 - 124
Perfluoroheptanesulfonic acid (PFHpS)	95.4	84.1		ng/L		88	70 - 131
Perfluorooctanesulfonic acid (PFOS)	93.0	78.6		ng/L		85	68 - 128
Perfluorononanesulfonic acid (PFNS)	96.2	80.6		ng/L		84	70 - 130
Perfluorodecanesulfonic acid (PFDS)	96.4	72.4		ng/L		75	66 - 126
Perfluorododecanesulfonic acid (PFDoS)	97.0	43.2	*-	ng/L		45	67 - 127
Perfluorooctanesulfonamide (FOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	ND		ng/L		0	0 - 10
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	ND		ng/L		0	0 - 10
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	ND		ng/L		0	0 - 10
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	ND		ng/L		0	0 - 10
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	ND		ng/L		0	0 - 10
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	ND		ng/L		0	0 - 10
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	ND		ng/L		0	0 - 10
9CI-PF3ONS	93.4	73.7		ng/L		79	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	78.6		ng/L		79	51 - 173

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-649929/2-A
Matrix: Water
Analysis Batch: 654848

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 649929

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
11CI-PF3OUdS	94.4	42.2	*-	ng/L		45	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	ND		ng/L		0	0 - 10
3:3 FTCA	100	ND		ng/L		0	0 - 10
5:3 FTCA	100	ND		ng/L		0	0 - 10
7:3 FTCA	100	ND		ng/L		0	0 - 10
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	101		ng/L		101	70 - 130
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	154	*+	ng/L		154	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	89.2	95.5		ng/L		107	70 - 130

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C8 FOSA	100		25 - 150
13C4 PFBA	113		25 - 150
13C5 PFPeA	124		25 - 150
13C2 PFHxA	136		25 - 150
13C4 PFHpA	129		25 - 150
13C4 PFOA	126		25 - 150
13C5 PFNA	118		25 - 150
13C2 PFDA	117		25 - 150
13C2 PFUnA	112		25 - 150
13C2 PFDoA	108		25 - 150
13C2 PFTeDA	106		25 - 150
13C3 PFBS	114		25 - 150
18O2 PFHxS	126		25 - 150
13C4 PFOS	113		25 - 150
d3-NMeFOSAA	108		25 - 150
d5-NEtFOSAA	109		25 - 150
13C2 4:2 FTS	0		0 - 10
13C2 6:2 FTS	89		25 - 150
13C2 8:2 FTS	111		25 - 150
d-N-MeFOSA-M	38		25 - 150
d-N-EtFOSA-M	31		25 - 150
d7-N-MeFOSE-M	33		25 - 150
d9-N-EtFOSE-M	31		25 - 150
13C3 HFPO-DA	135		25 - 150
13C-6:2 FTCA	125		25 - 150
13C-8:2 FTCA	119		25 - 150

Lab Sample ID: LCS 320-649929/2-A
Matrix: Water
Analysis Batch: 661935

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 649929

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	97.3		ng/L		97	70 - 130

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C2 PFHxA	114		25 - 150

Lab Sample ID: LCSD 320-649929/3-A
Matrix: Water
Analysis Batch: 654848

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 649929

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	100	187	*+	ng/L		187	93 - 153	2	30
Perfluoropentanoic acid (PFPeA)	100	191	*+	ng/L		191	85 - 145	2	30
Perfluorohexanoic acid (PFHxA)	100	191	*+	ng/L		191	81 - 141	2	30
Perfluoroheptanoic acid (PFHpA)	100	201	*+	ng/L		201	104 - 171	4	30
Perfluorooctanoic acid (PFOA)	100	340		ng/L		340	158 - 454	13	30
Perfluorononanoic acid (PFNA)	100	164	*+	ng/L		164	66 - 126	17	30
Perfluorodecanoic acid (PFDA)	100	132	*+	ng/L		132	65 - 125	5	30
Perfluoroundecanoic acid (PFUnA)	100	89.0		ng/L		89	57 - 117	0	30
Perfluorododecanoic acid (PFDoA)	100	92.4		ng/L		92	66 - 126	12	30
Perfluorotridecanoic acid (PFTrDA)	100	82.3		ng/L		82	65 - 136	30	30
Perfluorotetradecanoic acid (PFTeA)	100	81.2	*1	ng/L		81	63 - 123	43	30
Perfluorobutanesulfonic acid (PFBS)	88.8	88.9		ng/L		100	75 - 135	2	30
Perfluoropentanesulfonic acid (PFPeS)	94.0	103		ng/L		109	70 - 130	12	30
Perfluorohexanesulfonic acid (PFHxS)	91.2	80.6		ng/L		88	64 - 124	1	30
Perfluoroheptanesulfonic acid (PFHpS)	95.4	94.8		ng/L		99	70 - 131	12	30
Perfluorooctanesulfonic acid (PFOS)	93.0	86.9		ng/L		93	68 - 128	10	30
Perfluorononanesulfonic acid (PFNS)	96.2	85.6		ng/L		89	70 - 130	6	30
Perfluorodecanesulfonic acid (PFDS)	96.4	85.9		ng/L		89	66 - 126	17	30
Perfluorododecanesulfonic acid (PFDoS)	97.0	82.2	*1	ng/L		85	67 - 127	62	30
Perfluorooctanesulfonamide (FOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctanesulfonamide (NMeFOSAA)	100	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctanesulfonamide (NEtFOSAA)	100	ND		ng/L		0	0 - 10	NC	30
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	ND		ng/L		0	0 - 10	NC	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	ND		ng/L		0	0 - 10	NC	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	ND		ng/L		0	0 - 10	NC	30

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-649929/3-A
Matrix: Water
Analysis Batch: 654848

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 649929

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
N-ethylperfluorooctane sulfonamidoethanol (NETFOSE)	100	ND		ng/L		0	0 - 10	NC	30
9CI-PF3ONS	93.4	79.1		ng/L		85	75 - 135	7	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	76.7		ng/L		77	51 - 173	2	30
11CI-PF3OUdS	94.4	48.0	*-	ng/L		51	54 - 114	13	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	ND		ng/L		0	0 - 10	NC	30
3:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
5:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
7:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	94.4		ng/L		94	70 - 130	7	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	158	*+	ng/L		158	70 - 130	3	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	89.2	106		ng/L		119	70 - 130	10	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C8 FOSA	124		25 - 150
13C4 PFBA	107		25 - 150
13C5 PFPeA	123		25 - 150
13C2 PFHxA	132		25 - 150
13C4 PFHpA	124		25 - 150
13C4 PFOA	120		25 - 150
13C5 PFNA	114		25 - 150
13C2 PFDA	124		25 - 150
13C2 PFUnA	123		25 - 150
13C2 PFDoA	128		25 - 150
13C2 PFTeDA	121		25 - 150
13C3 PFBS	110		25 - 150
18O2 PFHxS	120		25 - 150
13C4 PFOS	120		25 - 150
d3-NMeFOSAA	111		25 - 150
d5-NEtFOSAA	122		25 - 150
13C2 4:2 FTS	0		0 - 10
13C2 6:2 FTS	113		25 - 150
13C2 8:2 FTS	131		25 - 150
d-N-MeFOSA-M	77		25 - 150
d-N-EtFOSA-M	64		25 - 150
d7-N-MeFOSE-M	42		25 - 150
d9-N-EtFOSE-M	37		25 - 150
13C3 HFPO-DA	134		25 - 150
13C-6:2 FTCA	117		25 - 150
13C-8:2 FTCA	104		25 - 150

QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-649929/3-A
Matrix: Water
Analysis Batch: 661935

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 649929

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit	
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	95.8		ng/L		96	70 - 130	2	30	
		<i>LCSD</i>	<i>LCSD</i>			<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>		
<i>Isotope Dilution</i>		<i>13C2 PFHxA</i>	<i>111</i>			<i>25 - 150</i>				

Method: ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Lab Sample ID: MB 410-352279/1-A
Matrix: Water
Analysis Batch: 352245

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 352279

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	ND		200	100	ug/L		03/10/23 09:57	03/10/23 10:45	1

Lab Sample ID: LCS 410-352279/2-A
Matrix: Water
Analysis Batch: 352245

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 352279

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Fluorine (TF)	5060	5590		ug/L		110	50 - 150

Lab Sample ID: LCSD 410-352279/3-A
Matrix: Water
Analysis Batch: 352245

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 352279

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Fluorine (TF)	5060	5540		ug/L		110	50 - 150	1	20

QC Association Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

HPLC/IC

Analysis Batch: 653084

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-96016-1	ANG_1_tf_10	Total/NA	Water	300.0	
320-96016-2	ANG_1_tf_9	Total/NA	Water	300.0	
MB 320-653084/7	Method Blank	Total/NA	Water	300.0	
LCS 320-653084/8	Lab Control Sample	Total/NA	Water	300.0	
320-96016-1 MS	ANG_1_tf_10	Total/NA	Water	300.0	
320-96016-1 MSD	ANG_1_tf_10	Total/NA	Water	300.0	

Analysis Batch: 653424

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-96016-1	ANG_1_tf_10	Total/NA	Water	300.0	
MB 320-653424/3	Method Blank	Total/NA	Water	300.0	
LCS 320-653424/4	Lab Control Sample	Total/NA	Water	300.0	
320-96016-1 MS	ANG_1_tf_10	Total/NA	Water	300.0	
320-96016-1 MSD	ANG_1_tf_10	Total/NA	Water	300.0	

LCMS

Analysis Batch: 352245

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-96016-1	ANG_1_tf_10	Total/NA	Water	ELLE SOP	352279
320-96016-2	ANG_1_tf_9	Total/NA	Water	ELLE SOP	352279
MB 410-352279/1-A	Method Blank	Total/NA	Water	ELLE SOP	352279
LCS 410-352279/2-A	Lab Control Sample	Total/NA	Water	ELLE SOP	352279
LCSD 410-352279/3-A	Lab Control Sample Dup	Total/NA	Water	ELLE SOP	352279

Prep Batch: 352279

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-96016-1	ANG_1_tf_10	Total/NA	Water	CIC Prep	
320-96016-2	ANG_1_tf_9	Total/NA	Water	CIC Prep	
MB 410-352279/1-A	Method Blank	Total/NA	Water	CIC Prep	
LCS 410-352279/2-A	Lab Control Sample	Total/NA	Water	CIC Prep	
LCSD 410-352279/3-A	Lab Control Sample Dup	Total/NA	Water	CIC Prep	

Prep Batch: 649929

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-96016-1 - RA	ANG_1_tf_10	Post-Treatment	Water	TOP Post Prep	
320-96016-1	ANG_1_tf_10	Post-Treatment	Water	TOP Post Prep	
320-96016-2 - RA	ANG_1_tf_9	Post-Treatment	Water	TOP Post Prep	
320-96016-2	ANG_1_tf_9	Post-Treatment	Water	TOP Post Prep	
MB 320-649929/1-A	Method Blank	Post-Treatment	Water	TOP Post Prep	
LCS 320-649929/2-A	Lab Control Sample	Post-Treatment	Water	TOP Post Prep	
LCSD 320-649929/3-A	Lab Control Sample Dup	Post-Treatment	Water	TOP Post Prep	

Prep Batch: 649930

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-96016-1 - RA	ANG_1_tf_10	Pre-Treatment	Water	TOP Pre - Prep	
320-96016-1	ANG_1_tf_10	Pre-Treatment	Water	TOP Pre - Prep	
320-96016-2 - RA	ANG_1_tf_9	Pre-Treatment	Water	TOP Pre - Prep	
320-96016-2	ANG_1_tf_9	Pre-Treatment	Water	TOP Pre - Prep	
MB 320-649930/1-A	Method Blank	Pre-Treatment	Water	TOP Pre - Prep	
LCS 320-649930/2-A	Lab Control Sample	Pre-Treatment	Water	TOP Pre - Prep	

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QC Association Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

LCMS (Continued)

Prep Batch: 649930 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 320-649930/3-A	Lab Control Sample Dup	Pre-Treatment	Water	TOP Pre - Prep	

Analysis Batch: 654848

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-96016-1	ANG_1_tf_10	Post-Treatment	Water	537 (modified)	649929
320-96016-1	ANG_1_tf_10	Pre-Treatment	Water	537 (modified)	649930
320-96016-2	ANG_1_tf_9	Post-Treatment	Water	537 (modified)	649929
320-96016-2	ANG_1_tf_9	Pre-Treatment	Water	537 (modified)	649930
MB 320-649929/1-A	Method Blank	Post-Treatment	Water	537 (modified)	649929
MB 320-649930/1-A	Method Blank	Pre-Treatment	Water	537 (modified)	649930
LCS 320-649929/2-A	Lab Control Sample	Post-Treatment	Water	537 (modified)	649929
LCS 320-649930/2-A	Lab Control Sample	Pre-Treatment	Water	537 (modified)	649930
LCSD 320-649929/3-A	Lab Control Sample Dup	Post-Treatment	Water	537 (modified)	649929
LCSD 320-649930/3-A	Lab Control Sample Dup	Pre-Treatment	Water	537 (modified)	649930

Analysis Batch: 661935

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-96016-1 - RA	ANG_1_tf_10	Post-Treatment	Water	537 (modified)	649929
320-96016-1 - RA	ANG_1_tf_10	Pre-Treatment	Water	537 (modified)	649930
320-96016-2 - RA	ANG_1_tf_9	Post-Treatment	Water	537 (modified)	649929
320-96016-2 - RA	ANG_1_tf_9	Pre-Treatment	Water	537 (modified)	649930
MB 320-649929/1-A	Method Blank	Post-Treatment	Water	537 (modified)	649929
MB 320-649930/1-A	Method Blank	Pre-Treatment	Water	537 (modified)	649930
LCS 320-649929/2-A	Lab Control Sample	Post-Treatment	Water	537 (modified)	649929
LCS 320-649930/2-A	Lab Control Sample	Pre-Treatment	Water	537 (modified)	649930
LCSD 320-649929/3-A	Lab Control Sample Dup	Post-Treatment	Water	537 (modified)	649929
LCSD 320-649930/3-A	Lab Control Sample Dup	Pre-Treatment	Water	537 (modified)	649930

Analysis Batch: 662497

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-96016-1	ANG_1_tf_10	Pre-Treatment	Water	Total PFCA-Sum	
320-96016-2	ANG_1_tf_9	Pre-Treatment	Water	Total PFCA-Sum	

Analysis Batch: 662500

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-96016-1	ANG_1_tf_10	Post-Treatment	Water	Total PFCA-Sum	
320-96016-2	ANG_1_tf_9	Post-Treatment	Water	Total PFCA-Sum	

Analysis Batch: 662501

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-96016-1	ANG_1_tf_10	Total/NA	Water	Total PFCA-Dif	
320-96016-2	ANG_1_tf_9	Total/NA	Water	Total PFCA-Dif	

Lab Chronicle

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Client Sample ID: ANG_1_tf_10

Lab Sample ID: 320-96016-1

Date Collected: 01/13/23 13:00

Matrix: Water

Date Received: 01/16/23 08:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	10 mL	10 mL	653084	02/10/23 14:57	Y1S	EET SAC
Total/NA	Analysis	300.0		10	10 mL	10 mL	653424	02/13/23 16:05	Y1S	EET SAC
Post-Treatment	Prep	TOP Post Prep	RA		0.00005 mL	10.0 mL	649929	01/27/23 12:19	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)	RA	1	1 mL	1 mL	661935	03/18/23 04:39	D1R	EET SAC
Post-Treatment	Prep	TOP Post Prep			0.00005 mL	10.0 mL	649929	01/27/23 12:19	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	654848	02/08/23 15:47	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep	RA		0.00005 mL	10.0 mL	649930	01/27/23 12:24	RAC	EET SAC
Pre-Treatment	Analysis	537 (modified)	RA	1	1 mL	1 mL	661935	03/18/23 05:39	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			0.00005 mL	10.0 mL	649930	01/27/23 12:24	RAC	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	654848	02/08/23 14:45	D1R	EET SAC
Total/NA	Prep	CIC Prep			0.002 g	0.2 mL	352279	03/10/23 09:57	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			352245	03/10/23 14:53	F9DU	ELLE
Total/NA	Analysis	Total PFCA-Dif		1			662501	03/23/23 08:40	VSG	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			662500	03/23/23 08:36	VSG	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			662497	03/23/23 08:32	VSG	EET SAC

Client Sample ID: ANG_1_tf_9

Lab Sample ID: 320-96016-2

Date Collected: 01/13/23 13:15

Matrix: Water

Date Received: 01/16/23 08:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	10 mL	10 mL	653084	02/10/23 15:50	Y1S	EET SAC
Post-Treatment	Prep	TOP Post Prep	RA		0.00005 mL	10.0 mL	649929	01/27/23 12:19	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)	RA	1	1 mL	1 mL	661935	03/18/23 04:49	D1R	EET SAC
Post-Treatment	Prep	TOP Post Prep			0.00005 mL	10.0 mL	649929	01/27/23 12:19	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	654848	02/08/23 15:57	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep	RA		0.00005 mL	10.0 mL	649930	01/27/23 12:24	RAC	EET SAC
Pre-Treatment	Analysis	537 (modified)	RA	1	1 mL	1 mL	661935	03/18/23 05:49	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			0.00005 mL	10.0 mL	649930	01/27/23 12:24	RAC	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	654848	02/08/23 14:56	D1R	EET SAC
Total/NA	Prep	CIC Prep			0.002 g	0.2 mL	352279	03/10/23 09:57	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			352245	03/10/23 15:28	F9DU	ELLE
Total/NA	Analysis	Total PFCA-Dif		1			662501	03/23/23 08:40	VSG	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			662500	03/23/23 08:36	VSG	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			662497	03/23/23 08:32	VSG	EET SAC

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

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

Accreditation/Certification Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Laboratory: Eurofins Sacramento

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 (UST)	State	17-020	02-20-24
ANAB	Dept. of Defense ELAP	L2468	04-09-23
ANAB	Dept. of Energy	L2468.01	07-11-23
ANAB	ISO/IEC 17025	L2468	04-09-23
Arizona	State	AZ0708	08-11-23
Arkansas DEQ	State	88-0691	06-17-23
California	State	2897	01-22-24
Colorado	State	CA00044	08-31-23
Florida	NELAP	E87570	06-30-23
Georgia	State	4040	01-29-24
Hawaii	State	<cert No.>	01-29-24
Illinois	NELAP	200060	03-17-24
Kansas	NELAP	E-10375	10-31-23
Louisiana	NELAP	01944	06-30-23
Louisiana (All)	NELAP	01944	06-30-23
Maine	State	CA00004	09-19-23
Michigan	State	9947	06-01-23
Nevada	State	CA00044	07-31-23
New Hampshire	NELAP	2997	04-18-23
New Jersey	NELAP	CA005	06-30-23
New York	NELAP	11666	03-29-23
Ohio	State	41252	01-29-24
Oregon	NELAP	4040	06-11-23
Texas	NELAP	T104704399-23-17	05-31-23
US Fish & Wildlife	US Federal Programs	58448	04-30-23
USDA	US Federal Programs	P330-18-00239	02-28-26
Utah	NELAP	CA000442023-16	09-19-23
Virginia	NELAP	460278	03-14-24
Washington	State	C581	05-05-23
West Virginia (DW)	State	9930C	12-31-23
Wisconsin	State	998204680	08-14-23
Wyoming	State Program	8TMS-L	01-28-19 *

Laboratory: Eurofins Lancaster Laboratories Environment Testing, 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
A2LA	Dept. of Defense ELAP	0001.01	11-30-24
A2LA	ISO/IEC 17025	0001.01	11-30-24
Alaska	State	PA00009	06-30-23
Alaska (UST)	State	17-027	02-28-24
Arizona	State	AZ0780	03-11-23
Arkansas DEQ	State	88-00660	08-08-23
California	State	2792	05-17-23
Colorado	State	PA00009	06-30-23
Connecticut	State	PH-0746	04-17-23
DE Haz. Subst. Cleanup Act (HSCA)	State	019-006 (PA cert)	01-31-24
Delaware (DW)	State	N/A	01-31-24
Florida	NELAP	E87997	04-17-23
Georgia (DW)	State	C048	01-31-24

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

Accreditation/Certification Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC (Continued)

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

Authority	Program	Identification Number	Expiration Date
Hawaii	State	N/A	01-31-24
Illinois	NELAP	200027	04-17-23
Iowa	State	361	03-12-23
Kansas	NELAP	E-10151	04-17-23
Kentucky (DW)	State	KY90088	03-27-23
Kentucky (UST)	State	0001.01	11-30-24
Kentucky (WW)	State	KY90088	04-17-23
Louisiana (All)	NELAP	02055	04-17-23
Maine	State	2019012	03-12-23
Maryland	State	100	05-11-23
Massachusetts	State	M-PA009	04-24-23
Michigan	State	9930	01-31-24
Minnesota	NELAP	042-999-487	12-31-23
Mississippi	State	023	01-31-24
Missouri	State	450	01-31-25
Montana (DW)	State	0098	01-01-24
Nebraska	State	NE-OS-32-17	01-31-24
New Hampshire	NELAP	2730	04-17-23
New Jersey	NELAP	PA011	04-23-23
New York	NELAP	10670	03-29-23
North Carolina (DW)	State	42705	07-04-23
North Carolina (WW/SW)	State	521	04-23-23
North Dakota	State	R-205	04-17-23
Oklahoma	NELAP	9804	04-24-23
Oregon	NELAP	PA200001	04-12-23
PALA	Canada	1978	09-16-24
Pennsylvania	NELAP	36-00037	04-17-23
Rhode Island	State	LAO00338	04-17-23
South Carolina	State	89002	04-23-23
Tennessee	State	02838	01-31-24
Texas	NELAP	T104704194-23-46	05-03-23
USDA	US Federal Programs	525-22-298-19481	10-25-25
Vermont	State	VT - 36037	10-27-23
Virginia	NELAP	460182	04-17-23
Washington	State	C457	04-11-23
West Virginia (DW)	State	9906 C	12-31-23
West Virginia DEP	State	055	04-11-23
Wyoming	State	8TMS-L	01-31-24
Wyoming (UST)	A2LA	0001.01	11-30-24

Method Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	EPA	EET SAC
537 (modified)	Fluorinated Alkyl Substances	EPA	EET SAC
ELLE SOP	Total or Organic Fluorine by Combustion Ion Chromatography	ELLE - Lancaster	ELLE
Total PFCA-Dif	Total PFCA (Treatment Difference)	TAL SOP	EET SAC
Total PFCA-Sum	Total PFCA (Summary)	TAL SOP	EET SAC
CIC Prep	Preparation, Fluorine	ELLE - Lancaster	ELLE
TOP Post Prep	Solid-Phase Extraction (SPE)	SW846	EET SAC
TOP Pre - Prep	Solid-Phase Extraction (SPE)	SW846	EET SAC

Protocol References:

ELLE - Lancaster = Eurofins Lancaster, Facility Standard Operating Procedure.

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

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

Sample Summary

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-96016-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-96016-1	ANG_1_tf_10	Water	01/13/23 13:00	01/16/23 08:50
320-96016-2	ANG_1_tf_9	Water	01/13/23 13:15	01/16/23 08:50

1

2

3

4

5

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14

15

Chain of Custody Record

588164



Environment Testing
TestAmerica

Address:

TAL-8210

Regulatory Program: DW NPDES RCRA Other:

Client Contact
 Company Name: **Enspired Solutions**
 Address: **4942 Dawn Avenue, Suite 104**
 City/State/Zip: **East Lansing, MI, 48823**
 Phone: **(937) 470-9461**
 Fax:
 Project Name: **PFAS PRD Destruction Technology**
 Site: **Enspired Solutions**
 P O #

Project Manager: **Laura Turpen**
 Tell/Email: **Suzanne Witt @ Enspired.com**

Site Contact: **Suzanne Witt**
 Date: _____
 Carrier: _____

COC No: **1** of **1** COCs

Sampler:
 For Lab Use Only:
 Walk-in Client:
 Lab Sampling:
 Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Analysis		Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Sample Specific Notes:
						TOP Assay (40 analytes)	CIC - Total Fluorine			
ANG-1-tf-10	1/13/23	13:00	G	W	5	✓	✓	N	N	See included data sheet
ANG-1-tf-9	1/13/23	13:15	G	W	5	✓	✓	N	N	See included data sheet
ANG-1-tf-10-M	1/13/23	13:00	G	W	1	✓	✓	N	N	Hold for analysis
ANG-1-tf-9-M	1/13/23	13:15	G	W	1	✓	✓	N	N	Hold for analysis



Preservation Used: **1= Ice; 2= HCl; 3= H2SO4; 4= HNO3; 5= NaOH; 6= Other**

Possible Hazard Identification: Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Non-Hazard Flammable Skin Irritant Poison B Unknown

Special Instructions/QC Requirements & Comments:

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Return to Client Disposal by Lab Archive for _____ Months

Custody Seal No.: **211485**
 Company: **Enspired Solutions**
 Date/Time: **1/13/23 14:00**

Received by: **Suzanne Witt**
 Company: **Enspired Solutions**
 Date/Time: **1/13/23 14:00**

Received by: **FFL Sac**
 Company: **FFL Sac**
 Date/Time: **1/16/23 850**

Received in Laboratory by: _____
 Date/Time: _____



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

Sample ID	Approximate total [PFAS] (ppm)	Approximate [Fluoride] (ppm)	Approximate [organic Fluorine] (ppm)	Approximate [CTAB] (ppm)	Other known constituents/notes
ANG_1_tf_9	6000	130	3500	< 0.1	This is AFFF that was diluted 10x and treated
ANG_1_tf_10	5000	185	3000	< 0.1	This is AFFF that was diluted 10x and treated
ANG_1_tf_9_M					Methanol rinse of reactor for ANG_1_tf_9 sample
ANG_1_tf_10_M					Methanol rinse of reactor for ANG_1_tf_9 sample

Eurofins Sacramento

880 Riverside Parkway
West Sacramento, CA 95605
Phone: 916-373-5600 Fax: 916-372-1059

Chain of Custody Record



Environment Testing

Client Information (Sub Contract Lab)		Sampler:		Lab PM:		Carrier Tracking No(s):		COC No:			
Client Contact: Shipping/Receiving		Phone:		E-Mail: Laura.Turpen@et.eurofinsus.com		State of Origin: Michigan		Page: Page 1 of 1			
Company: Eurofins Lancaster Laboratories Environm				Accreditations Required (See note):				Job #: 320-96016-1			
Address: 2425 New Holland Pike, City: Lancaster State, Zip: PA, 17601 Phone: 717-656-2300(Tel) Email:		Due Date Requested: 3/6/2023 TAT Requested (days):		Analysis Requested						Preservation Codes:	
Project Name: PFAS PRD Destruction Technology Site:		Project #: 32020425 SSOW#:								A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA	
PO #:		WO #:		Field Filled Sample (Yes or No)		Perform MS/MSD (Yes or No)		CIC_Fluorine/CIC_DI_Prep Total Fluorine		Total Number of Containers	
Sample Identification - Client ID (Lab ID)		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)		Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)		Special Instructions/Note:	
ANG_1_tf_10 (320-96016-1)		1/13/23		13:00 Eastern				Water		2 No CATB expected, ~3500ppm OF	
ANG_1_tf_9 (320-96016-2)		1/13/23		13:15 Eastern				Water		2 No CATB expected, ~3000ppm OF	
<p>Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northern California, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northern California, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northern California, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Northern California, LLC.</p>											
Possible Hazard Identification						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)					
Unconfirmed						<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months					
Deliverable Requested: I, II, III, IV, Other (specify)				Primary Deliverable Rank: 2		Special Instructions/QC Requirements:					
Empty Kit Relinquished by:				Date:		Time:		Method of Shipment:			
Relinquished by: <i>[Signature]</i>				Date/Time: 1/19/23 11:30		Company: EETSAC		Received by:		Date/Time: _____ Company: _____	
Relinquished by:				Date/Time:		Company:		Received by:		Date/Time: _____ Company: _____	
Relinquished by:				Date/Time:		Company:		Received by: <i>Debra A. Byza</i>		Date/Time: 1-20-23 09:30 Company: ELLC	
Custody Seals Intact: Δ Yes Δ No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 2.3							



Login Sample Receipt Checklist

Client: Enspired Solutions

Job Number: 320-96016-1

Login Number: 96016

List Source: Eurofins Sacramento

List Number: 1

Creator: Her, David A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	2116485
Sample custody seals, if present, are 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.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	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	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Enspired Solutions

Job Number: 320-96016-1

Login Number: 96016
List Number: 2
Creator: McBeth, Jessica

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC
List Creation: 01/20/23 01:27 PM

Question	Answer	Comment
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 ($\leq 6^{\circ}\text{C}$, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable ($\leq 6^{\circ}\text{C}$, 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	
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	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	N/A	





ANALYTICAL REPORT

PREPARED FOR

Attn: Suzanne Witt
Enspired Solutions
9047 West Scenic Lake Dr
Laingsburg, Michigan 48848

Generated 6/30/2023 11:41:51 AM

JOB DESCRIPTION

PFAS PRD Destruction Technology

JOB NUMBER

320-98786-1

Eurofins Sacramento

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northern California, LLC Project Manager.

Authorization



Generated
6/30/2023 11:41:51 AM

Authorized for release by
Laura Turpen, Project Manager I
Laura.Turpen@et.eurofinsus.com
(916)374-4414



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Definitions/Glossary

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Qualifiers

LCMS

Qualifier	Qualifier Description
*-	LCS and/or LCSD is outside acceptance limits, low biased.
*+	LCS and/or LCSD is outside acceptance limits, high biased.
*1	LCS/LCSD RPD exceeds control limits.
*5-	Isotope dilution analyte is outside acceptance limits, low biased.
*5+	Isotope dilution analyte is outside acceptance limits, high biased.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
E	Result exceeded calibration range.
F1	MS and/or MSD recovery exceeds control limits.
H	Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
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

Case Narrative

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Job ID: 320-98786-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative 320-98786-1

Comments

No additional comments.

Receipt

The samples were received on 4/11/2023 9:25 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 5.2° C.

LCMS

Method 537 (modified): Isotope Dilution Analyte (IDA) recovery is outside the method recommended limit for the following samples: NASJ_t2 (320-98786-2), NASJ_t4 (320-98786-3), NASJ_t8 (320-98786-4), (LCSD 320-668395/3-A), (MB 320-668395/1-A), (MB 320-676726/1-A), NASJ_t0 (320-98786-1), TAFB_t30 (320-98786-10), and TAFB_t0 (320-98786-6). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample.

Method 537 (modified): The concentration of one or more analytes associated with the following sample exceeded the instrument calibration range: NASJ_t8 (320-98786-4). These analytes have been qualified; however, the peaks did not saturate the instrument detector. Historical data indicate that for the isotope dilution method, dilution and re-analysis will not produce significantly different results from those reported above the calibration range.

Method 537 (modified): Results for samples NASJ_t0 (320-98786-1), NASJ_t2 (320-98786-2), NASJ_t4 (320-98786-3), NASJ_t8 (320-98786-4), and TAFB_t30 (320-98786-10) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits.

Method 537 (modified): Internal standard (ISTD) response for the following sample in analytical batch 320-672179 was outside acceptance criteria: TAFB_t30 (320-98786-10). The sample was re-extracted outside of holding time with concurring ISTD response. The ISTD is not used to calculate analyte concentration; therefore, the data have been reported.

Method 537 (modified): The laboratory control sample (LCS) for preparation batches 320-668898 and 320-676722 and analytical batches 320-669513 and 320-680810 recovered outside control limits for the following analytes: 11Cl-PF3OUdS. The analyte was biased high in the LCS and was not detected in the associated client samples; therefore, the data have been reported.

Method 537 (modified): The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 320-668652 and analytical batch 320-672179 recovered outside control limits for the following analytes: 11Cl-PF3OUdS. The associated samples were re-prepared and this compound was again outside control limits. The associated samples were ND for this analyte in both extractions. The results from the original extraction are reported for this analyte. (LCS 320-668652/2-A) and (LCSD 320-668652/3-A)

Method 537 (modified): The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 320-668671 and analytical batch 320-672176 recovered outside control limits for the following analytes: N-ethylperfluorooctane sulfonamide (NEtFOSA), N-methylperfluorooctane sulfonamide (NMeFOSA), N-methylperfluorooctane sulfonamidoethanol (NMeFOSE) and N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE). Sample 320-98786-10 was re-prepared and these compounds were again outside control limits. Sample 320-98786-10 is reported from the re-extraction batch. Samples 320-98786-1 and 320-98786-5 are reported from the original extraction. The associated samples were ND for these compounds. (LCS 320-668671/2-A) and (LCSD 320-668671/3-A)

Method 537 (modified): The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 320-676726 and analytical batch 320-680809 recovered outside control limits for several analytes. Sample 320-98786-10 was re-prepared and these compounds were again outside control limits. Sample 320-98786-10 is reported from the re-extraction batch. Sample 320-98786-6 is reported from this batch also because this was the only extraction for this sample. The associated samples were ND for these compounds. (LCS 320-676726/2-A) and (LCSD 320-676726/3-A)

Method 537 (modified): The matrix spike (MS) recoveries for Perfluorohexanoic acid (PFHxA) and Perfluorododecanesulfonic acid (PFDoS) preparation batch 320-668898 and analytical batch 320-669513 were outside control limits. Sample matrix interference is suspected

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because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 537 (modified): Due to the high concentration of 6:2 Fluorotelomer sulfonic acid (6:2 FTS), the matrix spike / matrix spike duplicate (MS/MSD) for preparation batch 320-668898 and analytical batch 320-669513 could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria.

Method 537 (modified): Reanalysis of the following sample was performed outside of the analytical holding time due to the samples needing further dilution: NASJ_t0 (320-98786-1).

