Naval Facilities Engineering Systems Command Northwest
Silverdale, Washington

Final

Sampling and Analysis Plan
Point-of-Use Treatment System Monitoring
Outlying Landing Field Coupeville

Naval Air Station Whidbey Island
Coupeville, Washington

December 2024

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SAP Worksheet #1—Title and Approval Page

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Sampling and Analysis Plan
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Naval Air Station Whidbey Island
Coupeville, Washington

December 2024

Prepared for NAVFAC Northwest
by CH2M HILL, Inc.
Bellevue, Washington
Contract N62470-21-D-0007
CTO N4425521F4206

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SAP Worksheet #1—Title and Approval Page (continued)

Approval Signature:

Kenneth Bowers
Naval Facilities Engineering Systems Command Atlantic
Quality Assurance Officer

Other Approval Signatures:

Kendra Clubb
Naval Facilities Engineering Systems Command Northwest
Remedial Project Manager

Christie Kroskie
Naval Facilities Engineering Systems Command Northwest
Remedial Project Manager

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Executive Summary

This Sampling and Analysis Plan (SAP) was prepared by CH2M HILL, Inc. (CH2M), a wholly owned subsidiary of Jacobs, under Naval Facilities Engineering Systems Command (NAVFAC) Atlantic's Comprehensive Long-term Environmental Action–Navy (CLEAN) Contract Number N62470-21-D-0007, Contract Task Order N4425521F4206, for submittal to NAVFAC Northwest, U.S. Environmental Protection Agency (EPA), and Washington State Department of Ecology. This SAP outlines the sampling activities to be conducted in support of monitoring of a Point-of-Use (POU) treatment system for treatment of per- and polyfluoroalkyl substances (PFAS) in drinking water for one property located adjacent to Outlying Landing Field (OLF) Coupeville, in Coupeville, Washington. Activities described herein are conducted under the Department of the Navy (Navy) Environmental Restoration Program.

In 1943, the Navy commissioned OLF Coupeville, which supports day and night Field Carrier Landing Practice operations for aircraft based at Naval Air Station Whidbey Island, Ault Field.

The Navy conducted on-Base drinking water sampling at OLF Coupeville in September 2016; drinking water samples were collected and analyzed for PFAS. Perfluorooctanoic acid (PFOA) was detected in one on-Base drinking water well near Building 2807 less than 70 nanograms per liter (ng/L), which was the action level in use at that time, indicating a potential previous release of PFAS near Building 2807. Since then, off-Base drinking water wells have been sampled under a sampling program within a 1 mile radius of Building 2807. In 2017, the sampling radius was expanded to include an additional 0.5 mile to the south. Drinking water samples have been collected from 115 locations since November 2016; PFOA has been present greater than 70 ng/L in eight off-Base drinking water wells that supply water to 10 properties.

In 2017, the Navy implemented a Time-Critical Removal Action (TCRA) to immediately provide an alternate drinking water source through biweekly deliveries of bottled water to property owners, and to install a POU treatment system for the kitchen sink tapwater as an alternative to biweekly deliveries of bottled water if agreed to be the impacted properties (Navy, 2017). One POU treatment system was installed in May 2018, while the nine other properties continued to receive bottled water. In September 2018, the Navy determined that the most protective and efficient long-term solution for PFOA and perfluorooctanesulfonic acid (PFOS) in drinking water near OLF Coupeville was to add PFAS treatment infrastructure to the Town of Coupeville's existing treatment system and connect the impacted properties to the Town's water distribution system. While 10 of the impacted properties downgradient of OLF Coupeville have been connected to the Town's water distribution system (CH2M, 2022), the property with the POU system has opted to not be connected. The Navy will continue to service and monitor the POU treatment system until an alternative long term solution has been implemented (e.g., the property is connected to the Town's water distribution system, the Navy has remediated the PFAS source and plume, or the property owners install their own treatment system). The POU treatment system monitoring and maintenance program was initiated in 2018. The objective of the POU treatment system monitoring and maintenance program is to ensure effectiveness of the POU system to reduce PFAS concentrations to levels below PALs at the tap (effluent). PALs were established by Department of Defense (DoD) guidance (DoD, 2024) for removal action for private drinking water wells impacted by PFAS from DoD activities and listed as follows:

- PFOA = 12 ng/L
- PFOS = 12 ng/L
- Perfluorohexanesulfonic acid (PFHxS) = 30 ng/L
- Perfluorononanoic acid (PFNA) = 30 ng/L
- HFPO-DA = 30 ng/L
- HI = 3 for combination of two or more of PFHxS, perfluorononanoic acid (PFNA), PFBS, and HFPO-DA

To meet the objectives, the initial SAP developed for the program included collection of water samples from the POU treatment system once every 4 months, replacement of the filters annually, and collection of water samples before and after cartridge replacement and analysis of the samples for 14 PFAS. The most recent POU treatment system monitoring and filter replacement was conducted in March 2024. Since installation in May 2018, the POU treatment system has been effective at removing PFAS in drinking water to less than the laboratory detection limits.

This SAP consists of 37 worksheets specific to the scope of work for monitoring the POU treatment system. All tables are embedded within the worksheets. All figures are included at the end of the document. Field standard operating procedures (SOPs) are included in **Appendix A**. The DoD Environmental Laboratory Accreditation Program (ELAP) letter for the supporting laboratory is included in **Appendix B**. Laboratory SOPs are not provided in this SAP because they contain confidential and proprietary information; they may be available for review by stakeholders upon request pending laboratory approval.

If changes to analytes and/or analytical method(s) not already described by this document are necessary based on ongoing on-Base investigations or off-Base drinking water results, a new SAP or SAP addendum will be submitted.

The laboratory information cited in this SAP is specific to Enthalpy Analytical Laboratory (Enthalpy) in El Dorado Hills, California. The backup laboratory information cited in this SAP is specific to Battelle in Norwell, Massachusetts. Administrative information for the backup laboratory is provided in the main body of the SAP; however, worksheets that are laboratory or chemistry specific, along with the ELAP letters for the backup laboratory are included in **Appendix C**.[1] If additional laboratory services are requested requiring modification to the existing SAP, revised SAP worksheets and a Field Change Request will be submitted to the Navy for approval.

[1] The laboratories' DoD ELAP contains different spellings of the analyte names as compared to Method 533 and Method 537.1 Revision 2. It was confirmed with that laboratory that all Chemical Abstract Service numbers were correct as compared to the analytical methods.

Contents

Appendixes

Tables

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Acronyms and Abbreviations

°C	degree(s) Celsius
%R	percent recovery
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
9Cl-PF3ONS	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
11Cl-PF3OudS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
AC	activated carbon
ADONA	4,8-dioxa-3H-perfluorononanoic acid
AM	Activity Manager
AQM	Activity Quality Manager
CA	corrective action
CAS	Chemical Abstracts Service
CCC	continuing calibration check
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH2M	CH2M HILL, Inc.
CLEAN	Comprehensive Long-term Environmental Action—Navy
DL	detection limit
DoD	Department of Defense
DQI	data quality indicator
DQO	data quality objective
DV	data validation
Ecology	Washington State Department of Ecology
EDD	electronic data deliverable
ELAP	Environmental Laboratory Accreditation Program
Enthalpy	Enthalpy Analytical Laboratory – El Dorado Hills
EPA	U.S. Environmental Protection Agency
FD	field duplicate
FRB	field reagent blank
FTL	Field Team Leader
GAC	granular activated carbon

H&S	health and safety
HI	hazard index
HFPO-DA	hexafluoropropylene oxide dimer acid
HSM	Health and Safety Manager
HSP	Health and Safety Plan
ICAL	initial calibration
ID	identification
IDA	isotope dilution analogue
IS	internal standards
LC/MS/MS	liquid chromatography/mass spectrometry/mass spectrometry
LDC	Laboratory Data Consultants, Inc.
LFB	laboratory fortified blank
LFSM	laboratory fortified sample matrix
LFSMD	laboratory fortified sample matrix duplicate
LOD	limit of detection
LOQ	limit of quantitation
m/z	mass-to-charge ratio
MCL	maximum contaminant level
mL	milliliter(s)
MPC	measurement performance criteria
MS	matrix spike
MSD	matrix spike duplicate
N/A	not applicable
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Systems Command
Navy	Department of the Navy
NC	no criteria
NEtFOSAA	N-Ethyl perfluorooctanesulfonamidoacetic acid
NFDHA	nonafluoro-3,6-dioxaheptanoic acid
ng/L	nanograms(s) per liter
NIRIS	Naval Installation Restoration Information Solution
NMeFOSAA	N-Methyl perfluorooctanesulfonamidoacetic acid
OLF	Outlying Landing Field

PAL	project action limit
PARCCS	precision, accuracy, representativeness, completeness, comparability, and sensitivity
PFAS	per- and polyfluoroalkyl substances
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFEESA	perfluoro(2-ethoxyethane)sulfonic acid
PFHpA	perfluoroheptanoic acid
PFHpS	perfluoroheptanesulfonic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFMBA	perfluoro-4-methoxybutanoic acid
PFMPA	perfluoro-3-methoxypropanoic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFPeS	perfluoropentanesulfonic acid
PFTA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnA	perfluoroundecanoic acid
PIL	project indicator limit
PM	Project Manager
POC	point of contact
POU	point-of-use
PQO	project quality objective
QA	quality assurance
QAO	Quality Assurance Officer
QC	quality control
QSM	Quality Systems Manual
RO	reverse osmosis
ROD	Record of Decision

ROE	Right of Entry
RPD	relative percent difference
RPM	Remedial Project Manager
SAP	Sampling and Analysis Plan
SME	Subject Matter Expert
SOP	standard operating procedure
SSC	Site Safety Coordinator
STC	Senior Technical Consultant
TBD	to be determined
TCRA	time-critical removal action
TM	Task Manager
UCMR	Unregulated Contaminant Monitoring Rule

SAP Worksheet #2—SAP Identifying Information

Site Name/Number:	Outlying Landing Field (OLF) Coupeville, Coupeville, Washington, Naval Air Station (NAS) Whidbey Island
Operable Unit/Solid Waste Management Unit:	Not applicable (N/A)
Contractor Name:	CH2M HILL, Inc. (CH2M), a subsidiary of Jacobs
Contract Number:	N62470-21-D-0007
Contract Title:	Comprehensive Long-term Environmental Action—Navy (CLEAN) 0007 Program
Work Assignment Number (optional):	Contract Task Order N4425521F4206

1. This Sampling and Analysis Plan (SAP) was prepared in accordance with the requirements of the following:

- *Guidance for Quality Assurance Project Plans* (EPA, 2002)
- *Uniform Federal Policy for Quality Assurance Project Plans* (EPA, 2005)
- *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006)
- *Policy Memorandum: Perfluorinated Compounds/Perfluoroalkyl Substances (PFC/PFAS) – Identification of Potential Areas of Concern* (Navy, 2016)
- *Interim Per- and Polyfluoroalkyl Substances (PFAS) Site Guidance for NAVFAC Remedial Project Managers (RPMs)/November 2020 Update* (Navy, 2020).
- *Prioritization of Department of Defense Cleanup Actions to Implement the Federal Drinking Water Standards for Per-and Polyfluoroalkyl Substances Under the Defense Environmental Restoration Program* (DoD, 2024).

2. Identify regulatory program:

- Work is being performed in accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as reauthorized by Superfund Amendments and Reauthorization Act of 1986. However, per- and polyfluoroalkyl substances (PFAS) are considered an uncontrolled CERCLA pollutant or contaminant until final designation from U.S. Environmental Protection Agency (EPA) of PFAS as a hazardous substance**.**

3. **This document is a project-specific SAP.**

- The approval entities are Naval Facilities Engineering Systems Command (NAVFAC) Northwest Remedial Project Manager (RPM) and NAVFAC Atlantic Quality Assurance Officer (QAO).

4. List dates and titles of any SAP documents written for previous site work that are relevant to the current investigation.

Title	Date
Final Sampling and Analysis Plan, Time-Critical Removal Action, Point-of-Use Treatment System Monitoring, Ault Field and Outlying Landing Field Coupeville (CH2M, 2018)	April 2018
Final Sampling and Analysis Plan Addendum, Time-Critical Removal Action, Point-of-Use Treatment System Monitoring, Ault Field and Outlying Landing Field Coupeville (CH2M, 2021a)	January 2021

SAP Worksheet #2—SAP Identifying Information (continued)

5. List organizational partners (stakeholders) and connection with lead organization:

- NAVFAC Atlantic: Project Chemist/QAO
- NAVFAC Northwest: RPM
- EPA: Regulatory Project Manager
- Island County, Washington: Technical Representative/Base stakeholder
- Washington State Department of Ecology (Ecology): Regulatory Project Manager

6. Lead organization:

- Department of the Navy (Navy)

7. If any required SAP elements or required information are N/A to the project or are provided elsewhere, then note the omitted SAP elements and provide an explanation for their exclusion as follows:

- Crosswalk table is excluded because all required information is provided in this SAP.

SAP Worksheet #3—Distribution List

Name of SAP Recipients	Title/Role	Organization	Telephone Number	Email Address or Mailing Address
Kendra Clubb	RPM/Task Order Contracting Officer's Representative	NAVFAC Northwest	[redacted]	kendra.r.clubb.civ@us.navy.mil
Christie Kroskie	RPM	NAVFAC Northwest	[redacted]	christi.l.kroskie.civ@us.navy.mil
Jennifer Madsen	Activity Manager (AM)	CH2M	[redacted]	jennifer.madsen@jacobs.com
Gerrit Gardner	PM	CH2M	NA	gerrit.gardner@jacobs.com
Elizabeth Munn	Activity Quality Manager (AQM)	CH2M	NA	elizabeth.munn@jacobs.com
Jenny Lagerquist	Senior Technical Consultant (STC)/ PFAS Subject Matter Expert (SME)	CH2M	[redacted]	jenny.lagerquist@jacobs.com
Loren Kaehn	Health and Safety Manager (HSM)	CH2M	[redacted]	loren.kaehn@jacobs.com
Brittany Prentice	Project Task Manager (TM)	CH2M	[redacted]	brittany.prentice@jacobs.com
Adrienne Jones	Program SAP Quality Reviewer	CH2M	[redacted]	adrienne.jones@jacobs.com
Mike Zamboni	Program Chemist	CH2M	[redacted]	michael.zamboni@jacobs.com
Juan Acaron	Senior Chemistry Lead/SAP Reviewer	CH2M	[redacted]	juan.acaron@jacobs.com
Travis Pitts	Project Chemist	CH2M	[redacted]	travis.pitts@jacobs.com
Pei Geng	Data Validator	Laboratory Data Consultants, Inc. (LDC)	[redacted]	pgeng@lab-data.com
To be determined (TBD)	Field Team Leader (FTL)	CH2M	TBD	TBD
TBD	Site Safety Coordinator (SSC)	CH2M	TBD	TBD
Chris Whitehead	Laboratory PM	Enthalpy Analytical Laboratory – El Dorado Hills (Enthalpy)	[redacted]	christopher.whitehead@enthalpy.com

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SAP Worksheet #4—Project Personnel Sign-off Sheet

Name	Organization/Title/Role	Telephone Number	Signature/Email Receipt	Date SAP Read
Kendra Clubb	NAVFAC RPM/Task Order Contracting Officer's Representative	[redacted]		
Christie Kroskie	NAVFAC RPM	[redacted]		
Kenneth Bowers	NAVFAC QAO	[redacted]		
Jennifer Madsen	CH2M/AM	[redacted]		
Gerrit Gardner	CH2M/PM	NA		
Elizabeth Munn	CH2M/AQM	NA		
Jenny Lagerquist	CH2M/STC/PFAS SME	[redacted]		
Loren Kaehn	CH2M/HSM	[redacted]		
Brittany Prentice	CH2M/Project TM	[redacted]		
Mike Zamboni	CH2M/Program Chemist	[redacted]		
Juan Acaron	CH2M/Senior Chemistry Lead/SAP Reviewer	[redacted]		
Travis Pitts	CH2M/Project Chemist	[redacted]		
Pei Geng	LDC/Data Validator	[redacted]		
TBD	CH2M FTL	TBD		
TBD	CH2M SSC	TBD		
Chris Whitehead	Enthalpy/Laboratory PM	[redacted]		

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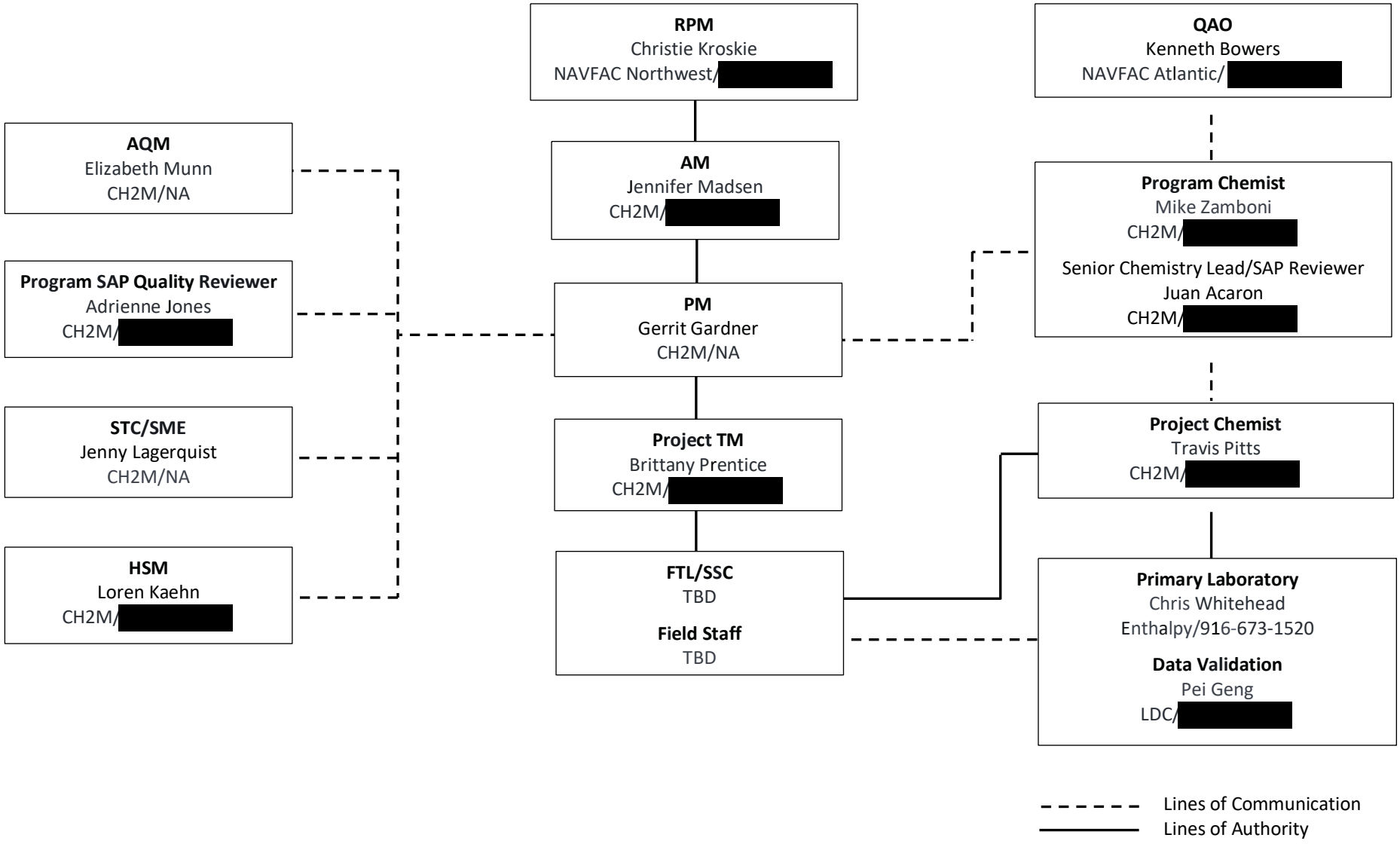
SAP Worksheet #5—Project Organizational Chart



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SAP Worksheet #6—Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure
Communication with base, CH2M PM/AM, EPA	NAVFAC Northwest RPM/Task Order Contracting Officer's Representative	Kendra Clubb	Kendra.r.clubb.civ@us.navy.mil [redacted]	Primary point of contact (POC) for facility; can delegate communication to other internal or external POCs. CH2M PM will notify RPM by email or telephone call within 24 hours for field changes affecting the scope or implementation of the Work Plan.
Communication with base, CH2M PM/AM, EPA	NAVFAC Northwest RPM/Task Order Contracting Officer's Representative	Christie Kroskie	christi.l.kroskie.civ@us.navy.mil [redacted]	Primary POC for facility; can delegate communication to other internal or external POCs. CH2M PM will notify RPM by email or telephone call within 24 hours for field changes affecting the scope or implementation of the Work Plan
SAP reviews	NAVFAC Atlantic Chemist/QAO	Kenneth Bowers	kenneth.a.bowers.civ@us.navy.mil [redacted]	Provides review comments to Navy contractor on preliminary draft SAP via the Naval Installation Restoration Information Solution (NIRIS) submittal. Provides overall Navy guidance via direct communication with Navy contractor chemist, as warranted.
Communication regarding overall project status and implementation, and primary POC with RPMs and project team	CH2M PM	Gerrit Gardner	gerrit.gardner@jacobs.com NA	Primary POC for CH2M. Interacts and coordinates activities with the RPM. Oversees project and will be informed of project status by the TM. If field changes occur, PM will communicate in-field changes to the team by email within 24 hours. All data results will be communicated to the project team following data receipt and review. Notifies the NAVFAC RPM, who at their discretion may notify the NAVFAC QAO of any serious laboratory issues that would cause negative impacts to project delivery or would cause the project data quality objectives (DQOs) to not be met.