Method 537 (modified): Zero percent recovery of precursor analytes (such as 4:2 FTS, 6:2 FTS, 8:2 FTS, FOSA, NMeFOSAA, NEtFOSAA, etc.) and enhanced recoveries of PFCA is observed in the Post-Treatment Laboratory Control Sample (LCS) and Post-Treatment Laboratory Control Sample Duplicate (LCSD) associated with these samples, consistent with the expected oxidation of precursor analytes. The existing LCS control limits are based upon our historical performance for a set of 24-36 analytes in the LCS solution. We have recently expanded to 70+ analytes. As the LCS solution now contains new/additional precursor analytes we are seeing enhanced recoveries for some PFCA vs. the historical limits as a result. The LCS results are flagged as being high and outside of the established limits for some analytes; however, this is a function of the new analytes in the LCS solution and not indicative of an "out of control" process. (LCS 320-668652/2-A), (LCSD 320-668652/3-A), (LCS 320-676722/2-A) and (LCSD 320-676722/3-A)

Method 537 (modified): The labeled analyte M2-4:2FTS is employed in this analysis as a "Reverse Surrogate". It is used to monitor the oxidation efficiency of the TOP assay. This analyte is fortified into all sample fractions prior to any processing. The recovery of this analyte should be 0% in Post-Treatment fractions, indicating complete oxidation of the sample. NASJ_t0 (320-98786-1), NASJ_t28 (320-98786-5), (LCS 320-668671/2-A), (LCSD 320-668671/3-A), (MB 320-668671/1-A), TAFB_t0 (320-98786-6), TAFB_t30 (320-98786-10), (LCS 320-676726/2-A), (LCSD 320-676722/3-A), (LCSD 320-676726/3-A), (MB 320-676722/1-A), (MB 320-676726/1-A), (LCS 320-676722/2-A), (LCSD 320-676722/3-A), (MB 320-676722/1-A), (LCS 320-668652/2-A), (LCSD 320-668652/3-A) and (MB 320-668652/1-A).

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

General Chemistry

Method 300.0: The following samples in analytical batch 320-671429 were diluted due to the nature of the sample matrix and to protect instrumentation. The samples were viscous, foamed upon filtering, and were a dark orange color. TAFB_t2 (320-98786-7), TAFB_t4 (320-98786-8), TAFB_t8 (320-98786-9) and TAFB_t30 (320-98786-10). Elevated reporting limits (RLs) are provided.

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

Organic Prep

Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with preparation batch 320-668395.

Method 3535: Equal parts of samples [samples 2 A and B, 3 A and B, and 4 A and B] were each combined into new 250 mL containers to make the following samples: NASJ_t2 (320-98786-2), NASJ_t4 (320-98786-3) and NASJ_t8 (320-98786-4). After combining, the samples were fortified with IDA then extracted.

Method 3535: The following samples were light yellow and foamy prior to extraction: NASJ_t2 (320-98786-2), NASJ_t4 (320-98786-3) and NASJ_t8 (320-98786-4).

Method 3535: The following samples were light yellow after extraction/final volume: NASJ_t2 (320-98786-2) and NASJ_t4 (320-98786-3).

Method 3535: Elevated reporting limits are provided for the following sample due to limited sample used for preparation: NASJ_t2 (320-98786-2).

Method TOP Pre - Prep: The following sample in preparation batch 320-668671 was amber in color prior to and following extraction. Sample extract is amber in color. Sample was slow to load onto the column TAFB_t30 (320-98786-10)

Method TOP Post Prep: The following sample in preparation batch 320-668652 was dark amber in color following oxidation. Sample

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fumed upon addition of HCl at the neutralization step. Sample was difficult to load onto the column at solid-phase extraction. The sample extract was dark amber in color: TAFB_t30 (320-98786-10)

Method 3535: A deviation from the Standard Operating Procedure (SOP) occurred. Details are as follows: due to the matrix, the following samples were prepared using a 10 mL aliquot without extracting via the SPE process, then received spike/IDA and MeOH, before 2 mLs of this was subsampled to use for the aliquot.: TAFB_t2 (320-98786-7), TAFB_t4 (320-98786-8), TAFB_t8 (320-98786-9), (320-98786-A-7 MS) and (320-98786-A-7 MSD). This is the equivalent of a 250x dilution prior to submitting extracts for analysis.

Method TOP Pre - and Post Prep: The following samples were prepared outside of preparation holding time due to scheduling oversight: NASJ_t0 (320-98786-1) and TAFB_t0 (320-98786-6).

Method TOP Post Prep: The following samples were re-prepared outside of preparation holding time due to low LCS/LCSD recoveries: NASJ_t0 (320-98786-1), NASJ_t28 (320-98786-5) and TAFB_t30 (320-98786-10).

Method TOP Pre - Prep: Due to the matrix, the initial volume used for the following sample deviated from the standard procedure: TAFB_t30 (320-98786-10). The reporting limits (RLs) have been adjusted proportionately.

Method TOP Post Prep: The following samples in preparation batch 320-676722 were brown in color following both extraction and concentration: TAFB_t0 (320-98786-6) and TAFB_t30 (320-98786-10).

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

VOA Prep

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

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Job ID: 320-98786-1

Client Sample ID: NASJ_t0

Lab Sample ID: 320-98786-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	270	H	5.0		ng/L	1		537 (modified)	Pre-Treatment
Perfluorodecanoic acid (PFDA)	25	H	5.0		ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS)	59	H	5.0		ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanesulfonic acid (PFPeS)	84	H	5.0		ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	91	H	5.0		ng/L	1		537 (modified)	Pre-Treatment
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	65	H	5.0		ng/L	1		537 (modified)	Pre-Treatment
3:3 FTCA	60	H	5.0		ng/L	1		537 (modified)	Pre-Treatment
5:3 FTCA	790	H	5.0		ng/L	1		537 (modified)	Pre-Treatment
7:3 FTCA	82	H	5.0		ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanoic acid (PFPeA) - DL	2200	H	500		ng/L	100		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA) - DL	2200	H	500		ng/L	100		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA) - DL	1300	H	500		ng/L	100		537 (modified)	Pre-Treatment
Perfluorooctanoic acid (PFOA) - DL	4300	H	500		ng/L	100		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS) - DL	1600	H	500		ng/L	100		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS) - DL	10000	H	500		ng/L	100		537 (modified)	Pre-Treatment
Perfluorooctanesulfonamide (FOSA) - DL	1700	H	500		ng/L	100		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS) - DL	4600	H	1300		ng/L	100		537 (modified)	Pre-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS) - DL	4200	H	500		ng/L	100		537 (modified)	Pre-Treatment
Perfluorononanoic acid (PFNA)	200	H	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorodecanoic acid (PFDA)	11	H	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS)	83	H	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanesulfonic acid (PFPeS)	75	H	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanesulfonic acid (PFHpS)	53	H	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanesulfonamide (FOSA)	15	H	5.0		ng/L	1		537 (modified)	Post-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	19	H	13		ng/L	1		537 (modified)	Post-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	50	H	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluoro-4-methoxybutanoic acid (PFMBA)	43	H	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluoro-3-methoxypropanoic acid (PFMPA)	26	H	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanoic acid (PFBA) - DL	11000	H	1300		ng/L	100		537 (modified)	Post-Treatment

This Detection Summary does not include radiochemical test results.

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Detection Summary

Client: Ensired Solutions
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Job ID: 320-98786-1

Client Sample ID: NASJ_t0 (Continued)

Lab Sample ID: 320-98786-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoropentanoic acid (PFPeA) - DL	20000	H	500		ng/L	100		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA) - DL	49000	*+ H	500		ng/L	100		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA) - DL	4100	H	500		ng/L	100		537 (modified)	Post-Treatment
Perfluorooctanoic acid (PFOA) - DL	5800	H	500		ng/L	100		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS) - DL	1800	H	500		ng/L	100		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS) - DL	6400	H	500		ng/L	100		537 (modified)	Post-Treatment
PFBA	11000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	18000				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	47000				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	2800				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	1500				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	80000				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	2200	H	500		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	2200	H	500		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	1300	H	500		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	4300	H	500		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFNA	270	H	5.0		ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	10000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	11000	H	1300		ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	20000	H	500		ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	49000	*+ H	500		ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	4100	H	500		ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	5800	H	500		ng/L	1		Total PFCA-Sum	Post-Treatment
PFNA	200	H	5.0		ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	90000				ng/L	1		Total PFCA-Sum	Post-Treatment

Client Sample ID: NASJ_t2

Lab Sample ID: 320-98786-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	150		2.1		ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	160		2.1		ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	11		2.1		ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	2.9		2.1		ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	20		2.1		ng/L	1		537 (modified)	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	5.5		2.1		ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

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Detection Summary

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Job ID: 320-98786-1

Client Sample ID: NASJ_t2 (Continued)

Lab Sample ID: 320-98786-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	94		2.1		ng/L	1		537 (modified)	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	6.3		2.1		ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonamide (FOSA)	120		2.1		ng/L	1		537 (modified)	Total/NA
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	50		2.1		ng/L	1		537 (modified)	Total/NA
3:3 FTCA	77		2.1		ng/L	1		537 (modified)	Total/NA
7:3 FTCA	8.0		2.1		ng/L	1		537 (modified)	Total/NA
Perfluoro-4-methoxybutanoic acid (PFMBA)	3.4		2.1		ng/L	1		537 (modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	1700		52		ng/L	10		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	2800		21		ng/L	10		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	3500		21		ng/L	10		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	2500		21		ng/L	10		537 (modified)	Total/NA
6:2 Fluorotelomer sulfonic acid (6:2 FTS) - DL	570		52		ng/L	10		537 (modified)	Total/NA
8:2 Fluorotelomer sulfonic acid (8:2 FTS) - DL	530		21		ng/L	10		537 (modified)	Total/NA
5:3 FTCA - DL	440		21		ng/L	10		537 (modified)	Total/NA
Total Fluorine (TF)	260		200		ug/L	1		ELLE SOP	Total/NA

Client Sample ID: NASJ_t4

Lab Sample ID: 320-98786-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	37		1.9		ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	65		1.9		ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	6.3		1.9		ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	2.0		1.9		ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	11		1.9		ng/L	1		537 (modified)	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	2.1		1.9		ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	45		1.9		ng/L	1		537 (modified)	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	3.9		1.9		ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonamide (FOSA)	70		1.9		ng/L	1		537 (modified)	Total/NA
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	48		1.9		ng/L	1		537 (modified)	Total/NA
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	200		4.8		ng/L	1		537 (modified)	Total/NA
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	290		1.9		ng/L	1		537 (modified)	Total/NA
3:3 FTCA	78		1.9		ng/L	1		537 (modified)	Total/NA
7:3 FTCA	2.6		1.9		ng/L	1		537 (modified)	Total/NA
Perfluoro-4-methoxybutanoic acid (PFMBA)	3.8		1.9		ng/L	1		537 (modified)	Total/NA
Perfluoro-3-methoxypropanoic acid (PFMPA)	2.3		1.9		ng/L	1		537 (modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	1900		48		ng/L	10		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	2400		19		ng/L	10		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	2100		19		ng/L	10		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	2100		19		ng/L	10		537 (modified)	Total/NA
5:3 FTCA - DL	330		19		ng/L	10		537 (modified)	Total/NA
Total Fluorine (TF)	260		200		ug/L	1		ELLE SOP	Total/NA

This Detection Summary does not include radiochemical test results.

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Detection Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t8

Lab Sample ID: 320-98786-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	130		1.9		ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	81		1.9		ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	3.6		1.9		ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	11		1.9		ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	27		1.9		ng/L	1		537 (modified)	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	3.2		1.9		ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonamide (FOSA)	33		1.9		ng/L	1		537 (modified)	Total/NA
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	68		1.9		ng/L	1		537 (modified)	Total/NA
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	270		4.8		ng/L	1		537 (modified)	Total/NA
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	200		1.9		ng/L	1		537 (modified)	Total/NA
3:3 FTCA	70		1.9		ng/L	1		537 (modified)	Total/NA
5:3 FTCA	230		1.9		ng/L	1		537 (modified)	Total/NA
Perfluoro-4-methoxybutanoic acid (PFMBA)	8.0		1.9		ng/L	1		537 (modified)	Total/NA
Perfluoro-3-methoxypropanoic acid (PFMPA)	5.4		1.9		ng/L	1		537 (modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	3100		48		ng/L	10		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	3800		19		ng/L	10		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	5900 E		19		ng/L	10		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1400		19		ng/L	10		537 (modified)	Total/NA
Total Fluorine (TF)	320		200		ug/L	1		ELLE SOP	Total/NA

Client Sample ID: NASJ_t28

Lab Sample ID: 320-98786-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	310		13		ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanoic acid (PFPeA)	270		5.0		ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	220		5.0		ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	31		5.0		ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanoic acid (PFOA)	56		5.0		ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanesulfonic acid (PFBS)	6.8		5.0		ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	15		5.0		ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS)	210		5.0		ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonamide (FOSA)	12		5.0		ng/L	1		537 (modified)	Pre-Treatment
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	29		5.0		ng/L	1		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	110		13		ng/L	1		537 (modified)	Pre-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	53		5.0		ng/L	1		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	400		13		ng/L	1		537 (modified)	Post-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t28 (Continued)

Lab Sample ID: 320-98786-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoropentanoic acid (PFPeA)	330		5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA)	280	*+	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	42		5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanoic acid (PFOA)	73		5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS)	6.6		5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS)	16		5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS)	220		5.0		ng/L	1		537 (modified)	Post-Treatment
Total Fluorine (TF)	310		200		ug/L	1		ELLE SOP	Total/NA
PFBA	94				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	61				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	57				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	11				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	16				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	240				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	310		13		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	270		5.0		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	220		5.0		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	31		5.0		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	56		5.0		ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	890				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	400		13		ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	330		5.0		ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	280	*+	5.0		ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	42		5.0		ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	73		5.0		ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	1100				ng/L	1		Total PFCA-Sum	Post-Treatment

Client Sample ID: TAFB_t0

Lab Sample ID: 320-98786-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	8800	H	1300		ng/L	100		537 (modified)	Pre-Treatment
Perfluoropentanoic acid (PFPeA)	15000	H	500		ng/L	100		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA)	22000	H	500		ng/L	100		537 (modified)	Pre-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t0 (Continued)

Lab Sample ID: 320-98786-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	1300	H	500		ng/L	100		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS)	2600	H	500		ng/L	100		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27000	H	1300		ng/L	100		537 (modified)	Pre-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	610	H	500		ng/L	100		537 (modified)	Pre-Treatment
5:3 FTCA	4300	H	500		ng/L	100		537 (modified)	Pre-Treatment
Perfluorooctanoic acid (PFOA)	200	H	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorononanoic acid (PFNA)	15	*+ H	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorodecanoic acid (PFDA)	23	*+ H	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluoroundecanoic acid (PFUnA)	7.4	H	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanesulfonic acid (PFPeS)	26	H	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS)	140	H	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanesulfonamide (FOSA)	64	H *1	5.0		ng/L	1		537 (modified)	Post-Treatment
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	550	H	5.0		ng/L	1		537 (modified)	Post-Treatment
3:3 FTCA	63	H	5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanoic acid (PFBA) - DL	9500	*+ H	1300		ng/L	100		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA) - DL	17000	*+ H	500		ng/L	100		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA) - DL	20000	*+ H	500		ng/L	100		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA) - DL	1700	H	500		ng/L	100		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS) - DL	3000	H	500		ng/L	100		537 (modified)	Post-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS) - DL	30000	H	1300		ng/L	100		537 (modified)	Post-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS) - DL	800	H	500		ng/L	100		537 (modified)	Post-Treatment
5:3 FTCA - DL	2900	H	500		ng/L	100		537 (modified)	Post-Treatment
Total Fluorine (TF)	1800		200		ug/L	1		ELLE SOP	Total/NA
PFBA	730				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	2400				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	460				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	200				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	15				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	1300				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	8800	H	1300		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	15000	H	500		ng/L	1		Total PFCA-Sum	Pre-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t0 (Continued)

Lab Sample ID: 320-98786-6

Analyte	Result	Qualifier	NONE	MDL	Unit	Dil Fac	D	Method	Prep Type
PFHxA	22000	H	500		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	1300	H	500		ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	47000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	9500	*+ H	1300		ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	17000	*+ H	500		ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	20000	*+ H	500		ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	1700	H	500		ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	200	H	5.0		ng/L	1		Total PFCA-Sum	Post-Treatment
PFNA	15	*+ H	5.0		ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	48000				ng/L	1		Total PFCA-Sum	Post-Treatment

Client Sample ID: TAFB_t2

Lab Sample ID: 320-98786-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	7500		1300		ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	14000		500		ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	21000	F1	500		ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1400		500		ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2500		500		ng/L	1		537 (modified)	Total/NA
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	90000		1300		ng/L	1		537 (modified)	Total/NA
5:3 FTCA	3300		500		ng/L	1		537 (modified)	Total/NA
Total Fluorine (TF)	1800		200		ug/L	1		ELLE SOP	Total/NA

Client Sample ID: TAFB_t4

Lab Sample ID: 320-98786-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	7300		1300		ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	13000		500		ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	20000		500		ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1300		500		ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2700		500		ng/L	1		537 (modified)	Total/NA
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	87000		1300		ng/L	1		537 (modified)	Total/NA
5:3 FTCA	3200		500		ng/L	1		537 (modified)	Total/NA
Total Fluorine (TF)	1800		200		ug/L	1		ELLE SOP	Total/NA

Client Sample ID: TAFB_t8

Lab Sample ID: 320-98786-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	7300		1300		ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	14000		500		ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	20000		500		ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1200		500		ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2800		500		ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t8 (Continued)

Lab Sample ID: 320-98786-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	85000		1300		ng/L	1		537 (modified)	Total/NA
5:3 FTCA	3200		500		ng/L	1		537 (modified)	Total/NA
Total Fluorine (TF)	1800		200		ug/L	1		ELLE SOP	Total/NA

Client Sample ID: TAFB_t30

Lab Sample ID: 320-98786-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	6700	H	130		ng/L	1		537 (modified)	Pre-Treatment
Perfluoroheptanoic acid (PFHpA)	830	H	50		ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanoic acid (PFOA)	320	H	50		ng/L	1		537 (modified)	Pre-Treatment
Perfluorohexanesulfonic acid (PFHxS)	77	H	50		ng/L	1		537 (modified)	Pre-Treatment
Perfluorooctanesulfonic acid (PFOS)	1500	H	50		ng/L	1		537 (modified)	Pre-Treatment
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	310	H	50		ng/L	1		537 (modified)	Pre-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	210	H	50		ng/L	1		537 (modified)	Pre-Treatment
3:3 FTCA	120	H	50		ng/L	1		537 (modified)	Pre-Treatment
5:3 FTCA	3000	H	50		ng/L	1		537 (modified)	Pre-Treatment
Perfluoropentanoic acid (PFPeA) - DL	12000	H	500		ng/L	10		537 (modified)	Pre-Treatment
Perfluorohexanoic acid (PFHxA) - DL	16000	H	500		ng/L	10		537 (modified)	Pre-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS) - DL	72000	H	1300		ng/L	10		537 (modified)	Pre-Treatment
Perfluorobutanoic acid (PFBA)	10000	H	1300		ng/L	100		537 (modified)	Post-Treatment
Perfluoropentanoic acid (PFPeA)	12000	H	500		ng/L	100		537 (modified)	Post-Treatment
Perfluorohexanoic acid (PFHxA)	15000	*+ H	500		ng/L	100		537 (modified)	Post-Treatment
Perfluoroheptanoic acid (PFHpA)	830		5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanoic acid (PFOA)	290		5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorobutanesulfonic acid (PFBS)	28		5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluoropentanesulfonic acid (PFPeS)	30		5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorohexanesulfonic acid (PFHxS)	58		5.0		ng/L	1		537 (modified)	Post-Treatment
Perfluorooctanesulfonic acid (PFOS)	1200	H	500		ng/L	100		537 (modified)	Post-Treatment
Perfluorooctanesulfonamide (FOSA)	32		5.0		ng/L	1		537 (modified)	Post-Treatment
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	920		5.0		ng/L	1		537 (modified)	Post-Treatment
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	31000	H	1300		ng/L	100		537 (modified)	Post-Treatment
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	250		5.0		ng/L	1		537 (modified)	Post-Treatment

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t30 (Continued)

Lab Sample ID: 320-98786-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
3:3 FTCA	57		5.0		ng/L	1		537 (modified)	Post-Treatment
5:3 FTCA	4000	H	500		ng/L	100		537 (modified)	Post-Treatment
Total Fluorine (TF)	1800		200		ug/L	1		ELLE SOP	Total/NA
PFBA	3600				ng/L	1		Total PFCA-Dif	Total/NA
PFPA	130				ng/L	1		Total PFCA-Dif	Total/NA
PFHxA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFHpA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFOA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
PFNA	0.00				ng/L	1		Total PFCA-Dif	Total/NA
Total PFCA	2300				ng/L	1		Total PFCA-Dif	Total/NA
PFBA	6700	H	130		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	6700	H	130		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	12000	H	500		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFPA	12000	H	500		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	16000	H	500		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHxA	16000	H	500		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	830	H	50		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFHpA	830	H	50		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	320	H	50		ng/L	1		Total PFCA-Sum	Pre-Treatment
PFOA	320	H	50		ng/L	1		Total PFCA-Sum	Pre-Treatment
Total PFCA	36000				ng/L	1		Total PFCA-Sum	Pre-Treatment
PFBA	10000	H	1300		ng/L	1		Total PFCA-Sum	Post-Treatment
PFPA	12000	H	500		ng/L	1		Total PFCA-Sum	Post-Treatment
PFHxA	15000	*+ H	500		ng/L	1		Total PFCA-Sum	Post-Treatment
PFHpA	830		5.0		ng/L	1		Total PFCA-Sum	Post-Treatment
PFOA	290		5.0		ng/L	1		Total PFCA-Sum	Post-Treatment
Total PFCA	38000				ng/L	1		Total PFCA-Sum	Post-Treatment

This Detection Summary does not include radiochemical test results.

Euofins Sacramento

Total Oxidation Precursors

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

TestAmerica Job ID: 320-98786-1

Client Sample ID: NASJ_t0

Lab Sample ID: 320-98786-1
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	537 (modified)			537 (modified)			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
Perfluorobutanoic acid (PFBA)	ND		ng/L	11000		ng/L	11000	ng/L
PFBA	ND		ng/L	11000		ng/L	11000	ng/L
Perfluoropentanoic acid (PFPeA)	2200		ng/L	20000		ng/L	18000	ng/L
PFPA	2200		ng/L	20000		ng/L	18000	ng/L
Perfluorohexanoic acid (PFHxA)	2200		ng/L	49000		ng/L	47000	ng/L
PFHxA	2200		ng/L	49000		ng/L	47000	ng/L
Perfluoroheptanoic acid (PFHpA)	1300		ng/L	4100		ng/L	2800	ng/L
PFHpA	1300		ng/L	4100		ng/L	2800	ng/L
Perfluorooctanoic acid (PFOA)	4300		ng/L	5800		ng/L	1500	ng/L
PFOA	4300		ng/L	5800		ng/L	1500	ng/L
Perfluorononanoic acid (PFNA)	270		ng/L	200		ng/L	0.00	ng/L
PFNA	270		ng/L	200		ng/L	0.00	ng/L
Total PFCA	10000		ng/L	90000		ng/L	80000	ng/L

Client Sample ID: NASJ_t28

Lab Sample ID: 320-98786-5
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	537 (modified)			537 (modified)			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
Perfluorobutanoic acid (PFBA)	310		ng/L	400		ng/L	94	ng/L
PFBA	310		ng/L	400		ng/L	94	ng/L
Perfluoropentanoic acid (PFPeA)	270		ng/L	330		ng/L	61	ng/L
PFPA	270		ng/L	330		ng/L	61	ng/L
Perfluorohexanoic acid (PFHxA)	220		ng/L	280		ng/L	57	ng/L
PFHxA	220		ng/L	280		ng/L	57	ng/L
Perfluoroheptanoic acid (PFHpA)	31		ng/L	42		ng/L	11	ng/L
PFHpA	31		ng/L	42		ng/L	11	ng/L
Perfluorooctanoic acid (PFOA)	56		ng/L	73		ng/L	16	ng/L
PFOA	56		ng/L	73		ng/L	16	ng/L
Perfluorononanoic acid (PFNA)	ND		ng/L	ND		ng/L	0.00	ng/L
PFNA	ND		ng/L	ND		ng/L	0.00	ng/L
Total PFCA	890		ng/L	1100		ng/L	240	ng/L

¹ Difference = Post-Treatment - Pre-Treatment

Total Oxidation Precursors

Client: Enspired Solutions
Project/Site: PFAS PRD Destruction Technology

TestAmerica Job ID: 320-98786-1

Client Sample ID: TAFB_t0

Lab Sample ID: 320-98786-6
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	537 (modified)			537 (modified)			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
Perfluorobutanoic acid (PFBA)	8800		ng/L	9500		ng/L	730	ng/L
PFBA	8800		ng/L	9500		ng/L	730	ng/L
Perfluoropentanoic acid (PFPeA)	15000		ng/L	17000		ng/L	2400	ng/L
PFPA	15000		ng/L	17000		ng/L	2400	ng/L
Perfluorohexanoic acid (PFHxA)	22000		ng/L	20000		ng/L	0.00	ng/L
PFHxA	22000		ng/L	20000		ng/L	0.00	ng/L
Perfluoroheptanoic acid (PFHpA)	1300		ng/L	1700		ng/L	460	ng/L
PFHpA	1300		ng/L	1700		ng/L	460	ng/L
Perfluorooctanoic acid (PFOA)	ND		ng/L	200		ng/L	200	ng/L
PFOA	ND		ng/L	200		ng/L	200	ng/L
Perfluorononanoic acid (PFNA)	ND		ng/L	15		ng/L	15	ng/L
PFNA	ND		ng/L	15		ng/L	15	ng/L
Total PFCA	47000		ng/L	48000		ng/L	1300	ng/L

Client Sample ID: TAFB_t30

Lab Sample ID: 320-98786-10
Matrix: Water

Analyte	Pre-Treatment Method			Post-Treatment Method			Difference ¹	
	537 (modified)			537 (modified)			Result	Unit
	Result	Qualifier	Unit	Result	Qualifier	Unit		
Perfluorobutanoic acid (PFBA)	6700		ng/L	10000		ng/L	3600	ng/L
PFBA	6700		ng/L	10000		ng/L	3600	ng/L
PFBA	6700		ng/L	10000		ng/L	3600	ng/L
Perfluoropentanoic acid (PFPeA)	12000		ng/L	12000		ng/L	130	ng/L
PFPA	12000		ng/L	12000		ng/L	130	ng/L
PFPA	12000		ng/L	12000		ng/L	130	ng/L
Perfluorohexanoic acid (PFHxA)	16000		ng/L	15000		ng/L	0.00	ng/L
PFHxA	16000		ng/L	15000		ng/L	0.00	ng/L
PFHxA	16000		ng/L	15000		ng/L	0.00	ng/L
Perfluoroheptanoic acid (PFHpA)	830		ng/L	830		ng/L	0.00	ng/L
PFHpA	830		ng/L	830		ng/L	0.00	ng/L
PFHpA	830		ng/L	830		ng/L	0.00	ng/L
Perfluorooctanoic acid (PFOA)	320		ng/L	290		ng/L	0.00	ng/L
PFOA	320		ng/L	290		ng/L	0.00	ng/L
PFOA	320		ng/L	290		ng/L	0.00	ng/L
Perfluorononanoic acid (PFNA)	ND		ng/L	ND		ng/L	0.00	ng/L
PFNA	ND		ng/L	ND		ng/L	0.00	ng/L
PFNA	ND		ng/L	ND		ng/L	0.00	ng/L
Total PFCA	36000		ng/L	38000		ng/L	2300	ng/L

¹ Difference = Post-Treatment - Pre-Treatment

Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t0

Lab Sample ID: 320-98786-1

Date Collected: 04/04/23 09:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.50		mg/L			05/01/23 19:52	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	270	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Perfluorodecanoic acid (PFDA)	25	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Perfluoroundecanoic acid (PFUnA)	ND	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Perfluorododecanoic acid (PFDoA)	ND	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Perfluorotridecanoic acid (PFTrDA)	ND	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Perfluorotetradecanoic acid (PFTeA)	ND	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Perfluorobutanesulfonic acid (PFBS)	59	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Perfluoropentanesulfonic acid (PFPeS)	84	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Perfluoroheptanesulfonic acid (PFHpS)	91	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Perfluorononanesulfonic acid (PFNS)	ND	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Perfluorodecanesulfonic acid (PFDS)	ND	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Perfluorododecanesulfonic acid (PFDoS)	ND	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	13		ng/L		04/19/23 12:43	04/28/23 15:47	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	13		ng/L		04/19/23 12:43	04/28/23 15:47	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	65	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H *	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H *	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H *	10		ng/L		04/19/23 12:43	04/28/23 15:47	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H *	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
9CI-PF3ONS	ND	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	10		ng/L		04/19/23 12:43	04/28/23 15:47	1
11CI-PF3OUdS	ND	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
3:3 FTCA	60	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
5:3 FTCA	790	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
7:3 FTCA	82	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND	H	5.0		ng/L		04/19/23 12:43	04/28/23 15:47	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	106		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C4 PFBA	98		25 - 150	04/19/23 12:43	04/28/23 15:47	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t0

Lab Sample ID: 320-98786-1

Date Collected: 04/04/23 09:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

<u>Isotope Dilution</u>	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Dil Fac</u>
13C5 PFPeA	115		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C2 PFHxA	128		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C4 PFHpA	127		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C4 PFOA	105		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C5 PFNA	100		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C2 PFDA	117		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C2 PFUnA	132		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C2 PFDoA	142		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C2 PFTeDA	131		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C3 PFBS	116		25 - 150	04/19/23 12:43	04/28/23 15:47	1
18O2 PFHxS	89		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C4 PFOS	77		25 - 150	04/19/23 12:43	04/28/23 15:47	1
d3-NMeFOSAA	116		25 - 150	04/19/23 12:43	04/28/23 15:47	1
d5-NEtFOSAA	127		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C2 4:2 FTS	182	*5+	25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C2 6:2 FTS	126		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C2 8:2 FTS	133		25 - 150	04/19/23 12:43	04/28/23 15:47	1
d-N-MeFOSA-M	101		25 - 150	04/19/23 12:43	04/28/23 15:47	1
d-N-EtFOSA-M	98		25 - 150	04/19/23 12:43	04/28/23 15:47	1
d7-N-MeFOSE-M	88		25 - 150	04/19/23 12:43	04/28/23 15:47	1
d9-N-EtFOSE-M	88		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C3 HFPO-DA	141		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C-6:2 FTCA	79		25 - 150	04/19/23 12:43	04/28/23 15:47	1
13C-8:2 FTCA	91		25 - 150	04/19/23 12:43	04/28/23 15:47	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment - DL

<u>Analyte</u>	<u>Result</u>	<u>Qualifier</u>	<u>RL</u>	<u>MDL</u>	<u>Unit</u>	<u>D</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Dil Fac</u>
Perfluorobutanoic acid (PFBA)	ND	H	1300		ng/L		04/19/23 12:43	06/16/23 19:05	100
Perfluoropentanoic acid (PFPeA)	2200	H	500		ng/L		04/19/23 12:43	06/16/23 19:05	100
Perfluorohexanoic acid (PFHxA)	2200	H	500		ng/L		04/19/23 12:43	06/16/23 19:05	100
Perfluoroheptanoic acid (PFHpA)	1300	H	500		ng/L		04/19/23 12:43	06/16/23 19:05	100
Perfluorooctanoic acid (PFOA)	4300	H	500		ng/L		04/19/23 12:43	06/16/23 19:05	100
Perfluorohexanesulfonic acid (PFHxS)	1600	H	500		ng/L		04/19/23 12:43	06/16/23 19:05	100
Perfluorooctanesulfonic acid (PFOS)	10000	H	500		ng/L		04/19/23 12:43	06/16/23 19:05	100
Perfluorooctanesulfonamide (FOSA)	1700	H	500		ng/L		04/19/23 12:43	06/16/23 19:05	100
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	4600	H	1300		ng/L		04/19/23 12:43	06/16/23 19:05	100
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	4200	H	500		ng/L		04/19/23 12:43	06/16/23 19:05	100
<u>Isotope Dilution</u>	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Dil Fac</u>			
13C8 FOSA	106		25 - 150	04/19/23 12:43	06/16/23 19:05	100			
13C4 PFBA	81		25 - 150	04/19/23 12:43	06/16/23 19:05	100			
13C5 PFPeA	107		25 - 150	04/19/23 12:43	06/16/23 19:05	100			
13C2 PFHxA	107		25 - 150	04/19/23 12:43	06/16/23 19:05	100			
13C4 PFHpA	124		25 - 150	04/19/23 12:43	06/16/23 19:05	100			
13C4 PFOA	109		25 - 150	04/19/23 12:43	06/16/23 19:05	100			
18O2 PFHxS	115		25 - 150	04/19/23 12:43	06/16/23 19:05	100			
13C4 PFOS	109		25 - 150	04/19/23 12:43	06/16/23 19:05	100			

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Client Sample Results

Client: Enspered Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t0

Lab Sample ID: 320-98786-1

Date Collected: 04/04/23 09:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	200	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
Perfluorodecanoic acid (PFDA)	11	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
Perfluoroundecanoic acid (PFUnA)	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
Perfluorododecanoic acid (PFDoA)	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
Perfluorotridecanoic acid (PFTrDA)	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
Perfluorotetradecanoic acid (PFTeA)	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
Perfluorobutanesulfonic acid (PFBS)	83	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
Perfluoropentanesulfonic acid (PFPeS)	75	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
Perfluoroheptanesulfonic acid (PFHpS)	53	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
Perfluorononanesulfonic acid (PFNS)	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
Perfluorodecanesulfonic acid (PFDS)	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
Perfluorododecanesulfonic acid (PFDoS)	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
Perfluorooctanesulfonamide (FOSA)	15	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	13		ng/L		04/19/23 12:24	04/28/23 17:16	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	13		ng/L		04/19/23 12:24	04/28/23 17:16	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	19	H	13		ng/L		04/19/23 12:24	04/28/23 17:16	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	50	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H	10		ng/L		04/19/23 12:24	04/28/23 17:16	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
9CI-PF3ONS	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:04	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	10		ng/L		04/19/23 12:24	04/28/23 17:16	1
11CI-PF3OUdS	ND	H *	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
3:3 FTCA	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
5:3 FTCA	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
7:3 FTCA	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	43	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:04	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	26	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND	H	5.0		ng/L		04/19/23 12:24	04/28/23 17:16	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t0