SAP Worksheet #6—Communication Pathways (continued)

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure
Communication regarding overall project status and implementation and primary POC with RPM and project team	CH2M AM/PM/ STC/PFAS SME	Jennifer Madsen	jennifer.madsen@jacobs.com [redacted]	Responsible for technical communications related to project implementation and data interpretation and quality. The PM will work with the PFAS SME regarding all technical aspects encountered in the field, data interpretation, and report writing.
		Gerrit Gardner	gerrit.gardner@jacobs.com NA	
		Jenny Lagerquist	jenny.lagerquist@jacobs.com NA	
Quality issues during and technical communications for project implementation and data interpretation	CH2M AQM	Elizabeth Munn	elizabeth.munn@jacobs.com NA	Contact the AQM regarding quality issues during project implementation. The AQM will report to the PM and the RPM.
Health and safety (H&S)	CH2M HSM	Loren Kaehn	loren.kaehn@jacobs.com [redacted]	Responsible for generation of the Health and Safety Plan (HSP) and approval of the activity hazard analyses before the start of fieldwork. The PM will contact the HSM as needed regarding questions/issues encountered in the field.
H&S	CH2M SSC	TBD	TBD	Responsible for the adherence of team members to the site safety requirements described in the HSP. Will report H&S incidents and near-misses to the PM as soon as possible.
Stop Work Order	CH2M PM	Gerrit Gardner	gerrit.gardner@jacobs.com NA	Any field member can immediately stop work if an unsafe condition that is immediately threatening to human health is observed. The field staff, FTL, or SSC should notify the RPM and the CH2M PM immediately. Ultimately, the FTL and PM can stop work for a period of time.
	CH2M FTL/SSC	TBD	TBD	
	Field Team Members	TBD	TBD	

SAP Worksheet #6—Communication Pathways (continued)

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure
Work plan changes in field	FTL	TBD	TBD	Documentation of deviations from the Work Plan will be made in the field logbook, and the PM will be notified immediately. Deviations will be made only with approval from the PM. The PM will communicate changes to the RPM.
Field changes/field progress reports	FTL	TBD	TBD	Documentation of field activities and Work Plan deviations (made with the approval of the STC and/or AQM) in field logbooks; provide daily progress reports to PM.
Reporting laboratory data quality issues	Enthalpy	Chris Whitehead	christopher.whitehead@enthalpy.com [redacted]	All quality assurance (QA)/quality control (QC) issues with project field samples will be reported by the laboratory to the Project Chemist within 2 days. In the event of serious analytical issues, the RPM will be contacted, who, at their discretion, may wish to consult with the NAVFAC chemist.
Communication regarding SAP changes	CH2M Program Chemist	Mike Zamboni	michael.zamboni@jacobs.com [redacted]	Changes to the project that would prompt a SAP change that would require NAVFAC QAO approval include: the addition of an analytical suite not previously included in the SAP, the addition of an environmental matrix not previously included in the SAP, laboratory accreditation to a new Department of Defense (DoD) Quality System Manual (QSM) version, inclusion of a new laboratory into the SAP, or updates to the conceptual site model that prompt new DQOs. Updated laboratory limit of quantitation (LOQ), limit of detection (LOD), and detection limit (DL) values will not prompt a SAP update for NAVFAC QAO approval unless those updates negatively impact the ability to meet project action limits (PALs).
	CH2M Senior Chemistry Lead/SAP Reviewer	Juan Acaron	juan.acaron@jacobs.com [redacted]	

SAP Worksheet #6—Communication Pathways (continued)

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure
Analytical corrective actions (CAs)	Project Chemist	Travis Pitts	travis.pitts@jacobs.com [redacted]	Any CAs for analytical issues will be determined by the FTL or the Project Chemist and reported to the PM within 4 hours. The PM will ensure SAP requirements are met by field staff for the duration of the project. In the event of serious analytical issues, the CH2M PM will contact the RPM, who at their discretion, may wish to consult with the NAVFAC chemist.
Data tracking from field collection to database upload release of analytical data	Project Chemist	Travis Pitts	travis.pitts@jacobs.com [redacted]	Tracks data from sample collection through database upload daily. No analytical data can be released until the Project Chemist validates and approves the data. The Project Chemist will review analytical results within 24 hours of receipt for release to the project team. The Project Chemist will inform the Navy CLEAN program chemist who will notify the NAVFAC QAO of any laboratory issues that would prevent the project from meeting project quality objectives (PQOs) or would cause significant delay in project schedule.
Reporting data quality issues	Data validation (DV)	Pei Geng	pgeng@lab-data.com [redacted]	The data validator reviews and qualifies analytical data as necessary. The data, along with a validation narrative, are returned to the Project Chemist within 7 calendar days.
Field CAs	FTL, PM, and Project TM	TBD	TBD	Field issues requiring CA will be determined by the FTL or PM on an as-needed basis; the PM will ensure SAP requirements are met by field staff for the duration of the project. The FTL will notify the PM via phone of any need for CA within 4 hours. The FTL will notify the PM and the PM may notify the Navy Technical Representative and RPM of any field issues that would negatively affect the schedule or the ability to meet project DQOs.
		Gerrit Gardner	gerrit.gardner@jacobs.com NA	
		Brittany Prentice	brittany.prentice@jacobs.com [redacted]	

SAP Worksheet #7—Personnel Responsibilities Table

Name	Title/Role	Organizational Affiliation	Responsibilities
Christie Kroskie	RPM	NAVFAC Northwest	Oversees project for NAVFAC and provides Base-specific information and coordination with NAS Whidbey Island.
Jennifer Madsen	AM	CH2M	Oversees and manages NAS Whidbey Island projects and activities.
Gerrit Gardner	PM	CH2M	Oversees and manages project activities and tasks.
Elizabeth Munn	AQM	CH2M	Oversees project delivery and execution.
Jenny Lagerquist	STC/PFAS SME	CH2M	Provides PFAS-related senior technical support for project approach and execution.
Brittany Prentice	Project TM	CH2M	Oversees and manages project tasks.
Adrienne Jones	Program SAP Quality Reviewer	CH2M	Reviews and approves changes or revisions to the SAP.
Mike Zamboni	Program Chemist	CH2M	Provides SAP project delivery support, reviews and approves SAP, and performs final data evaluation and QA oversight.
Juan Acaron	Senior Chemistry Lead/SAP Reviewer	CH2M	
Travis Pitts	Project Chemist	CH2M	Data management: Performs data evaluation and QA oversight; is the POC with laboratory and validator for analytical issues.
Loren Kaehn	HSM	CH2M	Prepares HSP and manages H&S for all field activities.
Pei Geng	Data Validator	LDC	Validates laboratory data from an analytical standpoint before data use.
TBD	FTL	CH2M	Coordinates all field activities and sampling.
TBD	Field Staff Member	CH2M	Conducts field activities.
Chris Whitehead	Laboratory PM	Enthalpy	Manages samples tracking and maintains good communication with Project Chemist.
Teresa Morrison	Laboratory QAO	Enthalpy	Responsible for audits, CA, and checks of QA performance within the laboratory.

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SAP Worksheet #8—Special Personnel Training Requirements Table

No specialized training beyond standard H&S training is required for this project. Field personnel are required to follow the CH2M standard operating procedure (SOP) that is specific to PFAS sampling. The SOP is included in **Appendix A**.

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SAP Worksheet #9-1—Project Scoping Session Participants Sheet

Project Name: NAS Whidbey Island Long-term Solutions – TCRA POU Treatment **Projected Date(s) of Sampling:** Routinely, March 2018-June 2018 **PM:** Rebecca Maco	**Site Name**: Ault Field and OLF Coupeville **Site Location**: Oak Harbor, Washington and Coupeville, Washington
Date of Session: October 30, 2017 **Scoping Session Purpose:** To obtain consensus on residential point-of-use (POU) treatment system monitoring approach and schedule.	

Name	Title/Project Role	Affiliation	Phone Number	Email Address
Kendra Leibman	RPM	NAVFAC Northwest	[redacted]	kendra.leibman@navy.mil
Christopher Generous	RPM's Supervisor	NAVFAC Atlantic	[redacted]	christopher.generous@navy.mil
Jennifer Corack	Technical Representative	NAVFAC Atlantic	[redacted]	jennifer.corack@navy.mil
Kenneth Bowers	NAVFAC QAO, Chemist	NAVFAC Atlantic	[redacted]	kenneth.a.bowers@navy.mil
Rebecca Maco	AM/PM	CH2M	[redacted]	rebecca.maco@jacobs.com
Kathryn Brown	Project TM	CH2M	[redacted]	kathryn.brown@jacobs.com
Nicole Badon	Lead SAP Author	CH2M	[redacted]	nicole.badon@jacobs.com
Tiffany Hill	Project Chemist	CH2M	[redacted]	tiffany.hill@jacobs.com
Gary Hickman	POU System SME	CH2M	[redacted]	gary.hickman@jacobs.com

Comments

The project team discussed the approach to monitor the effectiveness and carbon changeout needs for POU under-sink treatment systems. The POU systems are designed to treat kitchen sink tapwater for residents in Ault Field and OLF Coupeville that have PFAS (specifically perfluorooctanesulfonic acid [PFOS] and/or perfluorooctanoic acid [PFOA]) exceeding the PAL, which is the EPA Lifetime Health Advisory.

The following tasks were discussed for the path forward on development of the SAP:

- The Navy decided on POU treatment units as a Time-Critical Removal Action (TCRA) to replace bottled water use until a long-term solution can be implemented. The Navy feels the POUs best meet the Navy's goal to provide a cost-effective, protective solution that can be implemented in the timeline set by the NAS Whidbey Island Commanding Officer (to get residents off bottled water within 1 year).
- The POU system will preferentially be a three-unit system consisting of either three activated carbon (AC), or two AC and one reverse osmosis (RO), treatment units in series with breakthrough monitoring between each unit. If space does not allow a three-unit system, a two-AC unit system will be considered; however, the resident will need to continue using bottled water for drinking and cooking for a longer period than the three-unit system (three-AC or two-AC, one-RO) because the two-AC unit system is less protective. Breakthrough time and volume would need to be quantified longer for the two-unit systems compared to the three-unit system before allowing the resident to use the water for drinking and cooking.
- There are concerns about the ability to fit POU units beneath sinks. Additional adjacent cabinet (or other available) space may be needed.

SAP Worksheet #9-1—Project Scoping Session Participants Sheet (continued)

- The POU treatment goal is to provide drinking and cooking water to the resident with PFOA and PFOS less than the PALs. Keeping PFOA and PFOS levels less than the PALs is protective.
- POU unit treatment media changeouts will be triggered when PFOA and PFOS are detected at one-half the PAL (the PAL is the EPA Lifetime Health Advisory) in the most upstream midpoint sample. NAVFAC Northwest indicated that perfluorobutanesulfonic acid (PFBS) EPA Regional Screening Level will not be a trigger for remedial action or POU media changeout to be consistent with Navy policy.
- POU unit samples will be analyzed for 14 PFAS compounds.
- CH2M will check with the Naval Air Landing Field Fentress PFAS team regarding Washington State Department of Health input they considered for AC changeout frequency. The Navy is not aware of specific requirements at NAS Whidbey Island.
- CH2M will check AC loading calculations to evaluate the validity of the CH2M proposed monitoring schedule (1 to 3 weeks apart during the first 12 weeks). Actual breakthrough timing will depend on water use, AC type, AC quantity, and influent concentrations. CH2M performed these calculations subsequent to the meeting. The AC units will be designed by the POU subcontractor to exceed a 3-month service life.
- NAVFAC Northwest suggested obtaining at least three POU monitoring samples and associated validated analytical results before discontinuing bottled water use.
- CH2M will provide NAVFAC Northwest with a schedule of the two-AC vs. three-AC unit systems, including monitoring and bottled water use considerations. NAVFAC Northwest will decide which design is most appropriate. This information was provided to the Navy subsequent to the meeting.

SAP Worksheet #9-2—Project Scoping Session Participants Sheet

Project Name: NAS Whidbey Island POU Treatment System Monitoring **PM:** Jill Schrlau	**Site Name**: OLF Coupeville **Site Location**: Coupeville, Washington
Date of Session: September 16, 2024 **Scoping Session Purpose:** To obtain consensus on residential POU treatment system monitoring approach and schedule.	

Name	Title/Project Role	Affiliation	Phone Number	Email Address
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Comments

The project team reviewed the project background and history to date focusing on the evolution of the monitoring and maintenance schedule, procedures, and objectives, as well as the changes in Navy regulatory policy that have taken place since the POU system was installed.

The following updates to the project scope were discussed:

- Updated PALs will be implemented consistent with recent DoD guidance. The new PALs are equal to three times the maximum contaminant level (MCL) values listed in the EPA April 2024 drinking water rule (DoD, 2024). Additionally, the new project indicator limits (PILs), which will trigger system maintenance to change out the granular activated carbon (GAC) filters, will be equal to the MCL values.
- Samples will be collected from the POU system midpoint and effluent locations on a biannual basis in conjunction with the biannual drinking water well sampling program. The drinking water well sample is the same as the POU system influent, therefore, no additional samples need to be collected from the system influent during the POU sampling.
- The POU system's GAC filters will be changed out annually according to manufacturer recommendations. Rather than contracting with a separate vendor, CH2M personnel will perform the changeouts. Confirmation samples will be collected off the new filters after the new filters are installed. GAC changeout events will be separate from the biannual sampling events.
- The Navy team expressed concern about no longer having a system maintenance contractor and whether CH2M will be able to provide timely support in the event of an emergency maintenance issue.
- Water quality parameters no longer need to be recorded for the influent and effluent locations because there are no longer project outcomes associated with these data. Temperature readings will still be recorded during system flush consistent with drinking water sampling procedures.

SAP Worksheet #9-2—Project Scoping Session Participants Sheet (continued)

- Flow rate, system pressure, and flow totalizer readings no longer need to be recorded because there are no longer any project outcomes associated with these data.
- The Navy team will keep CH2M informed of the status of the interim Record of Decision (ROD), which has been on hold but may resume development now that EPA MCLs have been published and corresponding DoD guidance has been issued. When final, the interim ROD may require monitoring and maintenance of the POU system to be discontinued.

SAP Worksheet #10—Conceptual Site Model

OLF Coupeville is located in Coupeville, Washington (**Figure 1**). **Figure 2** presents the site layout of OLF Coupeville and the Phase 1 and 2 sampling areas. A description and background summary of the POU treatment system is presented in **Table 10-1**.

Table 10-1. Point-of-Use Treatment System Description and Background

Site Name	Off-Base Private Drinking Water Well location, OLF Coupeville, NAS Whidbey Island, Coupeville, Washington (**Figures 1** and **2**)
Study Area Description	The location to be monitored includes one off-Base property with a POU system that was installed in 2018 to address PFAS impacts to the property's private drinking water well, which had exceedances of 70 nanograms per liter (ng/L).
Study Area Investigation History	In November 2016, in response to a confirmation of PFAS in an on-Base well at OLF Coupeville, an off-Base drinking water investigation was initiated. The investigation sampled private drinking water wells within 1 mile of OLF Coupeville (Phase 1) and a subsequent 0.5-mile step-out perimeter (Phase 2) (**Figure 2**). PFOA was present greater than 70 ng/L at eight off-Base drinking water wells that supply water to 10 properties. In 2017, the Navy implemented a TCRA to immediately provide bottled water to property owners and to install a POU treatment system for their kitchen sink tapwater in place of bottled water. The TCRA was designed to minimize the property owners' PFAS-related risks before implementing a long-term solution. Out of 11 properties, a POU system (**Figure 3**) was installed at only one property in May 2018. The long-term solution identified by the Navy for properties impacted by PFAS in drinking water was connection to the Town of Coupeville water system. This included making improvements to the Town's water treatment plant to ensure nondetectable levels of PFAS in the Town's water distribution system. As of March 2024, the property with the POU system has not been connected. Therefore, monitoring and maintenance of the POU system is required until the property is connected to the Town's water distribution system, the Navy remediates the PFAS source and plume, or the property owner installs their own treatment system. Monitoring and maintenance of the system was initiated in 2018. The monitoring initially consisted of sampling the one POU system for PFAS every 3 weeks for the first 12 weeks of operation. Sampling points included the system influent, at two midpoints (Midpoints 1 and 2), and at the system effluent (**Figure 3**). After the first 12 weeks, additional monitoring was performed during the first year to determine the amount of time before PFAS breakthrough after the first filter cartridge, with monitoring initially occurring every 6 weeks and gradually decreasing to every 12 weeks as long as the results were nondetect for all analyzed PFAS). After 1 year, breakthrough of PFAS had not been observed. The manufacturer recommendation for the changeout frequency of the filter cartridges is 1 year if analytical results do not indicate a more frequent changeout is necessary. Based on the sampling results (no detections at Midpoints 1 or 2, or the effluent samples during the entire first year of monitoring) and the manufacturer recommendations, the Navy initiated a long-term monitoring program in July 2020 that consisted of triannual monitoring and sampling of the system influent, Midpoint 1 (after first filter cartridge in series), and the effluent of the POU system. Previous monitoring results showed no breakthrough at Midpoints 1 or 2; therefore, only Midpoint 1 was included with the influent and effluent sampling. Triannual monitoring and sampling events between July 2020 and March 2024 indicated PFOA concentrations at the influent have remained greater than 70 ng/L (ranged from 135 to 187 ng/L) since the installation of the system in May 2018 (CH2M, 2021b, 2024). At Midpoint 1 and effluent sampling locations, PFAS concentrations have been less than the laboratory limits of detection for all PFAS analytes since the installation of the POU system. Therefore, it has been determined that the monitoring frequency can be reduced, and semiannual monitoring would be sufficient.
Current Use	The property has a private drinking water well, the residence is inhabited, and the use of the POU treatment system is ongoing.

SAP Worksheet #10—Conceptual Site Model (continued)

Table 10-1. Point-of-Use Treatment System Description and Background

Constituents of Potential Concern	29 PFAS (listed in **Worksheet #15**)
Nature and Extent	Nature and extent of PFAS at OLF Coupeville is being addressed in a separate, ongoing investigation; however, the previous and ongoing investigations show on- and off-Base PFAS impacts at OLF Coupeville to the west and south directions from Facilities 1, 2, and 11 and Building 2709 PFAS areas. The private drinking water well for this SAP has PFAS concentrations that exceed 3 times the MCLs for PFOA and perfluorohexanesulfonic acid (PFHxS).
Potential Receptors/ Exposure Routes	Current and future human exposure to drinking water (ingestion) from an impacted off-Base private drinking water well near OLF Coupeville. Other potentially complete exposure pathways to humans and ecological receptors may be present; however, the focus of this investigation is human exposure to PFAS in drinking water.

Data Needs

The data needs and objectives are specified in **Worksheet #11**.

SAP Worksheet #11—Project Quality Objectives/Systematic Planning Process Statements

Problem Definition, Environmental Questions, and Project Quality Objectives

The investigation objectives, environmental questions, general investigation approach, and PQOs are presented in **Table 11-1**. The detailed sampling approach, including number of samples, sampling frequency, and analyses, are included in **Worksheet #17**. The sampling rationale is outlined in **Worksheets #17** and **#18**.

Table 11-1. Objective, Environmental Questions, General Investigation Approach and Project Quality Objectives

Objective	Environmental Question(s)	General Investigation Approach	PQOs
Ensure effectiveness of the POU treatment system to reduce PFAS concentrations to levels less than the PAL at the tap (effluent).	Is the POU treatment system continuing to reduce PFOS and PFOA concentrations to levels less than the PALs at the effluent, thereby providing water suitable for drinking and cooking?	Collect water samples from the system influent, Midpoint 1, and effluent ports of the POU treatment system two times annually (approximately once every 6 months). Change out the GAC filters once annually according to manufacturer's recommendations. When the filters are replaced, collect samples from Midpoint 1, and effluent ports after the changeout. Analyze the drinking water samples via EPA Methods 533 and 537.1 Version 2 (DoD, 2023) for the 29 PFAS compounds listed in the Unregulated Contaminant Monitoring Rule (UCMR) 5 listed in **Worksheet #15**.	In order to ensure that PFAS concentrations at the effluent remain below the PALs, the more conservative PILs will be used to trigger filter replacement. If the sampling results from the POU system indicate that PFAS concentrations do not exceed the PILs at Midpoint 1 or the effluent, then filter replacement will occur annually in accordance with manufacturer recommendations and monitoring will continue on a biannual basis. If POU system monitoring performance data indicate that PFAS concentrations exceed the PILs at Midpoint 1 or the effluent, then the filters will be replaced within 48 hours and sampling frequency will be re-evaluated as necessary.

SAP Worksheet #11—Project Quality Objectives/ Systematic Planning Process Statements (continued)

What are the Project Action Limits?

The PALs are based on DoD direction (DoD, 2024). DoD direction is to initiate removal actions for private drinking water wells impacted by PFAS from DoD activities where concentrations meet or exceed three times the MCL values:

- PFOA = 12 ng/L
- PFOS = 12 ng/L
- PFHxS = 30 ng/L
- Perfluorononanoic acid (PFNA) = 30 ng/L
- HFPO-DA = 30 ng/L
- Hazard index (HI) = 3 for combination of two or more of PFHxS, PFNA, PFBS, and HFPO-DA

Concentrations equal to one-third of the PALs (equal to the MCLs [DoD, 2024]) will be used to trigger a changeout of the POU system treatment media (GAC). These values are called the PILs, which are listed as follows:

- PFOA = 4 ng/L
- PFOS = 4 ng/L
- PFHxS = 10 ng/L
- PFNA = 10 ng/L
- HFPO-DA = 10 ng/L
- HI = 1 for combination of two or more of PFHxS, PFNA, PFBS, and HFPO-DA

This PIL trigger is needed because there will be, at minimum, a 10-day lag time between sample collection, laboratory result receipt, and POU system onsite maintenance. Using the PIL will be conservative to keep the resident's POU system water supply less than the target goal of less than the PALs at the tap.

There are no PALs for the other 23 PFAS being analyzed. The data for the other 27 PFAS being analyzed (**Worksheet #15**) will be archived for future use, if needed.

For what will the data be used?

The data will be used by the Navy, its contractors, and the other stakeholder agencies to address the environmental questions and PQOs listed in **Table 11-1**. Under EPA Methods 533 and 537.1, the data will be analyzed for 29 compounds (DoD, 2023). Based on current Navy policy, further drinking water investigations and removal action decisions are only based on PFOS and PFOA. All other data will be archived in an appendix of the drinking water report for future use.

What types of data are needed (matrix, target analytes, analytical groups, field screening, onsite analytical or offsite laboratory techniques, sampling techniques)?

Worksheets #14, #15, and **#18** contain detailed information on the types of data needed for this project. Detailed information on how data will be collected is provided in **Worksheet #14**, following the SOP listed in **Worksheet #21**. The samples will be collected from the influent, Midpoint 1, and effluent ports of the POU system. The project schedule is provided in **Worksheet #16**.

SAP Worksheet #11—Project Quality Objectives/ Systematic Planning Process Statements (continued)

Are there any special data quality needs, field or laboratory, to support environmental decisions?

All off-Base laboratory analytical data will be technically sound and defensible with respect to the aforementioned project objectives. Additionally, laboratory-specific LODs will be less than the MCLs. QC sample requirements are detailed in **Worksheet #20**. For action decisions, the laboratory will follow the Measurement Performance Criteria (MPC) in **Worksheets #24** and **#28** for laboratory QC samples. These MPC are consistent with the latest versions of EPA Method 533 and Method 537.1 Version 2.

Where, when, and how should the data be collected/generated?

Water samples will be collected from the influent, Midpoint 1, and effluent ports on the POU system**.** The sampling approach is summarized in **Worksheet #14.** Sampling is based on the rationale presented in **Worksheet #17** and will be in accordance with the project schedule outlined in **Worksheet #16**.

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SAP Worksheet #12-1—Field Quality Control Samples

Matrix: Drinking Water
Analytical Group: PFAS
Analytical Method: EPA Method 533

QC Sample[a]	Analytical Group	Frequency	DQIs	MPC[b]
Field Duplicate (FD)	PFAS	One per 10 normal field samples	Precision	Relative percent difference (RPD) less than 30%. Greater variability may be observed when FDs have analyte concentrations that are within a factor of 2 of the LOQ. At these concentrations, FDs should have RPDs that are less than or equal to 50%.
Field Reagent Blank (FRB)		One per property, where drinking water samples are collected	Bias/Contamination	If the same PFAS analyte is present in both the sample and FRB, and the concentration of that analyte greater than 1/3 LOQ in the FRB it will require all associated samples to be resampled and/or reanalyzed; however, decision-making and/or action (that is, providing an alternate drinking water source) may proceed in advance of the resampling and reanalysis.
Temperature Blank		One per cooler	Representativeness	Samples must be shipped on ice and received at the laboratory at or below 10 degrees Celsius (°C) and stored in the laboratory at or below 6°C. Samples must not be frozen.

[a] Although matrix spike (MS)/matrix spike duplicate (MSD) samples (presented as laboratory fortified sample matrix [LFSM] and laboratory fortified sample matrix duplicate [LFSMD] in this document) might be considered field QC, they are shown in **Worksheet #28**.

[b] EPA Method 533 (EPA, 2019a) is the basis for method performance criteria in this table.

DQI = data quality indicator

SAP Worksheet #12-2—Field Quality Control Samples

Matrix: Drinking Water
Analytical Group: PFAS
Analytical Method: EPA Method 537.1 Version 2

QC Sample[a]	Analytical Group	Frequency	DQIs	MPC[b]
FD	PFAS	One per 10 normal field samples.	Precision	RPD less than 30%. Greater variability may be observed when FDs have analyte concentrations that are within a factor of 2 of the LOQ. At these concentrations, FDs should have RPDs that are less than or equal to 50%.
FRB		One per property where drinking water samples are collected.	Bias/Contamination	If the same PFAS analyte is present in both the sample and FRB, and the concentration of that analyte greater than 1/3 LOQ in the FRB it will require all associated samples to be resampled and/or reanalyzed; however, decision-making and/or action (that is, providing an alternate drinking water source) may proceed in advance of the resampling and reanalysis.
Temperature Blank		One per cooler.	Representativeness	Samples must be shipped on ice and received at the laboratory at or below 10°C and stored in the laboratory at or below 6°C. Samples must not be frozen.

[a] Although MS/MSD samples (presented as LFSM and LFSMD in this document) might be considered field QC, they are shown in **Worksheet #28**.
[b] EPA Method 537.1 Version 2 (EPA, 2023) is the basis for method performance criteria in this table.

SAP Worksheet #13—Secondary Data Criteria and Limitations Table

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Organization, Data Types, Data Generation/Collection Dates)	How Data Will Be Used	Limitations on Data Use
Off-Base Drinking Water Results	CH2M. Document to be prepared discussing results of off-Base drinking water investigation. Results have been published at: https://www.acq.osd.mil/eie/eer/ecc/pfas/map/pfasmap.html	Analytical results for ongoing, biannual off-Base drinking water well sampling performed from November 2016 through April 2024, which includes the well supplying the property with the POU system (first sampled in October 2017).	Identify changes in PFOA and PFOS concentrations in influent of the POU system during ongoing, biannual off-Base drinking water well sampling that is conducted at different times than POU system monitoring.	None
POU Treatment System Results	CH2M, 2021b, 2024. *Evaluation of Point-of-Use Treatment System Monitoring, Outlying Landing Field Coupeville, Naval Air Station Whidbey Island, Oak Harbor, Washington*.	Analytical results for ongoing POU treatment system performance monitoring.	Monitor PFOA and PFOS concentrations in influent, Midpoint 1, and effluent of the POU system.	None

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SAP Worksheet #14—Summary of Project Tasks

Pre-sampling Tasks

- Subcontractor procurement
  - POU treatment unit vendor (maintenance)
  - Analytical laboratory
  - Data Validator
- Fieldwork scheduling
- Sampling appointment scheduling
- Right of Entry (ROE) form completion: an ROE form will be completed by the property owner before sample collection.

Mobilization

Mobilization for the field effort includes procurement of necessary field equipment and initial transport to the site. Equipment and supplies will be brought to the site when the CH2M field team mobilizes for field activities. All equipment and supplies must be PFAS-free in accordance with the SOPs as listed in **Worksheet #21** and provided in **Appendix A**. Field notes will be captured on loose-leaf notebook paper and forms each day. Before beginning any phase of work, CH2M will have field meetings to discuss the work items and worker responsibilities and to familiarize workers with the Accident Prevention Plan.

Drinking Water Sampling Tasks

Applicable field book and forms should be filled out completely each day.

Samples will be collected in accordance with **Worksheet #18** and with the SOPs listed in **Worksheet #21** and provided in **Appendix A**. Water samples will be collected from the POU system following the sampling protocol as specified in **Worksheet #18**.

Samples will be collected at the following locations in POU treatment system:

- Influent
- Midpoint 1 (between first and second treatment units)
- Effluent (faucet)

Sampling will occur two times annually, (approximately every 6 months) and monitoring will continue on a routine basis for the duration the POU treatment system is in use.

For POU sampling events that correspond to the biannual sampling events, the sample from the outdoor spigot at the POU residence for the biannual sampling will take the place of the POU influent sample. That is, when a sample is being collected from the outdoor spigot at the time of POU sampling, a sample from the influent port on the POU system should NOT be collected).

Before sampling, the treatment system will be flushed for 3 to 5 minutes, in accordance with EPA Method 537.1 Version 2, by turning on the faucet. During the flush, temperature will be measured once per minute with a handheld water quality meter with a temperature probe until temperature stabilization has occurred, a requirement of both EPA Method 533 and EPA Method 537.1 Version 2. Temperature is considered stable when three consecutive measurements are recorded as ±5 percent of each other. All temperature readings will be recorded on a separate log and the final three water temperature measurements will be recorded in the field book.

SAP Worksheet #14—Summary of Project Tasks (continued)

Once flushing is complete, samples can be collected from their respective locations. The sample containers will be identified as Trizma or ammonium acetate preserved by the laboratory. The field team will separate the bottles for each method before beginning sample collection. The sample collection steps are the same for EPA Method 533 and Method 537.1 Version 2. The bottle will be filled, taking care not to flush out the sample preservative (ammonium acetate for EPA Method 533 and Trizma for EPA Method 537.1 Version 2). The bottles will not be filled past the middle of the bottle shoulder; bottles should have headspace. After collecting the sample, the bottle will be capped and agitated by hand until the preservative is dissolved. Samples from the well will be collected before the FRB to avoid mislabeling. The sample will be kept sealed from time of collection until extraction.

The FRB sampling process for EPA Method 533 involves collecting an FRB for each sample location. The laboratory will supply an FB bottle for each sample location along with empty preserved (ammonium acetate) bottles. While still at the drinking water sample collection point but after collection is finished for the drinking water sample, the FB water bottle and an empty preserved (ammonium acetate) sample bottle will be opened. The reagent blank water will be poured from the bottle into the preserved (ammonium acetate) blank container. The FB sampling process for EPA Method 537.1 Version 2 involves collecting an FB for each sample location. FB bottles will be provided by the laboratory along with empty preserved (Trizma) bottles. While still at the drinking water sample collection point, the FB water bottle and an empty preserved (Trizma) sample bottle will be opened. The reagent blank water will be poured from the bottle into the preserved (Trizma) blank container. All samples will be packed on ice immediately for shipment to the offsite laboratory.

The sampling team will ensure the bottleware for each method is correctly identified and stored to ensure correct analysis by each method. Bottleware for each method will be stored in separate coolers before and after sample collection to ensure accurate collection and analysis. Additionally, the team will discuss the sample procedure with the property owner to inform them about the number of bottles collected at each location. The sampling team will document all required information to identify the samples and link the sample identifications (IDs) to the respective sampling port (influent, Midpoint 1, effluent) using sampling forms that will be provided in advance of the sampling as part of the premobilization activities.

Filter Changeout

In accordance with manufacturer recommendations, the three AC filter cartridges will be replaced with new ones once annually, or sooner if PFAS concentrations are detected greater than the PILs during a sampling event. Samples will be collected from Midpoint 1 and effluent after the new filters have been installed.

Equipment Decontamination

Nondisposable sampling equipment (such as a handheld water quality meter) will be cleaned immediately after each use by rinsing with effluent from the faucet and disposing down the sink drain.SAP Worksheet #14—Summary of Project Tasks (continued)

Sample Shipment

All analytical samples and equipment will be shipped by FedEx. All samples will be shipped in accordance with the SOP referenced in **Worksheet #21** and included in **Appendix A**.

Investigation-derived Waste Management

Nondisposable sampling equipment (such as a handheld water quality meter) will be cleaned immediately after each use by rinsing with effluent from the faucet and disposing down the sink drain. Analyses and Testing Tasks

SAP Worksheet #14—Summary of Project Tasks (continued)

The laboratory will maintain, test, inspect, and calibrate analytical instruments (**Worksheets #24** and **#25**). The laboratory will analyze aqueous samples for PFAS as shown in **Worksheets #15** and **#18**. Field QC samples are described in **Worksheets #12** and **#20** and laboratory QC samples are described in **Worksheet #28**. SOPs for all laboratory analytical tasks are identified in a tabulated form in **Worksheet #23**. Analyses will be conducted by Enthalpy as listed in **Worksheet #30** (Backup laboratory worksheets 6, 7, 15, 19, 23, 24, 25, and 28 are provided in **Appendix C**).

Procedures for Recording and Correcting Data

- Field data will be recorded on loose-leaf notebook paper
- Project Assessment/Audit: **Worksheets #31** and **#32**
- DV: **Worksheets #34-36**
- Data Usability Assessment: **Worksheet #37**

Analytical and Validation Tasks

The analytical laboratory will process and prepare samples for analysis and will analyze all samples in accordance with **Worksheets #19** and **#23**. Field QC samples are described in **Worksheets #12** and **#20** and laboratory QC samples are described in **Worksheet #28**. SOPs for all laboratory analytical tasks are identified in a tabulated form in **Worksheet #23** and include the following:

- The laboratory will maintain, test, inspect, and calibrate analytical instruments (**Worksheets #24** and **#25)**.
- The laboratory will process and prepare samples for analysis.
- All analytical data will be validated (**Worksheet #34-36**).

Secondary Data

Refer to **Worksheet #13**. Additionally, system data from previous events collected under the original SAP (CH2M, 2018) will be used for decision-making.

Data Validation, Review, and Management Tasks

The Project Chemist is responsible for data tracking and storage. Definitive analytical laboratory data will be reported as a Stage 4 data package including certificates of analysis for traceability and 100 percent of the data will undergo Stage 4 validation before use by the Navy. All analytical data will be loaded into the NIRIS database upon approval by NAVFAC for drinking water data. **Worksheets #34** through **#36** contain additional information for DV and review procedures.

Demobilization

Full demobilization will occur when the project is complete and appropriate QA/QC checks have been performed as follows:

- Chain-of-custody records will be reviewed to verify that all samples were collected as planned and submitted for appropriate analyses.
- All rented/nondisposable equipment will be inspected, packaged, and shipped to the appropriate location.

Data Use

The data will be used to determine whether PFAS treatment at the time of sampling was effective or whether breakthrough has occurred. If breakthrough, as defined in **Worksheet #11**, has occurred at Midpoint 1, or, in an unlikely event, the effluent, the supplier will be contacted to change out the AC at that property within 1 week.

SAP Worksheet #14—Summary of Project Tasks (continued)

Documentation and Reporting

After each sampling event, POU system monitoring sample results will be communicated to the Navy by email.

As directed by the Navy, validated POU system monitoring sample results will be provided to the property owner by the Navy via phone after each sampling event.

A summary of field activities for POU system monitoring as well as a data evaluation will be documented in a technical memorandum and submitted to the RPM for review and approval. Each technical memorandum will summarize field activities and evaluate data collected since the last technical memorandum. Technical memorandums will generally be prepared on an annual basis but may be prepared more or less frequently as directed by the RPM. Once final, the technical memorandum will be included in the Administrative Record and provided to the property owner.

Assessment/Audit Tasks

Refer to **Worksheets #31** and **#32**.

SAP Worksheet #15-1—Reference Limits and Evaluation Table

Matrix: Drinking Water

Analytical Group: PFAS (EPA Method 533)

Analyte	CAS Number	PALs (ng/L)[a]	PALs Reference	PILs (ng/L)[a]	PILs Reference	Laboratory Limits (ng/L)			Accuracy Control Limit (%R)[b]		Precision Control Limit (RPD)
						LOQs (ng/L)	LODs (ng/L)	DLs (ng/L)			
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	12	DoD, 2024	4	EPA MCL	2.0	1.5	0.75	70	130	30
Perfluorooctanoic acid (PFOA)	335-67-1	12	DoD, 2024	4	EPA MCL	2.0	1.5	0.75	70	130	30
Perfluorobutanesulfonic acid (PFBS)	375-73-5	NC[c,d]	NC[c]	NC[c,d]	NC[c]	2.0	1.5	0.75	70	130	30
Perfluorodecanoic acid (PFDA)	335-76-2	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
Perfluorododecanoic acid (PFDoA)	307-55-1	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
Perfluoroheptanoic acid (PFHpA)	375-85-9	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	30[d]	DoD, 2024	10	EPA MCL	2.0	1.5	0.75	70	130	30
Perfluorohexanoic acid (PFHxA)	307-24-4	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
Perfluorononanoic acid (PFNA)	375-95-1	30[d]	DoD, 2024	10	EPA MCL	2.0	1.5	0.75	70	130	30
Perfluoroundecanoic acid (PFUnA)	2058-94-8	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
Hexafluoropropylene oxide dimer acid (HFPO-DA)	13252-13-6	30[d]	DoD, 2024	10	EPA MCL	2.0	1.5	0.75	70	130	30

SAP Worksheet #15-1—Reference Limits and Evaluation Table (continued)

Analyte	CAS Number	PALs (ng/L)[a]	PALs Reference	PILs (ng/L)[a]	PILs Reference	Laboratory Limits (ng/L)			Accuracy Control Limit (%R)[b]		Precision Control Limit (RPD)
						LOQs (ng/L)	LODs (ng/L)	DLs (ng/L)			
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OudS)	763051-92-9	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	NC[c]	NC[c]	NC[c]	NC[c]	2.0	2.0	2.0	70	130	30
1H,1H, 2H, 2H-Perfluorohexane sulfonic acid (4:2FTS)	757124-72-4	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
1H,1H, 2H, 2H-Perfluorooctane sulfonic acid (6:2FTS)	27619-97-2	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
1H,1H, 2H, 2H-Perfluorodecane sulfonic acid (8:2FTS)	39108-34-4	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	151772-58-6	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
Perfluorobutanoic acid (PFBA)	375-22-4	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	113507-82-7	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
Perfluoroheptanesulfonic acid (PFHpS)[d]	375-92-8	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30

SAP Worksheet #15-1—Reference Limits and Evaluation Table (continued)

Analyte	CAS Number	PALs (ng/L)[a]	PALs Reference	PILs (ng/L)[a]	PILs Reference	Laboratory Limits (ng/L)			Accuracy Control Limit (%R)[b]		Precision Control Limit (RPD)
						LOQs (ng/L)	LODs (ng/L)	DLs (ng/L)			
Perfluoro-4-methoxybutanoic acid (PFMBA)	863090-89-5	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	377-73-1	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
Perfluoropentanoic acid (PFPeA)	2706-90-3	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
Perfluoropentanesulfonic acid (PFPeS)	2706-91-4	NC[c]	NC[c]	NC[c]	NC[c]	2.0	1.5	0.75	70	130	30
PFOA + PFOS (calculated)[e]	NA	3	DoD, 2024	1	EPA MCL	NA	NA	NA	NA	NA	NA

[a] Refer to **Worksheet #11** for a detailed discussion on development of PALs.

[b] Limits shown are for spikes greater than the LOQ. Limits are 50 to 150% for spikes at or below the LOQ. These limit requirements follow EPA Method 533.

[c] NC is No criteria for this compound.

[d] If two or more of PFHxS, PFNA, PFBS, and HFPO-DA are detected, an HI index will be calculated in accordance with the September 3, 2024 DoD-issued memo (DoD, 2024). The PAL will be calculated based on an HI of 3, and the PIL will be calculated based on an HI of 1.