Lab Sample ID: 320-98786-1

Date Collected: 04/04/23 09:50

Matrix: Water

Date Received: 04/11/23 09:25

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	132		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C4 PFBA	88		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C5 PFPeA	81		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C5 PFPeA	86		25 - 150	05/22/23 11:59	05/27/23 17:04	1
13C2 PFHxA	77		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C4 PFHpA	113		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C4 PFOA	106		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C5 PFNA	116		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C2 PFDA	145		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C2 PFUnA	135		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C2 PFDoA	152	*5+	25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C2 PFTeDA	150		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C3 PFBS	122		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C4 PFOS	101		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C4 PFOS	91		25 - 150	05/22/23 11:59	05/27/23 17:04	1
d3-NMeFOSAA	126		25 - 150	04/19/23 12:24	04/28/23 17:16	1
d5-NEtFOSAA	136		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C2 4:2 FTS	0		0 - 10	04/19/23 12:24	04/28/23 17:16	1
13C2 6:2 FTS	106		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C2 8:2 FTS	146		25 - 150	04/19/23 12:24	04/28/23 17:16	1
d-N-MeFOSA-M	122		25 - 150	04/19/23 12:24	04/28/23 17:16	1
d-N-EtFOSA-M	107		25 - 150	04/19/23 12:24	04/28/23 17:16	1
d7-N-MeFOSE-M	105		25 - 150	04/19/23 12:24	04/28/23 17:16	1
d9-N-EtFOSE-M	95		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C3 HFPO-DA	166	*5+	25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C-6:2 FTCA	102		25 - 150	04/19/23 12:24	04/28/23 17:16	1
13C-8:2 FTCA	109		25 - 150	04/19/23 12:24	04/28/23 17:16	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	11000	H	1300		ng/L		04/19/23 12:24	06/16/23 19:28	100
Perfluoropentanoic acid (PFPeA)	20000	H	500		ng/L		04/19/23 12:24	06/16/23 19:28	100
Perfluorohexanoic acid (PFHxA)	49000	*+ H	500		ng/L		04/19/23 12:24	06/16/23 19:28	100
Perfluoroheptanoic acid (PFHpA)	4100	H	500		ng/L		04/19/23 12:24	06/16/23 19:28	100
Perfluorooctanoic acid (PFOA)	5800	H	500		ng/L		04/19/23 12:24	06/16/23 19:28	100
Perfluorohexanesulfonic acid (PFHxS)	1800	H	500		ng/L		04/19/23 12:24	06/16/23 19:28	100
Perfluorooctanesulfonic acid (PFOS)	6400	H	500		ng/L		04/19/23 12:24	06/16/23 19:28	100

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	90		25 - 150	04/19/23 12:24	06/16/23 19:28	100
13C5 PFPeA	85		25 - 150	04/19/23 12:24	06/16/23 19:28	100
13C2 PFHxA	121		25 - 150	04/19/23 12:24	06/16/23 19:28	100
13C4 PFHpA	92		25 - 150	04/19/23 12:24	06/16/23 19:28	100
13C4 PFOA	93		25 - 150	04/19/23 12:24	06/16/23 19:28	100
18O2 PFHxS	98		25 - 150	04/19/23 12:24	06/16/23 19:28	100
13C4 PFOS	75		25 - 150	04/19/23 12:24	06/16/23 19:28	100

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	ND		200		ug/L		05/01/23 11:19	05/02/23 09:25	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t0

Lab Sample ID: 320-98786-1

Date Collected: 04/04/23 09:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	11000				ng/L			06/30/23 10:24	1
PFPA	18000				ng/L			06/30/23 10:24	1
PFHxA	47000				ng/L			06/30/23 10:24	1
PFHpA	2800				ng/L			06/30/23 10:24	1
PFOA	1500				ng/L			06/30/23 10:24	1
PFNA	0.00				ng/L			06/30/23 10:24	1
Total PFCA	80000				ng/L			06/30/23 10:24	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	ND	H	1300		ng/L			06/30/23 10:14	1
PFPA	2200	H	500		ng/L			06/30/23 10:14	1
PFHxA	2200	H	500		ng/L			06/30/23 10:14	1
PFHpA	1300	H	500		ng/L			06/30/23 10:14	1
PFOA	4300	H	500		ng/L			06/30/23 10:14	1
PFNA	270	H	5.0		ng/L			06/30/23 10:14	1
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	10000				ng/L			06/30/23 10:14	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	11000	H	1300		ng/L			06/30/23 10:19	1
PFPA	20000	H	500		ng/L			06/30/23 10:19	1
PFHxA	49000	*+ H	500		ng/L			06/30/23 10:19	1
PFHpA	4100	H	500		ng/L			06/30/23 10:19	1
PFOA	5800	H	500		ng/L			06/30/23 10:19	1
PFNA	200	H	5.0		ng/L			06/30/23 10:19	1
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	90000				ng/L			06/30/23 10:19	1

Client Sample ID: NASJ_t2

Lab Sample ID: 320-98786-2

Date Collected: 04/04/23 11:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.50		mg/L			05/01/23 20:50	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	150		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluorooctanoic acid (PFOA)	160		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluorononanoic acid (PFNA)	11		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluorodecanoic acid (PFDA)	2.9		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluoroundecanoic acid (PFUnA)	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluorododecanoic acid (PFDoA)	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluorotridecanoic acid (PFTrDA)	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluorobutanesulfonic acid (PFBS)	20		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t2

Lab Sample ID: 320-98786-2

Date Collected: 04/04/23 11:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanesulfonic acid (PFPeS)	5.5		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluorohexanesulfonic acid (PFHxS)	94		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluoroheptanesulfonic acid (PFHpS)	6.3		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluorononanesulfonic acid (PFNS)	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluorododecanesulfonic acid (PFDoS)	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluorooctanesulfonamide (FOSA)	120		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		5.2		ng/L		04/18/23 12:49	04/19/23 20:37	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		5.2		ng/L		04/18/23 12:49	04/19/23 20:37	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	50		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		4.2		ng/L		04/18/23 12:49	04/19/23 20:37	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
9CI-PF3ONS	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.2		ng/L		04/18/23 12:49	04/19/23 20:37	1
11CI-PF3OUdS	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
3:3 FTCA	77		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
7:3 FTCA	8.0		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	3.4		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		2.1		ng/L		04/18/23 12:49	04/19/23 20:37	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	110		25 - 150	04/18/23 12:49	04/19/23 20:37	1
13C5 PFPeA	91		25 - 150	04/18/23 12:49	04/19/23 20:37	1
13C2 PFHxA	105		25 - 150	04/18/23 12:49	04/19/23 20:37	1
13C4 PFHpA	102		25 - 150	04/18/23 12:49	04/19/23 20:37	1
13C4 PFOA	87		25 - 150	04/18/23 12:49	04/19/23 20:37	1
13C5 PFNA	86		25 - 150	04/18/23 12:49	04/19/23 20:37	1
13C2 PFDA	101		25 - 150	04/18/23 12:49	04/19/23 20:37	1
13C2 PFUnA	33		25 - 150	04/18/23 12:49	04/19/23 20:37	1
13C2 PFDoA	89		25 - 150	04/18/23 12:49	04/19/23 20:37	1
13C2 PFTeDA	95		25 - 150	04/18/23 12:49	04/19/23 20:37	1
13C3 PFBS	104		25 - 150	04/18/23 12:49	04/19/23 20:37	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t2

Lab Sample ID: 320-98786-2

Date Collected: 04/04/23 11:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	75		25 - 150	04/18/23 12:49	04/19/23 20:37	1
13C4 PFOS	81		25 - 150	04/18/23 12:49	04/19/23 20:37	1
d3-NMeFOSAA	67		25 - 150	04/18/23 12:49	04/19/23 20:37	1
d5-NEtFOSAA	44		25 - 150	04/18/23 12:49	04/19/23 20:37	1
13C2 4:2 FTS	64		25 - 150	04/18/23 12:49	04/19/23 20:37	1
d-N-MeFOSA-M	107		20 - 150	04/18/23 12:49	04/19/23 20:37	1
d-N-EtFOSA-M	111		20 - 150	04/18/23 12:49	04/19/23 20:37	1
d7-N-MeFOSE-M	111		10 - 120	04/18/23 12:49	04/19/23 20:37	1
d9-N-EtFOSE-M	147	*5+	10 - 120	04/18/23 12:49	04/19/23 20:37	1
13C3 HFPO-DA	125		25 - 150	04/18/23 12:49	04/19/23 20:37	1
13C-8:2 FTCA	105		25 - 150	04/18/23 12:49	04/19/23 20:37	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1700		52		ng/L		04/18/23 12:49	04/21/23 01:18	10
Perfluoropentanoic acid (PFPeA)	2800		21		ng/L		04/18/23 12:49	04/21/23 01:18	10
Perfluorohexanoic acid (PFHxA)	3500		21		ng/L		04/18/23 12:49	04/21/23 01:18	10
Perfluorooctanesulfonic acid (PFOS)	2500		21		ng/L		04/18/23 12:49	04/21/23 01:18	10
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	570		52		ng/L		04/18/23 12:49	04/21/23 01:18	10
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	530		21		ng/L		04/18/23 12:49	04/21/23 01:18	10
5:3 FTCA	440		21		ng/L		04/18/23 12:49	04/21/23 01:18	10

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	80		25 - 150	04/18/23 12:49	04/21/23 01:18	10
13C5 PFPeA	87		25 - 150	04/18/23 12:49	04/21/23 01:18	10
13C2 PFHxA	93		25 - 150	04/18/23 12:49	04/21/23 01:18	10
13C4 PFOS	94		25 - 150	04/18/23 12:49	04/21/23 01:18	10
13C2 6:2 FTS	79		25 - 150	04/18/23 12:49	04/21/23 01:18	10
13C2 8:2 FTS	89		25 - 150	04/18/23 12:49	04/21/23 01:18	10
13C-6:2 FTCA	93		25 - 150	04/18/23 12:49	04/21/23 01:18	10

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	260		200		ug/L		05/01/23 11:19	05/02/23 10:00	1

Client Sample ID: NASJ_t4

Lab Sample ID: 320-98786-3

Date Collected: 04/04/23 13:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.50		mg/L			05/01/23 21:10	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	37		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluorooctanoic acid (PFOA)	65		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluorononanoic acid (PFNA)	6.3		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluorodecanoic acid (PFDA)	2.0		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t4

Lab Sample ID: 320-98786-3

Date Collected: 04/04/23 13:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluorododecanoic acid (PFDoA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluorotridecanoic acid (PFTrDA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluorobutanesulfonic acid (PFBS)	11		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluoropentanesulfonic acid (PFPeS)	2.1		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluorohexanesulfonic acid (PFHxS)	45		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluoroheptanesulfonic acid (PFHpS)	3.9		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluorononanesulfonic acid (PFNS)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluorododecanesulfonic acid (PFDoS)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluorooctanesulfonamide (FOSA)	70		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.8		ng/L		04/18/23 12:49	04/19/23 20:47	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.8		ng/L		04/18/23 12:49	04/19/23 20:47	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	48		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	200		4.8		ng/L		04/18/23 12:49	04/19/23 20:47	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	290		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		3.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
9CI-PF3ONS	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
11CI-PF3OUdS	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
3:3 FTCA	78		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
7:3 FTCA	2.6		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	3.8		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	2.3		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:47	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	112		25 - 150				04/18/23 12:49	04/19/23 20:47	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t4

Lab Sample ID: 320-98786-3

Date Collected: 04/04/23 13:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFPeA	87		25 - 150	04/18/23 12:49	04/19/23 20:47	1
13C2 PFHxA	119		25 - 150	04/18/23 12:49	04/19/23 20:47	1
13C4 PFHpA	120		25 - 150	04/18/23 12:49	04/19/23 20:47	1
13C4 PFOA	94		25 - 150	04/18/23 12:49	04/19/23 20:47	1
13C5 PFNA	91		25 - 150	04/18/23 12:49	04/19/23 20:47	1
13C2 PFDA	99		25 - 150	04/18/23 12:49	04/19/23 20:47	1
13C2 PFUnA	77		25 - 150	04/18/23 12:49	04/19/23 20:47	1
13C2 PFDoA	93		25 - 150	04/18/23 12:49	04/19/23 20:47	1
13C2 PFTeDA	118		25 - 150	04/18/23 12:49	04/19/23 20:47	1
13C3 PFBS	113		25 - 150	04/18/23 12:49	04/19/23 20:47	1
18O2 PFHxS	85		25 - 150	04/18/23 12:49	04/19/23 20:47	1
13C4 PFOS	78		25 - 150	04/18/23 12:49	04/19/23 20:47	1
d3-NMeFOSAA	69		25 - 150	04/18/23 12:49	04/19/23 20:47	1
d5-NEtFOSAA	93		25 - 150	04/18/23 12:49	04/19/23 20:47	1
13C2 4:2 FTS	58		25 - 150	04/18/23 12:49	04/19/23 20:47	1
13C2 6:2 FTS	72		25 - 150	04/18/23 12:49	04/19/23 20:47	1
13C2 8:2 FTS	73		25 - 150	04/18/23 12:49	04/19/23 20:47	1
d-N-MeFOSA-M	110		20 - 150	04/18/23 12:49	04/19/23 20:47	1
d-N-EtFOSA-M	109		20 - 150	04/18/23 12:49	04/19/23 20:47	1
d7-N-MeFOSE-M	115		10 - 120	04/18/23 12:49	04/19/23 20:47	1
d9-N-EtFOSE-M	158	*5+	10 - 120	04/18/23 12:49	04/19/23 20:47	1
13C3 HFPO-DA	134		25 - 150	04/18/23 12:49	04/19/23 20:47	1
13C-8:2 FTCA	118		25 - 150	04/18/23 12:49	04/19/23 20:47	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1900		48		ng/L		04/18/23 12:49	04/21/23 01:29	10
Perfluoropentanoic acid (PFPeA)	2400		19		ng/L		04/18/23 12:49	04/21/23 01:29	10
Perfluorohexanoic acid (PFHxA)	2100		19		ng/L		04/18/23 12:49	04/21/23 01:29	10
Perfluorooctanesulfonic acid (PFOS)	2100		19		ng/L		04/18/23 12:49	04/21/23 01:29	10
5:3 FTCA	330		19		ng/L		04/18/23 12:49	04/21/23 01:29	10

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	80		25 - 150	04/18/23 12:49	04/21/23 01:29	10
13C5 PFPeA	91		25 - 150	04/18/23 12:49	04/21/23 01:29	10
13C2 PFHxA	106		25 - 150	04/18/23 12:49	04/21/23 01:29	10
13C4 PFOS	89		25 - 150	04/18/23 12:49	04/21/23 01:29	10
13C-6:2 FTCA	103		25 - 150	04/18/23 12:49	04/21/23 01:29	10

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	260		200		ug/L		05/01/23 11:19	05/02/23 10:36	1

Client Sample ID: NASJ_t8

Lab Sample ID: 320-98786-4

Date Collected: 04/04/23 17:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.50		mg/L			05/01/23 21:29	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t8

Lab Sample ID: 320-98786-4

Date Collected: 04/04/23 17:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	130		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluorooctanoic acid (PFOA)	81		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluorononanoic acid (PFNA)	3.6		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluorodecanoic acid (PFDA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluorododecanoic acid (PFDoA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluorotridecanoic acid (PFTrDA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluorobutanesulfonic acid (PFBS)	11		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluorohexanesulfonic acid (PFHxS)	27		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluoroheptanesulfonic acid (PFHpS)	3.2		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluorononanesulfonic acid (PFNS)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluorododecanesulfonic acid (PFDoS)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluorooctanesulfonamide (FOSA)	33		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.8		ng/L		04/18/23 12:49	04/19/23 20:57	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.8		ng/L		04/18/23 12:49	04/19/23 20:57	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	68		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	270		4.8		ng/L		04/18/23 12:49	04/19/23 20:57	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	200		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		3.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
9CI-PF3ONS	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
11CI-PF3OUdS	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
3:3 FTCA	70		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
5:3 FTCA	230		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
7:3 FTCA	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	8.0		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t8

Lab Sample ID: 320-98786-4

Date Collected: 04/04/23 17:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoro-3-methoxypropanoic acid (PFMPA)	5.4		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		1.9		ng/L		04/18/23 12:49	04/19/23 20:57	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	109		25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C5 PFPeA	77		25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C2 PFHxA	83		25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C4 PFHpA	109		25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C4 PFOA	100		25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C5 PFNA	98		25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C2 PFDA	104		25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C2 PFUnA	99		25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C2 PFDoA	96		25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C2 PFTeDA	106		25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C3 PFBS	99		25 - 150				04/18/23 12:49	04/19/23 20:57	1
18O2 PFHxS	79		25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C4 PFOS	87		25 - 150				04/18/23 12:49	04/19/23 20:57	1
d3-NMeFOSAA	108		25 - 150				04/18/23 12:49	04/19/23 20:57	1
d5-NEtFOSAA	109		25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C2 4:2 FTS	49		25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C2 6:2 FTS	80		25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C2 8:2 FTS	92		25 - 150				04/18/23 12:49	04/19/23 20:57	1
d-N-MeFOSA-M	96		20 - 150				04/18/23 12:49	04/19/23 20:57	1
d-N-EtFOSA-M	97		20 - 150				04/18/23 12:49	04/19/23 20:57	1
d7-N-MeFOSE-M	118		10 - 120				04/18/23 12:49	04/19/23 20:57	1
d9-N-EtFOSE-M	124	*5+	10 - 120				04/18/23 12:49	04/19/23 20:57	1
13C3 HFPO-DA	108		25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C-6:2 FTCA	158	*5+	25 - 150				04/18/23 12:49	04/19/23 20:57	1
13C-8:2 FTCA	137		25 - 150				04/18/23 12:49	04/19/23 20:57	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	3100		48		ng/L		04/18/23 12:49	04/21/23 01:40	10
Perfluoropentanoic acid (PFPeA)	3800		19		ng/L		04/18/23 12:49	04/21/23 01:40	10
Perfluorohexanoic acid (PFHxA)	5900	E	19		ng/L		04/18/23 12:49	04/21/23 01:40	10
Perfluorooctanesulfonic acid (PFOS)	1400		19		ng/L		04/18/23 12:49	04/21/23 01:40	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	79		25 - 150				04/18/23 12:49	04/21/23 01:40	10
13C5 PFPeA	88		25 - 150				04/18/23 12:49	04/21/23 01:40	10
13C2 PFHxA	93		25 - 150				04/18/23 12:49	04/21/23 01:40	10
13C4 PFOS	97		25 - 150				04/18/23 12:49	04/21/23 01:40	10

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	320		200		ug/L		05/01/23 11:19	05/02/23 11:11	1

Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t28

Lab Sample ID: 320-98786-5

Date Collected: 04/05/23 13:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.50		mg/L			05/01/23 18:53	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	310		13		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluoropentanoic acid (PFPeA)	270		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluorohexanoic acid (PFHxA)	220		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluoroheptanoic acid (PFHpA)	31		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluorooctanoic acid (PFOA)	56		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluorononanoic acid (PFNA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluorodecanoic acid (PFDA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluorododecanoic acid (PFDoA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluorotridecanoic acid (PFTrDA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluorobutanesulfonic acid (PFBS)	6.8		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluorohexanesulfonic acid (PFHxS)	15		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluorooctanesulfonic acid (PFOS)	210		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluorooctanesulfonamide (FOSA)	12		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13		ng/L		04/19/23 12:43	04/28/23 15:58	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13		ng/L		04/19/23 12:43	04/28/23 15:58	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	29		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	110		13		ng/L		04/19/23 12:43	04/28/23 15:58	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	53		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	-	5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	-	5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	-	10		ng/L		04/19/23 12:43	04/28/23 15:58	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	-	5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
9CI-PF3ONS	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10		ng/L		04/19/23 12:43	04/28/23 15:58	1
11CI-PF3OUdS	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t28

Lab Sample ID: 320-98786-5

Date Collected: 04/05/23 13:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
3:3 FTCA	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
5:3 FTCA	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
7:3 FTCA	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:58	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	95		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C4 PFBA	111		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C5 PFPeA	108		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C2 PFHxA	109		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C4 PFHpA	121		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C4 PFOA	112		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C5 PFNA	112		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C2 PFDA	115		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C2 PFUnA	109		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C2 PFDoA	118		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C2 PFTeDA	112		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C3 PFBS	106		25 - 150				04/19/23 12:43	04/28/23 15:58	1
18O2 PFHxS	116		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C4 PFOS	104		25 - 150				04/19/23 12:43	04/28/23 15:58	1
d3-NMeFOSAA	97		25 - 150				04/19/23 12:43	04/28/23 15:58	1
d5-NEtFOSAA	103		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C2 4:2 FTS	81		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C2 6:2 FTS	114		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C2 8:2 FTS	108		25 - 150				04/19/23 12:43	04/28/23 15:58	1
d-N-MeFOSA-M	97		25 - 150				04/19/23 12:43	04/28/23 15:58	1
d-N-EtFOSA-M	86		25 - 150				04/19/23 12:43	04/28/23 15:58	1
d7-N-MeFOSE-M	78		25 - 150				04/19/23 12:43	04/28/23 15:58	1
d9-N-EtFOSE-M	77		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C3 HFPO-DA	133		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C-6:2 FTCA	77		25 - 150				04/19/23 12:43	04/28/23 15:58	1
13C-8:2 FTCA	90		25 - 150				04/19/23 12:43	04/28/23 15:58	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	400		13		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluoropentanoic acid (PFPeA)	330		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluorohexanoic acid (PFHxA)	280	+	5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluoroheptanoic acid (PFHpA)	42		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluorooctanoic acid (PFOA)	73		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluorononanoic acid (PFNA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluorodecanoic acid (PFDA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t28

Lab Sample ID: 320-98786-5

Date Collected: 04/05/23 13:50

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorododecanoic acid (PFDoA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluorotridecanoic acid (PFTrDA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluorobutanesulfonic acid (PFBS)	6.6		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluorohexanesulfonic acid (PFHxS)	16		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluorooctanesulfonic acid (PFOS)	220		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13		ng/L		04/19/23 12:24	04/28/23 17:27	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13		ng/L		04/19/23 12:24	04/28/23 17:27	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13		ng/L		04/19/23 12:24	04/28/23 17:27	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10		ng/L		04/19/23 12:24	04/28/23 17:27	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
9CI-PF3ONS	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:16	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10		ng/L		04/19/23 12:24	04/28/23 17:27	1
11CI-PF3OUdS	ND	*	5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
3:3 FTCA	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
5:3 FTCA	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
7:3 FTCA	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:16	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 17:27	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t28

Lab Sample ID: 320-98786-5

Date Collected: 04/05/23 13:50

Matrix: Water

Date Received: 04/11/23 09:25

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	110		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C4 PFBA	113		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C5 PFPeA	117		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C5 PFPeA	106		25 - 150	05/22/23 11:59	05/27/23 17:16	1
13C2 PFHxA	115		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C4 PFHpA	125		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C4 PFOA	115		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C5 PFNA	121		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C2 PFDA	123		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C2 PFUnA	111		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C2 PFDoA	123		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C2 PFTeDA	124		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C3 PFBS	110		25 - 150	04/19/23 12:24	04/28/23 17:27	1
18O2 PFHxS	123		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C4 PFOS	113		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C4 PFOS	93		25 - 150	05/22/23 11:59	05/27/23 17:16	1
d3-NMeFOSAA	102		25 - 150	04/19/23 12:24	04/28/23 17:27	1
d5-NEtFOSAA	109		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C2 4:2 FTS	0		0 - 10	04/19/23 12:24	04/28/23 17:27	1
13C2 6:2 FTS	121		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C2 8:2 FTS	124		25 - 150	04/19/23 12:24	04/28/23 17:27	1
d-N-MeFOSA-M	89		25 - 150	04/19/23 12:24	04/28/23 17:27	1
d-N-EtFOSA-M	85		25 - 150	04/19/23 12:24	04/28/23 17:27	1
d7-N-MeFOSE-M	85		25 - 150	04/19/23 12:24	04/28/23 17:27	1
d9-N-EtFOSE-M	80		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C3 HFPO-DA	141		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C-6:2 FTCA	86		25 - 150	04/19/23 12:24	04/28/23 17:27	1
13C-8:2 FTCA	91		25 - 150	04/19/23 12:24	04/28/23 17:27	1

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	310		200		ug/L		05/01/23 11:19	05/02/23 11:46	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	94				ng/L			06/30/23 10:24	1
PFPA	61				ng/L			06/30/23 10:24	1
PFHxA	57				ng/L			06/30/23 10:24	1
PFHpA	11				ng/L			06/30/23 10:24	1
PFOA	16				ng/L			06/30/23 10:24	1
PFNA	0.00				ng/L			06/30/23 10:24	1
Total PFCA	240				ng/L			06/30/23 10:24	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	310		13		ng/L			06/30/23 10:14	1
PFPA	270		5.0		ng/L			06/30/23 10:14	1
PFHxA	220		5.0		ng/L			06/30/23 10:14	1
PFHpA	31		5.0		ng/L			06/30/23 10:14	1
PFOA	56		5.0		ng/L			06/30/23 10:14	1
PFNA	ND		5.0		ng/L			06/30/23 10:14	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t28

Lab Sample ID: 320-98786-5

Date Collected: 04/05/23 13:50

Matrix: Water

Date Received: 04/11/23 09:25

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	890				ng/L			06/30/23 10:14	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	400		13		ng/L			06/30/23 10:19	1
PFPA	330		5.0		ng/L			06/30/23 10:19	1
PFHxA	280	*+	5.0		ng/L			06/30/23 10:19	1
PFHpA	42		5.0		ng/L			06/30/23 10:19	1
PFOA	73		5.0		ng/L			06/30/23 10:19	1
PFNA	ND		5.0		ng/L			06/30/23 10:19	1
Total PFCA	1100				ng/L			06/30/23 10:19	1

Client Sample ID: TAFB_t0

Lab Sample ID: 320-98786-6

Date Collected: 04/06/23 10:20

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.50		mg/L			05/01/23 18:33	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	8800	H	1300		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluoropentanoic acid (PFPeA)	15000	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluorohexanoic acid (PFHxA)	22000	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluoroheptanoic acid (PFHpA)	1300	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluorooctanoic acid (PFOA)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluorononanoic acid (PFNA)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluorodecanoic acid (PFDA)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluoroundecanoic acid (PFUnA)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluorododecanoic acid (PFDoA)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluorotridecanoic acid (PFTTrDA)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluorotetradecanoic acid (PFTeA)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluorobutanesulfonic acid (PFBS)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluoropentanesulfonic acid (PFPeS)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluorohexanesulfonic acid (PFHxS)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluoroheptanesulfonic acid (PFHpS)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluorooctanesulfonic acid (PFOS)	2600	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluorononanesulfonic acid (PFNS)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluorodecanesulfonic acid (PFDS)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluorododecanesulfonic acid (PFDoS)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluorooctanesulfonamide (FOSA)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	1300		ng/L		05/22/23 12:07	06/16/23 20:57	100
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	1300		ng/L		05/22/23 12:07	06/16/23 20:57	100
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t0
Date Collected: 04/06/23 10:20
Date Received: 04/11/23 09:25

Lab Sample ID: 320-98786-6
Matrix: Water

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27000	H	1300		ng/L		05/22/23 12:07	06/16/23 20:57	100
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	610	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H *	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H *	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H *	1000		ng/L		05/22/23 12:07	06/16/23 20:57	100
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H *	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
9CI-PF3ONS	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	1000		ng/L		05/22/23 12:07	06/16/23 20:57	100
11CI-PF3OUdS	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
3:3 FTCA	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
5:3 FTCA	4300	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
7:3 FTCA	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND	H	500		ng/L		05/22/23 12:07	06/16/23 20:57	100

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	99		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C4 PFBA	100		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C5 PFPeA	110		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C2 PFHxA	112		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C4 PFHpA	123		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C4 PFOA	115		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C5 PFNA	109		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C2 PFDA	96		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C2 PFUnA	95		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C2 PFDaA	88		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C2 PFTeDA	102		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C3 PFBS	85		25 - 150	05/22/23 12:07	06/16/23 20:57	100
18O2 PFHxS	97		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C4 PFOS	89		25 - 150	05/22/23 12:07	06/16/23 20:57	100
d3-NMeFOSAA	91		25 - 150	05/22/23 12:07	06/16/23 20:57	100
d5-NEtFOSAA	128		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C2 4:2 FTS	146		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C2 6:2 FTS	494	*5+	25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C2 8:2 FTS	96		25 - 150	05/22/23 12:07	06/16/23 20:57	100
d-N-MeFOSA-M	46		25 - 150	05/22/23 12:07	06/16/23 20:57	100
d-N-EtFOSA-M	81		25 - 150	05/22/23 12:07	06/16/23 20:57	100
d7-N-MeFOSE-M	78		25 - 150	05/22/23 12:07	06/16/23 20:57	100

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t0

Lab Sample ID: 320-98786-6

Date Collected: 04/06/23 10:20

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
d9-N-EtFOSE-M	0	*5-	25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C3 HFPO-DA	122		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C-6:2 FTCA	78		25 - 150	05/22/23 12:07	06/16/23 20:57	100
13C-8:2 FTCA	56		25 - 150	05/22/23 12:07	06/16/23 20:57	100

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	200	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluorononanoic acid (PFNA)	15	*+ H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluorodecanoic acid (PFDA)	23	*+ H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluoroundecanoic acid (PFUnA)	7.4	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluorododecanoic acid (PFDoA)	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluorotridecanoic acid (PFTrDA)	ND	H *- *1	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluorotetradecanoic acid (PFTeA)	ND	H *- *1	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluorobutanesulfonic acid (PFBS)	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluoropentanesulfonic acid (PFPeS)	26	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluorohexanesulfonic acid (PFHxS)	140	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluoroheptanesulfonic acid (PFHpS)	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluorononanesulfonic acid (PFNS)	ND	H *-	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluorodecanesulfonic acid (PFDS)	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluorododecanesulfonic acid (PFDoS)	ND	H *- *1	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluorooctanesulfonamide (FOSA)	64	H *1	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	13		ng/L		05/22/23 11:59	05/27/23 17:27	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	13		ng/L		05/22/23 11:59	05/27/23 17:27	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	550	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H	10		ng/L		05/22/23 11:59	05/27/23 17:27	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
9CI-PF3ONS	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	10		ng/L		05/22/23 11:59	05/27/23 17:27	1
11CI-PF3OUdS	ND	H *-	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
3:3 FTCA	63	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
7:3 FTCA	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H *-	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t0

Lab Sample ID: 320-98786-6

Date Collected: 04/06/23 10:20

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:27	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	94		25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C4 PFBA	16	*5-	25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C5 PFPeA	35		25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C2 PFHxA	89		25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C4 PFHpA	129		25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C4 PFOSA	96		25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C5 PFNA	174	*5+	25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C2 PFDA	188	*5+	25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C2 PFUnA	189	*5+	25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C2 PFDoA	157	*5+	25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C2 PFTeDA	138		25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C3 PFBS	127		25 - 150				05/22/23 11:59	05/27/23 17:27	1
18O2 PFHxS	182	*5+	25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C4 PFOS	177	*5+	25 - 150				05/22/23 11:59	05/27/23 17:27	1
d3-NMeFOSAA	79		25 - 150				05/22/23 11:59	05/27/23 17:27	1
d5-NEtFOSAA	106		25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C2 4:2 FTS	0		0 - 10				05/22/23 11:59	05/27/23 17:27	1
d-N-MeFOSA-M	88		25 - 150				05/22/23 11:59	05/27/23 17:27	1
d-N-EtFOSA-M	85		25 - 150				05/22/23 11:59	05/27/23 17:27	1
d7-N-MeFOSE-M	74		25 - 150				05/22/23 11:59	05/27/23 17:27	1
d9-N-EtFOSE-M	72		25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C3 HFPO-DA	113		25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C-6:2 FTCA	62		25 - 150				05/22/23 11:59	05/27/23 17:27	1
13C-8:2 FTCA	84		25 - 150				05/22/23 11:59	05/27/23 17:27	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	9500	*+ H	1300		ng/L		05/22/23 11:59	06/16/23 22:38	100
Perfluoropentanoic acid (PFPeA)	17000	*+ H	500		ng/L		05/22/23 11:59	06/16/23 22:38	100
Perfluorohexanoic acid (PFHxA)	20000	*+ H	500		ng/L		05/22/23 11:59	06/16/23 22:38	100
Perfluoroheptanoic acid (PFHpA)	1700	H	500		ng/L		05/22/23 11:59	06/16/23 22:38	100
Perfluorooctanesulfonic acid (PFOS)	3000	H	500		ng/L		05/22/23 11:59	06/16/23 22:38	100
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	30000	H	1300		ng/L		05/22/23 11:59	06/16/23 22:38	100
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	800	H	500		ng/L		05/22/23 11:59	06/16/23 22:38	100
5:3 FTCA	2900	H	500		ng/L		05/22/23 11:59	06/16/23 22:38	100
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	53		25 - 150				05/22/23 11:59	06/16/23 22:38	100
13C5 PFPeA	74		25 - 150				05/22/23 11:59	06/16/23 22:38	100
13C2 PFHxA	115		25 - 150				05/22/23 11:59	06/16/23 22:38	100
13C4 PFHpA	89		25 - 150				05/22/23 11:59	06/16/23 22:38	100
13C4 PFOS	81		25 - 150				05/22/23 11:59	06/16/23 22:38	100
13C2 6:2 FTS	1968	*5+	25 - 150				05/22/23 11:59	06/16/23 22:38	100

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t0
 Date Collected: 04/06/23 10:20
 Date Received: 04/11/23 09:25