NA = not available

%R = percent recovery

CAS = Chemical Abstracts Service

SAP Worksheet #15-2—Reference Limits and Evaluation Table

Matrix: Drinking Water

Analytical Group: PFAS (EPA Method 537.1 Version 2)

Analyte	CAS Number	PALs (ng/L)	PALs Reference	Laboratory Limits (ng/L)			Accuracy Control Limit (%R)[a]		Precision Control Limit (RPD)
				LOQs (ng/L)	LODs (ng/L)	DLs (ng/L)			
N-Ethyl Perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2991-50-6	NC[b]	NC[b]	2.0	1.5	0.75	70	130	30
N-Methyl Perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2355-31-9	NC[b]	NC[b]	2.0	1.5	0.75	70	130	30
Perfluorotetradecanoic acid (PFTA)	376-06-7	NC[b]	NC[b]	2.0	1.5	0.75	70	130	30
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	NC[b]	NC[b]	2.0	1.5	0.75	70	130	30

[a] Limits shown are for spikes greater than the LOQ. Limits are 50 to 150% for spikes at or below the LOQ. These limit requirements follow EPA Method 537.1 Version 2.

[b] NC is No criteria for this compound.

SAP Worksheet #16—Project Schedule/Timeline Table

Activities	Organization	Dates (MM/DD/YY)		Deliverable
		Anticipated Date of Initiation	Anticipated Date of Completion	
SAP Schedule				
Draft SAP Preparation	CH2M	September 2023	January 2024	Draft SAP
NAVFAC SAP Review	NAVFAC Northwest	February 2024	June 2024	Comments
Draft Final SAP Preparation	CH2M	September 2024	October 2024	Draft Final SAP
Final SAP	CH2M	October 2024	December 2024	Final SAP
Sampling Schedule				
Fall POU Sampling	CH2M	November 2024	November 2024	N/A
Analytical Data	Subcontractor	14-day turnaround time		
Annual Filter Changeout and Verification Sampling	CH2M	February 2025	February 2025	N/A
Analytical Data	Subcontractors	14-business-day turnaround time		N/A
Spring POU Sampling	CH2M	April 2024	April 2024	N/A
Analytical Data	Subcontractor	14-day turnaround time		
Rapid Response – Drinking Water Supply (as needed)	CH2M	Within 48 hours of date of receipt of sample results, if warranted (**Worksheet #11**)	Within 48 hours of date of receipt of sample results (**Worksheet #11**)	N/A

SAP Worksheet #16—Project Schedule/Timeline Table (continued)

Activities	Organization	Dates (MM/DD/YY)		Deliverable
		Anticipated Date of Initiation	Anticipated Date of Completion	
Analytical Data	Subcontractor	14-business-day turnaround time		
Data Management	CH2M	TBD	TBD	N/A
Reporting	CH2M	TBD	TBD	Results Technical Memorandum

Note: Future sampling events will follow a similar schedule.

SAP Worksheet #17—Sampling Design and Rationale

Table 17-1. Point-of-Use Treatment System Sampling Strategy and Rationale

Matrix	Analysis and Method	Frequency[c]	Number of Samples[b]	Strategy and Rationale
Drinking Water	29 PFAS EPA Method 533 and EPA Method 537.1 Version 2[a]	Influent: Semiannually Midpoint 1 and Effluent: Semiannually, and after any planned or unplanned filter changeout	If no cartridge changeout is needed during the semiannual event three primary samples will be collected. If cartridge changeout is needed during the semiannual event, six primary samples will be collected.	During the annual changeout event of each year, a planned cartridge changeout will occur. Immediately following cartridge changeout, one sample will be collected from the Midpoint 1 and effluent locations. The sample results will be used to verify that PFAS concentrations in the treated water are less than the PALs. During the two biannual POU monitoring events of each year, three samples will be collected: one from the influent, one from the Midpoint 1, and one from the effluent. The sample results will be used to determine whether breakthrough of PFAS has occurred since the last monitoring event. If the results indicate concentrations greater than the PALs at the effluent or greater than the PILs at Midpoint 1, an unplanned cartridge changeout will occur within 48 hours. Post-changeout samples (Midpoint 1 and effluent) will be collected to verify the new filters are functioning properly.

[a] The 29 PFAS compounds listed in UCMR 5 will be analyzed. EPA Methods 533 and 537.1 Version 2 are used in tandem to provide data for all 29 PFAS compounds required. EPA Method 537.1 Version 2 is needed to report four compounds that are not provided by EPA Method 533.

[b] Drinking water samples will be collected as described in **Worksheet #14**.

[c] Monitoring frequency will be re-evaluated if detections are greater than PALs.

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SAP Worksheet #18—Sampling Locations and Methods/SOP Requirements Table

Station ID	Sample ID	Matrix	Depth (feet bgs)	Analytical Group	Number of Samples (FDs)	Sampling SOP Reference
WI-CV-1RW90	WI-CV-1RW90-INF01-MMDDYY	Drinking Water[a,b]	N/A	PFAS	1	**Worksheet #21**
	WI-CV-1RW90-MID01-MMDDYY				1	
	WI-CV-1RW90P-MID01-MMDDYY				1 (FD)	
	WI-CV-1RW90-EFF01-MMDDYY				1	
	WI-CV-1RW90-EFF01-MMDDYY-LFSM				1 (LFSM)	
	WI-CV-1RW90-EFF01-MMDDYY-LFSMD				1 (LFSMD)	
	WI-CV-1RW90-INF201-MMDDYY[c]				1	
	WI-CV-1RW90-MID201-MMDDYY[c]				1	
	WI-CV-1RW90-EFF201-MMDDYY[c]				1	
Field QC						
WI-CV-1RW90	WI-CV-1FRB90-MMDDYY	FRB[d]	N/A	PFAS	1	**Worksheet #21**

[a] Drinking water samples will be collected as described in **Worksheet #14**.

[b] FD and LFSM/LFSMD samples for drinking water will be collected as described in **Worksheets #12-1, #12-2,** and **Worksheet #28**.

[c] For AC filter changeout events, the samples collected on the new filters will be denoted by a "2" in the sample ID as shown in the table to denote the second sample taken from that location during that event.

[d] FRBs will be collected as described in **Worksheets #12-1** and **#12-2.**

bgs = below ground surface

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SAP Worksheet #19—Analytical SOP Requirements Table

Matrix	Analytical Group	Analytical and Preparation Method/ SOP Reference	Containers	Sample Volume	Preservation Requirements (Chemical, Temperature, Light-protected)[a]	Maximum Holding Time[b] (Preparation/Analysis)
Drinking Water	PFAS	EPA Method 533/ SOP-68	Two 250-mL polypropylene or polyethylene	250 mL	Ammonium acetate (1 gram per liter); received within 2 days of collection < 10°C and laboratory to store < 6°C	28 days/28 days
Drinking Water	PFAS	EPA Method 537.1 Version 2/SOP-64	Two 250-mL polypropylene	250 mL	Trizma (5.0 grams per liter); ≤10°C at laboratory receipt, storage in the laboratory ≤ 6°C, but not frozen	14 days/28 days

[a] For both Method 533 and Method 537.1 Version 2, the same lot of preservative must be used for the FRBs as for the field samples.

[b] Maximum holding time is calculated from the time the sample is collected to the time the sample is prepared/extracted.

< = less than

< = less than or equal to

mL = milliliter(s)

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SAP Worksheet #20-1—Field Quality Control Sample Summary Table

Matrix: Drinking Water

Analytical Group: PFAS (EPA Method 533)

Matrix	Analytical Group	Number of Samples[a]	Number of FDs[a]	Number of LFSM/LFSMD[a]	Number of Equipment Blanks[a]	Number of FRBs[a,b]	Number of Trip Blanks[a]	Total Number of Samples to Lab[a]
POU Treatment System								
Drinking Water	PFAS	9	2	2/2	N/A	2	N/A	15

[a] Number of samples collected in one year (two events). At one of the events, the filters will be replaced. A set of three samples will be collected both before and after filter replacement.

[b] An FRB will be collected at each station during each drinking water sampling event.

SAP Worksheet #20-2—Field Quality Control Sample Summary Table

Matrix: Drinking Water

Analytical Group: PFAS (EPA Method 537.1 Version 2)

Matrix	Analytical Group	Number of Samples per Event[a]	Number of FDs[a]	Number of LFSM/LFSMD[a]	Number of Equipment Blanks[a]	Number of FRBs[a,b]	Number of Trip Blanks[a]	Total Number of Samples to Lab[a]
POU Treatment System								
Drinking Water	PFAS	9	2	2/2	N/A	2	N/A	15

[a] Number of samples collected in one year (two events). At one of the two events, the filters will be replaced. A set of three samples will be collected both before and after filter replacement.

[b] An FRB will be collected at each station during each drinking water sampling event.

SAP Worksheet #21—Project Sampling SOP References Table

Reference Number	Title, Revision Date and/or Number	Originating Organization of Sampling SOP	Equipment Type	Modified for Project Work? (Yes/No)	Comments
SOP-001	Preparing Field Logbooks, rev. 03/2023	CH2M	Loose-leaf paper without waterproof coating	Yes	All components must be "fluorine-free." Acceptable substitutes would be a sewn notebook without a plastic cover or loose-leaf paper.
SOP-002	General Considerations for PFAS Investigations, rev. 04/2023	CH2M	Pen (not Sharpie), metal clip board, PFAS-free personal protective equipment	No	
SOP-067	Chain-of-Custody, rev. 03/2023	CH2M	Chain-of-custody form	No	
SOP-069	Packaging and Shipping Procedures for Low Concentration Samples, rev. 03/2023	CH2M	Plastic bags, ice, tape	Yes	No Teflon supplies, no Blue Ice. Samples will be kept on ice and samples shipped to laboratory via FedEx.
SOP-089	Drinking Water Sampling when Analyzing for Per- and Polyfluoroalkyl Substances (PFASs), rev. 05/2023	CH2M	Drinking water sample bottles (polypropylene bottle with polypropylene screw cap), laboratory pre-filled polypropylene bottles containing pre-preserved FRB water, shipping supplies loose-leaf paper without waterproof coating, clip board, pen (not Sharpie), nitrile or latex gloves, water quality meter with temperature probe	No	No Teflon components, PFAS-free shipping materials. Chilly water will be purged until temperature has stabilized before sample is collected.

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SAP Worksheet #22—Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field equipment requiring calibration, maintenance, testing, and inspection will not be used for this project.

Field Equipment	Activity	Frequency	Acceptance Criteria	CA	Responsible Person	SOP Reference	Comments
Horiba U-22 (or equivalent) Temperature Probe	Verification[a] of calibration	Verify daily before use, using stable room temperature water and traceable digital pocket thermometer	Consistent (±0.10) with the current ambient temperature	Do not use instrument if not operating properly	FTL	Drinking Water Sampling when Analyzing for Per- and Polyfluoroalkyl Substances (PFASs)	**Worksheet #21** and **Appendix A**
Traceable Digital Pocket Thermometer	Calibration not required with current calibration certificate valid within last year	Certificate will be checked prior to each sampling event	N/A	N/A	N/A	N/A	N/A

[a] Temperature is not a parameter that can be calibrated in the field.

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SAP Worksheet #23—Analytical SOP References Table

Lab SOP Number	Title, Revision Date, and/or Number	Date Reviewed if Not Revised	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Variance to QSM (Yes/No)	Modified for Project Work (Yes/No)
SOP-12	Sample Receiving and Sample Control Procedures; 03/17/23; rev. 22	N/A	N/A	Drinking Water/ PFAS	N/A	Enthalpy	No	No
SOP-14	Bottle Order Preparation; 07/14/21; rev. 8	07/05/23	N/A	Drinking Water/ PFAS	N/A	Enthalpy	No	No
SOP-64	Preparation and Analysis for the Determination of Per and Polyfluorinated Compounds in Drinking Water; 07/28/23; rev. 12	N/A	Definitive	Drinking Water/ PFAS	LC/MS/MS	Enthalpy	No	No
SOP-68	Preparation and Analysis for the Determination of Per and Polyfluorinated Compounds in Drinking Water by Method 533; 06/16/21; rev. 2	06/30/23	Definitive	Drinking Water/PFAS	LC/MS/MS	Enthalpy	No	No

Notes:

DoD ELAP certification is required for all definitive data. Enthalpy has DoD ELAP certification that is valid through September 30, 2025.

ELAP = Environmental Laboratory Accreditation Program

LC/MS/MS = liquid chromatography mass spectrometry/mass spectrometry

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SAP Worksheet #24—Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 533	Mass Calibration	Instrument must have a valid mass calibration prior to any sample analysis.	The target analyte ions should be within 0.3 m/z of the expected mass.	If the mass calibration fails, then recalibrate. If it fails again, consult manufacturer instructions on corrective maintenance.	Analyst	SOP-68
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 533	Ion Transitions (Precursor-> Product)	All samples	In order to avoid biasing results high due to known interferences for some transitions, the following transitions must be used for the quantification of the following analytes: PFOS: 499 → 80 PFHxS: 399 → 80 If these transitions are not used, the reason must be technically justified and documented (e.g., alternate transition was used due to observed interferences).	N/A	Analyst	SOP-68
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 533	Initial Calibration (ICAL)	ICAL prior to sample analysis	Minimum five-point ICAL for target analytes, lowest concentration standard at or below the reporting limit with either a linear or quadratic regression. Weighting may be used. Forcing the calibration curve through the origin is mandatory for this method. When each calibration standard is calculated as an unknown using the calibration curve, analytes fortified at or below the LOQ should be within 50 to 150% of the true value. Analytes fortified at all other levels should be within 70 to 130% of the true value. Isotope dilution analogues (IDA) should be within 70 to 130% for all calibration points.	If criteria cannot be met, CA is recommended such as reanalyzing the calibration standards, restricting the range of calibration, or performing instrument maintenance. If the cause for failure to meet the criteria is due to contamination or standard degradation, prepare fresh calibration standards and repeat the ICAL.	Analyst	SOP-68

SAP Worksheet #24—Analytical Instrument Calibration Table (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 533	Retention Time Windows	Prior to sample analysis.	Ensure that each method analyte, including earlier eluting branched isomers, elutes entirely within the assigned window during each analysis batch. Make this observation by viewing the quantitation ion for each analyte in the CCCs analyzed during an analysis batch.	If an analyte peak drifts out of the assigned window, then data for that analyte is invalid in all injections acquired since the last valid CCC. In addition, all peaks representing multiple isomers of an analyte must elute entirely within the same multiple reaction monitoring window.	Analyst	SOP-68
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 533	Continuing Calibration Check (CCC)	Verify ICAL by analyzing a low-level CCC (concentrations at or below the LOQ for each analyte) at the beginning of each analysis batch. Subsequent CCCs are required after every tenth field sample and to complete the batch. Alternate subsequent CCCs between the mid- and high-calibration levels.	The lowest level CCC must be within 50 to 150% of the true value. All other levels must be within 70 to 130% of the true value. The recovery for each analogue must be within a range of 70 to 130%. The absolute area of the quantitation ion for each of the three isotope performance standards must be within 50 to 150% of the average area measured during the ICAL.	Failure to meet the CCC QC performance criteria requires CA. Following a minor remedial action, such as servicing the autosampler or flushing the column, check the calibration with a mid-level CCC and a CCC at the LOQ, or recalibrate.	Analyst	SOP-68
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 533	Calibration Verification using QC Sample	Perform a calibration verification at least quarterly.	Results must be within 70 to 130% of the true value.	If the accuracy for any analyte fails the recovery criterion, prepare fresh standard dilutions and repeat the calibration verification.	Analyst	SOP-68

SAP Worksheet #24—Analytical Instrument Calibration Table (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 537.1 Version 2	Mass Calibration	Instrument must have a valid mass calibration prior to any sample analysis.	The target analyte ions should be within 0.3 m/z of the expected mass.	If the mass calibration fails, then recalibrate. If it fails again, consult manufacturer instructions on corrective maintenance.	Analyst	SOP-64
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 537.1 Version 2	ICAL	ICAL prior to sample analysis.	Minimum five-point linear regression or six-point quadratic calibration curve, forced through zero for each analyte. Weighting may be used. The lowest calibration point must be at or below the minimum reporting limit (or LOQ). Each target compound within each calibration level must be within 70 to 130% of the true value, except for the lowest point of the curve, which must be within 50 to 150% of the true value. Surrogate concentrations must be within 70 to 130% of the true value.	Evaluate standards, chromatography, and mass spectrometer response. If problem found with above, correct as appropriate, then repeat ICAL.	Analyst	SOP-64
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 537.1 Version 2	Peak Asymmetry Verification	With ICAL, using a midrange calibration standard.	For the first two eluting peaks, calculated factor in the range of 0.8 to 1.5.	Change instrument conditions to correct, then repeat ICAL.	Analyst	SOP-64

SAP Worksheet #24—Analytical Instrument Calibration Table (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 537.1 Version 2	Retention Time Windows	Prior to sample analysis.	Retention time windows should be based on measurements of actual retention time variation for each method analyte over the course of time. A value of plus or minus three times the standard deviation of the retention time obtained for each method analyte while establishing the ICAL and completing the initial demonstration of capability can be used to calculate a suggested retention time window size. However, the experience of the analyst should weigh heavily on the determination of the appropriate retention window size.	Dilute extract and reanalyze. Recalibrate if necessary to reestablish retention times.	Analyst	SOP-64
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 537.1 Version 2	Second-source QC Sample	Analyze at least quarterly or when preparing new standards.	All reported analytes and labeled compounds within ± 30% of true value.	Evaluate data. If problem (e.g., concentrated standard, plugged transfer line) found, correct, then repeat second-source verification. If it still fails, then repeat ICAL.	Analyst	SOP-64

SAP Worksheet #24—Analytical Instrument Calibration Table (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 537.1 Version 2	CCC	Verify ICAL by analyzing a low-level (at the LOQ or below) CCC prior to analyzing samples. CCCs are then injected after every 10 samples and after the last sample, rotating concentrations to cover the calibrated range of the instrument.	Recovery for each analyte and surrogate must be within 70 to 130% of the true value for all but the lowest level of calibration. Recovery for each analyte in the lowest calibration level CCC must be within 50 to 150% of the true value, and the surrogate must be within 70 to 130% of the true value.	If this criteria is not met, then all data for the problem analyte must be considered invalid, and remedial action should be taken which may require recalibration. Any field or QC samples that have been analyzed since the last acceptable calibration verification that are still within holding time must be reanalyzed after adequate calibration has been restored, with the following exception. If the CCC fails because the calculated concentration is greater than 130% (150% for the low-level CCC) for a particular method analyte, and field sample extracts show no detection for that method analyte, nondetects may be reported without reanalysis.	Analyst	SOP-64

Notes:
EPA Method 533 and EPA Method 537.1 Version 2 are the basis for method performance criteria in this table.
± = plus or minus
m/z = mass-to-charge ratio

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SAP Worksheet #25—Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	CA	Responsible Person	SOP Reference
LC/MS/MS	Clean sample and gas cones. Change the column. Clean the T-Wave.	EPA Method 533	Check the sample and gas cones.	T-Wave cleaning is performed when the instrument response deteriorates. Other instrument maintenance is done as needed to keep the instrument performing at peak performance.	ICAL within acceptance criteria in **Worksheet #24** and internal standards (IS) recovery within acceptance criteria in **Worksheets #28-1** and **#28-2**.	Recalibrate and/or perform the necessary equipment maintenance. Check the calibration standards. Reanalyze the affected data.	Analyst/ Supervisor	SOP-68
LC/MS/MS	Clean sample and gas cones. Change the column. Clean the T-Wave.	EPA Method 537.1 Version 2	Check the sample and gas cones.	T-Wave cleaning is performed when the instrument response deteriorates. Other instrument maintenance is done as needed to keep the instrument performing at peak performance.	ICAL within acceptance criteria in **Worksheet #24** and IS recovery within acceptance criteria in **Worksheets #28-1** and **#28-2**.	Recalibrate and/or perform the necessary equipment maintenance. Check the calibration standards. Reanalyze the affected data.	Analyst/ Supervisor	SOP-64

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SAP Worksheet #26—Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): Project Field Team, FTL/CH2M. Field SOPs are in **Appendix A** of this SAP.
Sample Packaging (Personnel/Organization): Project Field Team, FTL/CH2M. Field SOPs are in **Appendix A** of this SAP.
Coordination of Shipment (Personnel/Organization): FTL/CH2M
Type of Shipment/Carrier: FedEx Priority Overnight to respective laboratory. Samples will be shipped directly to Enthalpy.
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Sample Receiving – Enthalpy.
Sample Custody and Storage (Personnel/Organization): Sample Receiving – Enthalpy.
Sample Preparation (Personnel/Organization): Enthalpy.
Sample Determinative Analysis (Personnel/Organization): Enthalpy.
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): 45 days
Sample Extract/Digestate Storage (No. of days from extraction/digestion): 90 days
Biological Sample Storage (No. of days from sample collection): N/A
SAMPLE DISPOSAL
Personnel/Organization): Sample Disposal – Enthalpy.
Number of Days from Analysis: 45 days

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SAP Worksheet #27—Sample Custody Requirements Table

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory):

Samples will be collected by field team members under the supervision of the FTL. As samples are collected, they will be placed into containers and labeled. Labels will be taped to the jar to ensure they do not separate. Samples will be cushioned with packaging material and placed into coolers containing enough ice to keep the samples less than 10°C for the first 48 hours until they are received by the laboratory.

The chain-of-custody form will be placed into the cooler in a resealable zip-top plastic bag. Coolers will be taped and shipped to the laboratories via FedEx overnight, with the air bill number indicated on the chain-of-custody form (to relinquish custody). Upon delivery, the laboratory will log in each cooler and report the status of the samples to CH2M.

Refer to **Worksheet #21** for SOPs containing sample custody guidance.

The CH2M field team will ship all environmental samples directly to the laboratory performing the analysis. This will require shipment to Enthalpy in El Dorado Hills, California.

Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal):

Laboratory custody procedures can be found in the laboratory SOPs in **Worksheet #23**.

Sample ID Procedures:

Sample labels will include, at a minimum, client name, site, sample ID, date/time collected, analysis group or method, preservation, and sampler's initials. The field logbook will identify the sample ID with the location and time collected and the parameters requested. The laboratory will assign each field sample a laboratory sample ID based on information in the chain of custody. The laboratory will send sample log-in forms to the Project Chemist to check that sample IDs and parameters are correct.

Chain-of-custody Procedures:

Chain-of-custody forms will include, at a minimum, laboratory contact information, client contact information, sample information, and relinquished by/received by information. Sample information will include sample ID, date/time collected, number and type of containers, preservative information, analysis method, and comments. The chain-of-custody form will link location of the sample from the field logbook to the laboratory receipt of the sample. The laboratory will use the sample information to populate the Laboratory Information Management Systems database for each sample.

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SAP Worksheet #28-1—Laboratory QC Samples Table

Matrix: Drinking Water

Analytical Group: PFAS

Analytical Method/SOP Reference: EPA Method 533/SOP 68

QC Sample[a]	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs
Laboratory Reagent Blank	One per prep batch of up to 20 samples.	For the determination of native PFAS, the levels measured in the method blank of all method analytes must be below 1/3 the LOQ.	Verify instrument is clean (evaluate calibration blank and samples prior to method blank), then reanalyze. Evaluate to determine if systematic issue within laboratory, correct, then reprep and reanalyze the method blank and all samples processed with the contaminated blank.	Analyst/ Supervisor	Bias/ Contamination
Isotope Performance Standards	All standards and sample extracts.	Peak area counts for each isotope performance standard must be within 50 to 150% of the average peak area in the ICAL.	If an isotope performance standard area for a sample does not meet these criteria, reanalyze the extract in a subsequent analysis batch. If the isotope performance standard area fails to meet the acceptance criteria in the repeat analysis, extraction of the sample must be repeated, provided the sample is still within holding time.	Analyst/ Supervisor	Accuracy
IDA	All samples prior to extraction.	50% to 200% recovery for each analogue.	If an IDA fails to meet the recovery criterion, evaluate the area of the isotope performance standard to which the analogue is referenced and the recovery of the analogues in the CCCs. If necessary, recalibrate and service the LC/MS/MS system. Take CA, then analyze the failed extract in a subsequent analysis batch. If the repeat analysis meets the 50 to 200% recovery criterion, report only data for the reanalyzed extract. If the repeat analysis fails the recovery criterion after CA, extraction of the sample must be repeated provided a sample is available and still within the holding time.	Analyst/ Supervisor	Accuracy/ Precision

SAP Worksheet #28-1—Laboratory QC Samples Table (continued)

QC Sample[a]	Frequency/ Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs
Laboratory Fortified Blank (LFB)	One LFB is required for each extraction batch of up to 20 field samples. Rotate the fortified concentrations between low, medium, and high amounts.	For analytes fortified at concentrations ≤ 2 times the LOQ, the result must be within 50 to 150% of the true value; 70 to 130% of the true value if fortified at concentrations greater than 2 times the LOQ.	Reanalyze LFB once. If acceptable, report. Evaluate samples for detections, and LFB for high bias. If LFB has high bias, and samples nondetect, report with case narrative comment. If LFB has low bias, or if there are detections for critical chemicals of concern, evaluate and reprepare and reanalyze the LFB and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	Analyst/ Supervisor	Accuracy/ Bias
LFSM	Include one LFSM per extraction batch. Fortify the LFSM with method analytes at a concentration close to but greater than the native concentrations (if known).	For analytes fortified at concentrations ≤ 2 times the LOQ, the result must be within 50 to 150% of the true value; 70 to 130% of the true value if fortified at concentrations greater than 2 times the LOQ.	Evaluate the data, and reprep/reanalyze the native sample and LFSM/LFSMD pair if laboratory error is indicated.	Analyst/ Supervisor	Accuracy/ Bias
LFSMD or FD (FD)	Include at least one LFSMD or FD with each extraction batch.	For analytes fortified at concentrations ≤ 2 times the LOQ, the result must be within 50 to 150% of the true value; 70 to 130% of the true value if fortified at concentrations greater than 2 times the LOQ. For LFSMDs or FDs, relative percent differences must be ≤ 30% (≤ 50% if analyte concentration ≤ 2 times the LOQ).	Evaluate the data, and reprepare/reanalyze the native sample and LFSM/LFSMD pair if laboratory error is indicated.	Analyst/ Supervisor	Precision/ Accuracy/ Bias

SAP Worksheet #28-1—Laboratory QC Samples Table (continued)

QC Sample[a]	Frequency/ Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs
LOD Verification	Quarterly for every analyte.	Spike a quality system matrix at concentration 2 to 4 times the DL. Must meet 3:1 signal-to-noise ratio, or for data systems that do not measure noise, results must be at least 3 standard deviations greater than the mean method blank concentration.	If verification fails, the DL determination must be repeated and a LOD verification. Alternatively pass two consecutive LOD verification at a higher spike and set the LOD at the higher concentration.	Analyst/ Supervisor	Accuracy/ Sensitivity
LOQ Verification	Quarterly for every analyte.	Spike a quality system matrix at a concentration equal to or greater than the low point of the calibration curve.	Must meet laboratory-specified precision and bias limits. If LOQ fails, repeat at a higher level until limits are met.	Analyst/ Supervisor	Precision/ Bias

[a] EPA Method 533 is the basis for method performance criteria in this table.

≤ = less than or equal to

SAP Worksheet #28-2—Laboratory QC Samples Table

Matrix: Drinking Water

Analytical Group: PFAS

Analytical Method/SOP Reference: EPA Method 537.1 Version 2/SOP-64

QC Sample[a]	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs
Laboratory Reagent Blank	One per preparatory batch of up to 20 samples.	For the determination of native PFAS, the levels measured in the method blank of all method analytes must be below 1/3 the LOQ.	Correct problem. Reprepare and reanalyze method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, the data must be qualified and explained in the case narrative.	Analyst/ Supervisor	Bias/ Contamination
LFB	One LFB is required for each extraction batch of up to 20 field samples. Rotate the fortified concentrations between low, medium, and high amounts.	Results of LFB analyses must be 70 to 130% of the true value for each method analyte for all fortified concentrations except the lowest calibration point. Results of the LFBs corresponding to the lowest calibration point for each method analyte must be 50 to 150% of the true value.	Correct problem, reprepare, and reanalyze LFB and all samples in associated batch for failed analytes. If reanalysis cannot be performed, the data must be qualified and explained in the case narrative.	Analyst/ Supervisor	Accuracy/ Bias
LFSM	Analyze one LFSM per extraction batch (20 samples or less) fortified with method analytes at a concentration close to but greater than the native concentration, if known.	Recoveries at mid and high levels must be within 70 to 130% and within 50 to 150% at the low-level fortified amount (near the LOQ).	Evaluate the data to determine if the failed criteria are due to sample matrix or laboratory error. Reprepare if sufficient sample is available when laboratory error is suspected; otherwise, qualify data with narrative.	Analyst/ Supervisor	Accuracy/ Bias

SAP Worksheet #28-2—Laboratory QC Samples Table (continued)

QC Sample[a]	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs
LFSMD	Analyze one LFSMD per extraction batch (20 samples or less) fortified with method analytes at a concentration close to but greater than the native concentration, if known.	Recoveries at mid and high levels must be within 70 to 130% and within 50 to 150% at the low-level fortified amount (near the LOQ). Method analyte RPDs for the LFSMD or FD must be ≤ 30% at mid and high levels of fortification and ≤ 50% near the LOQ.	Evaluate the data to determine if the failed criteria are due to sample matrix or laboratory error. Reprepare if sufficient sample is available when laboratory error is suspected; otherwise, qualify data with narrative.	Analyst/ Supervisor	Precision/ Accuracy/ Bias
Surrogates Standards	Every field sample, standard, blank, and QC sample.	Within 70 to 130% of true value.	Identify and correct the problem. Reprepare and reanalyze all samples with failed surrogates in the associated preparatory batch. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary. Qualify all applicable data if acceptance criteria are not met and explain in case narrative.	Analyst/ Supervisor	Accuracy/ Precision
IS	Every field sample, standard, blank, and QC sample.	Peak area counts for all ISs in all injections must be within ± 50% of the average peak area calculated during the ICAL and 70 to 140% from the most recent CCC. If ISs do not meet this criterion, corresponding target results are invalid.	If peak areas are unacceptable, analyze a second aliquot of the extract or sample if enough extract remains. If there is not enough extract, reanalyze the first aliquot. If second analysis meets acceptance criteria, report the second analysis. If it fails, either analysis may be reported with the appropriate flags.	Analyst/ Supervisor	Accuracy

SAP Worksheet #28-2—Laboratory QC Samples Table (continued)

QC Sample[a]	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs
LOD Verification	Quarterly for every analyte.	Spike a quality system matrix at concentration 2-4x the DL. Must meet 3:1 signal-to-noise ratio, or for data systems that do not measure noise, results must be at least 3 standard deviations greater than the mean method blank concentration.	If verification fails, the DL determination must be repeated and a LOD verification. Alternatively pass two consecutive LOD verification at a higher spike and set the LOD at the higher concentration.	Analyst/ Supervisor	Accuracy/ Sensitivity
LOQ Verification	Quarterly for every analyte.	Spike a quality system matrix at a concentration equal to or greater than the low point of the calibration curve.	Must meet laboratory-specified precision and bias limits. If LOQ fails, repeat at a higher level until limits are met.	Analyst/ Supervisor	Precision/ Bias

[a] EPA Method 537.1 Version 2 is the basis for method performance criteria in this table.

≤ = less than or equal to

SAP Worksheet #29—Project Documents and Records Table

Document	Where Maintained
• Field Notebooks • Chain-of-Custody Records • Air Bills • Custody Seals • CA Forms • Electronic Data Deliverables (EDDs) • ID of QC Samples • Meteorological Data from Field • Sampling Instrument Calibration Logs • Sampling Locations and Sampling Plan • Sampling Notes and Drilling Logs • Water Quality Parameter • Sample Receipt, Chain of Custody, and Tracking Records • Standard Traceability Logs • Equipment Calibration Logs • Sample Preparation Logs • Run Logs • Equipment Maintenance, Testing, and Inspection Logs • CA Forms • Reported Field Sample Results • Reported Result for Standards, QC Checks, and QC Samples • Instrument Printouts (raw data) for Field Samples, Standards, QC Checks, and QC Samples • Data Package Completeness Checklists • Sample Disposal Records • Extraction/Cleanup Records • Raw Data (archived per Navy CLEAN Contract) • DV Reports • CA Forms • Laboratory QA Plan • Method DL Study Information	• Field data deliverables (e.g., logbooks entries, chains of custody, air bills, and EDDs) will be kept on CH2M's network server. • Field parameter data will be loaded with the analytical data into the Navy database. • Analytical laboratory hard copy deliverables and DV reports will be saved on the network server and archived per the Navy CLEAN contract. • Electronic data from the laboratory will be loaded into Navy database. • Following project completion, hard copy deliverables (e.g., logbooks, chains of custody) will be archived at Iron Mountain: Iron Mountain Headquarters 745 Atlantic Avenue Boston, MA 02111 (800) 899-IRON • Following project completion, hard copy deliverables including chains of custody and raw data will be archived at the Washington National Records Center: Washington National Records Center 4205 Suitland Road Suitland, Maryland 20746-8001 (301) 778-1550

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SAP Worksheet #30—Analytical Services Table

Matrix	Analytical Group	Sample Locations/ID	Analytical Method	Data Package Turnaround Time	Laboratory/Organization	Backup Laboratory/ Organization
Drinking Water	PFAS	Refer to **Worksheets #18** and **#20**	EPA Method 533	14 Calendar Days	Enthalpy Analytical Laboratory Attn: Sample Receiving 1104 Windfield Way, El Dorado Hills, California 95762 Contact: Chris Whitehead 916-673-1520	Battelle 141 Longwater Drive Suite 202 Norwell, Massachusetts 02061 Contact: Jonathan Thorn 781-681-5565
			EPA Method 537.1 Version 2			

Notes:

Enthalpy: DoD ELAP Certification Number 3091.01 through A2LA, valid to September 30, 2025.

Battelle: DoD ELAP Certification Number L23-262 through Perry Johnson Laboratory Accreditation, Inc., valid to April 30, 2025.

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SAP Worksheet #31—Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (title and organizational affiliation)	Person(s) Responsible for Responding to Assessment Findings (title and organizational affiliation)	Person(s) Responsible for Identifying and Implementing CA (title and organizational affiliation)	Person(s) Responsible for Monitoring Effectiveness of CA (title and organizational affiliation)
Field Performance Audit	One during 12-week monitoring period	Internal	CH2M	PM CH2M	FTL CH2M	PM CH2M	PM CH2M
Safe Work Observation	One during each sampling event	Internal	CH2M	SSC CH2M	Field Team Member observed CH2M	HSM CH2M	SSC CH2M
Field Document Review	Daily during sampling event	Internal	CH2M	PM or TM CH2M	FTL CH2M	PM CH2M	PM CH2M

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SAP Worksheet #32—Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (name, title, organization)	Timeframe of Notification	Nature of CA Response Documentation	Individual(s) Receiving CA Response (name, title, organization)	Timeframe for Response
Field Performance Audit	Checklist and written audit report	FTL CH2M	Within 1 day of audit	Verbal and memorandum	FTL CH2M	Within 1 day of receipt of CA Form
Safe Observation Report (SOR)	SOR form	HSM CH2M	Within 1 week of safe behavior observation	Memorandum	Field Team Member CH2M	Immediately
Field Document Review	Markup copy of field documentation	FTL CH2M	Within 1 day of review	Verbal and memorandum	FTL CH2M	Within 1 day of receipt of markup

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SAP Worksheet #32-1—Laboratory Corrective Action Form

Person initiating CA: _____ Date: _____

Description of problem and when identified:

_____
_____
_____
_____
_____

Cause of problem, if known or suspected:

_____
_____
_____
_____
_____

Sequence of CA: (including date implemented, action planned and personnel/data affected)

_____
_____
_____
_____
_____

CA implemented by: _____ Date: _____

CA initially approved by: _____ Date: _____

Follow-up date: _____

Final CA approved by: _____ Date: _____

Information copies to:

Mike Zamboni, CH2M Navy CLEAN Program Chemist

_____
_____
_____

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SAP Worksheet #32-2—Field Performance Audit Checklist

Project Responsibilities

Project No.: _____ Date: _____

Project Location: _____ Signature: _____

Team Members

Yes No 1) Is the approved Work Plan being followed?

Comments _____

Yes No 2) Was a briefing held for project participants?

Comments _____

Yes No 3) Were additional instructions given to project participants?

Comments _____

Sample Collection

Yes No 1) Is there a written list of sampling locations and descriptions?

Comments _____

Yes No 2) Are samples collected as stated in the master SOPs?

Comments _____

Yes No 3) Are samples collected in the type of containers specified in the Work Plan?

Comments _____

Yes No 4) Are samples preserved as specified in the Work Plan?

Comments _____

Yes No 5) Are the number, frequency, and type of samples collected as specified in the Work Plan?

Comments _____

SAP Worksheet #32-2—Field Performance Audit Checklist (continued)

Yes No 6) Are QA checks performed as specified in the Work Plan?

Comments _____

_____

Yes No 7) Are photographs taken and documented?

Comments _____

_____

Document Control

Yes No 1) Have any accountable documents been lost?

Comments _____

_____

Yes No 2) Have any accountable documents been voided?

Comments _____

_____

Yes No 3) Have any accountable documents been disposed of?

Comments _____

_____

Yes No 4) Are the samples identified with sample tags?

Comments _____

_____

Yes No 5) Are blank and duplicate samples properly identified?

Comments _____

_____

Yes No 6) Are samples listed on a chain-of-custody record?

Comments _____

_____

Yes No 7) Is chain of custody documented and maintained?

Comments _____

_____

SAP Worksheet #33—QA Management Reports Table

Type of Report	Frequency (daily, weekly monthly, quarterly, annually, and so forth)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (title and organizational affiliation)	Report Recipient(s) (title and organizational affiliation)
Field Audit Report	One during 12-week monitoring period	TBD	PM CH2M	Included in project files

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SAP Worksheet #34-36—Data Verification and Validation (Steps I and IIa/IIb) Process Table

Data Review Input	Description	Responsible for Verification or Validation	Step I/IIa/IIb[a]	Internal/ External[b]
Field Notebooks	Field notebooks will be reviewed internally and placed into the project file for archival at project closeout.	FTL/CH2M	Step I	Internal
Chains of Custody and Shipping Forms	Chain-of-custody forms and shipping documentation will be reviewed internally upon their completion and verified against the packed sample coolers they represent. The shipper's signature on the chain-of-custody forms will be initialed by the reviewer, a copy of the chain-of-custody forms retained in the site file, and the original and remaining copies taped inside the cooler for shipment. Chain-of-custody forms will also be reviewed for adherence to the SAP by the Project Chemist.	FTL/CH2M Project Chemist/ CH2M	Step I	Internal and External
Sample Condition upon Receipt	Any discrepancies or missing or broken containers will be communicated to the Project Chemist in the form of laboratory logins.	Project Chemist/ CH2M	Step I	External
Documentation of Laboratory Method Deviations	Laboratory method deviations are not allowed for this project. Laboratory method deviations must be approved by the DoD ELAP accrediting body.	Project Chemist/ CH2M	Step I	External
EDDs	EDDs will be compared against hard copy laboratory results (10% check). If discrepancies are found, a 25% check of the EDD against the hard copy will be carried out on the SDG in which the discrepancy was found, if additional discrepancies are found a 100% check will be completed.	Project Chemist/ CH2M	Step I	External
Case Narrative	Case narratives will be reviewed by the data validator during the DV process. This is verification that they were generated and applicable to the data packages.	Data Validator	Step I	External
Laboratory Data	All laboratory data packages will be verified internally by the laboratory performing the work for completeness and technical accuracy before submittal.	Laboratory QAO	Step I	Internal
Laboratory Data	The data will be verified for completeness by the Project Chemist. To ensure completeness, EDDs will be compared to the SAP. This is a verification that all samples were included in the laboratory data and that correct analyte lists were reported.	Project Chemist/ CH2M	Step I	External

SAP Worksheet #34-36—Data Verification and Validation (Steps I and IIa/IIb) Process Table (continued)

Data Review Input	Description	Responsible for Verification or Validation	Step I/IIa/IIb[a]	Internal/ External[b]
Audit Reports	Upon report completion, a copy of all audit reports will be placed in the site file. If CAs are required, a copy of the documented CA taken will be attached to the appropriate audit report in the QA site file. Periodically, and at the completion of site work, site file audit reports and CA forms will be reviewed internally to ensure that all appropriate CAs have been taken and that CA reports are attached. If CAs have not been taken, the site manager will be notified to ensure action is taken.	PM/CH2M Project Chemist/ CH2M	Step I	Internal
CA Reports	CA reports will be reviewed by the Project Chemist or PM and placed into the project file for archival at project closeout.	PM/CH2M Project Chemist/ CH2M	Step I	External
Laboratory Methods	During the prevalidation check, ensure that the laboratory analyzed samples using the correct methods specified in the SAP.	Project Chemist/ CH2M	Step IIa	External
Target Compound List and Target Analyte List	During the prevalidation check, ensure that the laboratory reported all analytes from each analysis group in accordance with **Worksheet #15**. If the target compound list is not correct, then it must be corrected before sending the data for validation. Once the checks are complete, the PM is notified via email.	Project Chemist/CH2M	Step IIa	External
Laboratory Limits (DL/LOD/LOQs)	During the prevalidation check, the laboratory limits (DL, LOD, and LOQ) will be compared with those listed in the project SAP. If limits were not met, the laboratory will be contacted and asked to provide an explanation, which will then be discussed in the associated project report. Often, minor laboratory limit deviation from those presented in the SAP is because of the quarterly update of laboratory LOD.	Project Chemist/ CH2M	Step IIb	External
Laboratory SOPs	Ensure that approved analytical laboratory SOPs were followed.	Laboratory QAO	Step IIa	Internal
Sample Chronology	Holding times from collection to extraction or analysis and from extraction to analysis will be considered during the DV process.	Data Validator	Step IIa and IIb	External
Raw Data	100% Stage 4 review of raw data to confirm laboratory calculations and manual integrations. For a recalculated result, the data validator attempts to recreate the reported numerical value. The laboratory is asked for clarification if a discrepancy is identified that cannot reasonably be attributed to rounding. In general, this is outside 5% difference.	Data Validator	Step IIa	External