Lab Sample ID: 320-98786-6
 Matrix: Water

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment - DL (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 8:2 FTS	93		25 - 150	05/22/23 11:59	06/16/23 22:38	100
13C-6:2 FTCA	74		25 - 150	05/22/23 11:59	06/16/23 22:38	100

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	1800		200		ug/L		05/01/23 11:19	05/02/23 12:22	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	730				ng/L			06/30/23 10:24	1
PFPA	2400				ng/L			06/30/23 10:24	1
PFHxA	0.00				ng/L			06/30/23 10:24	1
PFHpA	460				ng/L			06/30/23 10:24	1
PFOA	200				ng/L			06/30/23 10:24	1
PFNA	15				ng/L			06/30/23 10:24	1
Total PFCA	1300				ng/L			06/30/23 10:24	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	8800	H	1300		ng/L			06/30/23 10:14	1
PFPA	15000	H	500		ng/L			06/30/23 10:14	1
PFHxA	22000	H	500		ng/L			06/30/23 10:14	1
PFHpA	1300	H	500		ng/L			06/30/23 10:14	1
PFOA	ND	H	500		ng/L			06/30/23 10:14	1
PFNA	ND	H	500		ng/L			06/30/23 10:14	1
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	47000				ng/L			06/30/23 10:14	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	9500	*+ H	1300		ng/L			06/30/23 10:19	1
PFPA	17000	*+ H	500		ng/L			06/30/23 10:19	1
PFHxA	20000	*+ H	500		ng/L			06/30/23 10:19	1
PFHpA	1700	H	500		ng/L			06/30/23 10:19	1
PFOA	200	H	5.0		ng/L			06/30/23 10:19	1
PFNA	15	*+ H	5.0		ng/L			06/30/23 10:19	1
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	48000				ng/L			06/30/23 10:19	1

Client Sample ID: TAFB_t2
 Date Collected: 04/06/23 12:20
 Date Received: 04/11/23 09:25

Lab Sample ID: 320-98786-7
 Matrix: Water

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		1.0		mg/L			05/01/23 18:14	2

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	7500		1300		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluoropentanoic acid (PFPeA)	14000		500		ng/L		04/20/23 10:52	04/23/23 13:00	1

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Client Sample Results

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t2

Lab Sample ID: 320-98786-7

Date Collected: 04/06/23 12:20

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	21000	F1	500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluoroheptanoic acid (PFHpA)	1400		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluorooctanoic acid (PFOA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluorononanoic acid (PFNA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluorodecanoic acid (PFDA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluoroundecanoic acid (PFUnA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluorododecanoic acid (PFDoA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluorotridecanoic acid (PFTrDA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluorotetradecanoic acid (PFTeA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluorobutanesulfonic acid (PFBS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluoropentanesulfonic acid (PFPeS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluorohexanesulfonic acid (PFHxS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluorooctanesulfonic acid (PFOS)	2500		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluorononanesulfonic acid (PFNS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluorodecanesulfonic acid (PFDS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluorododecanesulfonic acid (PFDoS)	ND	F1	500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluorooctanesulfonamide (FOSA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		1300		ng/L		04/20/23 10:52	04/23/23 13:00	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		1300		ng/L		04/20/23 10:52	04/23/23 13:00	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	90000		1300		ng/L		04/20/23 10:52	04/23/23 13:00	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		1000		ng/L		04/20/23 10:52	04/23/23 13:00	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
9CI-PF3ONS	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		1000		ng/L		04/20/23 10:52	04/23/23 13:00	1
11CI-PF3OUdS	ND	*+	500		ng/L		04/20/23 10:52	04/23/23 13:00	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
3:3 FTCA	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
5:3 FTCA	3300		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
7:3 FTCA	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t2

Lab Sample ID: 320-98786-7

Date Collected: 04/06/23 12:20

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:00	1
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C8 FOSA	102		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C4 PFBA	100		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C5 PFPeA	108		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C2 PFHxA	112		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C4 PFHpA	100		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C4 PFOA	106		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C5 PFNA	99		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C2 PFDA	104		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C2 PFUnA	95		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C2 PFDoA	87		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C2 PFTeDA	74		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C3 PFBS	95		25 - 150				04/20/23 10:52	04/23/23 13:00	1
18O2 PFHxS	93		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C4 PFOS	92		25 - 150				04/20/23 10:52	04/23/23 13:00	1
d3-NMeFOSAA	88		25 - 150				04/20/23 10:52	04/23/23 13:00	1
d5-NEtFOSAA	102		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C2 4:2 FTS	86		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C2 6:2 FTS	104		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C2 8:2 FTS	83		25 - 150				04/20/23 10:52	04/23/23 13:00	1
d-N-MeFOSA-M	106		20 - 150				04/20/23 10:52	04/23/23 13:00	1
d-N-EtFOSA-M	99		20 - 150				04/20/23 10:52	04/23/23 13:00	1
d7-N-MeFOSE-M	95		10 - 120				04/20/23 10:52	04/23/23 13:00	1
d9-N-EtFOSE-M	86		10 - 120				04/20/23 10:52	04/23/23 13:00	1
13C3 HFPO-DA	93		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C-6:2 FTCA	106		25 - 150				04/20/23 10:52	04/23/23 13:00	1
13C-8:2 FTCA	112		25 - 150				04/20/23 10:52	04/23/23 13:00	1

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	1800		200		ug/L		05/01/23 11:19	05/02/23 14:43	1

Client Sample ID: TAFB_t4

Lab Sample ID: 320-98786-8

Date Collected: 04/06/23 14:20

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		1.0		mg/L			05/01/23 17:54	2

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	7300		1300		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluoropentanoic acid (PFPeA)	13000		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluorohexanoic acid (PFHxA)	20000		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluoroheptanoic acid (PFHpA)	1300		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluorooctanoic acid (PFOA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t4
Date Collected: 04/06/23 14:20
Date Received: 04/11/23 09:25

Lab Sample ID: 320-98786-8
Matrix: Water

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluorodecanoic acid (PFDA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluoroundecanoic acid (PFUnA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluorododecanoic acid (PFDoA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluorotridecanoic acid (PFTrDA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluorotetradecanoic acid (PFTeA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluorobutanesulfonic acid (PFBS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluoropentanesulfonic acid (PFPeS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluorohexanesulfonic acid (PFHxS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluorooctanesulfonic acid (PFOS)	2700		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluorononanesulfonic acid (PFNS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluorodecanesulfonic acid (PFDS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluorododecanesulfonic acid (PFDoS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluorooctanesulfonamide (FOSA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		1300		ng/L		04/20/23 10:52	04/23/23 13:31	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		1300		ng/L		04/20/23 10:52	04/23/23 13:31	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	87000		1300		ng/L		04/20/23 10:52	04/23/23 13:31	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		1000		ng/L		04/20/23 10:52	04/23/23 13:31	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
9CI-PF3ONS	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		1000		ng/L		04/20/23 10:52	04/23/23 13:31	1
11CI-PF3OUdS	ND	+	500		ng/L		04/20/23 10:52	04/23/23 13:31	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
3:3 FTCA	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
5:3 FTCA	3200		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
7:3 FTCA	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:31	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t4

Lab Sample ID: 320-98786-8

Date Collected: 04/06/23 14:20

Matrix: Water

Date Received: 04/11/23 09:25

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	101		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C4 PFBA	100		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C5 PFPeA	107		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C2 PFHxA	114		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C4 PFHpA	99		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C4 PFOA	106		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C5 PFNA	102		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C2 PFDA	107		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C2 PFUnA	98		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C2 PFDoA	97		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C2 PFTeDA	86		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C3 PFBS	94		25 - 150	04/20/23 10:52	04/23/23 13:31	1
18O2 PFHxS	88		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C4 PFOS	88		25 - 150	04/20/23 10:52	04/23/23 13:31	1
d3-NMeFOSAA	88		25 - 150	04/20/23 10:52	04/23/23 13:31	1
d5-NEtFOSAA	107		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C2 4:2 FTS	89		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C2 6:2 FTS	103		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C2 8:2 FTS	81		25 - 150	04/20/23 10:52	04/23/23 13:31	1
d-N-MeFOSA-M	107		20 - 150	04/20/23 10:52	04/23/23 13:31	1
d-N-EtFOSA-M	98		20 - 150	04/20/23 10:52	04/23/23 13:31	1
d7-N-MeFOSE-M	97		10 - 120	04/20/23 10:52	04/23/23 13:31	1
d9-N-EtFOSE-M	89		10 - 120	04/20/23 10:52	04/23/23 13:31	1
13C3 HFPO-DA	99		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C-6:2 FTCA	112		25 - 150	04/20/23 10:52	04/23/23 13:31	1
13C-8:2 FTCA	112		25 - 150	04/20/23 10:52	04/23/23 13:31	1

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	1800		200		ug/L		05/01/23 11:19	05/02/23 16:29	1

Client Sample ID: TAFB_t8

Lab Sample ID: 320-98786-9

Date Collected: 04/06/23 18:20

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		1.0		mg/L			05/01/23 17:34	2

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	7300		1300		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluoropentanoic acid (PFPeA)	14000		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluorohexanoic acid (PFHxA)	20000		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluoroheptanoic acid (PFHpA)	1200		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluorooctanoic acid (PFOA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluorononanoic acid (PFNA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluorodecanoic acid (PFDA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluoroundecanoic acid (PFUnA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluorododecanoic acid (PFDoA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluorotridecanoic acid (PFTTrDA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t8

Lab Sample ID: 320-98786-9

Date Collected: 04/06/23 18:20

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorotetradecanoic acid (PFTeA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluorobutanesulfonic acid (PFBS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluoropentanesulfonic acid (PFPeS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluorohexanesulfonic acid (PFHxS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluorooctanesulfonic acid (PFOS)	2800		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluorononanesulfonic acid (PFNS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluorodecanesulfonic acid (PFDS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluorododecanesulfonic acid (PFDoS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluorooctanesulfonamide (FOSA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		1300		ng/L		04/20/23 10:52	04/23/23 13:41	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		1300		ng/L		04/20/23 10:52	04/23/23 13:41	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	85000		1300		ng/L		04/20/23 10:52	04/23/23 13:41	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		1000		ng/L		04/20/23 10:52	04/23/23 13:41	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
9CI-PF3ONS	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		1000		ng/L		04/20/23 10:52	04/23/23 13:41	1
11CI-PF3OUdS	ND	+	500		ng/L		04/20/23 10:52	04/23/23 13:41	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
3:3 FTCA	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
5:3 FTCA	3200		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
7:3 FTCA	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		500		ng/L		04/20/23 10:52	04/23/23 13:41	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	105		25 - 150				04/20/23 10:52	04/23/23 13:41	1
13C4 PFBA	107		25 - 150				04/20/23 10:52	04/23/23 13:41	1
13C5 PFPeA	106		25 - 150				04/20/23 10:52	04/23/23 13:41	1
13C2 PFHxA	117		25 - 150				04/20/23 10:52	04/23/23 13:41	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t8

Lab Sample ID: 320-98786-9

Date Collected: 04/06/23 18:20

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFHpA	103		25 - 150	04/20/23 10:52	04/23/23 13:41	1
13C4 PFOA	106		25 - 150	04/20/23 10:52	04/23/23 13:41	1
13C5 PFNA	102		25 - 150	04/20/23 10:52	04/23/23 13:41	1
13C2 PFDA	109		25 - 150	04/20/23 10:52	04/23/23 13:41	1
13C2 PFUnA	104		25 - 150	04/20/23 10:52	04/23/23 13:41	1
13C2 PFDoA	95		25 - 150	04/20/23 10:52	04/23/23 13:41	1
13C2 PFTeDA	89		25 - 150	04/20/23 10:52	04/23/23 13:41	1
13C3 PFBS	95		25 - 150	04/20/23 10:52	04/23/23 13:41	1
18O2 PFHxS	93		25 - 150	04/20/23 10:52	04/23/23 13:41	1
13C4 PFOS	92		25 - 150	04/20/23 10:52	04/23/23 13:41	1
d3-NMeFOSAA	90		25 - 150	04/20/23 10:52	04/23/23 13:41	1
d5-NEtFOSAA	105		25 - 150	04/20/23 10:52	04/23/23 13:41	1
13C2 4:2 FTS	96		25 - 150	04/20/23 10:52	04/23/23 13:41	1
13C2 6:2 FTS	108		25 - 150	04/20/23 10:52	04/23/23 13:41	1
13C2 8:2 FTS	89		25 - 150	04/20/23 10:52	04/23/23 13:41	1
d-N-MeFOSA-M	111		20 - 150	04/20/23 10:52	04/23/23 13:41	1
d-N-EtFOSA-M	100		20 - 150	04/20/23 10:52	04/23/23 13:41	1
d7-N-MeFOSE-M	99		10 - 120	04/20/23 10:52	04/23/23 13:41	1
d9-N-EtFOSE-M	90		10 - 120	04/20/23 10:52	04/23/23 13:41	1
13C3 HFPO-DA	96		25 - 150	04/20/23 10:52	04/23/23 13:41	1
13C-6:2 FTCA	114		25 - 150	04/20/23 10:52	04/23/23 13:41	1
13C-8:2 FTCA	123		25 - 150	04/20/23 10:52	04/23/23 13:41	1

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	1800		200		ug/L		05/01/23 11:19	05/02/23 18:15	1

Client Sample ID: TAFB_t30

Lab Sample ID: 320-98786-10

Date Collected: 04/07/23 16:20

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		1.0		mg/L			05/01/23 17:15	2

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	6700	H	130		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluoroheptanoic acid (PFHpA)	830	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluorooctanoic acid (PFOA)	320	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluorononanoic acid (PFNA)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluorodecanoic acid (PFDA)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluoroundecanoic acid (PFUnA)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluorododecanoic acid (PFDoA)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluorotridecanoic acid (PFTeA)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluorotetradecanoic acid (PFTeA)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluorobutanesulfonic acid (PFBS)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluoropentanesulfonic acid (PFPeS)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluorohexanesulfonic acid (PFHxS)	77	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1

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Client Sample Results

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t30

Lab Sample ID: 320-98786-10

Date Collected: 04/07/23 16:20

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanesulfonic acid (PFHpS)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluorooctanesulfonic acid (PFOS)	1500	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluorononanesulfonic acid (PFNS)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluorodecanesulfonic acid (PFDS)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluorododecanesulfonic acid (PFDoS)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluorooctanesulfonamide (FOSA)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND	H	130		ng/L		05/22/23 12:07	05/27/23 13:55	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND	H	130		ng/L		05/22/23 12:07	05/27/23 13:55	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	310	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	210	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND	H *	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND	H *	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND	H *	100		ng/L		05/22/23 12:07	05/27/23 13:55	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND	H *	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
9CI-PF3ONS	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	H	100		ng/L		05/22/23 12:07	05/27/23 13:55	1
11CI-PF3OUdS	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
3:3 FTCA	120	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
5:3 FTCA	3000	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
7:3 FTCA	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND	H	50		ng/L		05/22/23 12:07	05/27/23 13:55	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	115		25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C4 PFBA	69		25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C5 PFPeA	68		25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C2 PFHxA	137		25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C4 PFHpA	129		25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C4 PFOA	104		25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C5 PFNA	133		25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C2 PFDA	102		25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C2 PFUnA	84		25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C2 PFDoA	54		25 - 150	05/22/23 12:07	05/27/23 13:55	1

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Client Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t30

Lab Sample ID: 320-98786-10

Date Collected: 04/07/23 16:20

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFTeDA	30		25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C3 PFBS	124		25 - 150	05/22/23 12:07	05/27/23 13:55	1
18O2 PFHxS	148		25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C4 PFOS	88		25 - 150	05/22/23 12:07	05/27/23 13:55	1
d3-NMeFOSAA	77		25 - 150	05/22/23 12:07	05/27/23 13:55	1
d5-NEtFOSAA	115		25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C2 4:2 FTS	184	*5+	25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C2 8:2 FTS	133		25 - 150	05/22/23 12:07	05/27/23 13:55	1
d-N-MeFOSA-M	71		25 - 150	05/22/23 12:07	05/27/23 13:55	1
d-N-EtFOSA-M	53		25 - 150	05/22/23 12:07	05/27/23 13:55	1
d7-N-MeFOSE-M	21	*5-	25 - 150	05/22/23 12:07	05/27/23 13:55	1
d9-N-EtFOSE-M	16	*5-	25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C3 HFPO-DA	145		25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C-6:2 FTCA	97		25 - 150	05/22/23 12:07	05/27/23 13:55	1
13C-8:2 FTCA	99		25 - 150	05/22/23 12:07	05/27/23 13:55	1

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Pre-Treatment - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanoic acid (PFPeA)	12000	H	500		ng/L		05/22/23 12:07	06/16/23 20:24	10
Perfluorohexanoic acid (PFHxA)	16000	H	500		ng/L		05/22/23 12:07	06/16/23 20:24	10
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	72000	H	1300		ng/L		05/22/23 12:07	06/16/23 20:24	10

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFPeA	83		25 - 150	05/22/23 12:07	06/16/23 20:24	10
13C2 PFHxA	105		25 - 150	05/22/23 12:07	06/16/23 20:24	10
13C2 6:2 FTS	155	*5+	25 - 150	05/22/23 12:07	06/16/23 20:24	10

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	10000	H	1300		ng/L		04/19/23 13:07	06/16/23 19:39	100
Perfluoropentanoic acid (PFPeA)	12000	H	500		ng/L		04/19/23 13:07	06/16/23 19:39	100
Perfluorohexanoic acid (PFHxA)	15000	*+ H	500		ng/L		04/19/23 13:07	06/16/23 19:39	100
Perfluoroheptanoic acid (PFHpA)	830		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluorooctanoic acid (PFOA)	290		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluorononanoic acid (PFNA)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluorodecanoic acid (PFDA)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluorododecanoic acid (PFDoA)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluorotridecanoic acid (PFTTrDA)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluorobutanesulfonic acid (PFBS)	28		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluoropentanesulfonic acid (PFPeS)	30		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluorohexanesulfonic acid (PFHxS)	58		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluorooctanesulfonic acid (PFOS)	1200	H	500		ng/L		04/19/23 13:07	06/16/23 19:39	100
Perfluoronanesulfonic acid (PFNS)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t30

Lab Sample ID: 320-98786-10

Date Collected: 04/07/23 16:20

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanesulfonic acid (PFDS)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluorooctanesulfonamide (FOSA)	32		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13		ng/L		04/19/23 13:07	04/28/23 17:38	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13		ng/L		04/19/23 13:07	04/28/23 17:38	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	920		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	31000	H	1300		ng/L		04/19/23 13:07	06/16/23 19:39	100
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	250		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10		ng/L		04/19/23 13:07	04/28/23 17:38	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
9CI-PF3ONS	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:38	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10		ng/L		04/19/23 13:07	04/28/23 17:38	1
11CI-PF3OUdS	ND	*	5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	*1	5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
3:3 FTCA	57		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
5:3 FTCA	4000	H	500		ng/L		04/19/23 13:07	06/16/23 19:39	100
7:3 FTCA	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	H	5.0		ng/L		05/22/23 11:59	05/27/23 17:38	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		5.0		ng/L		04/19/23 13:07	04/28/23 17:38	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	76		25 - 150				04/19/23 13:07	04/28/23 17:38	1
13C4 PFBA	11	*5-	25 - 150				04/19/23 13:07	04/28/23 17:38	1
13C4 PFBA	30		25 - 150				04/19/23 13:07	06/16/23 19:39	100
13C5 PFPeA	30		25 - 150				04/19/23 13:07	04/28/23 17:38	1
13C5 PFPeA	31		25 - 150				05/22/23 11:59	05/27/23 17:38	1
13C5 PFPeA	64		25 - 150				04/19/23 13:07	06/16/23 19:39	100
13C2 PFHxA	108		25 - 150				04/19/23 13:07	04/28/23 17:38	1
13C2 PFHxA	117		25 - 150				04/19/23 13:07	06/16/23 19:39	100
13C4 PFHpA	164	*5+	25 - 150				04/19/23 13:07	04/28/23 17:38	1
13C4 PFOA	101		25 - 150				04/19/23 13:07	04/28/23 17:38	1
13C5 PFNA	173	*5+	25 - 150				04/19/23 13:07	04/28/23 17:38	1
13C2 PFDA	133		25 - 150				04/19/23 13:07	04/28/23 17:38	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t30

Lab Sample ID: 320-98786-10

Date Collected: 04/07/23 16:20

Matrix: Water

Date Received: 04/11/23 09:25

Method: EPA 537 (modified) - Fluorinated Alkyl Substances - Post-Treatment (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	86		25 - 150	04/19/23 13:07	04/28/23 17:38	1
13C2 PFDoA	52		25 - 150	04/19/23 13:07	04/28/23 17:38	1
13C2 PFTeDA	16	*5-	25 - 150	04/19/23 13:07	04/28/23 17:38	1
13C3 PFBS	78		25 - 150	04/19/23 13:07	04/28/23 17:38	1
18O2 PFHxS	153	*5+	25 - 150	04/19/23 13:07	04/28/23 17:38	1
13C4 PFOS	88		25 - 150	04/19/23 13:07	04/28/23 17:38	1
13C4 PFOS	102		25 - 150	05/22/23 11:59	05/27/23 17:38	1
13C4 PFOS	41		25 - 150	04/19/23 13:07	06/16/23 19:39	100
d3-NMeFOSAA	55		25 - 150	04/19/23 13:07	04/28/23 17:38	1
d5-NEtFOSAA	70		25 - 150	04/19/23 13:07	04/28/23 17:38	1
13C2 4:2 FTS	104	*5+	0 - 10	04/19/23 13:07	04/28/23 17:38	1
13C2 6:2 FTS	1249	*5+	25 - 150	04/19/23 13:07	06/16/23 19:39	100
13C2 8:2 FTS	211	*5+	25 - 150	04/19/23 13:07	04/28/23 17:38	1
d-N-MeFOSA-M	52		25 - 150	04/19/23 13:07	04/28/23 17:38	1
d-N-EtFOSA-M	42		25 - 150	04/19/23 13:07	04/28/23 17:38	1
d7-N-MeFOSE-M	42		25 - 150	04/19/23 13:07	04/28/23 17:38	1
d9-N-EtFOSE-M	31		25 - 150	04/19/23 13:07	04/28/23 17:38	1
13C3 HFPO-DA	133		25 - 150	04/19/23 13:07	04/28/23 17:38	1
13C-6:2 FTCA	58		25 - 150	04/19/23 13:07	06/16/23 19:39	100
13C-8:2 FTCA	94		25 - 150	04/19/23 13:07	04/28/23 17:38	1

Method: ELLE - Lancaster ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Fluorine (TF)	1800		200		ug/L		05/01/23 11:19	05/02/23 20:01	1

Method: TAL SOP Total PFCA-Dif - Total PFCA (Treatment Difference)

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	3600				ng/L			06/30/23 10:24	1
PFPA	130				ng/L			06/30/23 10:24	1
PFHxA	0.00				ng/L			06/30/23 10:24	1
PFHpA	0.00				ng/L			06/30/23 10:24	1
PFOA	0.00				ng/L			06/30/23 10:24	1
PFNA	0.00				ng/L			06/30/23 10:24	1
Total PFCA	2300				ng/L			06/30/23 10:24	1

Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Pre-Treatment

Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	6700	H	130		ng/L			06/30/23 10:14	1
PFBA	6700	H	130		ng/L			06/30/23 10:14	1
PFPA	12000	H	500		ng/L			06/30/23 10:14	1
PFPA	12000	H	500		ng/L			06/30/23 10:14	1
PFHxA	16000	H	500		ng/L			06/30/23 10:14	1
PFHxA	16000	H	500		ng/L			06/30/23 10:14	1
PFHpA	830	H	50		ng/L			06/30/23 10:14	1
PFHpA	830	H	50		ng/L			06/30/23 10:14	1
PFOA	320	H	50		ng/L			06/30/23 10:14	1
PFOA	320	H	50		ng/L			06/30/23 10:14	1
PFNA	ND	H	50		ng/L			06/30/23 10:14	1
PFNA	ND	H	50		ng/L			06/30/23 10:14	1

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Client Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t30

Lab Sample ID: 320-98786-10

Date Collected: 04/07/23 16:20

Matrix: Water

Date Received: 04/11/23 09:25

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	36000				ng/L			06/30/23 10:14	1
Method: TAL SOP Total PFCA-Sum - Total PFCA (Summary) - Post-Treatment									
Analyte	Result	Qualifier	NONE	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFBA	10000	H	1300		ng/L			06/30/23 10:19	1
PFPA	12000	H	500		ng/L			06/30/23 10:19	1
PFHxA	15000	*+ H	500		ng/L			06/30/23 10:19	1
PFHpA	830		5.0		ng/L			06/30/23 10:19	1
PFOA	290		5.0		ng/L			06/30/23 10:19	1
PFNA	ND		5.0		ng/L			06/30/23 10:19	1
Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Total PFCA	38000				ng/L			06/30/23 10:19	1

Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)
320-98786-2	NASJ_t2	110	91	105	102	87	86	101	33

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)	M242FTS (25-150)
320-98786-2	NASJ_t2	89	95	104	75	81	67	44	64

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (20-150)	dEtFOSA (20-150)	NMFM (10-120)	NEFM (10-120)	HFPODA (25-150)	MFOEA (25-150)
320-98786-2	NASJ_t2			107	111	111	147 *5+	125	105

Surrogate Legend

PFOSA = 13C8 FOSA
 PFPeA = 13C5 PFPeA
 PFHxA = 13C2 PFHxA
 C4PFHA = 13C4 PFHpA
 PFOA = 13C4 PFOA
 PFNA = 13C5 PFNA
 PFDA = 13C2 PFDA
 PFUnA = 13C2 PFUnA
 PFDoA = 13C2 PFDoA
 PFTDA = 13C2 PFTeDA
 C3PFBS = 13C3 PFBS
 PFHxS = 18O2 PFHxS
 PFOS = 13C4 PFOS
 d3NMFOS = d3-NMeFOSAA
 d5NEFOS = d5-NEtFOSAA
 M242FTS = 13C2 4:2 FTS
 dMeFOSA = d-N-MeFOSA-M
 dEtFOSA = d-N-EtFOSA-M
 NMFM = d7-N-MeFOSE-M
 NEFM = d9-N-EtFOSE-M
 HFPODA = 13C3 HFPO-DA
 MFOEA = 13C-8:2 FTCA

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	PFOS (25-150)	M262FTS (25-150)	M282FTS (25-150)	MFHEA (25-150)
320-98786-2 - DL	NASJ_t2	80	87	93	94	79	89	93

Surrogate Legend

PFBA = 13C4 PFBA
 PFPeA = 13C5 PFPeA
 PFHxA = 13C2 PFHxA
 PFOS = 13C4 PFOS
 M262FTS = 13C2 6:2 FTS
 M282FTS = 13C2 8:2 FTS
 MFHEA = 13C-6:2 FTCA

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)
320-98786-3	NASJ_t4	112	87	119	120	94	91	99	77

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFDaA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)	M242FTS (25-150)
320-98786-3	NASJ_t4	93	118	113	85	78	69	93	58

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (20-150)	dEtFOSA (20-150)	NMFM (10-120)	NEFM (10-120)	HFPODA (25-150)	MFHEA (25-150)
320-98786-3	NASJ_t4	72	73	110	109	115	158 *5+	134	

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	MFOEA (25-150)
320-98786-3	NASJ_t4	118

Surrogate Legend

- PFOSA = 13C8 FOSA
- PFPeA = 13C5 PFPeA
- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDaA = 13C2 PFDaA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- M242FTS = 13C2 4:2 FTS
- M262FTS = 13C2 6:2 FTS
- M282FTS = 13C2 8:2 FTS
- dMeFOSA = d-N-MeFOSA-M
- dEtFOSA = d-N-EtFOSA-M
- NMFM = d7-N-MeFOSE-M
- NEFM = d9-N-EtFOSE-M
- HFPODA = 13C3 HFPO-DA
- MFOEA = 13C-8:2 FTCA

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	PFOS (25-150)	MFHEA (25-150)
320-98786-3 - DL	NASJ_t4	80	91	106	89	103

Surrogate Legend

- PFBA = 13C4 PFBA
- PFPeA = 13C5 PFPeA

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Isotope Dilution Summary

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology
 PFHxA = 13C2 PFHxA
 PFOS = 13C4 PFOS
 MFHEA = 13C-6:2 FTCA

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-98786-4	NASJ_t8	109		77	83	109	100	98	104
320-98786-7	TAFB_t2	102	100	108	112	100	106	99	104
320-98786-7 MS	TAFB_t2	112	107	117	128	110	118	110	118
320-98786-7 MSD	TAFB_t2	106	103	111	115	104	113	106	107
320-98786-8	TAFB_t4	101	100	107	114	99	106	102	107
320-98786-9	TAFB_t8	105	107	106	117	103	106	102	109
LCS 320-668395/2-A	Lab Control Sample	107	103	99	100	101	102	105	103
LCS 320-668898/2-A	Lab Control Sample	99	106	103	101	101	107	99	107
LCSD 320-668395/3-A	Lab Control Sample Dup	109	98	91	108	106	102	97	96
MB 320-668395/1-A	Method Blank	106	103	97	98	101	105	102	107
MB 320-668898/1-A	Method Blank	106	105	108	102	101	101	100	110

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-98786-4	NASJ_t8	99	96	106	99	79	87	108	109
320-98786-7	TAFB_t2	95	87	74	95	93	92	88	102
320-98786-7 MS	TAFB_t2	109	110	93	110	107	107	92	116
320-98786-7 MSD	TAFB_t2	105	104	97	101	100	97	87	106
320-98786-8	TAFB_t4	98	97	86	94	88	88	88	107
320-98786-9	TAFB_t8	104	95	89	95	93	92	90	105
LCS 320-668395/2-A	Lab Control Sample	98	105	101	103	115	120	106	99
LCS 320-668898/2-A	Lab Control Sample	96	105	115	98	91	89	90	100
LCSD 320-668395/3-A	Lab Control Sample Dup	101	98	95	109	95	96	95	96
MB 320-668395/1-A	Method Blank	97	98	100	107	97	106	100	94
MB 320-668898/1-A	Method Blank	106	101	115	94	95	94	98	110

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	M242FTS (25-150)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (20-150)	dEtFOSA (20-150)	NMFM (10-120)	NEFM (10-120)	HFPODA (25-150)
320-98786-4	NASJ_t8	49	80	92	96	97	118	124 *5+	108
320-98786-7	TAFB_t2	86	104	83	106	99	95	86	93
320-98786-7 MS	TAFB_t2	108	114	95	125	113	107	99	105
320-98786-7 MSD	TAFB_t2	101	113	87	112	106	103	90	101
320-98786-8	TAFB_t4	89	103	81	107	98	97	89	99
320-98786-9	TAFB_t8	96	108	89	111	100	99	90	96
LCS 320-668395/2-A	Lab Control Sample	94	97	99	85	81	58	57	86
LCS 320-668898/2-A	Lab Control Sample	88	84	88	101	88	89	82	95
LCSD 320-668395/3-A	Lab Control Sample Dup	91	108	94	85	83	109	124 *5+	99
MB 320-668395/1-A	Method Blank	85	96	85	94	85	110	121 *5+	99
MB 320-668898/1-A	Method Blank	85	84	85	104	96	99	91	100

		Percent Isotope Dilution Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	MFHEA (25-150)	MFOEA (25-150)
320-98786-4	NASJ_t8	158 *5+	137
320-98786-7	TAFB_t2	106	112
320-98786-7 MS	TAFB_t2	124	128
320-98786-7 MSD	TAFB_t2	115	128

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)	
		MFHEA (25-150)	MFOEA (25-150)
320-98786-8	TAFB_t4	112	112
320-98786-9	TAFB_t8	114	123
LCS 320-668395/2-A	Lab Control Sample	95	97
LCS 320-668898/2-A	Lab Control Sample	105	112
LCS 320-668395/3-A	Lab Control Sample Dup	132	113
MB 320-668395/1-A	Method Blank	137	112
MB 320-668898/1-A	Method Blank	111	114

Surrogate Legend

PFOSA = 13C8 FOSA
 PFBA = 13C4 PFBA
 PFPeA = 13C5 PFPeA
 PFHxA = 13C2 PFHxA
 C4PFHA = 13C4 PFHpA
 PFOA = 13C4 PFOA
 PFNA = 13C5 PFNA
 PFDA = 13C2 PFDA
 PFUnA = 13C2 PFUnA
 PFDaA = 13C2 PFDaA
 PFTDA = 13C2 PFTeDA
 C3PFBS = 13C3 PFBS
 PFHxS = 18O2 PFHxS
 PFOS = 13C4 PFOS
 d3NMFOA = d3-NMeFOA-M
 d5NEFOA = d5-NEtFOA-M
 M242FTS = 13C2 4:2 FTS
 M262FTS = 13C2 6:2 FTS
 M282FTS = 13C2 8:2 FTS
 dMeFOA = d-N-MeFOA-M
 dEtFOA = d-N-EtFOA-M
 NMFM = d7-N-MeFOSE-M
 NEFM = d9-N-EtFOSE-M
 HFPODA = 13C3 HFPO-DA
 MFHEA = 13C-6:2 FTCA
 MFOEA = 13C-8:2 FTCA

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)			
		PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	PFOS (25-150)
320-98786-4 - DL	NASJ_t8	79	88	93	97

Surrogate Legend

PFBA = 13C4 PFBA
 PFPeA = 13C5 PFPeA
 PFHxA = 13C2 PFHxA
 PFOS = 13C4 PFOS

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Isotope Dilution Summary

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Pre-Treatment

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-98786-1	NASJ_t0	106	98	115	128	127	105	100	117
320-98786-1 - DL	NASJ_t0	106	81	107	107	124	109		
320-98786-5	NASJ_t28	95	111	108	109	121	112	112	115
320-98786-6	TAFB_t0	99	100	110	112	123	115	109	96
320-98786-10	TAFB_t30	115	69	68	137	129	104	133	102
320-98786-10 - DL	TAFB_t30			83	105				
LCS 320-668671/2-A	Lab Control Sample	98	116	114	120	117	114	119	114
LCS 320-676726/2-A	Lab Control Sample	99	113	113	110	111	110	109	106
LCSD 320-668671/3-A	Lab Control Sample Dup	95	113	113	110	115	114	111	109
LCSD 320-676726/3-A	Lab Control Sample Dup	87	115	116	107	107	106	109	108
MB 320-668671/1-A	Method Blank	96	108	117	114	118	112	116	110
MB 320-676726/1-A	Method Blank	108	117	119	121	117	119	114	116