SAP Worksheet #34-36—Data Verification and Validation (Steps I and IIa/IIb) Process Table (continued)

Data Review Input	Description	Responsible for Verification or Validation	Step I/IIa/IIb[a]	Internal/ External[b]
Documentation of Method QC Results	Establish that all required QC samples were run and met limits.	Data Validator	Step IIa	External
Documentation of Field QC Sample Results	Establish that all required QC samples were run and met limits and is discussed in the associated project report.	Project Chemist/ CH2M	Step IIa	Internal
DoD ELAP Evaluation	Ensure that each laboratory is DoD ELAP certified for the analyses they are to perform. Ensure evaluation time frame does not expire.	Project Chemist/ CH2M	Step I	External
Analytical Data for PFAS in Drinking Water	100% of data will receive Stage 4 review. Analytical methods and laboratory SOPs will be evaluated against QA/QC criteria to ensure compliance as presented in this SAP. QA/QC criteria for field QC samples are presented in **Worksheet #12**. LOQs, LODs, and DLs are presented in **Worksheet #15**. QA/QC criteria for calibrations are presented in **Worksheet #24** and also presented in laboratory SOPs (referenced in **Worksheet #23**). QA/QC criteria for laboratory QC samples are presented in **Worksheet #28**. Data may be qualified if QA/QC exceedances have occurred. Guidance and qualifiers from the following will be applied, as appropriate: *General Data Validation Guidelines* (DoD, 2019) and EPA Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537 (EPA, 2018). As specific modules for the analytical methods in this project are published, the data validators will refer to those modules for guidance. In the meantime, if specific guidance is not given for these methods in the *General Data Validation Guidelines*, the data validator may adapt the guidance from *National Functional Guidelines for Organic Superfund Methods Data Review* (EPA, 2020b) and *Per- and Polyfluoroalkyl Substances (PFAS): Reviewing Analytical Methods Data for Environmental Samples* (EPA, 2019b).	Data Validator	Step IIa and IIb	External

[a] Verification (Step I) is a completeness check that is performed before the data review process continues to determine whether the required information (complete data package) is available for further review. Validation (Step IIa) is a review that the data generated are in compliance with analytical methods, procedures, and contracts. Validation (Step IIb) is a comparison of generated data against MPC in the SAP (both sampling and analytical). Should CH2M find discrepancies during the verification or validation procedures listed in this table, an email documenting the issue will be circulated to the internal project team, and a Corrections to File Memo will be prepared identifying the issues and the CA needed. This memo will be sent to the laboratory, or applicable party, and maintained in the project file.

[b] Internal or external is in relation to the data generator.

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SAP Worksheet #37—Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used:

Nondetected site constituents will be evaluated to ensure that LOQs, LODs, and DLs goals in **Worksheet #15** were achieved. If LOQs, LODs, and DLs were achieved and the verification and validation steps yielded acceptable data, then the data are considered usable.

During verification and validation steps, data may be qualified as estimated with the following qualifiers: J, J+, J-, or UJ. These qualifiers represent minor QC deficiencies that will not affect the usability of the data. When major QC deficiencies are encountered, data will be qualified with a qualifier as recommended for rejection. The project team will assess the DV report, consider DQOs, and decide if the X qualified results can be used for project decisions. If results cannot be used, the R qualifier will be applied. The qualifiers are as follows:

- J = Analyte present. Reported value may or may not be accurate or precise.
- UJ = Analyte not detected. Reporting limits (i.e., LOD) may be inaccurate or imprecise.
- J+ = Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- J- = Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- X = Result recommended for rejection by the data validator.
- R = Rejected result, team decision. Result not reliable.

Additional qualifiers that may be given by the validator are:

- U = Not detected substantially above the level reported in laboratory or FRBs.
- N = Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
- NJ = Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
- U = Not detected at significantly greater than that in an associated blank.

Analytical data will be checked to ensure the values and any qualifiers are appropriately transferred to the electronic database. These checks include a comparison of hard copy data and qualifiers to the EDD. Once the data have been uploaded into the electronic database, another check will be performed to ensure all results were loaded accurately.

Field and laboratory precision will be compared as RPD between the two results.

Deviations from the SAP will be reviewed to assess whether CA is warranted and to assess impacts to achieving project objectives.

If significant biases are detected with laboratory QA/QC samples, the biases will be evaluated to assess impacts on decision-making. Low biases will be described in detail because they represent a possible inability to detect compounds that may be present at the site.

If significant deviations are noted between laboratory and field precision, the cause will be further evaluated to assess the impact on decision-making.

Data Quality Indicators

Quantifiable criteria, known as MPC, are presented in **Worksheet #12**. The precision, accuracy, representativeness, completeness, comparability and sensitivity (PARCCS) criteria will be the qualitative and quantitative indicators of data quality. The PARCCS criteria are defined and discussed following.

SAP Worksheet #37—Usability Assessment (continued)

Precision

Precision is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. Precision will be measured by using FDs, LFSM/LFSMD, and MS/MSD samples. It will be expressed in terms of the RPD as follows:

$$RPD = \frac{|C_1 - C_2|}{(C_1 + C_2)/2} \times 100$$

where:

RPD = relative percent difference
C1 = concentration of sample or LFSM
C2 = concentration of duplicate or LFSMD

Accuracy

Accuracy is the degree of agreement of an observed measurement (or an average of the same measurement type) with an accepted reference or true value. Accuracy of analytical determinations will be measured using laboratory QC analyses such as laboratory control samples and surrogate spikes. Accuracy will be measured by evaluating the actual result against the known concentration added to a spiked sample and will be expressed as %R shown as follows:

$$\%R = \frac{S - U}{C_{sa}} \times 100$$

where:

%R = Percent recovery
S = Measured concentration of spiked aliquot
U = Measured concentration of unspiked aliquot
Csa = Concentration of spike added

Representativeness

Representativeness is the reliability with which a measurement or measurement system reflects the true conditions under investigation. Representativeness is influenced by the number and location of the sampling points, sampling timing and frequency of monitoring efforts, and the field and laboratory procedures. The representativeness of data will be maintained by the use of established field and laboratory procedures and their consistent application.

Comparability

Comparability expresses the confidence with which one dataset can be compared to another based on using EPA defined procedures, where available. If EPA procedures are not available, the procedures have been defined or referenced in this SAP.

The comparability of data will be established through well-documented methods and procedures, standard reference materials, QC samples, performance evaluation study results, and by reporting each data type in consistent units.

SAP Worksheet #37—Usability Assessment (continued)

Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal conditions. Analytical DV and data quality assessment will determine which data will be valid and which data will be rejected. Percent completeness will be defined as follows:

$$Percent\ Completeness = \frac{V}{T} \times 100$$

where:

V = Number of valid (not rejected) measurements over a given time
T = Total number of planned measurements

The completeness goal for this project will be 100 percent for valid, usable data. If the completeness goal of the project is not achieved, a discussion of the limitations on the use of the project data will be included in the Usability Assessment section of the final reports.

Sensitivity

Sensitivity is the measure of a concentration at which an analytical method can positively identify and report analytical results. The sensitivity of an analytical method will be indicated by the project-required LOQs, LODs, and DLs, as compared to the PALs.

Describe the documentation that will be generated during the usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:

A data table will be produced to reflect detected and nondetected analytes. Data qualifiers will be reflected in the tables and discussed in the data quality evaluation.

Identify the personnel responsible for performing the usability assessment.

The PM, Project Chemist, and other team members will be responsible for compiling the data. The data will then be presented to the Navy and stakeholders who will evaluate the data usability according to project objectives.

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Figures

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Legend

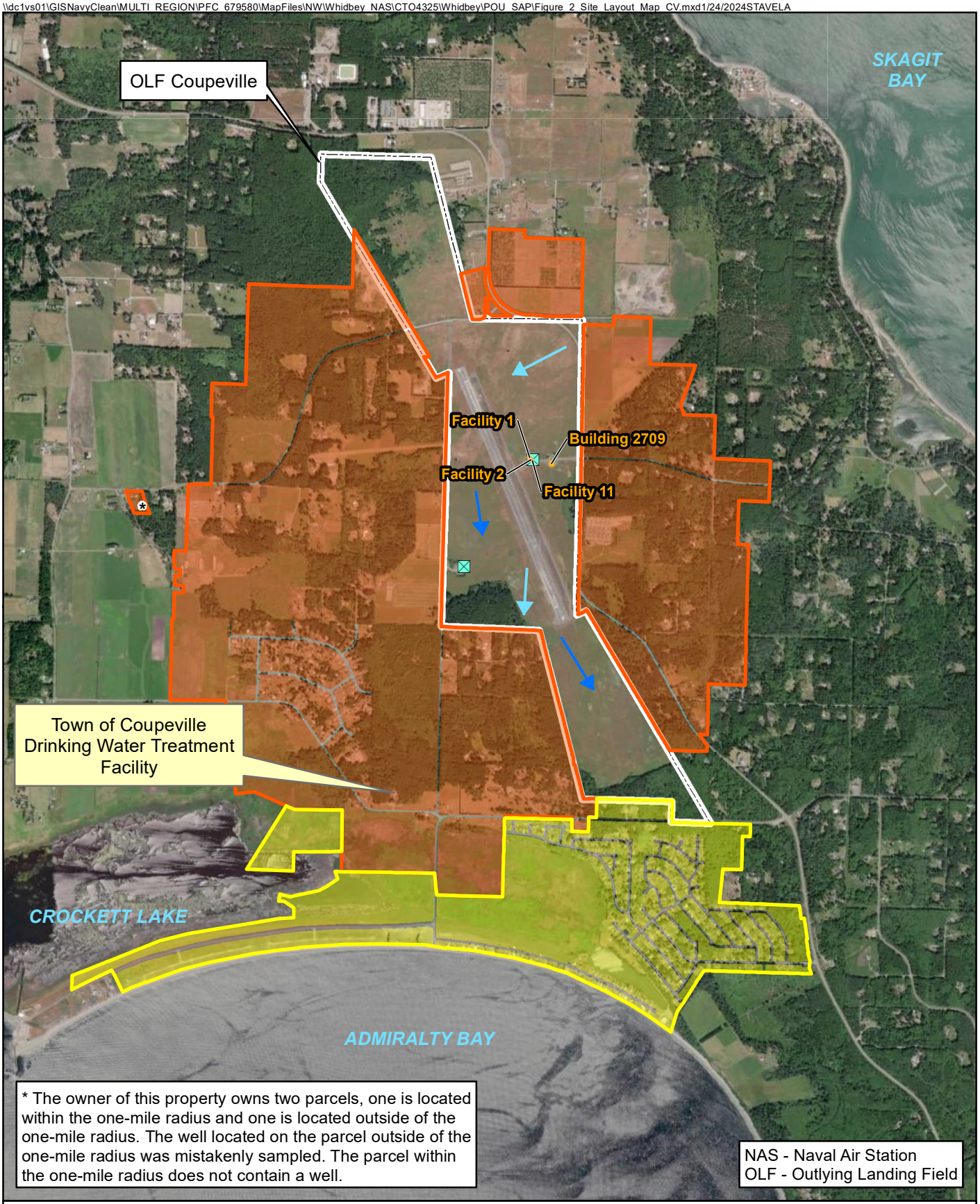
- City
- Secondary Road
- Local Connecting Road
- Important Local Road
- Base Boundary

0 1 2 Miles

1 inch = 2 miles

Figure 1
Base Location
POU Treatment System Monitoring SAP
Naval Air Station Whidbey Island –
Outlying Landing Field
Coupeville, WA

For Official Use Only



Legend

- OLF Coupeville Supply Well
- Intermediate Zone Groundwater Flow Direction
- Deep Zone Groundwater Flow Direction
- Future RI: Potential Source Area
- Phase 1 Sampling Area
- Phase 2 Step-Out Sampling Area
- Base Boundary

N

0 0.25 0.5 Mile

1 inch = 0.5 mile

Imagery Source: Esri

Figure 2
Site Layout Map - OLF Coupeville
POU Treatment System Monitoring SAP
Naval Air Station Whidbey Island – Outlying Landing Field
Coupeville, WA

For Official Use Only

Figure 3
Point-of-Use Treatment System Design
POU Treatment System Monitoring SAP
Naval Air Station Whidbey Island
Coupeville, WA

Notes:
1. Modified from original design by Michael Nesheim/Culligan Water Company
2. LD-ASO = leak detection – automatic shut-off
3. TD CART. = activated carbon treatment cartridge (14.7 inches high, 4 inches long, and 3.5 inches wide)

Appendix A
Field Standard Operating Procedures

Preparing Field Logbooks

I. Purpose

This SOP provides general guidelines for entering field data into logbooks (hard copy and electronic) during site investigation and remediation activities.

II. Scope

This is a general description of data requirements and format for field logbooks. Logbooks are needed to properly document all field activities in support of data evaluation and possible legal activities. Field notes may be recorded in field logbooks or electronically on computer tablets.

III. Equipment and Materials

- Logbook
- Indelible pen
- Jacobs supplied electronic tablet or laptop with notebook software

IV. Procedures and Guidelines

Properly completed field logbooks are a requirement for all of the work we perform under the Navy CLEAN contract. Logbooks are legal documents and, as such, must be prepared following specific procedures and must contain required information to ensure their integrity and legitimacy. This SOP describes the basic requirements for field logbook entries.

A. Procedures for Completing Field Logbooks

1. Field notes commonly are kept in bound, hard-cover logbooks used by surveyors and produced, for example, by Peninsular Publishing Company and Sesco, Inc. Pages should be water resistant and notes should be taken only with water-proof, non-erasable permanent ink, such as that provided in Rite in the Rain or Sanford Sharpie permanent markers. Note: for sites where PFC is being analyzed for, Rite-in-the-Rain, Sanford Sharpie, or anything water-resistant or with Teflon cannot be used in the field. All field book materials must be "fluorine free". Acceptable substitutes would be a sewn notebook without a plastic cover, or loose-leaf notebook paper.
2. Alternatively, field notes may be recorded electronically in Jacobs provided field tablets or laptop computers. Notes are recorded in appropriate note collection software; e.g., Microsoft One Note. At the end of each day, the electronic notes must be digitally signed by the author and downloaded for electronic file storage. The notes may be converted to an Adobe pdf file prior to storage. It is important that the field notes be downloaded daily to ensure the electronic time stamp of the notes is the same as the day the notes were recorded.

3. On the inside cover of the logbook the following information should be included:
   - Company name and address
   - Log-holders name if logbook was assigned specifically to that person
   - Activity or location
   - Project name
   - Project manager's name
   - Phone numbers of the company, supervisors, emergency response, etc.
4. All lines of all pages should be used to prevent later additions of text, which could later be questioned. Any line not used should be marked through with a line and initialed and dated. Any pages not used should be marked through with a line, the author's initials, the date, and the note "Intentionally Left Blank."
5. If field notes are recorded electronically, the author will not have any spaces between entries.
6. If errors are made in the logbook, cross a single line through the error and enter the correct information. All corrections shall be initialed and dated by the personnel performing the correction. If possible, all corrections should be made by the individual who made the error.
7. Daily entries will be made chronologically.
8. Information will be recorded directly in the field logbook during the work activity. Information will not be written on a separate sheet and then later transcribed into the logbook.
9. Each page of the logbook will have the date of the work and the note takers initials.
10. The final page of each day's notes will include the note-takers signature as well as the date.
11. Only information relevant to the subject project will be added to the logbook.
12. The field notes will be copied and the copies sent to the Project Manager or designee in a timely manner (at least by the end of each week of work being performed).

B. Information to be Included in Field Logbooks

1. Entries into the logbook should be as detailed and descriptive as possible so that a particular situation can be recalled without reliance on the collector's memory. Entries must be legible and complete.
2. General project information will be recorded at the beginning of each field project. This will include the project title, the project number, and project staff.
3. Scope: Describe the general scope of work to be performed each day.
4. Weather: Record the weather conditions and any significant changes in the weather during the day.

5. Tail Gate Safety Meetings: Record time and location of meeting, who was present, topics discussed, issues/problems/concerns identified, and corrective actions or adjustments made to address concerns/ problems, and other pertinent information.
6. Standard Health and Safety Procedures: Record level of personal protection being used (e.g., level D PPE), record air monitoring data on a regular basis and note where data were recording (e.g., reading in borehole, reading in breathing zone, etc). Also record other required health and safety procedures as specified in the project specific health and safety plan.
7. Instrument Calibration; Record calibration information for each piece of health and safety and field equipment.
8. Personnel: Record names of all personnel present during field activities and list their roles and their affiliation. Record when personnel and visitors enter and leave a project site and their level of personal protection.
9. Communications: Record communications with project manager, subcontractors, regulators, facility personnel, and others that impact performance of the project.
10. Time: Keep a running time log explaining field activities as they occur chronologically throughout the day.
11. Deviations from the Work Plan: Record any deviations from the work plan and document why these were required and any communications authorizing these deviations.
12. Health and Safety Incidents: Record any health and safety incidents and immediately report any incidents to the Project Manager.
13. Subcontractor Information: Record name of company, record names and roles of subcontractor personnel, list type of equipment being used and general scope of work. List times of starting and stopping work and quantities of consumable equipment used if it is to be billed to the project.
14. Problems and Corrective Actions: Clearly describe any problems encountered during the field work and the corrective actions taken to address these problems.
15. Technical and Project Information: Describe the details of the work being performed. The technical information recorded will vary significantly between projects. The project work plan will describe the specific activities to be performed and may also list requirements for note taking. Discuss note-taking expectations with the Project Manager prior to beginning the field work.
16. Any conditions that might adversely affect the work or any data obtained (e.g., nearby construction that might have introduced excessive amounts of dust into the air).
17. Sampling Information: Specific information that will be relevant to most sampling jobs includes the following:
    - Description of the general sampling area – site name, buildings and streets in the area, etc.
    - Station/Location identifier

- Description of the sample location – estimate location in comparison to two fixed points – draw a diagram in the field logbook indicating sample location relative to these fixed points – include distances in feet.
- Sample matrix and type
- Sample date and time
- Sample identifier
- Draw a box around the sample ID so that it stands out in the field notes
- Information on how the sample was collected – distinguish between "grab," "composite," and "discrete" samples
- Number and type of sample containers collected
- Record of any field measurements taken (i.e., pH, turbidity, dissolved oxygen, and temperature, and conductivity)
- Parameters to be analyzed for, if appropriate
- Descriptions of soil samples and drilling cuttings can be entered in depth sequence, along with PID readings and other observations. Include any unusual appearances of the samples.

C. Suggested Format for Recording Field Data

1. Use the left side border to record times and the remainder of the page to record information (see attached example).
2. Use tables to record sampling information and field data from multiple samples.
3. Sketch sampling locations and other pertinent information.
4. Sketch well construction diagrams.

V. Attachments

- Example field notes.

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(47) MAY 12, 2003 EXAMPLE

0715 ARRIVE ON SITE AT XYZ SITE.
CH2M HILL STAFF:
John Smith: FIELD TEAM LEADER
Bob Builder: SITE SAFETY COORD.
WEATHER: OVERCAST + COOL, 45°F
CHANCE OF LATE SHOWERS
SCOPE: • COLLECT GROUNDWATER SAMPLES FOR LTM WORK AT SITE 14
• SUPERVISE SURVEY CREW
AT SITE 17
0725 BB ~~CALIBRATES~~ (JS) CALIBRATES
PID: 101 ppm/100 ppm OK
PID Model #, SERIAL #
0730 BB CALIBRATES HORIBA METER
Model #, SERIAL #
→ LIST CALIBRATION RESULTS
0738 SURVEY CREW ARRIVES ON SITE
→ LIST NAMES
0745 BB HOLDS H+S TALK ON SLIPS, TRIPS, FALLS, TICKS + AIR MONITORING
JS + SURVEY CREW ATTEND
NO H+S ISSUES IDENTIFIED AS CONCERNS. ALL WORK IS IN "LEVEL D."
0755 JS CONDUCTS SITE-WIDE AIR MONITORING
ALL READINGS = 0.0 ppm IN

JS 5-12-03

MAY 12, 2003 EXAMPLE (48)

SITE 14 LTM
BREATHING ZONE (BZ)
0805 MOBILIZE TO WELL MW-22 TO SAMPLE, SURVEYORS SETTING UP AT SITE 17
0815 PM (PAUL PAPER PUSHER) CALLS AND INFORMS JS TO COLLECT GW SAMPLE AT WELL MW-44 TODAY FOR 24 hour TAT ANALYSIS OF VOCS
0820 PURGING MW-22
→ RECORD WATER QUALITY DATA

JS 5-12-03

0843 COLLECT SAMPLE AT MW-22 FOR total TAL Metals AND VOCs. No Dissolved Metals collected per PM
0905 JS + BB MOBILIZE TO SITE 17 TO SHOW SURVEYORS WELLS TO SURVEY
0942 MOBILIZE TO WELL MW-22 TO COLLECT SAMPLE
0950 CAN NOT ACCESS WELL MW-22 due to BASE OPERATIONS; CONTACT PAUL PAPERPUSHER AND HE STATED HE WILL CHECK ON GAINING ACCESS WITH BASE CONTACT.
0955 MOBILIZE TO WELL MW-19

JS 5-12-03

General Considerations for PFAS Investigations

I. Purpose and Scope

This SOP describes the techniques to be used in conjunction with other approved standard operating procedures (SOPs) to conduct PFAS investigation.

II. Materials and Equipment

- Loose leaf paper without waterproof coating or a spiralbound notebook (not waterproof) or tablet (see tablet use notes below)
- Metal clip board (if using loose-leaf paper)
- Pen (not Sharpie)
- Personal Protective Equipment (PPE) to be PFAS free – confirm with PFAS SME to confirm which products are suitable if using non-standard PPE (i.e, personal floatation device (PFD) and waders)
- PFAS-free tubing (avoid Teflon, Viton, PTFE and other fluorinated compounds)
  - High density polyethylene (HDPE) tubing (unlined)
  - If Masterflex tubing is needed for peristaltic pumps, Cole Parmer C-Flex (06424 series) and Tygon E-3603 (06509 series) are suitable options
- Sample containers (HDPE bottle with HDPE screwcap unless conducting drinking water sampling), sample bottles should not be glass as glass may sorb PFAS. Sample bottle caps should not contain Teflon. Notify your project manager (PM) if bottles provided by the lab are glass or contain Teflon parts.
- Laboratory prepared deionized, certified PFAS-free water for field blank collection
- PFAS-free shipping supplies (labels [if available][1], coolers, and ice)
- Nitrile or latex gloves (powder-free gloves only)
- Durham Geoslope Water Level Indicators and the Solinst Model 101 with the P2 meter have been shown to be fluorine free.
  - PFAS-free Pump such as:
    - Geotech PFAS-free Portable Bladder Pump (note, most bladder pumps include a Teflon-lined bladder, but Geotech currently has one model which is Teflon-free).

[1] Efforts will be made to obtain PFAS-free labels; however, information on labels is scarce and labels are frequently mounted on PFAS-coated paper to allow for easy removal.

        - Panacea P120 or P125. The P200 Stainless Steel Pump may also be used, but the standard model contains Teflon at the tube connection. If you are using this Panacea model, you must request one with the "PTFE-free thread sealant option."
        - Waterra stainless foot-valve
        - QED Sample Pro
        - Monsoon or Mega Monsoon submersible pump
        - Grundfos Rediflo2 (this pump contains small Teflon components, but has not been shown to leach, it is less preferable than the other options)
        - Peristaltic pump (may be suitable for some sample locations)
    - Specifically, the following material should be avoided by the field team during sampling:
- Gore-Tex brand or similar high-performance outdoor clothing, clothing treated with ScotchGuard® brand or similar water repellent, fluoropolymer-coated Tyvek®, wrinkle-resistant fabrics, and fire-resistant clothing with fluorochemical treatment or anything advertised as water repellant.
- New clothing that has been washed fewer than six times.
- Weather-proof log books with fluorochemical coatings.
- Teflon or PTFE tape
- Fluorinate pipe dope

  Dry erase markers

III. Sampling Guidelines and Considerations

The sample collection area should be clear of the following items:

- Pre-packaged food wrappers (e.g., fast food sandwich wrappers, pizza boxes, etc.)
- Microwave popcorn bags
- Blue ice containers
- Non-stick aluminum foil
- Kim-Wipes
- Sunscreen, insect repellant and other personal hygiene products that may contain PFAS (contact your PFAS SME for an approved list of sunscreens and insect repellants)

The use of electronics (e.g., cell phones and tablets) should be avoided without the implementation of precautionary measures outlined below:

- All devices should be used with clean, ungloved hands and an approved stylus (if desired).
- Following the use of a device, hands must be washed with soap and water and clean gloves should be used prior to contact with sampling equipment (bottleware, tubing, etc.).
- Wash hands before sampling with dish detergent and don nitrile gloves.

- Affix labels immediately after samples have been collected and bottles have been closed, collect one sample at a time to ensure sample bottles are not mixed up.
- Place samples into Ziploc bags and then into a cooler immediately following sampling,

IV. Equipment Decontamination

Whenever possible, use disposable equipment when collecting samples. The use of any non-standard equipment must be approved by the SME to confirm the equipment does not contain any PFAS parts. If reusable equipment must be used, the equipment must be cleaned/decontaminated between uses. Alconox and Liquinox soap are acceptable for cleaning/decontaminating reusable equipment at PFAS sites. Any water used for cleaning/decontamination must be certified PFAS-free by a laboratory (or otherwise approved by the SME). Consider triple-rinsing. Once decontaminated, wrap equipment in plastic bags (such as Ziploc) or un-coated aluminum foil, and store away from potential PFAS sources.

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Chain-of-Custody

I. Purpose

The purpose of this SOP is to provide information on chain-of-custody procedures to be used under the CLEAN Program.

II. Scope

This procedure describes the steps necessary for transferring samples using Chain-of-Custody Records. A Chain-of-Custody Record is required, without exception, for the tracking and recording of samples collected for on-site or off-site analysis (chemical or geotechnical) during program activities (except wellhead samples taken for measurement of field parameters). Use of the Chain-of-Custody Record Form creates an accurate written record that can be used to trace the possession and handling of the sample from the moment of its collection through analysis. This procedure identifies the necessary custody records and describes their completion. This procedure does not take precedence over region specific or site-specific requirements for chain-of-custody.

III. Definitions

Chain-of-Custody Record Form - A Chain-of-Custody Record Form is a printed two-part form that accompanies a sample or group of samples as custody of the sample(s) is transferred from one custodian to another custodian. One copy of the form must be retained in the project file.

Custodian - The person responsible for the custody of samples at a particular time, until custody is transferred to another person (and so documented), who then becomes custodian. A sample is under one's custody if:

- It is in one's actual possession.
- It is in one's view, after being in one's physical possession.
- It was in one's physical possession and then they locked it up to prevent tampering.
- It is in a designated and identified secure area.

Sample - A sample is physical evidence collected from a facility or the environment, which is representative of conditions at the point and time that it was collected.

IV. Procedures

The term "chain-of-custody" refers to procedures which ensure that evidence presented in a court of law is valid. The chain-of-custody procedures track the evidence from the time and place it is first obtained to the courtroom, as well as providing security for the evidence as it is moved and/or passed from the custody of one individual to another.

Chain-of-custody procedures, recordkeeping, and documentation are an important part of the management control of samples. Regulatory agencies must be able to provide the chain-of-possession and custody of any samples that are offered for evidence, or that form the basis of analytical test results introduced as evidence. Written procedures must be available and followed whenever evidence samples are collected, transferred, stored, analyzed, or destroyed.

A. Sample Identification

The method of identification of a sample depends on the type of measurement or analysis performed. When in situ measurements are made, the data are recorded directly in bound logbooks or other field data records with identifying information.

Information which shall be recorded in the field logbook, when in-situ measurements or samples for laboratory analysis are collected, includes:

- Field Sampler(s),
- Contract Task Order (CTO) Number,
- Project Sample Number,
- Sample location or sampling station number,
- Date and time of sample collection and/or measurement,
- Field observations,
- Equipment used to collect samples and measurements, and
- Calibration data for equipment used

Measurements and observations shall be recorded using waterproof ink.

B. Sample Label

Samples, other than for in situ measurements, are removed and transported from the sample location to a laboratory or other location for analysis. Before removal, however, a sample is often divided into portions, depending upon the analyses to be performed. Each portion is preserved in accordance with the Sampling and Analysis Plan. Each sample container is identified by a sample label (Attachment 1). Sample labels are provided, along with sample containers, by the analytical laboratory. The information recorded on the sample label includes:

- Project: Name of project site.
- Sample Identification: The unique sample number identifying this sample.
- Date: A six-digit number indicating the day, month, and year of sample collection (for example, 05/21/17).
- Time: A four-digit number indicating the 24-hour time of collection (for example: 0954 is 9:54 a.m., and 1629 is 4:29 p.m.).
- Medium: Water, soil, sediment, sludge, waste, etc.
- Sample Type: Grab or composite.
- Preservation: Type and quantity of preservation added.

- Analysis: VOA, BNAs, PCBs, pesticides, metals, cyanide, other.
- Sampled By: Printed name or initials of the sampler.
- Remarks: Any pertinent additional information.

The field team should always follow the sample ID system prepared by the Project Chemist and reviewed by the Project Manager.

C. Chain-of-Custody Procedures

After collection, separation, identification, and preservation, the sample is maintained under chain-of-custody procedures until it is in the custody of the analytical laboratory and has been stored or disposed.

D. Field Custody Procedures

- Samples are collected as described in the site Sampling and Analysis Plan. Care must be taken to precisely record the sample location and to ensure that the sample number on the label matches the Chain-of-Custody Record exactly.
- A Chain-of-Custody Record will be prepared for each individual cooler shipped and will include only the samples contained within that cooler. The Chain-of-Custody Record for that cooler will then be sealed in a zip-log bag and placed in the cooler prior to sealing. This ensures that the laboratory properly attributes trip blanks with the correct cooler and allows for easier tracking should a cooler become lost during transit.
- The person undertaking the actual sampling in the field is responsible for the care and custody of the samples collected until they are properly transferred or dispatched.
- When photographs are taken of the sampling as part of the documentation procedure, the name of the photographer, date, time, site location, and site description are entered sequentially in the site logbook as photos are taken. Once downloaded to the server or developed, the electronic files or photographic prints shall be serially numbered, corresponding to the logbook descriptions; photographic prints will be stored in the project files. To identify sample locations in photographs, an easily read sign with the appropriate sample location number should be included.
- Sample labels shall be completed for each sample, using waterproof ink unless prohibited by weather conditions (e.g., a logbook notation would explain that a pencil was used to fill out the sample label if the pen would not function in freezing weather.)

E. Transfer of Custody and Shipment

Samples are accompanied by a Chain-of-Custody Record Form. A Chain-of-Custody Record Form must be completed for each cooler and should include only the samples contained within that cooler. A Chain-of-Custody Record Form example is shown in Attachment 2. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the Record. This Record documents sample custody transfer from the sampler,

often through another person, to the analyst in the laboratory. The Chain-of-Custody Record is filled out as given below:

- Enter header information (CTO number, samplers, and project name).
- Enter sample specific information (sample number, media, sample analysis required and analytical method grab or composite, number and type of sample containers, and date/time sample was collected).
- Sign, date, and enter the time under "Relinquished by" entry.
- Have the person receiving the sample sign the "Received by" entry. If shipping samples by a common carrier, print the carrier to be used and enter the airbill number under "Remarks," in the bottom right corner.
- Place the original (top, signed copy) of the Chain-of-Custody Record Form in a plastic zipper-type bag or other appropriate sample-shipping package. Retain the copy with field records.
- Sign and date the custody seal, a 1-inch by 3-inch white paper label with black lettering and an adhesive backing. Attachment 3 is an example of a custody seal. The custody seal is part of the chain-of-custody process and is used to prevent tampering with samples after they have been collected in the field. Custody seals shall be provided by the analytical laboratory.
- Place the seal across the shipping container opening (front and back) so that it would be broken if the container were to be opened.
- Complete other carrier-required shipping papers.

The custody record is completed using waterproof ink. Any corrections are made by drawing a line through and initialing and dating the change, then entering the correct information. Erasures are not permitted.

Common carriers will usually not accept responsibility for handling Chain-of-Custody Record Forms; this necessitates packing the record in the shipping container (enclosed with other documentation in a plastic zipper-type bag). If custody forms are sealed inside the shipping container and the custody seals are intact, commercial carriers are not required to sign the custody form.

The laboratory representative who accepts the incoming sample shipment signs and dates the Chain-of-Custody Record, completing the sample transfer process. It is then the laboratory's responsibility to maintain internal logbooks and custody records throughout sample preparation and analysis.

V. Quality Assurance Records

Once samples have been packaged and shipped, the Chain-of-Custody copy and airbill receipt become part of the quality assurance record.

VI. Attachments

1. Sample Label
2. Chain of Custody Form
3. Custody Seal

VII. References

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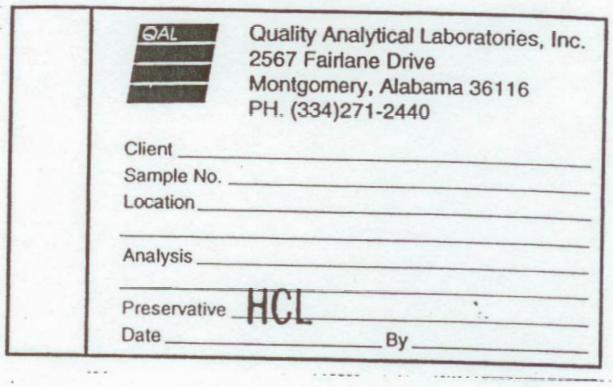
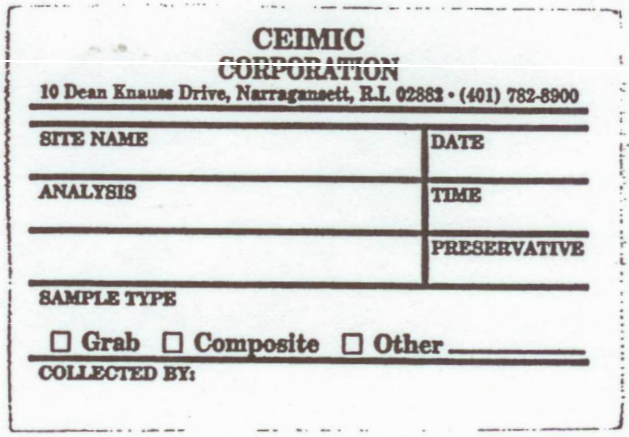
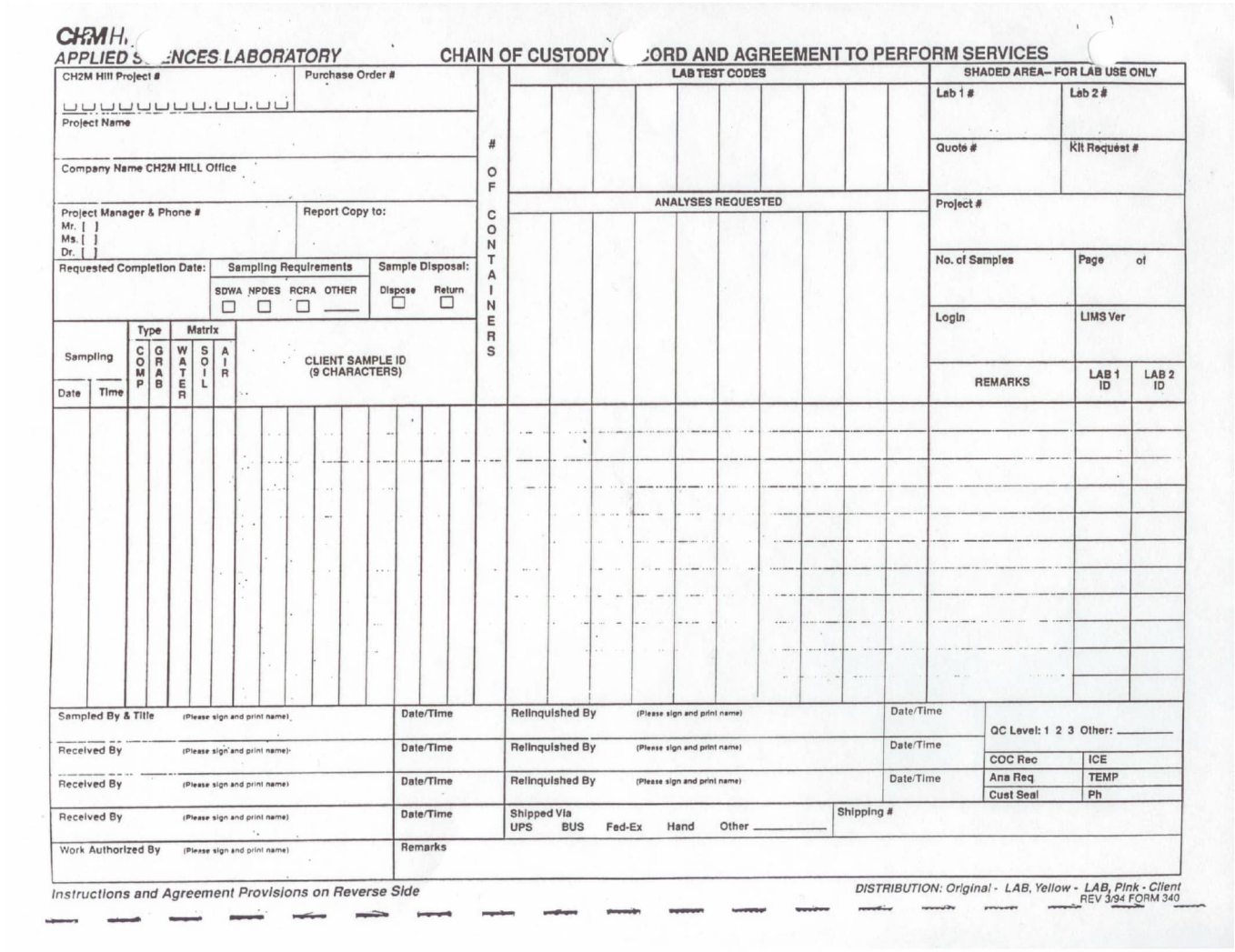

QAL
Quality Analytical Laboratories, Inc.
2567 Fairlane Drive
Montgomery, Alabama 36116
PH. (334)271-2440
Client
Sample No.
Location
Analysis
Preservative HCL
Date
By


CEIMIC
CORPORATION
10 Dean Knauss Drive, Narragansett, R.I. 02882 • (401) 782-8900
SITE NAME
DATE
ANALYSIS
TIME
PRESERVATIVE
SAMPLE TYPE
☐ Grab ☐ Composite ☐ Other
COLLECTED BY:



CH2M HILL
APPLIED SCIENCES LABORATORY

CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES

CH2M Hill Project # ␣␣␣␣␣␣␣␣.␣␣.␣␣

Purchase Order #

Project Name

Company Name CH2M HILL Office

Project Manager & Phone #
Mr. [ ]
Ms. [ ]
Dr. [ ]

Report Copy to:

Requested Completion Date:

Sampling Requirements: SDWA ☐ NPDES ☐ RCRA ☐ OTHER ____

Sample Disposal: Dispose ☐ Return ☐

Sampling Date	Sampling Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	Matrix AIR	CLIENT SAMPLE ID (9 CHARACTERS)	# OF CONTAINERS	LAB TEST CODES / ANALYSES REQUESTED

SHADED AREA– FOR LAB USE ONLY

Lab 1 # | Lab 2 #

Quote # | Kit Request #

Project #

No. of Samples | Page ___ of ___

Login | LIMS Ver

REMARKS	LAB 1 ID	LAB 2 ID

Sampled By & Title (Please sign and print name) | Date/Time | Relinquished By (Please sign and print name) | Date/Time

Received By (Please sign and print name) | Date/Time | Relinquished By (Please sign and print name) | Date/Time

Received By (Please sign and print name) | Date/Time | Relinquished By (Please sign and print name) | Date/Time

Received By (Please sign and print name) | Date/Time | Shipped Via UPS BUS Fed-Ex Hand Other ____ | Shipping #

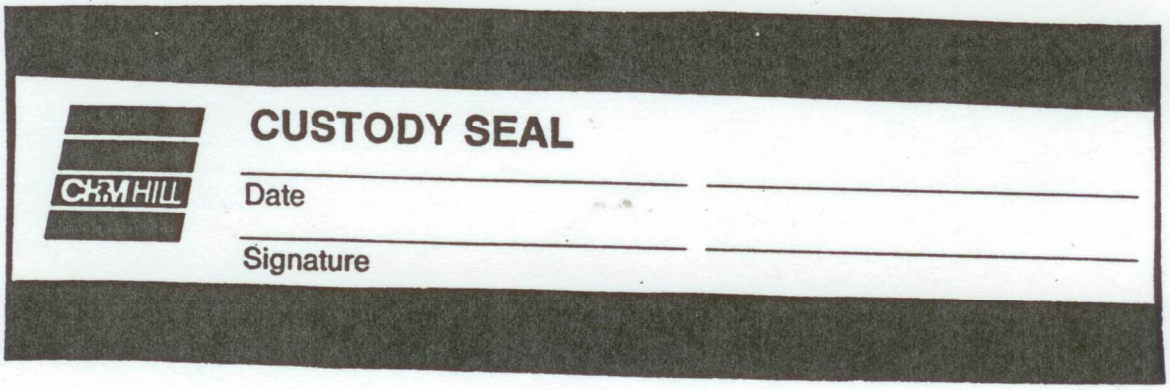
Work Authorized By (Please sign and print name) | Remarks

QC Level: 1 2 3 Other: ____

COC Rec | ICE
Ana Req | TEMP
Cust Seal | Ph

Instructions and Agreement Provisions on Reverse Side

DISTRIBUTION: Original - LAB, Yellow - LAB, Pink - Client
REV 3/94 FORM 340


CH2M HILL
CUSTODY SEAL
Date
Signature

Packaging and Shipping Procedures for Low-Concentration Samples

I. Purpose and Scope

The purpose of this guideline is to describe the packaging and shipping of low-concentration samples of various media to a laboratory for analysis.