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-98786-1	NASJ_t0	132	142	131	116	89	77	116	127
320-98786-1 - DL	NASJ_t0					115	109		
320-98786-5	NASJ_t28	109	118	112	106	116	104	97	103
320-98786-6	TAFB_t0	95	88	102	85	97	89	91	128
320-98786-10	TAFB_t30	84	54	30	124	148	88	77	115
320-98786-10 - DL	TAFB_t30								
LCS 320-668671/2-A	Lab Control Sample	111	113	120	109	123	113	102	94
LCS 320-676726/2-A	Lab Control Sample	104	109	114	116	129	111	107	99
LCSD 320-668671/3-A	Lab Control Sample Dup	107	114	109	108	115	101	97	95
LCSD 320-676726/3-A	Lab Control Sample Dup	97	109	115	117	123	111	100	97
MB 320-668671/1-A	Method Blank	105	119	110	112	120	114	98	103
MB 320-676726/1-A	Method Blank	114	116	115	133	142	121	114	112

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		M242FTS (25-150)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFM (25-150)	NEFM (25-150)	HFPODA (25-150)
320-98786-1	NASJ_t0	182 *5+	126	133	101	98	88	88	141
320-98786-1 - DL	NASJ_t0								
320-98786-5	NASJ_t28	81	114	108	97	86	78	77	133
320-98786-6	TAFB_t0	146	494 *5+	96	46	81	78	0 *5-	122
320-98786-10	TAFB_t30	184 *5+		133	71	53	21 *5-	16 *5-	145
320-98786-10 - DL	TAFB_t30		155 *5+						
LCS 320-668671/2-A	Lab Control Sample	88	105	110	91	86	80	80	122
LCS 320-676726/2-A	Lab Control Sample	119	117	144	63	48	27	24 *5-	107
LCSD 320-668671/3-A	Lab Control Sample Dup	81	107	107	87	81	78	74	124
LCSD 320-676726/3-A	Lab Control Sample Dup	125	121	145	59	47	29	26	104
MB 320-668671/1-A	Method Blank	83	100	106	87	85	80	77	118
MB 320-676726/1-A	Method Blank	133	131	159 *5+	69	54	29	25	115

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)	
		MFHEA (25-150)	MFOEA (25-150)
320-98786-1	NASJ_t0	79	91
320-98786-1 - DL	NASJ_t0		
320-98786-5	NASJ_t28	77	90
320-98786-6	TAFB_t0	78	56

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Water

Prep Type: Pre-Treatment

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)	
		MFHEA (25-150)	MFOEA (25-150)
320-98786-10	TAFB_t30	97	99
320-98786-10 - DL	TAFB_t30		
LCS 320-668671/2-A	Lab Control Sample	84	86
LCS 320-676726/2-A	Lab Control Sample	80	83
LCSD 320-668671/3-A	Lab Control Sample Dup	81	86
LCSD 320-676726/3-A	Lab Control Sample Dup	84	82
MB 320-668671/1-A	Method Blank	79	88
MB 320-676726/1-A	Method Blank	89	86

Surrogate Legend

- PFOSA = 13C8 FOSA
- PFBA = 13C4 PFBA
- PFPeA = 13C5 PFPeA
- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDaA = 13C2 PFDaA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3NMFOA = d3-NMeFOA
- d5NEFOA = d5-NEtFOA
- M242FTS = 13C2 4:2 FTS
- M262FTS = 13C2 6:2 FTS
- M282FTS = 13C2 8:2 FTS
- dMeFOA = d-N-MeFOA-M
- dEtFOA = d-N-EtFOA-M
- NMFM = d7-N-MeFOSE-M
- NEFM = d9-N-EtFOSE-M
- HFPODA = 13C3 HFPO-DA
- MFHEA = 13C-6:2 FTCA
- MFOEA = 13C-8:2 FTCA

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Post-Treatment

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-98786-1	NASJ_t0	132	88	81	77	113	106	116	145
320-98786-1	NASJ_t0			86					
320-98786-1 - DL	NASJ_t0		90	85	121	92	93		
320-98786-5	NASJ_t28	110	113	117	115	125	115	121	123
320-98786-5	NASJ_t28			106					
320-98786-6	TAFB_t0	94	16 *5-	35	89	129	96	174 *5+	188 *5+
320-98786-6 - DL	TAFB_t0		53	74	115	89			
320-98786-10	TAFB_t30	76	11 *5-	30	108	164 *5+	101	173 *5+	133

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Water

Prep Type: Post-Treatment

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)
320-98786-10	TAFB_t30			31					
320-98786-10	TAFB_t30		30	64	117				
LCS 320-668652/2-A	Lab Control Sample	109	112	122	117	126	115	123	119
LCS 320-676722/2-A	Lab Control Sample	104	72	112	112	105	111	111	104
LCSD 320-668652/3-A	Lab Control Sample Dup	106	112	118	114	123	114	121	114
LCSD 320-676722/3-A	Lab Control Sample Dup	90	110	119	113	107	112	106	89
LCSD 320-676722/3-A	Lab Control Sample Dup				108				
MB 320-668652/1-A	Method Blank	107	113	112	115	125	124	119	116
MB 320-676722/1-A	Method Blank	96	111	111	107	107	103	106	92
		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	d3NMFOS (25-150)	d5NEFOS (25-150)
320-98786-1	NASJ_t0	135	152 *5+	150	122		101	126	136
320-98786-1	NASJ_t0						91		
320-98786-1 - DL	NASJ_t0					98	75		
320-98786-5	NASJ_t28	111	123	124	110	123	113	102	109
320-98786-5	NASJ_t28						93		
320-98786-6	TAFB_t0	189 *5+	157 *5+	138	127	182 *5+	177 *5+	79	106
320-98786-6 - DL	TAFB_t0						81		
320-98786-10	TAFB_t30	86	52	16 *5-	78	153 *5+	88	55	70
320-98786-10	TAFB_t30						102		
320-98786-10	TAFB_t30						41		
LCS 320-668652/2-A	Lab Control Sample	113	123	121	122	129	125	106	108
LCS 320-676722/2-A	Lab Control Sample	101	110	119	123	127	107	103	103
LCSD 320-668652/3-A	Lab Control Sample Dup	113	128	127	112	124	120	106	111
LCSD 320-676722/3-A	Lab Control Sample Dup	86	91	105	118	125	95	86	90
LCSD 320-676722/3-A	Lab Control Sample Dup								
MB 320-668652/1-A	Method Blank	113	112	121	110	125	120	110	103
MB 320-676722/1-A	Method Blank	95	102	111	115	120	101	83	92
		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	M242FTS (0-10)	M262FTS (25-150)	M282FTS (25-150)	dMeFOSA (25-150)	dEtFOSA (25-150)	NMFm (25-150)	NEFM (25-150)	HFPODA (25-150)
320-98786-1	NASJ_t0	0	106	146	122	107	105	95	166 *5+
320-98786-1	NASJ_t0								
320-98786-1 - DL	NASJ_t0								
320-98786-5	NASJ_t28	0	121	124	89	85	85	80	141
320-98786-5	NASJ_t28								
320-98786-6	TAFB_t0	0			88	85	74	72	113
320-98786-6 - DL	TAFB_t0		1968 *5+	93					
320-98786-10	TAFB_t30	104 *5+		211 *5+	52	42	42	31	133
320-98786-10	TAFB_t30		1249 *5+						
320-98786-10	TAFB_t30								
LCS 320-668652/2-A	Lab Control Sample	0	125	123	98	89	85	85	136
LCS 320-676722/2-A	Lab Control Sample	0	100	129	71	60	32	30	115
LCSD 320-668652/3-A	Lab Control Sample Dup	0	116	124	94	90	85	77	142
LCSD 320-676722/3-A	Lab Control Sample Dup	0	102	131	45	40	28	26	112
LCSD 320-676722/3-A	Lab Control Sample Dup								
MB 320-668652/1-A	Method Blank	0	124	126	93	85	84	81	138
MB 320-676722/1-A	Method Blank	0	106	128	38	36	31	28	111

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Isotope Dilution Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Matrix: Water

Prep Type: Post-Treatment

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	MFHEA (25-150)	MFOEA (25-150)
320-98786-1	NASJ_t0	102	109
320-98786-1	NASJ_t0		
320-98786-1 - DL	NASJ_t0		
320-98786-5	NASJ_t28	86	91
320-98786-5	NASJ_t28		
320-98786-6	TAFB_t0	62	84
320-98786-6 - DL	TAFB_t0	74	
320-98786-10	TAFB_t30		94
320-98786-10	TAFB_t30		
320-98786-10	TAFB_t30	58	
LCS 320-668652/2-A	Lab Control Sample	90	91
LCS 320-676722/2-A	Lab Control Sample	80	79
LCSD 320-668652/3-A	Lab Control Sample Dup	88	90
LCSD 320-676722/3-A	Lab Control Sample Dup	80	80
LCSD 320-676722/3-A	Lab Control Sample Dup		
MB 320-668652/1-A	Method Blank	83	93
MB 320-676722/1-A	Method Blank	76	69

Surrogate Legend

- PFOSA = 13C8 FOSA
- PFBA = 13C4 PFBA
- PFPeA = 13C5 PFPeA
- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDoA = 13C2 PFDoA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- M242FTS = 13C2 4:2 FTS
- M262FTS = 13C2 6:2 FTS
- M282FTS = 13C2 8:2 FTS
- dMeFOSA = d-N-MeFOSA-M
- dEtFOSA = d-N-EtFOSA-M
- NMFM = d7-N-MeFOSE-M
- NEFM = d9-N-EtFOSE-M
- HFPODA = 13C3 HFPO-DA
- MFHEA = 13C-6:2 FTCA
- MFOEA = 13C-8:2 FTCA

QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 320-671429/3
Matrix: Water
Analysis Batch: 671429

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.50		mg/L			05/01/23 15:57	1

Lab Sample ID: LCS 320-671429/4
Matrix: Water
Analysis Batch: 671429

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	7.50	7.55		mg/L		101	90 - 110

Lab Sample ID: 320-98786-1 MS
Matrix: Water
Analysis Batch: 671429

Client Sample ID: NASJ_t0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	ND		5.00	5.20		mg/L		103	90 - 110

Lab Sample ID: 320-98786-1 MSD
Matrix: Water
Analysis Batch: 671429

Client Sample ID: NASJ_t0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Fluoride	ND		5.00	5.20		mg/L		102	90 - 110	0	10

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-668395/1-A
Matrix: Water
Analysis Batch: 668676

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 668395

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		5.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluoropentanoic acid (PFPeA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluorohexanoic acid (PFHxA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluorooctanoic acid (PFOA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluorononanoic acid (PFNA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluorodecanoic acid (PFDA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluorododecanoic acid (PFDoA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluorotridecanoic acid (PFTTrDA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluorononanesulfonic acid (PFNS)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-668395/1-A
Matrix: Water
Analysis Batch: 668676

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 668395

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorododecanesulfonic acid (PFDoS)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		5.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		5.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		5.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		4.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
9CI-PF3ONS	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
11CI-PF3OUdS	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
3:3 FTCA	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
5:3 FTCA	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
7:3 FTCA	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		2.0		ng/L		04/18/23 12:49	04/19/23 19:45	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	106		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C4 PFBA	103		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C5 PFPeA	97		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C2 PFHxA	98		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C4 PFHpA	101		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C4 PFOA	105		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C5 PFNA	102		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C2 PFDA	107		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C2 PFUnA	97		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C2 PFDoA	98		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C2 PFTeDA	100		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C3 PFBS	107		25 - 150	04/18/23 12:49	04/19/23 19:45	1
18O2 PFHxS	97		25 - 150	04/18/23 12:49	04/19/23 19:45	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-668395/1-A
Matrix: Water
Analysis Batch: 668676

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 668395

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C4 PFOS	106		25 - 150	04/18/23 12:49	04/19/23 19:45	1
d3-NMeFOSAA	100		25 - 150	04/18/23 12:49	04/19/23 19:45	1
d5-NEtFOSAA	94		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C2 4:2 FTS	85		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C2 6:2 FTS	96		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C2 8:2 FTS	85		25 - 150	04/18/23 12:49	04/19/23 19:45	1
d-N-MeFOSA-M	94		20 - 150	04/18/23 12:49	04/19/23 19:45	1
d-N-EtFOSA-M	85		20 - 150	04/18/23 12:49	04/19/23 19:45	1
d7-N-MeFOSE-M	110		10 - 120	04/18/23 12:49	04/19/23 19:45	1
d9-N-EtFOSE-M	121	*5+	10 - 120	04/18/23 12:49	04/19/23 19:45	1
13C3 HFPO-DA	99		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C-6:2 FTCA	137		25 - 150	04/18/23 12:49	04/19/23 19:45	1
13C-8:2 FTCA	112		25 - 150	04/18/23 12:49	04/19/23 19:45	1

Lab Sample ID: LCS 320-668395/2-A
Matrix: Water
Analysis Batch: 669012

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 668395

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec
							Limits
Perfluorobutanoic acid (PFBA)	40.0	41.3		ng/L		103	76 - 136
Perfluoropentanoic acid (PFPeA)	40.0	42.3		ng/L		106	71 - 131
Perfluorohexanoic acid (PFHxA)	40.0	42.2		ng/L		105	73 - 133
Perfluoroheptanoic acid (PFHpA)	40.0	44.8		ng/L		112	72 - 132
Perfluorooctanoic acid (PFOA)	40.0	44.9		ng/L		112	70 - 130
Perfluorononanoic acid (PFNA)	40.0	44.3		ng/L		111	75 - 135
Perfluorodecanoic acid (PFDA)	40.0	46.4		ng/L		116	76 - 136
Perfluoroundecanoic acid (PFUnA)	40.0	49.1		ng/L		123	68 - 128
Perfluorododecanoic acid (PFDoA)	40.0	41.0		ng/L		103	71 - 131
Perfluorotridecanoic acid (PFTrDA)	40.0	41.8		ng/L		104	71 - 131
Perfluorotetradecanoic acid (PFTeA)	40.0	43.3		ng/L		108	70 - 130
Perfluorobutanesulfonic acid (PFBS)	35.5	41.7		ng/L		117	67 - 127
Perfluoropentanesulfonic acid (PFPeS)	37.6	43.8		ng/L		116	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	36.5	39.8		ng/L		109	59 - 119
Perfluoroheptanesulfonic acid (PFHpS)	38.2	40.5		ng/L		106	76 - 136
Perfluorooctanesulfonic acid (PFOS)	37.2	35.7		ng/L		96	70 - 130
Perfluorononanesulfonic acid (PFNS)	38.5	40.4		ng/L		105	75 - 135
Perfluorodecanesulfonic acid (PFDS)	38.6	38.2		ng/L		99	71 - 131
Perfluorododecanesulfonic acid (PFDoS)	38.8	35.3		ng/L		91	67 - 127
Perfluorooctanesulfonamide (FOSA)	40.0	44.8		ng/L		112	73 - 133

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-668395/2-A
Matrix: Water
Analysis Batch: 669012

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 668395

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	43.8		ng/L		109	76 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	45.4		ng/L		114	76 - 136
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	37.5	43.0		ng/L		115	79 - 139
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	38.1	43.5		ng/L		114	59 - 175
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	38.4	43.9		ng/L		114	75 - 135
N-ethylperfluorooctane sulfonamide (NEtFOSA)	40.0	44.1		ng/L		110	78 - 138
N-methylperfluorooctane sulfonamide (NMeFOSA)	40.0	46.7		ng/L		117	67 - 154
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	40.0	46.9		ng/L		117	70 - 130
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	40.0	45.2		ng/L		113	71 - 131
9CI-PF3ONS	37.4	36.5		ng/L		98	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	43.8		ng/L		109	51 - 173
11CI-PF3OUdS	37.8	35.6		ng/L		94	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.8	34.6		ng/L		92	79 - 139
3:3 FTCA	40.0	41.8		ng/L		104	70 - 130
5:3 FTCA	40.0	41.7		ng/L		104	70 - 130
7:3 FTCA	40.0	40.0		ng/L		100	70 - 130
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	40.0	42.9		ng/L		107	70 - 130
Perfluoro-4-methoxybutanoic acid (PFMBA)	40.0	42.5		ng/L		106	70 - 130
Perfluoro-3-methoxypropanoic acid (PFMPA)	40.0	42.6		ng/L		106	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	35.7	41.0		ng/L		115	70 - 130

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
13C8 FOSA	107		25 - 150
13C4 PFBA	103		25 - 150
13C5 PFPeA	99		25 - 150
13C2 PFHxA	100		25 - 150
13C4 PFHpA	101		25 - 150
13C4 PFOA	102		25 - 150
13C5 PFNA	105		25 - 150
13C2 PFDA	103		25 - 150
13C2 PFUnA	98		25 - 150
13C2 PFDoA	105		25 - 150
13C2 PFTeDA	101		25 - 150
13C3 PFBS	103		25 - 150
18O2 PFHxS	115		25 - 150
13C4 PFOS	120		25 - 150
d3-NMeFOSAA	106		25 - 150

QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-668395/2-A
Matrix: Water
Analysis Batch: 669012

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 668395

<i>Isotope Dilution</i>	<i>LCS</i>	<i>LCS</i>	<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
d5-NEtFOSAA	99		25 - 150
13C2 4:2 FTS	94		25 - 150
13C2 6:2 FTS	97		25 - 150
13C2 8:2 FTS	99		25 - 150
d-N-MeFOSA-M	85		20 - 150
d-N-EtFOSA-M	81		20 - 150
d7-N-MeFOSE-M	58		10 - 120
d9-N-EtFOSE-M	57		10 - 120
13C3 HFPO-DA	86		25 - 150
13C-6:2 FTCA	95		25 - 150
13C-8:2 FTCA	97		25 - 150

Lab Sample ID: LCSD 320-668395/3-A
Matrix: Water
Analysis Batch: 668676

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 668395

<i>Analyte</i>	<i>Spike</i>	<i>LCSD</i>	<i>LCSD</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec</i>	<i>RPD</i>	<i>RPD</i>
	<i>Added</i>	<i>Result</i>	<i>Qualifier</i>				<i>Limits</i>	<i>RPD</i>	<i>Limit</i>
Perfluorobutanoic acid (PFBA)	40.0	38.5		ng/L		96	76 - 136	8	30
Perfluoropentanoic acid (PFPeA)	40.0	41.6		ng/L		104	71 - 131	8	30
Perfluorohexanoic acid (PFHxA)	40.0	41.6		ng/L		104	73 - 133	1	30
Perfluoroheptanoic acid (PFHpA)	40.0	42.5		ng/L		106	72 - 132	2	30
Perfluorooctanoic acid (PFOA)	40.0	43.7		ng/L		109	70 - 130	8	30
Perfluorononanoic acid (PFNA)	40.0	46.1		ng/L		115	75 - 135	6	30
Perfluorodecanoic acid (PFDA)	40.0	49.1		ng/L		123	76 - 136	16	30
Perfluoroundecanoic acid (PFUnA)	40.0	39.2		ng/L		98	68 - 128	10	30
Perfluorododecanoic acid (PFDoA)	40.0	42.0		ng/L		105	71 - 131	2	30
Perfluorotridecanoic acid (PFTrDA)	40.0	45.1		ng/L		113	71 - 131	0	30
Perfluorotetradecanoic acid (PFTeA)	40.0	43.1		ng/L		108	70 - 130	3	30
Perfluorobutanesulfonic acid (PFBS)	35.5	38.1		ng/L		107	67 - 127	20	30
Perfluoropentanesulfonic acid (PFPeS)	37.6	30.0		ng/L		80	66 - 126	22	30
Perfluorohexanesulfonic acid (PFHxS)	36.5	39.4		ng/L		108	59 - 119	4	30
Perfluoroheptanesulfonic acid (PFHpS)	38.2	39.5		ng/L		103	76 - 136	5	30
Perfluorooctanesulfonic acid (PFOS)	37.2	40.3		ng/L		108	70 - 130	5	30
Perfluorononanesulfonic acid (PFNS)	38.5	39.3		ng/L		102	75 - 135	9	30
Perfluorodecanesulfonic acid (PFDS)	38.6	41.4		ng/L		107	71 - 131	6	30
Perfluorododecanesulfonic acid (PFDoS)	38.8	44.5		ng/L		115	67 - 127	4	30
Perfluorooctanesulfonamide (FOSA)	40.0	39.9		ng/L		100	73 - 133	8	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	42.6		ng/L		107	76 - 136	5	30

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QC Sample Results

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-668395/3-A
Matrix: Water
Analysis Batch: 668676

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 668395

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
N-ethylperfluorooctanesulfonamide doacetic acid (NETFOSAA)	40.0	46.4		ng/L		116	76 - 136	15	30
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	37.5	45.2		ng/L		120	79 - 139	21	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	38.1	36.7		ng/L		96	59 - 175	13	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	38.4	38.8		ng/L		101	75 - 135	7	30
N-ethylperfluorooctane sulfonamide (NETFOSA)	40.0	41.7		ng/L		104	78 - 138	9	30
N-methylperfluorooctane sulfonamide (NMeFOSA)	40.0	40.4		ng/L		101	67 - 154	3	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	40.0	40.0		ng/L		100	70 - 130	2	30
N-ethylperfluorooctane sulfonamidoethanol (NETFOSE)	40.0	41.0		ng/L		103	71 - 131	1	30
9Cl-PF3ONS	37.4	43.2		ng/L		116	75 - 135	4	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	45.2		ng/L		113	51 - 173	6	30
11Cl-PF3OUdS	37.8	42.0		ng/L		111	54 - 114	1	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.8	47.2		ng/L		125	79 - 139	8	30
3:3 FTCA	40.0	40.9		ng/L		102	70 - 130	9	30
5:3 FTCA	40.0	45.0		ng/L		113	70 - 130	7	30
7:3 FTCA	40.0	37.8		ng/L		95	70 - 130	14	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	40.0	39.2		ng/L		98	70 - 130	2	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	40.0	48.8		ng/L		122	70 - 130	1	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	40.0	47.7		ng/L		119	70 - 130	7	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	35.7	37.1		ng/L		104	70 - 130	19	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C8 FOSA	109		25 - 150
13C4 PFBA	98		25 - 150
13C5 PFPeA	91		25 - 150
13C2 PFHxA	108		25 - 150
13C4 PFHpA	106		25 - 150
13C4 PFOA	102		25 - 150
13C5 PFNA	97		25 - 150
13C2 PFDA	96		25 - 150
13C2 PFUnA	101		25 - 150
13C2 PFDoA	98		25 - 150
13C2 PFTeDA	95		25 - 150
13C3 PFBS	109		25 - 150
18O2 PFHxS	95		25 - 150
13C4 PFOS	96		25 - 150
d3-NMeFOSAA	95		25 - 150
d5-NETFOSAA	96		25 - 150
13C2 4:2 FTS	91		25 - 150

QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-668395/3-A
Matrix: Water
Analysis Batch: 668676

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 668395

<i>Isotope Dilution</i>	<i>LCS D</i>	<i>LCS D</i>	<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C2 6:2 FTS	108		25 - 150
13C2 8:2 FTS	94		25 - 150
d-N-MeFOSA-M	85		20 - 150
d-N-EtFOSA-M	83		20 - 150
d7-N-MeFOSE-M	109		10 - 120
d9-N-EtFOSE-M	124	*5+	10 - 120
13C3 HFPO-DA	99		25 - 150
13C-6:2 FTCA	132		25 - 150
13C-8:2 FTCA	113		25 - 150

Lab Sample ID: MB 320-668898/1-A
Matrix: Water
Analysis Batch: 669513

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 668898

<i>Analyte</i>	<i>MB</i>	<i>MB</i>	<i>RL</i>	<i>MDL</i>	<i>Unit</i>	<i>D</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
	<i>Result</i>	<i>Qualifier</i>							
Perfluorobutanoic acid (PFBA)	ND		1300		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluoropentanoic acid (PFPeA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluorohexanoic acid (PFHxA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluoroheptanoic acid (PFHpA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluorooctanoic acid (PFOA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluorononanoic acid (PFNA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluorodecanoic acid (PFDA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluoroundecanoic acid (PFUnA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluorododecanoic acid (PFDoA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluorotridecanoic acid (PFTTrDA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluorotetradecanoic acid (PFTTeA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluorobutanesulfonic acid (PFBS)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluoropentanesulfonic acid (PFPeS)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluorohexanesulfonic acid (PFHxS)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluorooctanesulfonic acid (PFOS)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluorononanesulfonic acid (PFNS)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluorodecanesulfonic acid (PFDS)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluorododecanesulfonic acid (PFDoS)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluorooctanesulfonamide (FOSA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		1300		ng/L		04/20/23 10:52	04/23/23 12:40	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		1300		ng/L		04/20/23 10:52	04/23/23 12:40	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		1300		ng/L		04/20/23 10:52	04/23/23 12:40	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-668898/1-A
Matrix: Water
Analysis Batch: 669513

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 668898

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		1000		ng/L		04/20/23 10:52	04/23/23 12:40	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
9CI-PF3ONS	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		1000		ng/L		04/20/23 10:52	04/23/23 12:40	1
11CI-PF3OUdS	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
3:3 FTCA	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
5:3 FTCA	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
7:3 FTCA	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		500		ng/L		04/20/23 10:52	04/23/23 12:40	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	106		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C4 PFBA	105		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C5 PFPeA	108		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C2 PFHxA	102		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C4 PFHpA	101		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C4 PFOA	101		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C5 PFNA	100		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C2 PFDA	110		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C2 PFUnA	106		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C2 PFDoA	101		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C2 PFTeDA	115		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C3 PFBS	94		25 - 150	04/20/23 10:52	04/23/23 12:40	1
18O2 PFHxS	95		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C4 PFOS	94		25 - 150	04/20/23 10:52	04/23/23 12:40	1
d3-NMeFOSAA	98		25 - 150	04/20/23 10:52	04/23/23 12:40	1
d5-NEtFOSAA	110		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C2 4:2 FTS	85		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C2 6:2 FTS	84		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C2 8:2 FTS	85		25 - 150	04/20/23 10:52	04/23/23 12:40	1
d-N-MeFOSA-M	104		20 - 150	04/20/23 10:52	04/23/23 12:40	1
d-N-EtFOSA-M	96		20 - 150	04/20/23 10:52	04/23/23 12:40	1
d7-N-MeFOSE-M	99		10 - 120	04/20/23 10:52	04/23/23 12:40	1
d9-N-EtFOSE-M	91		10 - 120	04/20/23 10:52	04/23/23 12:40	1
13C3 HFPO-DA	100		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C-6:2 FTCA	111		25 - 150	04/20/23 10:52	04/23/23 12:40	1
13C-8:2 FTCA	114		25 - 150	04/20/23 10:52	04/23/23 12:40	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: LCS 320-668898/2-A
Matrix: Water
Analysis Batch: 669513

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 668898

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	10000	10100		ng/L		101	76 - 136
Perfluoropentanoic acid (PFPeA)	10000	10700		ng/L		107	71 - 131
Perfluorohexanoic acid (PFHxA)	10000	10200		ng/L		102	73 - 133
Perfluoroheptanoic acid (PFHpA)	10000	11200		ng/L		112	72 - 132
Perfluorooctanoic acid (PFOA)	10000	10300		ng/L		103	70 - 130
Perfluorononanoic acid (PFNA)	10000	11000		ng/L		110	75 - 135
Perfluorodecanoic acid (PFDA)	10000	10900		ng/L		109	76 - 136
Perfluoroundecanoic acid (PFUnA)	10000	11400		ng/L		114	68 - 128
Perfluorododecanoic acid (PFDoA)	10000	10900		ng/L		109	71 - 131
Perfluorotridecanoic acid (PFTTrDA)	10000	10300		ng/L		103	71 - 131
Perfluorotetradecanoic acid (PFTeA)	10000	9580		ng/L		96	70 - 130
Perfluorobutanesulfonic acid (PFBS)	8880	9010		ng/L		101	67 - 127
Perfluoropentanesulfonic acid (PFPeS)	9400	10500		ng/L		112	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	9120	9500		ng/L		104	59 - 119
Perfluoroheptanesulfonic acid (PFHpS)	9540	11100		ng/L		116	76 - 136
Perfluorooctanesulfonic acid (PFOS)	9300	9750		ng/L		105	70 - 130
Perfluorononanesulfonic acid (PFNS)	9620	10600		ng/L		110	75 - 135
Perfluorodecanesulfonic acid (PFDS)	9640	10700		ng/L		111	71 - 131
Perfluorododecanesulfonic acid (PFDoS)	9700	9490		ng/L		98	67 - 127
Perfluorooctanesulfonamide (FOSA)	10000	11400		ng/L		114	73 - 133
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	10000	10600		ng/L		106	76 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	10000	10300		ng/L		103	76 - 136
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	9380	10600		ng/L		114	79 - 139
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	9520	11300		ng/L		119	59 - 175
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	9600	10200		ng/L		107	75 - 135
N-ethylperfluorooctane sulfonamide (NEtFOSA)	10000	10600		ng/L		106	78 - 138
N-methylperfluorooctane sulfonamide (NMeFOSA)	10000	9700		ng/L		97	67 - 154
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	10000	10700		ng/L		107	70 - 130
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	10000	11500		ng/L		115	71 - 131
9CI-PF3ONS	9340	11300		ng/L		121	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	10000	11100		ng/L		111	51 - 173

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-668898/2-A
Matrix: Water
Analysis Batch: 669513

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 668898

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
11CI-PF3OUdS	9440	11600	*+	ng/L		123	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	9440	13000		ng/L		137	79 - 139
3:3 FTCA	10000	11700		ng/L		117	70 - 130
5:3 FTCA	10000	9940		ng/L		99	70 - 130
7:3 FTCA	10000	9520		ng/L		95	70 - 130
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	10000	12800		ng/L		128	70 - 130
Perfluoro-4-methoxybutanoic acid (PFMBA)	10000	10300		ng/L		103	70 - 130
Perfluoro-3-methoxypropanoic acid (PFMPA)	10000	10900		ng/L		109	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	8920	9880		ng/L		111	70 - 130

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C8 FOSA	99		25 - 150
13C4 PFBA	106		25 - 150
13C5 PFPeA	103		25 - 150
13C2 PFHxA	101		25 - 150
13C4 PFHpA	101		25 - 150
13C4 PFOA	107		25 - 150
13C5 PFNA	99		25 - 150
13C2 PFDA	107		25 - 150
13C2 PFUnA	96		25 - 150
13C2 PFDoA	105		25 - 150
13C2 PFTeDA	115		25 - 150
13C3 PFBS	98		25 - 150
18O2 PFHxS	91		25 - 150
13C4 PFOS	89		25 - 150
d3-NMeFOSAA	90		25 - 150
d5-NEtFOSAA	100		25 - 150
13C2 4:2 FTS	88		25 - 150
13C2 6:2 FTS	84		25 - 150
13C2 8:2 FTS	88		25 - 150
d-N-MeFOSA-M	101		20 - 150
d-N-EtFOSA-M	88		20 - 150
d7-N-MeFOSE-M	89		10 - 120
d9-N-EtFOSE-M	82		10 - 120
13C3 HFPO-DA	95		25 - 150
13C-6:2 FTCA	105		25 - 150
13C-8:2 FTCA	112		25 - 150

Lab Sample ID: 320-98786-7 MS
Matrix: Water
Analysis Batch: 669513

Client Sample ID: TAFB_t2
Prep Type: Total/NA
Prep Batch: 668898

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	7500		10000	16600		ng/L		91	76 - 136
Perfluoropentanoic acid (PFPeA)	14000		10000	22500		ng/L		88	71 - 131

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: 320-98786-7 MS
Matrix: Water
Analysis Batch: 669513

Client Sample ID: TAFB_t2
Prep Type: Total/NA
Prep Batch: 668898

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec Limits
	Result	Qualifier	Added	Result	Qualifier				
Perfluorohexanoic acid (PFHxA)	21000	F1	10000	26900	F1	ng/L		60	73 - 133
Perfluoroheptanoic acid (PFHpA)	1400		10000	11800		ng/L		104	72 - 132
Perfluorooctanoic acid (PFOA)	ND		10000	10300		ng/L		100	70 - 130
Perfluorononanoic acid (PFNA)	ND		10000	10900		ng/L		109	75 - 135
Perfluorodecanoic acid (PFDA)	ND		10000	12000		ng/L		120	76 - 136
Perfluoroundecanoic acid (PFUnA)	ND		10000	11200		ng/L		112	68 - 128
Perfluorododecanoic acid (PFDoA)	ND		10000	10400		ng/L		104	71 - 131
Perfluorotridecanoic acid (PFTrDA)	ND		10000	8740		ng/L		87	71 - 131
Perfluorotetradecanoic acid (PFTeA)	ND		10000	9800		ng/L		98	70 - 130
Perfluorobutanesulfonic acid (PFBS)	ND		8880	9680		ng/L		108	67 - 127
Perfluoropentanesulfonic acid (PFPeS)	ND		9400	11100		ng/L		118	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	ND		9120	9900		ng/L		107	59 - 119
Perfluoroheptanesulfonic acid (PFHpS)	ND		9540	11100		ng/L		116	76 - 136
Perfluorooctanesulfonic acid (PFOS)	2500		9300	12000		ng/L		102	70 - 130
Perfluorononanesulfonic acid (PFNS)	ND		9620	9650		ng/L		100	75 - 135
Perfluorodecanesulfonic acid (PFDS)	ND		9640	9030		ng/L		94	71 - 131
Perfluorododecanesulfonic acid (PFDoS)	ND	F1	9700	6000	F1	ng/L		62	67 - 127
Perfluorooctanesulfonamide (FOSA)	ND		10000	10900		ng/L		109	73 - 133
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		10000	11200		ng/L		112	76 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		10000	10200		ng/L		102	76 - 136
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		9380	11600		ng/L		121	79 - 139
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	90000		9520	88600	4	ng/L		-14	59 - 175
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		9600	11000		ng/L		112	75 - 135
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		10000	10800		ng/L		108	78 - 138
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		10000	10100		ng/L		101	67 - 154
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10000	10200		ng/L		102	70 - 130
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		10000	11100		ng/L		111	71 - 131
9CI-PF3ONS	ND		9340	10600		ng/L		114	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10000	10800		ng/L		108	51 - 173
11CI-PF3OUdS	ND	*+	9440	7560		ng/L		80	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		9440	11700		ng/L		124	79 - 139

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: 320-98786-7 MS
Matrix: Water
Analysis Batch: 669513

Client Sample ID: TAFB_t2
Prep Type: Total/NA
Prep Batch: 668898

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier					
3:3 FTCA	ND		10000	10800		ng/L		106		70 - 130
5:3 FTCA	3300		10000	12600		ng/L		93		70 - 130
7:3 FTCA	ND		10000	9470		ng/L		95		70 - 130
Nonafluoro-3,6-dioxahexanoic acid (NFDHA)	ND		10000	10700		ng/L		107		70 - 130
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		10000	9980		ng/L		100		70 - 130
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		10000	10300		ng/L		103		70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		8920	9840		ng/L		110		70 - 130
		MS MS								
Isotope Dilution		%Recovery	Qualifier	Limits						
13C8 FOSA		112		25 - 150						
13C4 PFBA		107		25 - 150						
13C5 PFPeA		117		25 - 150						
13C2 PFHxA		128		25 - 150						
13C4 PFHpA		110		25 - 150						
13C4 PFOA		118		25 - 150						
13C5 PFNA		110		25 - 150						
13C2 PFDA		118		25 - 150						
13C2 PFUnA		109		25 - 150						
13C2 PFDoA		110		25 - 150						
13C2 PFTeDA		93		25 - 150						
13C3 PFBS		110		25 - 150						
18O2 PFHxS		107		25 - 150						
13C4 PFOS		107		25 - 150						
d3-NMeFOSAA		92		25 - 150						
d5-NEtFOSAA		116		25 - 150						
13C2 4:2 FTS		108		25 - 150						
13C2 6:2 FTS		114		25 - 150						
13C2 8:2 FTS		95		25 - 150						
d-N-MeFOSA-M		125		20 - 150						
d-N-EtFOSA-M		113		20 - 150						
d7-N-MeFOSE-M		107		10 - 120						
d9-N-EtFOSE-M		99		10 - 120						
13C3 HFPO-DA		105		25 - 150						
13C-6:2 FTCA		124		25 - 150						
13C-8:2 FTCA		128		25 - 150						

Lab Sample ID: 320-98786-7 MSD
Matrix: Water
Analysis Batch: 669513

Client Sample ID: TAFB_t2
Prep Type: Total/NA
Prep Batch: 668898

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier							
Perfluorobutanoic acid (PFBA)	7500		10000	16600		ng/L		90		76 - 136	0	30
Perfluoropentanoic acid (PFPeA)	14000		10000	22400		ng/L		87		71 - 131	1	30
Perfluorohexanoic acid (PFHxA)	21000	F1	10000	28300		ng/L		74		73 - 133	5	30
Perfluoroheptanoic acid (PFHpA)	1400		10000	11900		ng/L		105		72 - 132	0	30
Perfluorooctanoic acid (PFOA)	ND		10000	10300		ng/L		101		70 - 130	0	30

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: 320-98786-7 MSD
Matrix: Water
Analysis Batch: 669513

Client Sample ID: TAFB_t2
Prep Type: Total/NA
Prep Batch: 668898

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	RPD
	Result	Qualifier	Added	Result	Qualifier				Limits		Limit
Perfluorononanoic acid (PFNA)	ND		10000	10900		ng/L		109	75 - 135	0	30
Perfluorodecanoic acid (PFDA)	ND		10000	12300		ng/L		123	76 - 136	3	30
Perfluoroundecanoic acid (PFUnA)	ND		10000	11300		ng/L		113	68 - 128	1	30
Perfluorododecanoic acid (PFDoA)	ND		10000	10600		ng/L		106	71 - 131	1	30
Perfluorotridecanoic acid (PFTrDA)	ND		10000	9700		ng/L		97	71 - 131	11	30
Perfluorotetradecanoic acid (PFTeA)	ND		10000	9570		ng/L		96	70 - 130	2	30
Perfluorobutanesulfonic acid (PFBS)	ND		8880	9540		ng/L		107	67 - 127	1	30
Perfluoropentanesulfonic acid (PFPeS)	ND		9400	11400		ng/L		121	66 - 126	3	30
Perfluorohexanesulfonic acid (PFHxS)	ND		9120	9950		ng/L		107	59 - 119	1	30
Perfluoroheptanesulfonic acid (PFHpS)	ND		9540	11500		ng/L		121	76 - 136	4	30
Perfluorooctanesulfonic acid (PFOS)	2500		9300	12100		ng/L		104	70 - 130	1	30
Perfluorononanesulfonic acid (PFNS)	ND		9620	9680		ng/L		101	75 - 135	0	30
Perfluorodecanesulfonic acid (PFDS)	ND		9640	9620		ng/L		100	71 - 131	6	30
Perfluorododecanesulfonic acid (PFDoS)	ND	F1	9700	7470		ng/L		77	67 - 127	22	30
Perfluorooctanesulfonamide (FOSA)	ND		10000	10900		ng/L		109	73 - 133	0	30
N-methylperfluorooctanesulfonamide (NMeFOSAA)	ND		10000	11100		ng/L		111	76 - 136	0	30
N-ethylperfluorooctanesulfonamide (NEtFOSAA)	ND		10000	10700		ng/L		107	76 - 136	5	30
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		9380	11100		ng/L		116	79 - 139	4	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	90000		9520	91200	4	ng/L		13	59 - 175	3	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		9600	10900		ng/L		110	75 - 135	2	30
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		10000	10600		ng/L		106	78 - 138	2	30
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		10000	9980		ng/L		100	67 - 154	1	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10000	10200		ng/L		102	70 - 130	0	30
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		10000	11500		ng/L		115	71 - 131	3	30
9CI-PF3ONS	ND		9340	11100		ng/L		119	75 - 135	4	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10000	10900		ng/L		109	51 - 173	1	30
11CI-PF3OUdS	ND	*+	9440	7870		ng/L		83	54 - 114	4	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		9440	12700		ng/L		134	79 - 139	8	30
3:3 FTCA	ND		10000	11600		ng/L		114	70 - 130	7	30
5:3 FTCA	3300		10000	12800		ng/L		95	70 - 130	2	30
7:3 FTCA	ND		10000	9110		ng/L		91	70 - 130	4	30

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: 320-98786-7 MSD
Matrix: Water
Analysis Batch: 669513

Client Sample ID: TAFB_t2
Prep Type: Total/NA
Prep Batch: 668898

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		10000	11400		ng/L		114	70 - 130	7	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		10000	10100		ng/L		101	70 - 130	1	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		10000	9960		ng/L		100	70 - 130	3	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		8920	10500		ng/L		117	70 - 130	6	30

Isotope Dilution	MSD %Recovery	MSD Qualifier	MSD Limits
13C8 FOSA	106		25 - 150
13C4 PFBA	103		25 - 150
13C5 PFPeA	111		25 - 150
13C2 PFHxA	115		25 - 150
13C4 PFHpA	104		25 - 150
13C4 PFOA	113		25 - 150
13C5 PFNA	106		25 - 150
13C2 PFDA	107		25 - 150
13C2 PFUnA	105		25 - 150
13C2 PFDoA	104		25 - 150
13C2 PFTeDA	97		25 - 150
13C3 PFBS	101		25 - 150
18O2 PFHxS	100		25 - 150
13C4 PFOS	97		25 - 150
d3-NMeFOSAA	87		25 - 150
d5-NEtFOSAA	106		25 - 150
13C2 4:2 FTS	101		25 - 150
13C2 6:2 FTS	113		25 - 150
13C2 8:2 FTS	87		25 - 150
d-N-MeFOSA-M	112		20 - 150
d-N-EtFOSA-M	106		20 - 150
d7-N-MeFOSE-M	103		10 - 120
d9-N-EtFOSE-M	90		10 - 120
13C3 HFPO-DA	101		25 - 150
13C-6:2 FTCA	115		25 - 150
13C-8:2 FTCA	128		25 - 150

Lab Sample ID: MB 320-668671/1-A
Matrix: Water
Analysis Batch: 672176

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 668671

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		13		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluoropentanoic acid (PFPeA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluorohexanoic acid (PFHxA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluoroheptanoic acid (PFHpA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluorooctanoic acid (PFOA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluorononanoic acid (PFNA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluorodecanoic acid (PFDA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-668671/1-A
Matrix: Water
Analysis Batch: 672176

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 668671

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorododecanoic acid (PFDoA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluorotridecanoic acid (PFTTrDA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluorobutanesulfonic acid (PFBS)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluorohexanesulfonic acid (PFHxS)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluorooctanesulfonic acid (PFOS)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13		ng/L		04/19/23 12:43	04/28/23 15:13	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13		ng/L		04/19/23 12:43	04/28/23 15:13	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13		ng/L		04/19/23 12:43	04/28/23 15:13	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10		ng/L		04/19/23 12:43	04/28/23 15:13	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
9CI-PF3ONS	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10		ng/L		04/19/23 12:43	04/28/23 15:13	1
11CI-PF3OUdS	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
3:3 FTCA	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
5:3 FTCA	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
7:3 FTCA	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		5.0		ng/L		04/19/23 12:43	04/28/23 15:13	1

Isotope Dilution	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C8 FOSA	96		25 - 150	04/19/23 12:43	04/28/23 15:13	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-668671/1-A
Matrix: Water
Analysis Batch: 672176

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 668671

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C4 PFBA	108		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C5 PFPeA	117		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C2 PFHxA	114		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C4 PFHpA	118		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C4 PFOA	112		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C5 PFNA	116		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C2 PFDA	110		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C2 PFUnA	105		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C2 PFDoA	119		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C2 PFTeDA	110		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C3 PFBS	112		25 - 150	04/19/23 12:43	04/28/23 15:13	1
18O2 PFHxS	120		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C4 PFOS	114		25 - 150	04/19/23 12:43	04/28/23 15:13	1
d3-NMeFOSAA	98		25 - 150	04/19/23 12:43	04/28/23 15:13	1
d5-NEtFOSAA	103		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C2 4:2 FTS	83		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C2 6:2 FTS	100		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C2 8:2 FTS	106		25 - 150	04/19/23 12:43	04/28/23 15:13	1
d-N-MeFOSA-M	87		25 - 150	04/19/23 12:43	04/28/23 15:13	1
d-N-EtFOSA-M	85		25 - 150	04/19/23 12:43	04/28/23 15:13	1
d7-N-MeFOSE-M	80		25 - 150	04/19/23 12:43	04/28/23 15:13	1
d9-N-EtFOSE-M	77		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C3 HFPO-DA	118		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C-6:2 FTCA	79		25 - 150	04/19/23 12:43	04/28/23 15:13	1
13C-8:2 FTCA	88		25 - 150	04/19/23 12:43	04/28/23 15:13	1

Lab Sample ID: LCS 320-668671/2-A
Matrix: Water
Analysis Batch: 672176

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 668671

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Perfluorobutanoic acid (PFBA)	100	82.1		ng/L		82	76 - 136
Perfluoropentanoic acid (PFPeA)	100	84.9		ng/L		85	71 - 131
Perfluorohexanoic acid (PFHxA)	100	81.3		ng/L		81	73 - 133
Perfluoroheptanoic acid (PFHpA)	100	88.2		ng/L		88	72 - 132
Perfluorooctanoic acid (PFOA)	100	90.1		ng/L		90	70 - 130
Perfluorononanoic acid (PFNA)	100	89.5		ng/L		89	75 - 135
Perfluorodecanoic acid (PFDA)	100	88.7		ng/L		89	76 - 136
Perfluoroundecanoic acid (PFUnA)	100	90.6		ng/L		91	68 - 128
Perfluorododecanoic acid (PFDoA)	100	88.7		ng/L		89	71 - 131
Perfluorotridecanoic acid (PFTTrDA)	100	82.1		ng/L		82	71 - 131
Perfluorotetradecanoic acid (PFTeA)	100	77.0		ng/L		77	70 - 130
Perfluorobutanesulfonic acid (PFBS)	88.8	78.8		ng/L		89	67 - 127
Perfluoropentanesulfonic acid (PFPeS)	94.0	84.2		ng/L		90	66 - 126

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-668671/2-A
Matrix: Water
Analysis Batch: 672176

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 668671

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorohexanesulfonic acid (PFHxS)	91.2	70.1		ng/L		77	59 - 119
Perfluoroheptanesulfonic acid (PFHpS)	95.4	83.0		ng/L		87	76 - 136
Perfluorooctanesulfonic acid (PFOS)	93.0	79.2		ng/L		85	70 - 130
Perfluorononanesulfonic acid (PFNS)	96.2	78.8		ng/L		82	75 - 135
Perfluorodecanesulfonic acid (PFDS)	96.4	82.0		ng/L		85	71 - 131
Perfluorododecanesulfonic acid (PFDoS)	97.0	74.2		ng/L		76	67 - 127
Perfluorooctanesulfonamide (FOSA)	100	83.1		ng/L		83	73 - 133
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	82.9		ng/L		83	76 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	86.7		ng/L		87	76 - 136
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	78.9		ng/L		84	79 - 139
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	84.4		ng/L		89	59 - 175
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	89.1		ng/L		93	75 - 135
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	52.8	*-	ng/L		53	78 - 138
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	52.7	*-	ng/L		53	67 - 154
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	69.2	*-	ng/L		69	70 - 130
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	66.1	*-	ng/L		66	71 - 131
9CI-PF3ONS	93.4	81.8		ng/L		88	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	88.5		ng/L		89	51 - 173
11CI-PF3OUdS	94.4	81.1		ng/L		86	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	82.0		ng/L		87	79 - 139
3:3 FTCA	100	80.7		ng/L		81	70 - 130
5:3 FTCA	100	117		ng/L		117	70 - 130
7:3 FTCA	100	94.6		ng/L		95	70 - 130
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	86.6		ng/L		87	70 - 130
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	84.8		ng/L		85	70 - 130
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	88.5		ng/L		89	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	89.2	75.9		ng/L		85	70 - 130

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
13C8 FOSA	98		25 - 150
13C4 PFBA	116		25 - 150
13C5 PFPeA	114		25 - 150

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-668671/2-A
Matrix: Water
Analysis Batch: 672176

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 668671

<i>Isotope Dilution</i>	<i>LCS</i>	<i>LCS</i>	<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C2 PFHxA	120		25 - 150
13C4 PFHpA	117		25 - 150
13C4 PFOA	114		25 - 150
13C5 PFNA	119		25 - 150
13C2 PFDA	114		25 - 150
13C2 PFUnA	111		25 - 150
13C2 PFDaA	113		25 - 150
13C2 PFTeDA	120		25 - 150
13C3 PFBS	109		25 - 150
18O2 PFHxS	123		25 - 150
13C4 PFOS	113		25 - 150
d3-NMeFOSAA	102		25 - 150
d5-NEtFOSAA	94		25 - 150
13C2 4:2 FTS	88		25 - 150
13C2 6:2 FTS	105		25 - 150
13C2 8:2 FTS	110		25 - 150
d-N-MeFOSA-M	91		25 - 150
d-N-EtFOSA-M	86		25 - 150
d7-N-MeFOSE-M	80		25 - 150
d9-N-EtFOSE-M	80		25 - 150
13C3 HFPO-DA	122		25 - 150
13C-6:2 FTCA	84		25 - 150
13C-8:2 FTCA	86		25 - 150

Lab Sample ID: LCSD 320-668671/3-A
Matrix: Water
Analysis Batch: 672176

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 668671

<i>Analyte</i>	<i>Spike</i>	<i>LCSD</i>	<i>LCSD</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec</i>	<i>RPD</i>	<i>RPD</i>
	<i>Added</i>	<i>Result</i>	<i>Qualifier</i>			<i>Limits</i>	<i>Limits</i>	<i>RPD</i>	<i>Limit</i>
Perfluorobutanoic acid (PFBA)	100	83.2		ng/L		83	76 - 136	1	30
Perfluoropentanoic acid (PFPeA)	100	83.7		ng/L		84	71 - 131	1	30
Perfluorohexanoic acid (PFHxA)	100	83.4		ng/L		83	73 - 133	3	30
Perfluoroheptanoic acid (PFHpA)	100	91.6		ng/L		92	72 - 132	4	30
Perfluorooctanoic acid (PFOA)	100	81.1		ng/L		81	70 - 130	10	30
Perfluorononanoic acid (PFNA)	100	91.6		ng/L		92	75 - 135	2	30
Perfluorodecanoic acid (PFDA)	100	86.5		ng/L		86	76 - 136	3	30
Perfluoroundecanoic acid (PFUnA)	100	92.8		ng/L		93	68 - 128	2	30
Perfluorododecanoic acid (PFDaA)	100	83.4		ng/L		83	71 - 131	6	30
Perfluorotridecanoic acid (PFTTrDA)	100	86.3		ng/L		86	71 - 131	5	30
Perfluorotetradecanoic acid (PFTTeA)	100	80.5		ng/L		81	70 - 130	5	30
Perfluorobutanesulfonic acid (PFBS)	88.8	81.2		ng/L		91	67 - 127	3	30
Perfluoropentanesulfonic acid (PFPeS)	94.0	82.3		ng/L		88	66 - 126	2	30
Perfluorohexanesulfonic acid (PFHxS)	91.2	72.0		ng/L		79	59 - 119	3	30

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-668671/3-A
Matrix: Water
Analysis Batch: 672176

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 668671

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluoroheptanesulfonic acid (PFHpS)	95.4	88.0		ng/L		92	76 - 136	6	30
Perfluorooctanesulfonic acid (PFOS)	93.0	83.5		ng/L		90	70 - 130	5	30
Perfluorononanesulfonic acid (PFNS)	96.2	91.8		ng/L		95	75 - 135	15	30
Perfluorodecanesulfonic acid (PFDS)	96.4	90.8		ng/L		94	71 - 131	10	30
Perfluorododecanesulfonic acid (PFDoS)	97.0	82.9		ng/L		85	67 - 127	11	30
Perfluorooctanesulfonamide (FOSA)	100	85.9		ng/L		86	73 - 133	3	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	83.4		ng/L		83	76 - 136	1	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	88.6		ng/L		89	76 - 136	2	30
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	77.9		ng/L		83	79 - 139	1	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	78.7		ng/L		83	59 - 175	7	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	83.2		ng/L		87	75 - 135	7	30
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	56.0	*-	ng/L		56	78 - 138	6	30
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	56.7	*-	ng/L		57	67 - 154	7	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	68.5	*-	ng/L		69	70 - 130	1	30
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	71.9		ng/L		72	71 - 131	8	30
9CI-PF3ONS	93.4	92.7		ng/L		99	75 - 135	12	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	81.2		ng/L		81	51 - 173	9	30
11CI-PF3OUdS	94.4	89.3		ng/L		95	54 - 114	10	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	92.5		ng/L		98	79 - 139	12	30
3:3 FTCA	100	81.8		ng/L		82	70 - 130	1	30
5:3 FTCA	100	111		ng/L		111	70 - 130	5	30
7:3 FTCA	100	95.5		ng/L		96	70 - 130	1	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	93.3		ng/L		93	70 - 130	7	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	86.1		ng/L		86	70 - 130	1	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	85.2		ng/L		85	70 - 130	4	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	89.2	79.8		ng/L		89	70 - 130	5	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	LCSD Limits
13C8 FOSA	95		25 - 150
13C4 PFBA	113		25 - 150
13C5 PFPeA	113		25 - 150
13C2 PFHxA	110		25 - 150
13C4 PFHpA	115		25 - 150

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-668671/3-A
Matrix: Water
Analysis Batch: 672176

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 668671

<i>Isotope Dilution</i>	<i>LCSD %Recovery</i>	<i>LCSD Qualifier</i>	<i>Limits</i>
13C4 PFOA	114		25 - 150
13C5 PFNA	111		25 - 150
13C2 PFDA	109		25 - 150
13C2 PFUnA	107		25 - 150
13C2 PFDoA	114		25 - 150
13C2 PFTeDA	109		25 - 150
13C3 PFBS	108		25 - 150
18O2 PFHxS	115		25 - 150
13C4 PFOS	101		25 - 150
d3-NMeFOSAA	97		25 - 150
d5-NEtFOSAA	95		25 - 150
13C2 4:2 FTS	81		25 - 150
13C2 6:2 FTS	107		25 - 150
13C2 8:2 FTS	107		25 - 150
d-N-MeFOSA-M	87		25 - 150
d-N-EtFOSA-M	81		25 - 150
d7-N-MeFOSE-M	78		25 - 150
d9-N-EtFOSE-M	74		25 - 150
13C3 HFPO-DA	124		25 - 150
13C-6:2 FTCA	81		25 - 150
13C-8:2 FTCA	86		25 - 150

Lab Sample ID: MB 320-676726/1-A
Matrix: Water
Analysis Batch: 680809

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 676726

<i>Analyte</i>	<i>MB Result</i>	<i>MB Qualifier</i>	<i>RL</i>	<i>MDL</i>	<i>Unit</i>	<i>D</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Perfluorobutanoic acid (PFBA)	ND		13		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluoropentanoic acid (PFPeA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluorohexanoic acid (PFHxA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluoroheptanoic acid (PFHpA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluorooctanoic acid (PFOA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluorononanoic acid (PFNA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluorodecanoic acid (PFDA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluorododecanoic acid (PFDoA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluorotridecanoic acid (PFTTrDA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluorobutanesulfonic acid (PFBS)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluorohexanesulfonic acid (PFHxS)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluorooctanesulfonic acid (PFOS)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-676726/1-A
Matrix: Water
Analysis Batch: 680809

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 676726

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13		ng/L		05/22/23 12:07	05/27/23 12:48	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13		ng/L		05/22/23 12:07	05/27/23 12:48	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13		ng/L		05/22/23 12:07	05/27/23 12:48	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
9CI-PF3ONS	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10		ng/L		05/22/23 12:07	05/27/23 12:48	1
11CI-PF3OUdS	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
3:3 FTCA	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
5:3 FTCA	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
7:3 FTCA	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		5.0		ng/L		05/22/23 12:07	05/27/23 12:48	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	108		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C4 PFBA	117		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C5 PFPeA	119		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C2 PFHxA	121		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C4 PFHpA	117		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C4 PFOA	119		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C5 PFNA	114		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C2 PFDA	116		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C2 PFUnA	114		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C2 PFDoA	116		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C2 PFTeDA	115		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C3 PFBS	133		25 - 150	05/22/23 12:07	05/27/23 12:48	1
18O2 PFHxS	142		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C4 PFOS	121		25 - 150	05/22/23 12:07	05/27/23 12:48	1
d3-NMeFOSAA	114		25 - 150	05/22/23 12:07	05/27/23 12:48	1
d5-NEtFOSAA	112		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C2 4:2 FTS	133		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C2 6:2 FTS	131		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C2 8:2 FTS	159	*5+	25 - 150	05/22/23 12:07	05/27/23 12:48	1
d-N-MeFOSA-M	69		25 - 150	05/22/23 12:07	05/27/23 12:48	1
d-N-EtFOSA-M	54		25 - 150	05/22/23 12:07	05/27/23 12:48	1
d7-N-MeFOSE-M	29		25 - 150	05/22/23 12:07	05/27/23 12:48	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-676726/1-A
Matrix: Water
Analysis Batch: 680809

Client Sample ID: Method Blank
Prep Type: Pre-Treatment
Prep Batch: 676726

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
d9-N-EtFOSE-M	25		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C3 HFPO-DA	115		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C-6:2 FTCA	89		25 - 150	05/22/23 12:07	05/27/23 12:48	1
13C-8:2 FTCA	86		25 - 150	05/22/23 12:07	05/27/23 12:48	1

Lab Sample ID: LCS 320-676726/2-A
Matrix: Water
Analysis Batch: 680809

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 676726

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec
							Limits
Perfluorobutanoic acid (PFBA)	100	103		ng/L		103	76 - 136
Perfluoropentanoic acid (PFPeA)	100	96.9		ng/L		97	71 - 131
Perfluorohexanoic acid (PFHxA)	100	92.7		ng/L		93	73 - 133
Perfluoroheptanoic acid (PFHpA)	100	92.9		ng/L		93	72 - 132
Perfluorooctanoic acid (PFOA)	100	90.3		ng/L		90	70 - 130
Perfluorononanoic acid (PFNA)	100	103		ng/L		103	75 - 135
Perfluorodecanoic acid (PFDA)	100	97.2		ng/L		97	76 - 136
Perfluoroundecanoic acid (PFUnA)	100	104		ng/L		104	68 - 128
Perfluorododecanoic acid (PFDoA)	100	97.4		ng/L		97	71 - 131
Perfluorotridecanoic acid (PFTrDA)	100	85.6		ng/L		86	71 - 131
Perfluorotetradecanoic acid (PFTeA)	100	85.1		ng/L		85	70 - 130
Perfluorobutanesulfonic acid (PFBS)	88.8	84.4		ng/L		95	67 - 127
Perfluoropentanesulfonic acid (PFPeS)	94.0	96.9		ng/L		103	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	91.2	78.1		ng/L		86	59 - 119
Perfluoroheptanesulfonic acid (PFHpS)	95.4	101		ng/L		105	76 - 136
Perfluorooctanesulfonic acid (PFOS)	93.0	89.9		ng/L		97	70 - 130
Perfluorononanesulfonic acid (PFNS)	96.2	95.1		ng/L		99	75 - 135
Perfluorodecanesulfonic acid (PFDS)	96.4	89.1		ng/L		92	71 - 131
Perfluorododecanesulfonic acid (PFDoS)	97.0	81.3		ng/L		84	67 - 127
Perfluorooctanesulfonamide (FOSA)	100	90.5		ng/L		90	73 - 133
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	94.8		ng/L		95	76 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	93.3		ng/L		93	76 - 136
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	89.2		ng/L		95	79 - 139
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	93.3		ng/L		98	59 - 175
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	90.6		ng/L		94	75 - 135

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-676726/2-A
Matrix: Water
Analysis Batch: 680809

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 676726

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	48.7	*-	ng/L		49	78 - 138
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	58.2	*-	ng/L		58	67 - 154
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	66.4	*-	ng/L		66	70 - 130
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	71.8		ng/L		72	71 - 131
9CI-PF3ONS	93.4	80.3		ng/L		86	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	95.9		ng/L		96	51 - 173
11CI-PF3OUdS	94.4	81.0		ng/L		86	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	92.1		ng/L		98	79 - 139
3:3 FTCA	100	83.3		ng/L		83	70 - 130
5:3 FTCA	100	110		ng/L		110	70 - 130
7:3 FTCA	100	106		ng/L		106	70 - 130
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	87.8		ng/L		88	70 - 130
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	95.1		ng/L		95	70 - 130
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	93.1		ng/L		93	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	89.2	88.8		ng/L		100	70 - 130

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
13C8 FOSA	99		25 - 150
13C4 PFBA	113		25 - 150
13C5 PFPeA	113		25 - 150
13C2 PFHxA	110		25 - 150
13C4 PFHpA	111		25 - 150
13C4 PFOA	110		25 - 150
13C5 PFNA	109		25 - 150
13C2 PFDA	106		25 - 150
13C2 PFUnA	104		25 - 150
13C2 PFDoA	109		25 - 150
13C2 PFTeDA	114		25 - 150
13C3 PFBS	116		25 - 150
18O2 PFHxS	129		25 - 150
13C4 PFOS	111		25 - 150
d3-NMeFOSAA	107		25 - 150
d5-NEtFOSAA	99		25 - 150
13C2 4:2 FTS	119		25 - 150
13C2 6:2 FTS	117		25 - 150
13C2 8:2 FTS	144		25 - 150
d-N-MeFOSA-M	63		25 - 150
d-N-EtFOSA-M	48		25 - 150
d7-N-MeFOSE-M	27		25 - 150
d9-N-EtFOSE-M	24	*5-	25 - 150
13C3 HFPO-DA	107		25 - 150

QC Sample Results

Client: Enspired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-676726/2-A
Matrix: Water
Analysis Batch: 680809

Client Sample ID: Lab Control Sample
Prep Type: Pre-Treatment
Prep Batch: 676726

<i>Isotope Dilution</i>	<i>LCS</i>	<i>LCS</i>	<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C-6:2 FTCA	80		25 - 150
13C-8:2 FTCA	83		25 - 150

Lab Sample ID: LCSD 320-676726/3-A
Matrix: Water
Analysis Batch: 680809

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 676726

<i>Analyte</i>	<i>Spike Added</i>	<i>LCSD Result</i>	<i>LCSD Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec Limits</i>	<i>RPD</i>	<i>RPD Limit</i>
Perfluorobutanoic acid (PFBA)	100	98.9		ng/L		99	76 - 136	4	30
Perfluoropentanoic acid (PFPeA)	100	94.0		ng/L		94	71 - 131	3	30
Perfluorohexanoic acid (PFHxA)	100	95.4		ng/L		95	73 - 133	3	30
Perfluoroheptanoic acid (PFHpA)	100	97.8		ng/L		98	72 - 132	5	30
Perfluorooctanoic acid (PFOA)	100	93.6		ng/L		94	70 - 130	4	30
Perfluorononanoic acid (PFNA)	100	94.8		ng/L		95	75 - 135	8	30
Perfluorodecanoic acid (PFDA)	100	90.2		ng/L		90	76 - 136	7	30
Perfluoroundecanoic acid (PFUnA)	100	106		ng/L		106	68 - 128	2	30
Perfluorododecanoic acid (PFDoA)	100	95.2		ng/L		95	71 - 131	2	30
Perfluorotridecanoic acid (PFTTrDA)	100	87.4		ng/L		87	71 - 131	2	30
Perfluorotetradecanoic acid (PFTeA)	100	84.5		ng/L		85	70 - 130	1	30
Perfluorobutanesulfonic acid (PFBS)	88.8	88.0		ng/L		99	67 - 127	4	30
Perfluoropentanesulfonic acid (PFPeS)	94.0	94.1		ng/L		100	66 - 126	3	30
Perfluorohexanesulfonic acid (PFHxS)	91.2	78.4		ng/L		86	59 - 119	0	30
Perfluoroheptanesulfonic acid (PFHpS)	95.4	94.0		ng/L		99	76 - 136	7	30
Perfluorooctanesulfonic acid (PFOS)	93.0	86.9		ng/L		93	70 - 130	3	30
Perfluorononanesulfonic acid (PFNS)	96.2	88.6		ng/L		92	75 - 135	7	30
Perfluorodecanesulfonic acid (PFDS)	96.4	88.6		ng/L		92	71 - 131	1	30
Perfluorododecanesulfonic acid (PFDoS)	97.0	82.0		ng/L		85	67 - 127	1	30
Perfluorooctanesulfonamide (FOSA)	100	88.0		ng/L		88	73 - 133	3	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	96.5		ng/L		96	76 - 136	2	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	90.4		ng/L		90	76 - 136	3	30
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	88.3		ng/L		94	79 - 139	1	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	83.6		ng/L		88	59 - 175	11	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	89.4		ng/L		93	75 - 135	1	30
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	51.0	*-	ng/L		51	78 - 138	5	30

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-676726/3-A
Matrix: Water
Analysis Batch: 680809

Client Sample ID: Lab Control Sample Dup
Prep Type: Pre-Treatment
Prep Batch: 676726

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	58.8	*-	ng/L		59	67 - 154	1	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	61.5	*-	ng/L		61	70 - 130	8	30
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	67.8	*-	ng/L		68	71 - 131	6	30
9CI-PF3ONS	93.4	84.7		ng/L		91	75 - 135	5	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	93.6		ng/L		94	51 - 173	2	30
11CI-PF3OUdS	94.4	77.2		ng/L		82	54 - 114	5	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	90.5		ng/L		96	79 - 139	2	30
3:3 FTCA	100	82.7		ng/L		83	70 - 130	1	30
5:3 FTCA	100	111		ng/L		111	70 - 130	0	30
7:3 FTCA	100	106		ng/L		106	70 - 130	0	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	93.0		ng/L		93	70 - 130	6	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	88.8		ng/L		89	70 - 130	7	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	89.5		ng/L		90	70 - 130	4	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	89.2	86.9		ng/L		97	70 - 130	2	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
13C8 FOSA	87		25 - 150
13C4 PFBA	115		25 - 150
13C5 PFPeA	116		25 - 150
13C2 PFHxA	107		25 - 150
13C4 PFHpA	107		25 - 150
13C4 PFOA	106		25 - 150
13C5 PFNA	109		25 - 150
13C2 PFDA	108		25 - 150
13C2 PFUnA	97		25 - 150
13C2 PFDoA	109		25 - 150
13C2 PFTeDA	115		25 - 150
13C3 PFBS	117		25 - 150
18O2 PFHxS	123		25 - 150
13C4 PFOS	111		25 - 150
d3-NMeFOSAA	100		25 - 150
d5-NEtFOSAA	97		25 - 150
13C2 4:2 FTS	125		25 - 150
13C2 6:2 FTS	121		25 - 150
13C2 8:2 FTS	145		25 - 150
d-N-MeFOSA-M	59		25 - 150
d-N-EtFOSA-M	47		25 - 150
d7-N-MeFOSE-M	29		25 - 150
d9-N-EtFOSE-M	26		25 - 150
13C3 HFPO-DA	104		25 - 150
13C-6:2 FTCA	84		25 - 150
13C-8:2 FTCA	82		25 - 150

QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-668652/1-A

Matrix: Water

Analysis Batch: 672179

Client Sample ID: Method Blank

Prep Type: Post-Treatment

Prep Batch: 668652

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorobutanoic acid (PFBA)	ND		13		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluoropentanoic acid (PFPeA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluorohexanoic acid (PFHxA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluoroheptanoic acid (PFHpA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluorooctanoic acid (PFOA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluorononanoic acid (PFNA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluorodecanoic acid (PFDA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluorododecanoic acid (PFDoA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluorotridecanoic acid (PFTrDA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluorobutanesulfonic acid (PFBS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluorohexanesulfonic acid (PFHxS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluorooctanesulfonic acid (PFOS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13		ng/L		04/19/23 12:24	04/28/23 16:42	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13		ng/L		04/19/23 12:24	04/28/23 16:42	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13		ng/L		04/19/23 12:24	04/28/23 16:42	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10		ng/L		04/19/23 12:24	04/28/23 16:42	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10		ng/L		04/19/23 12:24	04/28/23 16:42	1
11CI-PF3OUdS	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
3:3 FTCA	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
5:3 FTCA	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
7:3 FTCA	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-668652/1-A
Matrix: Water
Analysis Batch: 672179

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 668652

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	ND		5.0		ng/L		04/19/23 12:24	04/28/23 16:42	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	107		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C4 PFBA	113		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C5 PFPeA	112		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C2 PFHxA	115		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C4 PFHpA	125		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C4 PFOA	124		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C5 PFNA	119		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C2 PFDA	116		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C2 PFUnA	113		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C2 PFDoA	112		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C2 PFTeDA	121		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C3 PFBS	110		25 - 150	04/19/23 12:24	04/28/23 16:42	1
18O2 PFHxS	125		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C4 PFOS	120		25 - 150	04/19/23 12:24	04/28/23 16:42	1
d3-NMeFOSAA	110		25 - 150	04/19/23 12:24	04/28/23 16:42	1
d5-NEtFOSAA	103		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C2 4:2 FTS	0		0 - 10	04/19/23 12:24	04/28/23 16:42	1
13C2 6:2 FTS	124		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C2 8:2 FTS	126		25 - 150	04/19/23 12:24	04/28/23 16:42	1
d-N-MeFOSA-M	93		25 - 150	04/19/23 12:24	04/28/23 16:42	1
d-N-EtFOSA-M	85		25 - 150	04/19/23 12:24	04/28/23 16:42	1
d7-N-MeFOSE-M	84		25 - 150	04/19/23 12:24	04/28/23 16:42	1
d9-N-EtFOSE-M	81		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C3 HFPO-DA	138		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C-6:2 FTCA	83		25 - 150	04/19/23 12:24	04/28/23 16:42	1
13C-8:2 FTCA	93		25 - 150	04/19/23 12:24	04/28/23 16:42	1

Lab Sample ID: LCS 320-668652/2-A
Matrix: Water
Analysis Batch: 672179

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 668652

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	100	148		ng/L		148	93 - 153
Perfluoropentanoic acid (PFPeA)	100	130		ng/L		130	85 - 145
Perfluorohexanoic acid (PFHxA)	100	167	*+	ng/L		167	81 - 141
Perfluoroheptanoic acid (PFHpA)	100	153		ng/L		153	104 - 171
Perfluorooctanoic acid (PFOA)	100	298		ng/L		298	158 - 454
Perfluorononanoic acid (PFNA)	100	122		ng/L		122	66 - 126
Perfluorodecanoic acid (PFDA)	100	117		ng/L		117	65 - 125
Perfluoroundecanoic acid (PFUnA)	100	89.5		ng/L		90	57 - 117
Perfluorododecanoic acid (PFDoA)	100	83.5		ng/L		84	66 - 126

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-668652/2-A
Matrix: Water
Analysis Batch: 672179

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 668652

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorotridecanoic acid (PFTTrDA)	100	74.8		ng/L		75	65 - 136
Perfluorotetradecanoic acid (PFTTeA)	100	63.1		ng/L		63	63 - 123
Perfluorobutanesulfonic acid (PFBS)	88.8	77.2		ng/L		87	75 - 135
Perfluoropentanesulfonic acid (PFPeS)	94.0	84.9		ng/L		90	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	91.2	75.9		ng/L		83	64 - 124
Perfluoroheptanesulfonic acid (PFHpS)	95.4	79.0		ng/L		83	70 - 131
Perfluorooctanesulfonic acid (PFOS)	93.0	81.1		ng/L		87	68 - 128
Perfluorononanesulfonic acid (PFNS)	96.2	75.0		ng/L		78	70 - 130
Perfluorodecanesulfonic acid (PFDS)	96.4	78.0		ng/L		81	66 - 126
Perfluorododecanesulfonic acid (PFDoS)	97.0	77.7		ng/L		80	67 - 127
Perfluorooctanesulfonamide (FOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctanesulfonamide (NMeFOSAA)	100	ND		ng/L		0	0 - 10
N-ethylperfluorooctanesulfonamide (NEtFOSAA)	100	ND		ng/L		0	0 - 10
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	ND		ng/L		0	0 - 10
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	ND		ng/L		0	0 - 10
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	ND		ng/L		0	0 - 10
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	ND		ng/L		0	0 - 10
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	ND		ng/L		0	0 - 10
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	73.9		ng/L		74	51 - 173
11Cl-PF3OUdS	94.4	46.5	*-	ng/L		49	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	ND		ng/L		0	0 - 10
3:3 FTCA	100	ND		ng/L		0	0 - 10
5:3 FTCA	100	ND		ng/L		0	0 - 10
7:3 FTCA	100	ND		ng/L		0	0 - 10
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	71.8		ng/L		72	70 - 130
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	106		ng/L		106	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	89.2	78.4		ng/L		88	70 - 130

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

<i>Isotope Dilution</i>	<i>LCS</i>	<i>LCS</i>	<i>Limits</i>
<i>%Recovery</i>	<i>Qualifier</i>		
13C8 FOSA	109		25 - 150
13C4 PFBA	112		25 - 150
13C5 PFPeA	122		25 - 150
13C2 PFHxA	117		25 - 150
13C4 PFHpA	126		25 - 150
13C4 PFOA	115		25 - 150
13C5 PFNA	123		25 - 150
13C2 PFDA	119		25 - 150
13C2 PFUnA	113		25 - 150
13C2 PFDoA	123		25 - 150
13C2 PFTeDA	121		25 - 150
13C3 PFBS	122		25 - 150
18O2 PFHxS	129		25 - 150
13C4 PFOS	125		25 - 150
d3-NMeFOSAA	106		25 - 150
d5-NEtFOSAA	108		25 - 150
13C2 4:2 FTS	0		0 - 10
13C2 6:2 FTS	125		25 - 150
13C2 8:2 FTS	123		25 - 150
d-N-MeFOSA-M	98		25 - 150
d-N-EtFOSA-M	89		25 - 150
d7-N-MeFOSE-M	85		25 - 150
d9-N-EtFOSE-M	85		25 - 150
13C3 HFPO-DA	136		25 - 150
13C-6:2 FTCA	90		25 - 150
13C-8:2 FTCA	91		25 - 150

Lab Sample ID: LCSD 320-668652/3-A
Matrix: Water
Analysis Batch: 672179

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 668652

<i>Analyte</i>	<i>Spike Added</i>	<i>LCSD Result</i>	<i>LCSD Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec Limits</i>	<i>RPD</i>	
								<i>RPD</i>	<i>Limit</i>
Perfluorobutanoic acid (PFBA)	100	152		ng/L		152	93 - 153	3	30
Perfluoropentanoic acid (PFPeA)	100	142		ng/L		142	85 - 145	8	30
Perfluorohexanoic acid (PFHxA)	100	183	*+	ng/L		183	81 - 141	9	30
Perfluoroheptanoic acid (PFHpA)	100	151		ng/L		151	104 - 171	1	30
Perfluorooctanoic acid (PFOA)	100	260		ng/L		260	158 - 454	14	30
Perfluorononanoic acid (PFNA)	100	118		ng/L		118	66 - 126	3	30
Perfluorodecanoic acid (PFDA)	100	108		ng/L		108	65 - 125	9	30
Perfluoroundecanoic acid (PFUnA)	100	83.1		ng/L		83	57 - 117	7	30
Perfluorododecanoic acid (PFDoA)	100	78.0		ng/L		78	66 - 126	7	30
Perfluorotridecanoic acid (PFTTrDA)	100	75.5		ng/L		75	65 - 136	1	30
Perfluorotetradecanoic acid (PFTTeA)	100	66.4		ng/L		66	63 - 123	5	30
Perfluorobutanesulfonic acid (PFBS)	88.8	81.0		ng/L		91	75 - 135	5	30
Perfluoropentanesulfonic acid (PFPeS)	94.0	87.0		ng/L		93	70 - 130	2	30
Perfluorohexanesulfonic acid (PFHxS)	91.2	73.5		ng/L		81	64 - 124	3	30

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-668652/3-A
Matrix: Water
Analysis Batch: 672179

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 668652

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluoroheptanesulfonic acid (PFHpS)	95.4	76.4		ng/L		80	70 - 131	3	30
Perfluorooctanesulfonic acid (PFOS)	93.0	75.7		ng/L		81	68 - 128	7	30
Perfluorononanesulfonic acid (PFNS)	96.2	72.5		ng/L		75	70 - 130	3	30
Perfluorodecanesulfonic acid (PFDS)	96.4	75.1		ng/L		78	66 - 126	4	30
Perfluorododecanesulfonic acid (PFDoS)	97.0	76.1		ng/L		78	67 - 127	2	30
Perfluorooctanesulfonamide (FOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	ND		ng/L		0	0 - 10	NC	30
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	ND		ng/L		0	0 - 10	NC	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	ND		ng/L		0	0 - 10	NC	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	ND		ng/L		0	0 - 10	NC	30
9Cl-PF3ONS	93.4	69.1	*-	ng/L		74	75 - 135	6	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	70.7		ng/L		71	51 - 173	4	30
11Cl-PF3OUdS	94.4	42.5	*-	ng/L		45	54 - 114	9	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	ND		ng/L		0	0 - 10	NC	30
3:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
5:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
7:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	77.6		ng/L		78	70 - 130	8	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	67.2	*-	ng/L		67	70 - 130	4	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	109		ng/L		109	70 - 130	3	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	89.2	81.3		ng/L		91	70 - 130	4	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C8 FOSA	106		25 - 150
13C4 PFBA	112		25 - 150
13C5 PFPeA	118		25 - 150
13C2 PFHxA	114		25 - 150
13C4 PFHpA	123		25 - 150

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-668652/3-A
Matrix: Water
Analysis Batch: 672179

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 668652

<i>Isotope Dilution</i>	<i>LCSD %Recovery</i>	<i>LCSD Qualifier</i>	<i>Limits</i>
13C4 PFOA	114		25 - 150
13C5 PFNA	121		25 - 150
13C2 PFDA	114		25 - 150
13C2 PFUnA	113		25 - 150
13C2 PFDoA	128		25 - 150
13C2 PFTeDA	127		25 - 150
13C3 PFBS	112		25 - 150
18O2 PFHxS	124		25 - 150
13C4 PFOS	120		25 - 150
d3-NMeFOSAA	106		25 - 150
d5-NEtFOSAA	111		25 - 150
13C2 4:2 FTS	0		0 - 10
13C2 6:2 FTS	116		25 - 150
13C2 8:2 FTS	124		25 - 150
d-N-MeFOSA-M	94		25 - 150
d-N-EtFOSA-M	90		25 - 150
d7-N-MeFOSE-M	85		25 - 150
d9-N-EtFOSE-M	77		25 - 150
13C3 HFPO-DA	142		25 - 150
13C-6:2 FTCA	88		25 - 150
13C-8:2 FTCA	90		25 - 150

Lab Sample ID: MB 320-676722/1-A
Matrix: Water
Analysis Batch: 680810

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 676722

<i>Analyte</i>	<i>MB Result</i>	<i>MB Qualifier</i>	<i>RL</i>	<i>MDL</i>	<i>Unit</i>	<i>D</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Perfluorobutanoic acid (PFBA)	ND		13		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluoropentanoic acid (PFPeA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluorohexanoic acid (PFHxA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluoroheptanoic acid (PFHpA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluorooctanoic acid (PFOA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluorononanoic acid (PFNA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluorodecanoic acid (PFDA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluoroundecanoic acid (PFUnA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluorododecanoic acid (PFDoA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluorotridecanoic acid (PFTTrDA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluorotetradecanoic acid (PFTeA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluorobutanesulfonic acid (PFBS)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluoropentanesulfonic acid (PFPeS)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluorohexanesulfonic acid (PFHxS)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluorooctanesulfonic acid (PFOS)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluorononanesulfonic acid (PFNS)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluorodecanesulfonic acid (PFDS)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluorododecanesulfonic acid (PFDoS)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluorooctanesulfonamide (FOSA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-676722/1-A
Matrix: Water
Analysis Batch: 680810

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 676722

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		13		ng/L		05/22/23 11:59	05/27/23 16:09	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		13		ng/L		05/22/23 11:59	05/27/23 16:09	1
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	ND		13		ng/L		05/22/23 11:59	05/27/23 16:09	1
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		10		ng/L		05/22/23 11:59	05/27/23 16:09	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
9CI-PF3ONS	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		10		ng/L		05/22/23 11:59	05/27/23 16:09	1
11CI-PF3OUdS	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
3:3 FTCA	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
5:3 FTCA	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
7:3 FTCA	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		5.0		ng/L		05/22/23 11:59	05/27/23 16:09	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	96		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C4 PFBA	111		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C5 PFPeA	111		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C2 PFHxA	107		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C4 PFHpA	107		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C4 PFOA	103		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C5 PFNA	106		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C2 PFDA	92		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C2 PFUnA	95		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C2 PFDoA	102		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C2 PFTeDA	111		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C3 PFBS	115		25 - 150	05/22/23 11:59	05/27/23 16:09	1
18O2 PFHxS	120		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C4 PFOS	101		25 - 150	05/22/23 11:59	05/27/23 16:09	1
d3-NMeFOSAA	83		25 - 150	05/22/23 11:59	05/27/23 16:09	1

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-676722/1-A
Matrix: Water
Analysis Batch: 680810

Client Sample ID: Method Blank
Prep Type: Post-Treatment
Prep Batch: 676722

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
d5-NEtFOSAA	92		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C2 4:2 FTS	0		0 - 10	05/22/23 11:59	05/27/23 16:09	1
13C2 6:2 FTS	106		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C2 8:2 FTS	128		25 - 150	05/22/23 11:59	05/27/23 16:09	1
d-N-MeFOSA-M	38		25 - 150	05/22/23 11:59	05/27/23 16:09	1
d-N-EtFOSA-M	36		25 - 150	05/22/23 11:59	05/27/23 16:09	1
d7-N-MeFOSE-M	31		25 - 150	05/22/23 11:59	05/27/23 16:09	1
d9-N-EtFOSE-M	28		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C3 HFPO-DA	111		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C-6:2 FTCA	76		25 - 150	05/22/23 11:59	05/27/23 16:09	1
13C-8:2 FTCA	69		25 - 150	05/22/23 11:59	05/27/23 16:09	1

Lab Sample ID: LCS 320-676722/2-A
Matrix: Water
Analysis Batch: 680810

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 676722

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec
							Limits
Perfluorobutanoic acid (PFBA)	100	199	*+	ng/L		199	93 - 153
Perfluoropentanoic acid (PFPeA)	100	177	*+	ng/L		177	85 - 145
Perfluorohexanoic acid (PFHxA)	100	199	*+	ng/L		199	81 - 141
Perfluoroheptanoic acid (PFHpA)	100	190	*+	ng/L		190	104 - 171
Perfluorooctanoic acid (PFOA)	100	296		ng/L		296	158 - 454
Perfluorononanoic acid (PFNA)	100	145	*+	ng/L		145	66 - 126
Perfluorodecanoic acid (PFDA)	100	134	*+	ng/L		134	65 - 125
Perfluoroundecanoic acid (PFUnA)	100	95.5		ng/L		95	57 - 117
Perfluorododecanoic acid (PFDoA)	100	85.5		ng/L		86	66 - 126
Perfluorotridecanoic acid (PFTrDA)	100	82.2		ng/L		82	65 - 136
Perfluorotetradecanoic acid (PFTeA)	100	69.0		ng/L		69	63 - 123
Perfluorobutanesulfonic acid (PFBS)	88.8	86.0		ng/L		97	75 - 135
Perfluoropentanesulfonic acid (PFPeS)	94.0	88.7		ng/L		94	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	91.2	80.8		ng/L		89	64 - 124
Perfluoroheptanesulfonic acid (PFHpS)	95.4	97.1		ng/L		102	70 - 131
Perfluorooctanesulfonic acid (PFOS)	93.0	92.6		ng/L		100	68 - 128
Perfluorononanesulfonic acid (PFNS)	96.2	83.2		ng/L		87	70 - 130
Perfluorodecanesulfonic acid (PFDS)	96.4	83.7		ng/L		87	66 - 126
Perfluorododecanesulfonic acid (PFDoS)	97.0	81.4		ng/L		84	67 - 127
Perfluorooctanesulfonamide (FOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	ND		ng/L		0	0 - 10

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-676722/2-A
Matrix: Water
Analysis Batch: 680810

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 676722

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
N-ethylperfluorooctanesulfonami doacetic acid (NETFOSAA)	100	ND		ng/L		0	0 - 10
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	ND		ng/L		0	0 - 10
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	ND		ng/L		0	0 - 10
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	ND		ng/L		0	0 - 10
N-ethylperfluorooctane sulfonamide (NETFOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	ND		ng/L		0	0 - 10
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	ND		ng/L		0	0 - 10
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	ND		ng/L		0	0 - 10
9Cl-PF3ONS	93.4	78.1		ng/L		84	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	78.9		ng/L		79	51 - 173
11Cl-PF3OUdS	94.4	47.1	*-	ng/L		50	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	ND		ng/L		0	0 - 10
3:3 FTCA	100	ND		ng/L		0	0 - 10
5:3 FTCA	100	ND		ng/L		0	0 - 10
7:3 FTCA	100	ND		ng/L		0	0 - 10
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	78.5		ng/L		78	70 - 130
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	81.5		ng/L		82	70 - 130
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	115		ng/L		115	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	89.2	81.4		ng/L		91	70 - 130

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C8 FOSA	104		25 - 150
13C4 PFBA	72		25 - 150
13C5 PFPeA	112		25 - 150
13C2 PFHxA	112		25 - 150
13C4 PFHpA	105		25 - 150
13C4 PFOA	111		25 - 150
13C5 PFNA	111		25 - 150
13C2 PFDA	104		25 - 150
13C2 PFUnA	101		25 - 150
13C2 PFDoA	110		25 - 150
13C2 PFTeDA	119		25 - 150
13C3 PFBS	123		25 - 150
18O2 PFHxS	127		25 - 150
13C4 PFOS	107		25 - 150
d3-NMeFOSAA	103		25 - 150
d5-NEtFOSAA	103		25 - 150
13C2 4:2 FTS	0		0 - 10

QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-676722/2-A
Matrix: Water
Analysis Batch: 680810

Client Sample ID: Lab Control Sample
Prep Type: Post-Treatment
Prep Batch: 676722

<u>Isotope Dilution</u>	<u>LCS</u> <u>%Recovery</u>	<u>LCS</u> <u>Qualifier</u>	<u>Limits</u>
13C2 6:2 FTS	100		25 - 150
13C2 8:2 FTS	129		25 - 150
d-N-MeFOSA-M	71		25 - 150
d-N-EtFOSA-M	60		25 - 150
d7-N-MeFOSE-M	32		25 - 150
d9-N-EtFOSE-M	30		25 - 150
13C3 HFPO-DA	115		25 - 150
13C-6:2 FTCA	80		25 - 150
13C-8:2 FTCA	79		25 - 150

Lab Sample ID: LCSD 320-676722/3-A
Matrix: Water
Analysis Batch: 680810

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 676722

<u>Analyte</u>	<u>Spike</u> <u>Added</u>	<u>LCSD</u> <u>Result</u>	<u>LCSD</u> <u>Qualifier</u>	<u>Unit</u>	<u>D</u>	<u>%Rec</u>	<u>%Rec</u> <u>Limits</u>	<u>RPD</u>	<u>RPD</u> <u>Limit</u>
Perfluorobutanoic acid (PFBA)	100	191	*+	ng/L		191	93 - 153	4	30
Perfluoropentanoic acid (PFPeA)	100	159	*+	ng/L		159	85 - 145	10	30
Perfluorohexanoic acid (PFHxA)	100	185	*+	ng/L		185	81 - 141	7	30
Perfluoroheptanoic acid (PFHpA)	100	176	*+	ng/L		176	104 - 171	8	30
Perfluorooctanoic acid (PFOA)	100	277		ng/L		277	158 - 454	7	30
Perfluorononanoic acid (PFNA)	100	127	*+	ng/L		127	66 - 126	14	30
Perfluorodecanoic acid (PFDA)	100	130	*+	ng/L		130	65 - 125	3	30
Perfluoroundecanoic acid (PFUnA)	100	85.8		ng/L		86	57 - 117	11	30
Perfluorododecanoic acid (PFDoA)	100	70.1		ng/L		70	66 - 126	20	30
Perfluorotridecanoic acid (PFTrDA)	100	54.8	*- *1	ng/L		55	65 - 136	40	30
Perfluorotetradecanoic acid (PFTeA)	100	34.3	*- *1	ng/L		34	63 - 123	67	30
Perfluorobutanesulfonic acid (PFBS)	88.8	86.9		ng/L		98	75 - 135	1	30
Perfluoropentanesulfonic acid (PFPeS)	94.0	91.3		ng/L		97	70 - 130	3	30
Perfluorohexanesulfonic acid (PFHxS)	91.2	79.1		ng/L		87	64 - 124	2	30
Perfluoroheptanesulfonic acid (PFHpS)	95.4	97.5		ng/L		102	70 - 131	0	30
Perfluorooctanesulfonic acid (PFOS)	93.0	87.0		ng/L		94	68 - 128	6	30
Perfluorononanesulfonic acid (PFNS)	96.2	65.5	*-	ng/L		68	70 - 130	24	30
Perfluorodecanesulfonic acid (PFDS)	96.4	66.6		ng/L		69	66 - 126	23	30
Perfluorododecanesulfonic acid (PFDoS)	97.0	53.9	*- *1	ng/L		56	67 - 127	41	30
Perfluorooctanesulfonamide (FOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	ND		ng/L		0	0 - 10	NC	30

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QC Sample Results

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-676722/3-A
Matrix: Water
Analysis Batch: 680810

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 676722

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	93.8	ND		ng/L		0	0 - 10	NC	30
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	95.2	ND		ng/L		0	0 - 10	NC	30
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	96.0	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctane sulfonamide (NEtFOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctane sulfonamide (NMeFOSA)	100	ND		ng/L		0	0 - 10	NC	30
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	100	ND		ng/L		0	0 - 10	NC	30
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	100	ND		ng/L		0	0 - 10	NC	30
9CI-PF3ONS	93.4	70.7		ng/L		76	75 - 135	10	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	100	75.1		ng/L		75	51 - 173	5	30
11CI-PF3OUdS	94.4	35.6	*-	ng/L		38	54 - 114	28	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	94.4	ND		ng/L		0	0 - 10	NC	30
3:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
5:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
7:3 FTCA	100	ND		ng/L		0	0 - 10	NC	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	100	70.1		ng/L		70	70 - 130	15	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	100	116		ng/L		116	70 - 130	1	30
Perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	89.2	83.7		ng/L		94	70 - 130	3	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C8 FOSA	90		25 - 150
13C4 PFBA	110		25 - 150
13C5 PFPeA	119		25 - 150
13C2 PFHxA	113		25 - 150
13C4 PFHpA	107		25 - 150
13C4 PFOA	112		25 - 150
13C5 PFNA	106		25 - 150
13C2 PFDA	89		25 - 150
13C2 PFUnA	86		25 - 150
13C2 PFDoA	91		25 - 150
13C2 PFTeDA	105		25 - 150
13C3 PFBS	118		25 - 150
18O2 PFHxS	125		25 - 150
13C4 PFOS	95		25 - 150
d3-NMeFOSAA	86		25 - 150
d5-NEtFOSAA	90		25 - 150
13C2 4:2 FTS	0		0 - 10
13C2 6:2 FTS	102		25 - 150
13C2 8:2 FTS	131		25 - 150
d-N-MeFOSA-M	45		25 - 150
d-N-EtFOSA-M	40		25 - 150

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QC Sample Results

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-676722/3-A
Matrix: Water
Analysis Batch: 680810

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 676722

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
d7-N-MeFOSE-M	28		25 - 150
d9-N-EtFOSE-M	26		25 - 150
13C3 HFPO-DA	112		25 - 150
13C-6:2 FTCA	80		25 - 150
13C-8:2 FTCA	80		25 - 150

Lab Sample ID: LCSD 320-676722/3-A
Matrix: Water
Analysis Batch: 683804

Client Sample ID: Lab Control Sample Dup
Prep Type: Post-Treatment
Prep Batch: 676722

Analyte	Spike Added	LCSD		Unit	D	%Rec	%Rec		RPD	Limit
		Result	Qualifier				Limits	RPD		
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	100	75.7		ng/L		76	70 - 130	6	30	

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C2 PFHxA	108		25 - 150

Method: ELLE SOP - Total or Organic Fluorine by Combustion Ion Chromatography

Lab Sample ID: MB 410-370565/1-A
Matrix: Water
Analysis Batch: 370577

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 370565

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Fluorine (TF)	ND		200		ug/L		05/01/23 11:19	05/01/23 11:36	1

Lab Sample ID: LCS 410-370565/2-A
Matrix: Water
Analysis Batch: 370577

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 370565

Analyte	Spike Added	LCS		Unit	D	%Rec	%Rec	
		Result	Qualifier				Limits	RPD
Total Fluorine (TF)	5060	5230		ug/L		103	50 - 150	

Lab Sample ID: LCSD 410-370565/3-A
Matrix: Water
Analysis Batch: 370577

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 370565

Analyte	Spike Added	LCSD		Unit	D	%Rec	%Rec		RPD	Limit
		Result	Qualifier				Limits	RPD		
Total Fluorine (TF)	5060	5310		ug/L		105	50 - 150	2	20	

QC Association Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

HPLC/IC

Analysis Batch: 671429

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-1	NASJ_t0	Total/NA	Water	300.0	
320-98786-2	NASJ_t2	Total/NA	Water	300.0	
320-98786-3	NASJ_t4	Total/NA	Water	300.0	
320-98786-4	NASJ_t8	Total/NA	Water	300.0	
320-98786-5	NASJ_t28	Total/NA	Water	300.0	
320-98786-6	TAFB_t0	Total/NA	Water	300.0	
320-98786-7	TAFB_t2	Total/NA	Water	300.0	
320-98786-8	TAFB_t4	Total/NA	Water	300.0	
320-98786-9	TAFB_t8	Total/NA	Water	300.0	
320-98786-10	TAFB_t30	Total/NA	Water	300.0	
MB 320-671429/3	Method Blank	Total/NA	Water	300.0	
LCS 320-671429/4	Lab Control Sample	Total/NA	Water	300.0	
320-98786-1 MS	NASJ_t0	Total/NA	Water	300.0	
320-98786-1 MSD	NASJ_t0	Total/NA	Water	300.0	

LCMS

Prep Batch: 370565

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-1	NASJ_t0	Total/NA	Water	CIC Prep	
320-98786-2	NASJ_t2	Total/NA	Water	CIC Prep	
320-98786-3	NASJ_t4	Total/NA	Water	CIC Prep	
320-98786-4	NASJ_t8	Total/NA	Water	CIC Prep	
320-98786-5	NASJ_t28	Total/NA	Water	CIC Prep	
320-98786-6	TAFB_t0	Total/NA	Water	CIC Prep	
320-98786-7	TAFB_t2	Total/NA	Water	CIC Prep	
320-98786-8	TAFB_t4	Total/NA	Water	CIC Prep	
320-98786-9	TAFB_t8	Total/NA	Water	CIC Prep	
320-98786-10	TAFB_t30	Total/NA	Water	CIC Prep	
MB 410-370565/1-A	Method Blank	Total/NA	Water	CIC Prep	
LCS 410-370565/2-A	Lab Control Sample	Total/NA	Water	CIC Prep	
LCSD 410-370565/3-A	Lab Control Sample Dup	Total/NA	Water	CIC Prep	

Analysis Batch: 370577

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-1	NASJ_t0	Total/NA	Water	ELLE SOP	370565
320-98786-2	NASJ_t2	Total/NA	Water	ELLE SOP	370565
320-98786-3	NASJ_t4	Total/NA	Water	ELLE SOP	370565
320-98786-4	NASJ_t8	Total/NA	Water	ELLE SOP	370565
320-98786-5	NASJ_t28	Total/NA	Water	ELLE SOP	370565
320-98786-6	TAFB_t0	Total/NA	Water	ELLE SOP	370565
320-98786-7	TAFB_t2	Total/NA	Water	ELLE SOP	370565
320-98786-8	TAFB_t4	Total/NA	Water	ELLE SOP	370565
320-98786-9	TAFB_t8	Total/NA	Water	ELLE SOP	370565
320-98786-10	TAFB_t30	Total/NA	Water	ELLE SOP	370565
MB 410-370565/1-A	Method Blank	Total/NA	Water	ELLE SOP	370565
LCS 410-370565/2-A	Lab Control Sample	Total/NA	Water	ELLE SOP	370565
LCSD 410-370565/3-A	Lab Control Sample Dup	Total/NA	Water	ELLE SOP	370565

QC Association Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

LCMS

Prep Batch: 668395

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-2 - DL	NASJ_t2	Total/NA	Water	3535	
320-98786-2	NASJ_t2	Total/NA	Water	3535	
320-98786-3 - DL	NASJ_t4	Total/NA	Water	3535	
320-98786-3	NASJ_t4	Total/NA	Water	3535	
320-98786-4 - DL	NASJ_t8	Total/NA	Water	3535	
320-98786-4	NASJ_t8	Total/NA	Water	3535	
MB 320-668395/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-668395/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-668395/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Prep Batch: 668652

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-1 - DL	NASJ_t0	Post-Treatment	Water	TOP Post Prep	
320-98786-1	NASJ_t0	Post-Treatment	Water	TOP Post Prep	
320-98786-5	NASJ_t28	Post-Treatment	Water	TOP Post Prep	
320-98786-10	TAFB_t30	Post-Treatment	Water	TOP Post Prep	
MB 320-668652/1-A	Method Blank	Post-Treatment	Water	TOP Post Prep	
LCS 320-668652/2-A	Lab Control Sample	Post-Treatment	Water	TOP Post Prep	
LCSD 320-668652/3-A	Lab Control Sample Dup	Post-Treatment	Water	TOP Post Prep	

Prep Batch: 668671

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-1 - DL	NASJ_t0	Pre-Treatment	Water	TOP Pre - Prep	
320-98786-1	NASJ_t0	Pre-Treatment	Water	TOP Pre - Prep	
320-98786-5	NASJ_t28	Pre-Treatment	Water	TOP Pre - Prep	
MB 320-668671/1-A	Method Blank	Pre-Treatment	Water	TOP Pre - Prep	
LCS 320-668671/2-A	Lab Control Sample	Pre-Treatment	Water	TOP Pre - Prep	
LCSD 320-668671/3-A	Lab Control Sample Dup	Pre-Treatment	Water	TOP Pre - Prep	

Analysis Batch: 668676

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-2	NASJ_t2	Total/NA	Water	537 (modified)	668395
320-98786-3	NASJ_t4	Total/NA	Water	537 (modified)	668395
320-98786-4	NASJ_t8	Total/NA	Water	537 (modified)	668395
MB 320-668395/1-A	Method Blank	Total/NA	Water	537 (modified)	668395
LCSD 320-668395/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	668395

Prep Batch: 668898

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-7	TAFB_t2	Total/NA	Water	3535	
320-98786-8	TAFB_t4	Total/NA	Water	3535	
320-98786-9	TAFB_t8	Total/NA	Water	3535	
MB 320-668898/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-668898/2-A	Lab Control Sample	Total/NA	Water	3535	
320-98786-7 MS	TAFB_t2	Total/NA	Water	3535	
320-98786-7 MSD	TAFB_t2	Total/NA	Water	3535	

Analysis Batch: 669012

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-2 - DL	NASJ_t2	Total/NA	Water	537 (modified)	668395
320-98786-3 - DL	NASJ_t4	Total/NA	Water	537 (modified)	668395

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QC Association Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

LCMS (Continued)

Analysis Batch: 669012 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-4 - DL	NASJ_t8	Total/NA	Water	537 (modified)	668395
LCS 320-668395/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	668395

Analysis Batch: 669513

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-7	TAFB_t2	Total/NA	Water	537 (modified)	668898
320-98786-8	TAFB_t4	Total/NA	Water	537 (modified)	668898
320-98786-9	TAFB_t8	Total/NA	Water	537 (modified)	668898
MB 320-668898/1-A	Method Blank	Total/NA	Water	537 (modified)	668898
LCS 320-668898/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	668898
320-98786-7 MS	TAFB_t2	Total/NA	Water	537 (modified)	668898
320-98786-7 MSD	TAFB_t2	Total/NA	Water	537 (modified)	668898

Analysis Batch: 672176

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-1	NASJ_t0	Pre-Treatment	Water	537 (modified)	668671
320-98786-5	NASJ_t28	Pre-Treatment	Water	537 (modified)	668671
MB 320-668671/1-A	Method Blank	Pre-Treatment	Water	537 (modified)	668671
LCS 320-668671/2-A	Lab Control Sample	Pre-Treatment	Water	537 (modified)	668671
LCSD 320-668671/3-A	Lab Control Sample Dup	Pre-Treatment	Water	537 (modified)	668671

Analysis Batch: 672179

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-1	NASJ_t0	Post-Treatment	Water	537 (modified)	668652
320-98786-5	NASJ_t28	Post-Treatment	Water	537 (modified)	668652
320-98786-10	TAFB_t30	Post-Treatment	Water	537 (modified)	668652
MB 320-668652/1-A	Method Blank	Post-Treatment	Water	537 (modified)	668652
LCS 320-668652/2-A	Lab Control Sample	Post-Treatment	Water	537 (modified)	668652
LCSD 320-668652/3-A	Lab Control Sample Dup	Post-Treatment	Water	537 (modified)	668652

Prep Batch: 676722

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-1	NASJ_t0	Post-Treatment	Water	TOP Post Prep	
320-98786-5	NASJ_t28	Post-Treatment	Water	TOP Post Prep	
320-98786-6	TAFB_t0	Post-Treatment	Water	TOP Post Prep	
320-98786-6 - DL	TAFB_t0	Post-Treatment	Water	TOP Post Prep	
320-98786-10	TAFB_t30	Post-Treatment	Water	TOP Post Prep	
MB 320-676722/1-A	Method Blank	Post-Treatment	Water	TOP Post Prep	
LCS 320-676722/2-A	Lab Control Sample	Post-Treatment	Water	TOP Post Prep	
LCSD 320-676722/3-A	Lab Control Sample Dup	Post-Treatment	Water	TOP Post Prep	

Prep Batch: 676726

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-6	TAFB_t0	Pre-Treatment	Water	TOP Pre - Prep	
320-98786-10 - DL	TAFB_t30	Pre-Treatment	Water	TOP Pre - Prep	
320-98786-10	TAFB_t30	Pre-Treatment	Water	TOP Pre - Prep	
MB 320-676726/1-A	Method Blank	Pre-Treatment	Water	TOP Pre - Prep	
LCS 320-676726/2-A	Lab Control Sample	Pre-Treatment	Water	TOP Pre - Prep	
LCSD 320-676726/3-A	Lab Control Sample Dup	Pre-Treatment	Water	TOP Pre - Prep	

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QC Association Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

LCMS

Analysis Batch: 680809

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-10	TAFB_t30	Pre-Treatment	Water	537 (modified)	676726
MB 320-676726/1-A	Method Blank	Pre-Treatment	Water	537 (modified)	676726
LCS 320-676726/2-A	Lab Control Sample	Pre-Treatment	Water	537 (modified)	676726
LCSD 320-676726/3-A	Lab Control Sample Dup	Pre-Treatment	Water	537 (modified)	676726

Analysis Batch: 680810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-1	NASJ_t0	Post-Treatment	Water	537 (modified)	676722
320-98786-5	NASJ_t28	Post-Treatment	Water	537 (modified)	676722
320-98786-6	TAFB_t0	Post-Treatment	Water	537 (modified)	676722
320-98786-10	TAFB_t30	Post-Treatment	Water	537 (modified)	676722
MB 320-676722/1-A	Method Blank	Post-Treatment	Water	537 (modified)	676722
LCS 320-676722/2-A	Lab Control Sample	Post-Treatment	Water	537 (modified)	676722
LCSD 320-676722/3-A	Lab Control Sample Dup	Post-Treatment	Water	537 (modified)	676722

Analysis Batch: 683802

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-1 - DL	NASJ_t0	Post-Treatment	Water	537 (modified)	668652
320-98786-1 - DL	NASJ_t0	Pre-Treatment	Water	537 (modified)	668671
320-98786-10	TAFB_t30	Post-Treatment	Water	537 (modified)	668652

Analysis Batch: 683804

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-6 - DL	TAFB_t0	Post-Treatment	Water	537 (modified)	676726
320-98786-6	TAFB_t0	Pre-Treatment	Water	537 (modified)	676726
320-98786-10 - DL	TAFB_t30	Pre-Treatment	Water	537 (modified)	676726
LCSD 320-676722/3-A	Lab Control Sample Dup	Post-Treatment	Water	537 (modified)	676722

Analysis Batch: 687278

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-1	NASJ_t0	Pre-Treatment	Water	Total PFCA-Sum	
320-98786-5	NASJ_t28	Pre-Treatment	Water	Total PFCA-Sum	
320-98786-6	TAFB_t0	Pre-Treatment	Water	Total PFCA-Sum	
320-98786-10	TAFB_t30	Pre-Treatment	Water	Total PFCA-Sum	
320-98786-10	TAFB_t30	Pre-Treatment	Water	Total PFCA-Sum	

Analysis Batch: 687286

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-1	NASJ_t0	Post-Treatment	Water	Total PFCA-Sum	
320-98786-5	NASJ_t28	Post-Treatment	Water	Total PFCA-Sum	
320-98786-6	TAFB_t0	Post-Treatment	Water	Total PFCA-Sum	
320-98786-10	TAFB_t30	Post-Treatment	Water	Total PFCA-Sum	

Analysis Batch: 687295

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-98786-1	NASJ_t0	Total/NA	Water	Total PFCA-Dif	
320-98786-5	NASJ_t28	Total/NA	Water	Total PFCA-Dif	
320-98786-6	TAFB_t0	Total/NA	Water	Total PFCA-Dif	
320-98786-10	TAFB_t30	Total/NA	Water	Total PFCA-Dif	

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Lab Chronicle

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t0
Date Collected: 04/04/23 09:50
Date Received: 04/11/23 09:25

Lab Sample ID: 320-98786-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	10 mL	10 mL	671429	05/01/23 19:52	Y1S	EET SAC
Post-Treatment	Prep	TOP Post Prep			100.0 mL	10.0 mL	668652	04/19/23 12:24	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	672179	04/28/23 17:16	S1M	EET SAC
Post-Treatment	Prep	TOP Post Prep			100.0 mL	10.0 mL	676722	05/22/23 11:59	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	680810	05/27/23 17:04	RS1	EET SAC
Post-Treatment	Prep	TOP Post Prep	DL		100.0 mL	10.0 mL	668652	04/19/23 12:24	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)	DL	100	1 mL	1 mL	683802	06/16/23 19:28	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			100.0 mL	10.0 mL	668671	04/19/23 12:43	RAC	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	672176	04/28/23 15:47	JRB	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep	DL		100.0 mL	10.0 mL	668671	04/19/23 12:43	RAC	EET SAC
Pre-Treatment	Analysis	537 (modified)	DL	100	1 mL	1 mL	683802	06/16/23 19:05	D1R	EET SAC
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	370565	05/01/23 11:19	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			370577	05/02/23 09:25	F9DU	ELLE
Total/NA	Analysis	Total PFCA-Dif		1			687295	06/30/23 10:24	MKW	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			687286	06/30/23 10:19	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			687278	06/30/23 10:14	MKW	EET SAC

Client Sample ID: NASJ_t2
Date Collected: 04/04/23 11:50
Date Received: 04/11/23 09:25

Lab Sample ID: 320-98786-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	10 mL	10 mL	671429	05/01/23 20:50	Y1S	EET SAC
Total/NA	Prep	3535	DL		240.2 mL	10.0 mL	668395	04/18/23 12:49	SEY	EET SAC
Total/NA	Analysis	537 (modified)	DL	10	1 mL	1 mL	669012	04/21/23 01:18	JRB	EET SAC
Total/NA	Prep	3535			240.2 mL	10.0 mL	668395	04/18/23 12:49	SEY	EET SAC
Total/NA	Analysis	537 (modified)		1	1 mL	1 mL	668676	04/19/23 20:37	S1M	EET SAC
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	370565	05/01/23 11:19	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			370577	05/02/23 10:00	F9DU	ELLE

Client Sample ID: NASJ_t4
Date Collected: 04/04/23 13:50
Date Received: 04/11/23 09:25

Lab Sample ID: 320-98786-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	10 mL	10 mL	671429	05/01/23 21:10	Y1S	EET SAC
Total/NA	Prep	3535	DL		258.5 mL	10.0 mL	668395	04/18/23 12:49	SEY	EET SAC
Total/NA	Analysis	537 (modified)	DL	10	1 mL	1 mL	669012	04/21/23 01:29	JRB	EET SAC
Total/NA	Prep	3535			258.5 mL	10.0 mL	668395	04/18/23 12:49	SEY	EET SAC
Total/NA	Analysis	537 (modified)		1	1 mL	1 mL	668676	04/19/23 20:47	S1M	EET SAC
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	370565	05/01/23 11:19	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			370577	05/02/23 10:36	F9DU	ELLE

Lab Chronicle

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: NASJ_t8

Lab Sample ID: 320-98786-4

Date Collected: 04/04/23 17:50

Matrix: Water

Date Received: 04/11/23 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	10 mL	10 mL	671429	05/01/23 21:29	Y1S	EET SAC
Total/NA	Prep	3535	DL		257.9 mL	10.0 mL	668395	04/18/23 12:49	SEY	EET SAC
Total/NA	Analysis	537 (modified)	DL	10	1 mL	1 mL	669012	04/21/23 01:40	JRB	EET SAC
Total/NA	Prep	3535			257.9 mL	10.0 mL	668395	04/18/23 12:49	SEY	EET SAC
Total/NA	Analysis	537 (modified)		1	1 mL	1 mL	668676	04/19/23 20:57	S1M	EET SAC
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	370565	05/01/23 11:19	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			370577	05/02/23 11:11	F9DU	ELLE

Client Sample ID: NASJ_t28

Lab Sample ID: 320-98786-5

Date Collected: 04/05/23 13:50

Matrix: Water

Date Received: 04/11/23 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	10 mL	10 mL	671429	05/01/23 18:53	Y1S	EET SAC
Post-Treatment	Prep	TOP Post Prep			100.0 mL	10.0 mL	668652	04/19/23 12:24	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	672179	04/28/23 17:27	S1M	EET SAC
Post-Treatment	Prep	TOP Post Prep			100.0 mL	10.0 mL	676722	05/22/23 11:59	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	680810	05/27/23 17:16	RS1	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			100.0 mL	10.0 mL	668671	04/19/23 12:43	RAC	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	672176	04/28/23 15:58	JRB	EET SAC
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	370565	05/01/23 11:19	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			370577	05/02/23 11:46	F9DU	ELLE
Total/NA	Analysis	Total PFCA-Dif		1			687295	06/30/23 10:24	MKW	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			687286	06/30/23 10:19	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			687278	06/30/23 10:14	MKW	EET SAC

Client Sample ID: TAFB_t0

Lab Sample ID: 320-98786-6

Date Collected: 04/06/23 10:20

Matrix: Water

Date Received: 04/11/23 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	10 mL	10 mL	671429	05/01/23 18:33	Y1S	EET SAC
Post-Treatment	Prep	TOP Post Prep			100.0 mL	10.0 mL	676722	05/22/23 11:59	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	680810	05/27/23 17:27	RS1	EET SAC
Post-Treatment	Prep	TOP Post Prep	DL		100.0 mL	10.0 mL	676722	05/22/23 11:59	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)	DL	100	1 mL	1 mL	683804	06/16/23 22:38	JRB	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			100.0 mL	10.0 mL	676726	05/22/23 12:07	RAC	EET SAC
Pre-Treatment	Analysis	537 (modified)		100	1 mL	1 mL	683804	06/16/23 20:57	JRB	EET SAC
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	370565	05/01/23 11:19	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			370577	05/02/23 12:22	F9DU	ELLE
Total/NA	Analysis	Total PFCA-Dif		1			687295	06/30/23 10:24	MKW	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			687286	06/30/23 10:19	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			687278	06/30/23 10:14	MKW	EET SAC

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Lab Chronicle

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t2
Date Collected: 04/06/23 12:20
Date Received: 04/11/23 09:25

Lab Sample ID: 320-98786-7
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	10 mL	10 mL	671429	05/01/23 18:14	Y1S	EET SAC
Total/NA	Prep	3535			1.0 mL	10.0 mL	668898	04/20/23 10:52	RAC	EET SAC
Total/NA	Analysis	537 (modified)		1	1 mL	1 mL	669513	04/23/23 13:00	S1M	EET SAC
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	370565	05/01/23 11:19	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			370577	05/02/23 14:43	F9DU	ELLE

Client Sample ID: TAFB_t4
Date Collected: 04/06/23 14:20
Date Received: 04/11/23 09:25

Lab Sample ID: 320-98786-8
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	10 mL	10 mL	671429	05/01/23 17:54	Y1S	EET SAC
Total/NA	Prep	3535			1.0 mL	10.0 mL	668898	04/20/23 10:52	RAC	EET SAC
Total/NA	Analysis	537 (modified)		1	1 mL	1 mL	669513	04/23/23 13:31	S1M	EET SAC
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	370565	05/01/23 11:19	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			370577	05/02/23 16:29	F9DU	ELLE

Client Sample ID: TAFB_t8
Date Collected: 04/06/23 18:20
Date Received: 04/11/23 09:25

Lab Sample ID: 320-98786-9
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	10 mL	10 mL	671429	05/01/23 17:34	Y1S	EET SAC
Total/NA	Prep	3535			1.0 mL	10.0 mL	668898	04/20/23 10:52	RAC	EET SAC
Total/NA	Analysis	537 (modified)		1	1 mL	1 mL	669513	04/23/23 13:41	S1M	EET SAC
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	370565	05/01/23 11:19	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			370577	05/02/23 18:15	F9DU	ELLE

Client Sample ID: TAFB_t30
Date Collected: 04/07/23 16:20
Date Received: 04/11/23 09:25

Lab Sample ID: 320-98786-10
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	10 mL	10 mL	671429	05/01/23 17:15	Y1S	EET SAC
Post-Treatment	Prep	TOP Post Prep			100.0 mL	10.0 mL	668652	04/19/23 13:07	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	672179	04/28/23 17:38	S1M	EET SAC
Post-Treatment	Prep	TOP Post Prep			100.0 mL	10.0 mL	676722	05/22/23 11:59	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	680810	05/27/23 17:38	RS1	EET SAC
Post-Treatment	Prep	TOP Post Prep			100.0 mL	10.0 mL	668652	04/19/23 13:07	RAC	EET SAC
Post-Treatment	Analysis	537 (modified)		100	1 mL	1 mL	683802	06/16/23 19:39	D1R	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep			10.0 mL	10.0 mL	676726	05/22/23 12:07	RAC	EET SAC
Pre-Treatment	Analysis	537 (modified)		1	1 mL	1 mL	680809	05/27/23 13:55	RS1	EET SAC
Pre-Treatment	Prep	TOP Pre - Prep	DL		10.0 mL	10.0 mL	676726	05/22/23 12:07	RAC	EET SAC
Pre-Treatment	Analysis	537 (modified)	DL	10	1 mL	1 mL	683804	06/16/23 20:24	JRB	EET SAC

Eurolins Sacramento

Lab Chronicle

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Client Sample ID: TAFB_t30

Lab Sample ID: 320-98786-10

Date Collected: 04/07/23 16:20

Matrix: Water

Date Received: 04/11/23 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	CIC Prep			0.2 g	0.2 mL	370565	05/01/23 11:19	QLP7	ELLE
Total/NA	Analysis	ELLE SOP		1			370577	05/02/23 20:01	F9DU	ELLE
Total/NA	Analysis	Total PFCA-Dif		1			687295	06/30/23 10:24	MKW	EET SAC
Post-Treatment	Analysis	Total PFCA-Sum		1			687286	06/30/23 10:19	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			687278	06/30/23 10:14	MKW	EET SAC
Pre-Treatment	Analysis	Total PFCA-Sum		1			687278	06/30/23 10:14	MKW	EET SAC

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

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



Accreditation/Certification Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Laboratory: Eurofins Sacramento

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 (UST)	State	17-020	02-20-24
ANAB	Dept. of Defense ELAP	L2468	01-20-24
ANAB	Dept. of Energy	L2468.01	01-20-24
ANAB	ISO/IEC 17025	L2468	01-20-24
Arizona	State	AZ0708	08-11-23
Arkansas DEQ	State	88-0691	05-18-24
California	State	2897	01-22-24
Colorado	State	CA0004	08-31-23
Florida	NELAP	E87570	06-30-23
Georgia	State	4040	01-29-24
Hawaii	State	<cert No.>	01-29-24
Illinois	NELAP	200060	03-17-24
Kansas	NELAP	E-10375	10-31-23
Louisiana	NELAP	01944	06-30-23
Louisiana (All)	NELAP	01944	06-30-23
Maine	State	CA00004	04-14-24
Michigan	State	9947	06-01-23 *
Nevada	State	CA00044	07-31-23
New Hampshire	NELAP	2997	04-18-24
New Jersey	NELAP	CA005	06-30-23
New York	NELAP	11666	04-01-24
Ohio	State	41252	01-29-24
Oregon	NELAP	4040	01-29-24
Texas	NELAP	T104704399-19-13	05-31-24
US Fish & Wildlife	US Federal Programs	58448	04-30-24
USDA	US Federal Programs	P330-18-00239	02-28-26
Utah	NELAP	CA000442021-12	02-28-24
Virginia	NELAP	460278	03-14-24
Washington	State	C581	05-05-23 *
West Virginia (DW)	State	9930C	12-31-23
Wisconsin	State	998204680	08-31-23
Wyoming	State Program	8TMS-L	01-28-19 *

Laboratory: Eurofins Lancaster Laboratories Environment Testing, 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
A2LA	Dept. of Defense ELAP	0001.01	11-30-24
A2LA	ISO/IEC 17025	0001.01	11-30-24
Alaska	State	PA00009	06-30-23
Alaska (UST)	State	17-027	02-28-24
Arizona	State	AZ0780	03-12-24
Arkansas DEQ	State	88-00660	08-09-23
California	State	2792	05-17-23
Colorado	State	PA00009	06-30-23
Connecticut	State	PH-0746	05-31-23
DE Haz. Subst. Cleanup Act (HSCA)	State	019-006 (PA cert)	01-31-24
Delaware (DW)	State	N/A	01-31-24
Florida	NELAP	E87997	05-22-23
Georgia (DW)	State	C048	01-31-24

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

Eurofins Sacramento

Accreditation/Certification Summary

Client: Ensired Solutions
 Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC (Continued)

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

Authority	Program	Identification Number	Expiration Date
Hawaii	State	N/A	01-31-24
Illinois	NELAP	200027	05-29-23
Iowa	State	361	05-17-23
Kansas	NELAP	E-10151	05-29-23
Kentucky (DW)	State	KY90088	12-31-23
Kentucky (UST)	State	0001.01	11-30-24
Kentucky (WW)	State	KY90088	05-18-23
Louisiana (All)	NELAP	02055	06-30-23
Maine	State	2019012	03-12-25
Maryland	State	100	05-11-23
Massachusetts	State	M-PA009	05-24-23
Michigan	State	9930	01-31-24
Minnesota	NELAP	042-999-487	12-31-23
Mississippi	State	023	01-31-24
Missouri	State	450	01-31-25
Montana (DW)	State	0098	01-01-24
Nebraska	State	NE-OS-32-17	01-31-24
New Hampshire	NELAP	2730	01-10-24
New Jersey	NELAP	PA011	05-30-23
New York	NELAP	10670	05-03-23
North Carolina (DW)	State	42705	07-31-23
North Carolina (WW/SW)	State	521	12-31-23
North Dakota	State	R-205	05-22-23
Oklahoma	NELAP	9804	06-12-23
Oregon	NELAP	PA200001	09-11-23
PALA	Canada	1978	09-16-24
Pennsylvania	NELAP	36-00037	05-18-23
Rhode Island	State	LAO00338	12-31-23
South Carolina	State	89002	01-31-24
Tennessee	State	02838	01-31-24
Texas	NELAP	T104704194-23-46	05-03-23
USDA	US Federal Programs	525-22-298-19481	10-25-25
Vermont	State	VT - 36037	10-28-23
Virginia	NELAP	460182	06-14-23
Washington	State	C457	04-11-24
West Virginia (DW)	State	9906 C	12-31-23
West Virginia DEP	State	055	05-25-23
Wyoming	State	8TMS-L	01-31-24
Wyoming (UST)	A2LA	0001.01	11-30-24

Method Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	EPA	EET SAC
537 (modified)	Fluorinated Alkyl Substances	EPA	EET SAC
ELLE SOP	Total or Organic Fluorine by Combustion Ion Chromatography	ELLE - Lancaster	ELLE
Total PFCA-Dif	Total PFCA (Treatment Difference)	TAL SOP	EET SAC
Total PFCA-Sum	Total PFCA (Summary)	TAL SOP	EET SAC
3535	Solid-Phase Extraction (SPE)	SW846	EET SAC
CIC Prep	Preparation, Fluorine	ELLE - Lancaster	ELLE
TOP Post Prep	Solid-Phase Extraction (SPE)	SW846	EET SAC
TOP Pre - Prep	Solid-Phase Extraction (SPE)	SW846	EET SAC

Protocol References:

ELLE - Lancaster = Eurofins Lancaster, Facility Standard Operating Procedure.

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

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

Sample Summary

Client: Ensired Solutions
Project/Site: PFAS PRD Destruction Technology

Job ID: 320-98786-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-98786-1	NASJ_t0	Water	04/04/23 09:50	04/11/23 09:25
320-98786-2	NASJ_t2	Water	04/04/23 11:50	04/11/23 09:25
320-98786-3	NASJ_t4	Water	04/04/23 13:50	04/11/23 09:25
320-98786-4	NASJ_t8	Water	04/04/23 17:50	04/11/23 09:25
320-98786-5	NASJ_t28	Water	04/05/23 13:50	04/11/23 09:25
320-98786-6	TAFB_t0	Water	04/06/23 10:20	04/11/23 09:25
320-98786-7	TAFB_t2	Water	04/06/23 12:20	04/11/23 09:25
320-98786-8	TAFB_t4	Water	04/06/23 14:20	04/11/23 09:25
320-98786-9	TAFB_t8	Water	04/06/23 18:20	04/11/23 09:25
320-98786-10	TAFB_t30	Water	04/07/23 16:20	04/11/23 09:25

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Chain of Custody Record



Client Information		Sampler: <u>Suzanne With</u>		Lab PM:		Carrier Tracking No(s):		COC No:	
Client Contact: <u>Suzanne With</u>		Phone:		E-Mail:		State of Origin: <u>MI</u>		Page <u>1</u> of <u>1</u>	
Company: <u>Inspired Solutions</u>		PWSID:		Analysis Requested:		Preservation Codes:		M - Hexane N - None 7 - AsNaO2 - Na2O4S - Na2SO3 - H2SO4 - TSP Dodecahydrate - Acetone - MCAA - pH 4-5 - Trizma Z - other (specify)	
Address: <u>4942 Dawn Ave Suite 104</u>		Due Date Requested:		Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/>		Form MS/MSD (Yes or No) <input checked="" type="checkbox"/>		Total Number of containers	
City: <u>EAST LANSING, MI</u>		TAT Requested (days):		Matrix (W=water, S=solid, O=soil, I=oil)		Barcode:		Special Instructions/Note:	
State, Zip: <u>MI 48823</u>		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Sample Type (C=Comp, G=grab)		320-98786 Chain of Custody		see included sample notes	
Phone: <u>937-470-9461</u>		PO #:		Sample Time		Project Name: <u>PPES PRD Destruction Technology</u>			
Email: <u>suzanne.with@inspiredsolutions.com</u>		WO #:		Sample Date		Project #: <u>32020425</u>			
Project Name: <u>PPES PRD Destruction Technology</u>		SSOW#:		Sample Date		Sample Time			
Site: <u>PPES PRD Destruction Technology</u>		Sample Date		Sample Time		Sample Date			
Sample Identification		Sample Date		Sample Time		Sample Date			
<u>NAST-t0</u>		<u>4-4-23</u>		<u>9:50</u>		<u>9</u>		<u>W</u>	
<u>NAST-t2</u>		<u>4-4-23</u>		<u>11:50</u>		<u>9</u>		<u>W</u>	
<u>NAST-t4</u>		<u>4-4-23</u>		<u>13:50</u>		<u>9</u>		<u>W</u>	
<u>NAST-t8</u>		<u>4-4-23</u>		<u>17:50</u>		<u>9</u>		<u>W</u>	
<u>NAST-t28</u>		<u>4-5-23</u>		<u>13:50</u>		<u>9</u>		<u>W</u>	
<u>TAPB-t0</u>		<u>4-6-23</u>		<u>10:20</u>		<u>9</u>		<u>W</u>	
<u>TAPB-t2</u>		<u>4-6-23</u>		<u>12:20</u>		<u>9</u>		<u>W</u>	
<u>TAPB-t4</u>		<u>4-6-23</u>		<u>14:20</u>		<u>9</u>		<u>W</u>	
<u>TAPB-t8</u>		<u>4-6-23</u>		<u>16:20</u>		<u>9</u>		<u>W</u>	
<u>TAPB-t30</u>		<u>4-7-23</u>		<u>16:20</u>		<u>9</u>		<u>W</u>	
Possible Hazard Identification		Sample Date		Sample Time		Sample Date			
<input checked="" type="checkbox"/> Non-Hazard		<input type="checkbox"/> Flammable		<input type="checkbox"/> Skin Irritant		<input type="checkbox"/> Poison B		<input type="checkbox"/> Unknown	
<input type="checkbox"/> Deliverable Requested: I, II, III, IV, Other (specify)		<input type="checkbox"/> Radiological		Date:		Time:		Method of Shipment:	
Empty Kit Relinquished by:		Date:		Time:		Date:		Time:	
Relinquished by: <u>Suzanne With</u>		Date: <u>4/10/23</u>		Time: <u>12:00</u>		Date:		Time:	
Relinquished by:		Date:		Time:		Date:		Time:	
Relinquished by:		Date:		Time:		Date:		Time:	
Custody Seals Intact:		Date:		Time:		Date:		Time:	
<input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Date:		Time:		Company:	



Sample ID	Approximate total [PFAS] (ppb)	Approximate [Fluoride] (ppb)	Approximate [organic Fluorine] (ppb)	Approximate [CTAB] (ppb)	Other known constituents/notes
NASJ_t0	390	80	260	0	This is a groundwater sample
NASJ_t2	275	155	185	50,000	This is a groundwater sample spiked with 50,000 ppb CTAB and treated for PFAS
NASJ_t4	225	190	150	40,000	This is a groundwater sample spiked with 50,000 ppb CTAB and treated for PFAS. CTAB is partially degraded during the process.
NASJ_t8	150	240	100	25,000	This is a groundwater sample spiked with 50,000 ppb CTAB and treated for PFAS. CTAB is partially degraded during the process.
NASJ_t28	90	280	60	<100	This is a groundwater sample spiked with 50,000 ppb CTAB and treated for PFAS. CTAB is partially degraded during the process.
TAFB_t0	510	400	340	0	This is the rinsate from washing out AFFF from a firefighting truck with water.
TAFB_t2	360	500	240	50,000	This is the rinsate from washing out AFFF from a firefighting truck with water spiked with 50,000 ppb CTAB and treated for PFAS.
TAFB_t4	300	540	200	40,000	This is the rinsate from washing out AFFF from a firefighting truck with water spiked with 50,000 ppb CTAB and treated for PFAS. CTAB is partially degraded during the process.
TAFB_t8	210	600	140	25,000	This is the rinsate from washing out AFFF from a firefighting truck with water spiked with 50,000 ppb CTAB and treated for PFAS. CTAB is partially degraded during the process.
TAFB_t30	105	670	70	10,000	This is the rinsate from washing out AFFF from a firefighting truck with water spiked with 50,000 ppb CTAB and treated for PFAS. CTAB is partially degraded during the process.

Eurofins Sacramento

880 Riverside Parkway
West Sacramento, CA 95605
Phone: 916-373-5600 Fax: 916-372-1059

Chain of Custody Record





Client Information (Sub Contract Lab)		Sampler	Lab PM		Carrier Tracking No(s)		COC No				
Client Contact		Phone:	Turpen, Laura				320-304272.1				
Shipping/Receiving		E-Mail:	Laura.Turpen@et.eurofinsus.com		State of Origin:		Page:				
Company:		Eurofins Lancaster Laboratories Environm				Accreditations Required (See note):		Job #:			
Address:		Due Date Requested:		Analysis Requested				Preservation Codes:			
2425 New Holland Pike,		5/22/2023						A - HCL		M - Hexane	
City:		TAT Requested (days):		Field Filtered Sample (Yes or No)		B - NaOH		N - None			
Lancaster				Perform MS/MSD (Yes or No)		C - Zn Acetate		O - AsNaO2			
State, Zip:		PO #:		CIC_Fluorine/CIC_DI_Prep Total Fluorine		D - Nitric Acid		P - Na2O4S			
PA, 17601		WO #:				E - NaHSO4		Q - Na2SO3			
Phone:		Project #:				F - MeOH		R - Na2S2O3			
717-656-2300(Tel)		32020425				G - Amchlor		S - H2SO4			
Email:		SSOW#:				H - Ascorbic Acid		T - TSP Dodecahydrate			
						I - Ice		U - Acetone			
Project Name:		Project #:				J - DI Water		V - MCAA			
PFAS PRD Destruction Technology		32020425				K - EDTA		W - pH 4-5			
Site:		SSOW#:				L - EDA		Y - Trizma			
						Z - other (specify)		Other:			
Sample Identification - Client ID (Lab ID)		Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=soil, BT=Tissue, AA=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	CIC_Fluorine/CIC_DI_Prep Total Fluorine	Total Number of Containers	Special Instructions/Note:	
				Preservation Code:							
NASJ_10 (320-98786-1)		4/4/23	09:50 Eastern	Water		X			2	no CATB expected, ~260ppb TOF	
NASJ_12 (320-98786-2)		4/4/23	11:50 Eastern	Water		X			2	Possible CTAB interference, ~185ppb TOF expected	
NASJ_14 (320-98786-3)		4/4/23	13:50 Eastern	Water		X			2	Possible CTAB interference, ~150ppb TOF expected	
NASJ_18 (320-98786-4)		4/4/23	17:50 Eastern	Water		X			2	Possible CTAB interference, ~100ppb TOF expected	
NASJ_128 (320-98786-5)		4/5/23	13:50 Eastern	Water		X			2	Possible CTAB interference, ~60ppb TOF expected	
TAFB_10 (320-98786-6)		4/6/23	10:20 Eastern	Water		X			2	no CATB expected, ~340ppb TOF	
TAFB_12 (320-98786-7)		4/6/23	12:20 Eastern	Water		X			2	Possible CTAB interference, ~240ppb TOF expected	
TAFB_14 (320-98786-8)		4/6/23	14:20 Eastern	Water		X			2	Possible CTAB interference, ~200ppb TOF expected	
TAFB_18 (320-98786-9)		4/6/23	18:20 Eastern	Water		X			2	Possible CTAB interference, ~140ppb TOF expected	
<p>Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northern California, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northern California, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northern California, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Northern California, LLC</p>											
Possible Hazard Identification					Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)						
Unconfirmed					<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For Months						
Deliverable Requested: I, II, III, IV, Other (specify)					Primary Deliverable Rank: 2		Special Instructions/QC Requirements:				
Empty Kit Relinquished by:			Date:		Time:		Method of Shipment:				
Relinquished by:			Date/Time: 4/11/23 16:30		Company: FETSu		Received by:		Date/Time:		Company:
Relinquished by:			Date/Time:		Company:		Received by:		Date/Time:		Company:
Relinquished by:			Date/Time:		Company:		Received by:		Date/Time: 4/13/23 10:06		Company: ELLET
Custody Seals Intact:			Custody Seal No.:			Cooler Temperature(s) °C and Other Remarks:					
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						1.5					

SR



Chain of Custody Record

Client Information (Sub Contract Lab)				Sampler:		Lab PM Turpen, Laura		Carrier Tracking No(s):		COC No: 320-304272.2			
Client Contact: Shipping/Receiving				Phone:		E-Mail: Laura.Turpen@et.eurofinsus.com		State of Origin: Michigan		Page: Page 2 of 2			
Company: Eurofins Lancaster Laboratories Environm				Accreditations Required (See note):						Job #: 320-98786-1			
Address: 2425 New Holland Pike, City: Lancaster State, Zip: PA, 17601 Phone: 717-656-2300(Tel) Email:				Due Date Requested: 5/22/2023		Analysis Requested						Preservation Codes: A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acalone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Y - Trizma Z - other (specify)	
Project Name: PFAS PRD Destruction Technology		Project #: 32020425		Other:									
Site:		SSOW#:											
PO #:		WO #:											
Sample Identification - Client ID (Lab ID)				Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	CIC_Fluorine/CIC_DL_Prep Total Fluorine	Total Number of containers	Special Instructions/Note:	
TAFB_I30 (320-98786-10)				4/7/23	16:20 Eastern		Water			X	2	Possible CTAB interference, ~70ppb TOF expected	
<p>Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northern California, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northern California, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northern California, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Northern California, LLC.</p>													
Possible Hazard Identification						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)							
Unconfirmed						<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months							
Deliverable Requested: I, II, III, IV, Other (specify)				Primary Deliverable Rank: 2		Special Instructions/QC Requirements:							
Empty Kit Relinquished by:				Date:		Time:		Method of Shipment:					
Relinquished by: 		Date/Time: 4/12/23 (630)		Company: EFT/SEN		Received by:		Date/Time:		Company:			
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:			
Relinquished by:		Date/Time:		Company:		Received by: 		Date/Time: 4/13/23 10:06		Company: ELLET			
Custody Seals Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 1.5									

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Login Sample Receipt Checklist

Client: Enspired Solutions

Job Number: 320-98786-1

Login Number: 98786

List Source: Eurofins Sacramento

List Number: 1

Creator: Pratali, Sandra A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	2103454
Sample custody seals, if present, are 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.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	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	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Login Sample Receipt Checklist

Client: Enspired Solutions

Job Number: 320-98786-1

Login Number: 98786

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC

List Number: 2

List Creation: 04/13/23 03:19 PM

Creator: Roth, Stephanie

Question	Answer	Comment
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 ($\leq 6^{\circ}\text{C}$, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable ($\leq 6^{\circ}\text{C}$, 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	
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	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace $>6\text{mm}$ in diameter (none, if from WV)?	N/A	