II. Scope

The guideline only discusses the packaging and shipping of samples that are anticipated to have low concentrations of chemical constituents. Whether or not samples should be classified as low-concentration or otherwise will depend upon the site history, observation of the samples in the field, odor, and photoionization-detector readings.

If the site is known to have produced high-concentration samples in the past or the sampler suspects that high concentrations of contaminants might be present in the samples, then the sampler should conservatively assume that the samples cannot be classified as low-concentration. Samples that are anticipated to have medium to high concentrations of constituents should be packaged and shipped accordingly.

If warranted, procedures for dangerous-goods shipping may be implemented. Dangerous goods and hazardous materials pose an unreasonable risk to health, safety, or property during transportation without special handling. As a result only employees who are trained under Jacobs Dangerous Goods Shipping course may ship or transport dangerous goods. Employees should contact a designated Jacobs HazMat advisor with questions.

A. Equipment and Materials

- Coolers
- Clear tape
- Strapping tape
- Contractor bags
- Absorbent pads or equivalent
- Resealable bags
- Bubble bags (for glass bottle ware)
- Bubble wrap (if needed)
- Ice
- Chain-of-Custody form (completed)
- Custody seals

B. Procedures and Guidelines

1. Low-Concentration Samples

   A. Prepare coolers for shipment:

      - Tape drains shut.
      - Place mailing label with laboratory address on top of coolers.
      - Fill bottom of coolers with absorbent pads or similar material.
      - Place a contractor bag inside the cooler.

   B. Affix appropriate adhesive sample labels to each container. Protect with clear packing tape.

   C. Arrange decontaminated sample containers in groups by sample number. Consolidate VOC samples into one cooler to minimize the need for trip blanks. Cross check CoC to ensure all samples are present.

   D. Seal each glass sample bottle within a separate bubble bag (VOCs grouped per sample location). Sample labels should be visible through the bag. Whenever possible, group samples per location for all analytes and place in resealable bags. Make sure to release as much air as practicable from the bag before sealing.

   E. Arrange sample bottles in coolers so that they do not touch.

   F. If ice is required to preserve the samples, cubes should be repackaged in resealable bags and placed on and around the containers.

   G. Fill remaining spaces with bubble wrap if needed.

   H. Complete and sign chain-of-custody form (or obtain signature) and indicate the time and date it was relinquished to Federal Express or the courier.

   I. Close lid and latch.

   J. Carefully peel custody seals from backings and place intact over lid openings (right front and left back). Cover seals with clear packing tape.

   K. Tape cooler shut on both ends, making several complete revolutions with strapping tape. Cover custody seals with clear packing tape to avoid seals being able to be peeled from the cooler.

   L. Relinquish to Federal Express or to a courier arranged with the laboratory. Scan air bill receipt and CoC and send to the sample documentation coordinator along with the other documentation.

C. Medium- and High-Concentration Samples:

Medium- and high-concentration samples are packaged using the same techniques used to package low-concentration samples, with potential additional restrictions. If applicable, the sample handler must refer to instructions associated with the shipping of dangerous goods for the necessary procedures for shipping by Federal Express (preferred) or other overnight carrier (if necessary). If warranted, procedures for

dangerous-goods shipping may be implemented. Dangerous goods and hazardous materials pose an unreasonable risk to health, safety, or property during transportation without special handling. As a result, only employees who are trained under Jacobs Dangerous Goods Shipping course may ship or transport dangerous goods. Employees should contact a designated Jacobs HazMat advisor with questions.

III. Attachments

None.

IV. Key Checks and Items

- Be sure laboratory address is correct on the mailing label
- Pack sample bottles carefully, with adequate packaging and without allowing bottles to touch
- Be sure there is adequate ice
- Include chain-of-custody form
- Include custody seals

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Drinking Water Sampling when Analyzing for Per- and Polyfluoroalkyl Substances (PFASs)

I. Purpose and Scope

This SOP provides guidelines for drinking water sample collection for samples that will be analyzed for per- and polyfluoroalklyl substances (PFAS), aka perfluorinated compounds (PFCs), including perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) via EPA Method 533 and EPA Method 537.1 Version 1 and Version 2. There are differences between the field reagent blank procedures between EPA Method 537.1 versions 1 and 2, it is important to confirm the version for the project prior to sample collection.

Standard techniques for collecting representative samples are summarized. These procedures are specific to the Navy Comprehensive Long-term Environmental Action Navy (CLEAN) Program.

II. Equipment and Materials

A. Equipment and Materials Required

- Method 533 sample containers
  - Drinking water sample containers (polypropylene bottles fitted with polypropylene screw-caps, or polyethylene bottles with polypropylene screw caps and ammonium acetate preservative), sample bottle ware will be identified as ammonium acetate preserved by the laboratory.
  - Laboratory pre-filled polypropylene or polyethylene bottles containing field reagent blank water
  - Field Reagent Blank sample containers (polypropylene bottles fitted with polypropylene screw-caps, or polyethylene bottles with polypropylene screw caps and ammonium acetate preservative)
- Method 537.1 Version 1 sample containers
  - Drinking water sample containers (polypropylene bottle with polypropylene screw cap and Trizma preservative), sample bottle ware will be identified as Trizma preserved by the laboratory.
  - Laboratory pre-filled polypropylene bottles containing field reagent blank water and Trizma preservative
  - Field Reagent Blank sample containers (polypropylene bottle with polypropylene screw cap and no preservative)
- Method 537.1 Version 2 sample containers
  - Drinking water sample containers (polypropylene bottle with polypropylene screw cap and Trizma preservative), sample containers will be identified as Trizma preserved by the laboratory.
  - Laboratory pre-filled polypropylene bottles containing field reagent blank water

- Field Reagent Blank sample containers (polypropylene bottle with polypropylene screw cap and Trizma preservative)
- Shipping supplies (labels [if available][1], coolers, and ice)
- Loose leaf paper without waterproof coating or tablet (see tablet use notes below)
- Clip board (if using loose leaf paper)
- Pen (not Sharpie)
- Nitrile or latex gloves
- Water quality meter with temperature probe

B. Equipment and Materials to Avoid During Sampling

Equipment and materials used to collect drinking water samples should not contain any fluorinated compounds, including polytetrafluoroethylene (PTFE), Teflon® or synthetic rubber with fluoropolymer elastomers (e.g., Viton®).

Specifically, the following material should be avoided during sampling:

- Gore-Tex brand or similar high-performance outdoor clothing, clothing treated with ScotchGuard® brand or similar water repellent, fluoropolymer-coated Tyvek®, wrinkle-resistant fabrics, and fire-resistant clothing with fluorochemical treatment or anything advertised as water repellant.
- New clothing that has been washed fewer than six times.
- Weather-proof log books with fluorochemical coatings.

The sample collection area should be clear of the following items:

- Pre-packaged food wrappers (e.g., fast food sandwich wrappers, pizza boxes, etc.)
- Microwave popcorn bags
- Blue ice containers
- Non-stick aluminum foil
- Kim-Wipes
- Sunscreen, insect repellant and other personal hygiene products that may contain PFAS (contact your PFAS SME for an approved list of sunscreens and insect repellants)

Sample bottles should be polypropylene or polyethylene in accordance with Method 533 and polypropylene in accordance with Method 537.1 Version 1 and Version 2. PFAS have a tendency to adhere to glass surfaces. Contact the project manager (PM) if the lab sends glass bottles. Sample vials should not have PTFE/Teflon® lined bottles or caps.

The use of electronics (e.g., cell phones and tablets) should be avoided without the implementation of precautionary measures outlined below:

- All devices should be used with clean, ungloved hands and an approved stylus (if desired).

[1] Efforts will be made to obtain PFAS-free labels; however, information on labels is scarce and labels are frequently mounted on PFAS-coated paper to allow for easy removal.

Following the use of a device, hands must be washed with soap and water and clean gloves should be used prior to contact with sampling equipment (bottleware, tubing, etc.).

III. Procedures and Guidelines

A. Setup

1. At the start of each day, verify that the temperature sensor is reading accurately by comparing it to a traceable thermometer or other known reference in stable room temperature water. Be sure to consider the specification tolerances of both the temperature sensor and the thermometer when comparing the measurements. If the temperature sensor is not reading accurately, ensure that it is clean and free of debris.

B. Setup

1. Prior to mobilizing to sample location, a color-coded sticker should be applied to sample containers for each method (if not applied by the laboratory) to differentiate sample containers for Methods 533 and 537.1.
2. Obtain well construction information from homeowner, if available, in accordance with homeowner questionnaire developed for your project.
3. Record personnel onsite, address, homeowner name, and designated sample ID in the field notes. Sample IDs should not contain identifying information about the property location due to potential privacy issues, so be sure both address and designated ID are carefully recorded for tracking. Sample IDs and addresses on the sample labels and in the sample notes must be checked by both field team members and the address in the field notes should be confirmed with the homeowner or resident.
4. As feasible, select a sampling collection point prior to any treatment system installed by the homeowner. For example, if the homeowner has a point of use reverse osmosis or granular activated carbon filter in their kitchen sink, collect at the bathroom sink. If there is a point of entry filtration system, ask if there is a sampling port between the well and the system. If there is no way to bypass the existing treatment system without disconnecting pump components or potentially damaging the system, collect a treated sample and note that the sample was collected post-treatment. Avoid collecting samples through hoses. Instead, disconnect the hose and sample from the spigot if an outside collection station is selected.
5. Wash hands before sampling with dish detergent and don nitrile gloves.
6. Open the cold water tap and allow the system to flush. For Method 537.1 Version 1 and Version 2, the well will be purged for 3 to 5 minutes before samples are collected. For Method 533, while flushing, the temperature will be measured up to once per one minute with a handheld water quality meter with temperature probe until temperature stabilization has occurred. Temperature is considered stable when three consecutive measurements are recorded as ±5 percent of each other. All temperature readings will be recorded on a separate log and the final three water temperature measurements will be recorded in the field book. Do not open bottles until you are ready to sample. Do not sample from the hot water tap, as a hot water sample may have been contained in a hot water heater and may not reflect water quality of water drawn directly from the private well.

C. Sample Collection

Once flushing is complete, samples can be collected. The collection steps are the same for Method 533 and Method 537.1 Version 1 and Version 2. The sample containers will be identified as Trizma or ammonium acetate preserved. Separate the bottles for each method prior to beginning sample collection.

The steps to be followed for sample collection are as follows:

1. Collect samples from the flowing system. Remove the cap from the sample bottle. Position the sample bottle under the tap.
2. Fill the bottle, taking care not to flush out the sample preservative. Do not fill bottles past the middle of the bottle shoulder. Bottles should have headspace.
3. After collecting the sample, cap the bottle and agitate by hand until the preservative is dissolved.
4. Affix labels immediately after bottles have been closed; collect home sample prior to field reagent blank to avoid mislabeling.
5. Keep the sample sealed from time of collection until extraction.
6. Pack the sample on ice immediately for shipment to the offsite laboratory.

D. Field Reagent Blank Collection

A field reagent blank is required at each drinking water sampling location and is to be collected immediately following collection of the drinking water sample. The field reagent blank must be collected in a sample container with the same preservative lot as that for the parent sample. The steps to complete collection of the field reagent blank are as follows:

For Method 533

1. A field reagent blank for each sample location will be provided by the laboratory along with empty preserved (ammonium acetate) bottles for the field reagent blanks. While still at the drinking water sample collection point, open the field reagent blank water bottle and an empty preserved (ammonium acetate) sample bottle.
2. Pour the reagent blank water from the bottle into the preserved (ammonium acetate) blank container.
3. Affix the label to the field reagent blank bottle and pack in the same cooler as the associated drinking water sampling for shipment to the offsite laboratory.

For Method 537.1 Version 1

1. A preserved (Trizma) field reagent blank for each sample location will be provided by the laboratory along with empty bottles for the field reagent blanks. While still at the drinking water sample collection point, open the preserved (Trizma) field reagent blank water bottle and an empty unpreserved sample bottle.
2. Pour the preserved (Trizma) reagent blank water from the preserved (Trizma) bottle into the unpreserved blank container.

3. Affix the label to the field reagent blank bottle and pack in the same cooler as the associated drinking water sampling for shipment to the offsite laboratory.

For Method 537.1 Version 2

1. A field reagent blank for each sample location will be provided by the laboratory along with empty preserved (Trizma) bottles for the field reagent blanks. While still at the drinking water sample collection point, open the field reagent blank water bottle and an empty preserved (Trizma) sample bottle.
2. Pour the reagent blank water from the bottle into the preserved (Trizma) blank container.
3. Affix the label to the field reagent blank bottle and pack in the same cooler as the associated drinking water sampling for shipment to the offsite laboratory.

IV. References

United States Environmental Protection Agency (USEPA), 2018. Method 537.1: Determination of Selected Perfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) Version 1. November

USEPA, 2019. Method 533: Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry. November

USEPA, 2020. Method 537.1: Determination of Selected Perfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) Version 2. March.

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Appendix B
Department of Defense Environmental Laboratory Accreditation Program Accreditation Letters

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ENTHALPY ANALYTICAL, LLC
1104 Windfield Way
El Dorado Hills, CA 95762
Teresa Morrison Phone: (510) 204 2237

ENVIRONMENTAL

Valid To: September 30, 2025 Certificate Number: 3091.01

In recognition of the successful completion of the A2LA evaluation process, (including an assessment of the laboratory's compliance with ISO IEC 17025:2017, the 2009/2016 TNI Environmental Testing Laboratory Standard, the requirements of the DoD Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in version 5.4 of the DoD Quality Systems Manual for Environmental Laboratories), accreditation is granted to this laboratory to perform recognized EPA methods using the following testing technologies and in the analyte categories identified below:

Testing Technologies

High Resolution Gas Chromatography / Mass Spectrometry
Liquid Chromatography Mass Spectrometry / Mass Spectrometry

Parameter/Analyte	**Nonpotable Water**	**Solid Hazardous Waste**	**Tissue**
Dioxins/Furans			
Clean Up Method	3620C	3620C	3620C
1,2,3,4,6,7,8-Heptachlorodibenzofuran	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
1,2,3,4,7,8,9-Heptachlorodibenzofuran	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
1,2,3,4,7,8-Hexachlorodibenzofuran	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
1,2,3,6,7,8-Hexachlorodibenzofuran	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
1,2,3,7,8,9-Hexachlorodibenzofuran	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
2,3,4,6,7,8-Hexachlorodibenzofuran	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A

Parameter/Analyte	Nonpotable Water	Solid Hazardous Waste	Tissue
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
1,2,3,7,8-Pentachlorodibenzofuran	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
2,3,4,7,8-Pentachlorodibenzofuran	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
2,3,7,8-Tetrachlorodibenzofuran	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
2,3,7,8-Tetrachlorodibenzo-p-dioxin	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
Total Heptachlorodibenzofuran	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
Total Heptachlorodibenzo-p-dioxin	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
Total Hexachlorodibenzofuran	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
Total Hexachlorodibenzo-p-dioxin	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
Total Pentachlorodibenzofuran	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
Total Pentachlorodibenzo-p-dioxin	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
Total Tetrachlorodibenzofuran	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
Total Tetrachlorodibenzo-p-dioxin	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A	EPA 1613B EPA 8290/8290A
PCBs			
2-Chlorobiphenyl (1)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3-Chlorobiphenyl (2)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
4-Chlorobiphenyl (3)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2'-Dichlorobiphenyl (4)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3-Dichlorobiphenyl (5)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3'-Dichlorobiphenyl (6)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,4-Dichlorobiphenyl (7)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,4'-Dichlorobiphenyl (8)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,5-Dichlorobiphenyl (9)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,6-Dichlorobiphenyl (10)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,3'-Dichlorobiphenyl (11)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,4-Dichlorobiphenyl (12)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,4'-Dichlorobiphenyl (13)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,5-Dichlorobiphenyl (14)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
4,4'-Dichlorobiphenyl (15)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C

Parameter/Analyte	Nonpotable Water	Solid Hazardous Waste	Tissue
2,2',3-Trichlorobiphenyl (16)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',4-Trichlorobiphenyl (17)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',5-Trichlorobiphenyl (18)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',6-Trichlorobiphenyl (19)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3'-Trichlorobiphenyl (20)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,4-Trichlorobiphenyl (21)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,4'-Trichlorobiphenyl (22)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,5-Trichlorobiphenyl (23)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,6-Trichlorobiphenyl (24)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',4-Trichlorobiphenyl (25)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',5-Trichlorobiphenyl (26)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',6-Trichlorobiphenyl (27)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,4,4'-Trichlorobiphenyl (28)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,4,5-Trichlorobiphenyl (29)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,4,6-Trichlorobiphenyl (30)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,4',5-Trichlorobiphenyl (31)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,4',6-Trichlorobiphenyl (32)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2',3,4-Trichlorobiphenyl (33)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2',3,5-Trichlorobiphenyl (34)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,3',4-Trichlorobiphenyl (35)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,3',5-Trichlorobiphenyl (36)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,4,4'-Trichlorobiphenyl (37)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,4,5-Trichlorobiphenyl (38)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,4',5-Trichlorobiphenyl (39)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3'-Tetrachlorobiphenyl (40)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4-Tetrachlorobiphenyl (41)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4'-Tetrachlorobiphenyl (42)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,5-Tetrachlorobiphenyl (43)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,5'-Tetrachlorobiphenyl (44)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,6-Tetrachlorobiphenyl (45)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,6'-Tetrachlorobiphenyl (46)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',4,4'-Tetrachlorobiphenyl (47)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',4,5-Tetrachlorobiphenyl (48)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',4,5'-Tetrachlorobiphenyl (49)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',4,6-Tetrachlorobiphenyl (50)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',4,6'-Tetrachlorobiphenyl (51)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',5,5'-Tetrachlorobiphenyl (52)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',5,6'-Tetrachlorobiphenyl (53)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',6,6'-Tetrachlorobiphenyl (54)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4'-Tetrachlorobiphenyl (55)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4'-Tetrachlorobiphenyl (56)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',5-Tetrachlorobiphenyl (57)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',5'-Tetrachlorobiphenyl (58)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',6-Tetrachlorobiphenyl (59)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,4,4'-Tetrachlorobiphenyl (60)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,4,5-Tetrachlorobiphenyl (61)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,4,6-Tetrachlorobiphenyl (62)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C

Parameter/Analyte	Nonpotable Water	Solid Hazardous Waste	Tissue
2,3,4',5-Tetrachlorobiphenyl (63)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,4',6-Tetrachlorobiphenyl (64)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,5,6-Tetrachlorobiphenyl (65)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',4,4'-Tetrachlorobiphenyl (66)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',4,5-Tetrachlorobiphenyl (67)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',4,5'-Tetrachlorobiphenyl (68)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',4,6-Tetrachlorobiphenyl (69)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',4',5-Tetrachlorobiphenyl (70)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',4',6-Tetrachlorobiphenyl (71)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',5,5'-Tetrachlorobiphenyl (72)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',5',6-Tetrachlorobiphenyl (73)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,4,4',5-Tetrachlorobiphenyl (74)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,4,4',6-Tetrachlorobiphenyl (75)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2',3,4,5-Tetrachlorobiphenyl (76)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,3',4,4'-Tetrachlorobiphenyl (77)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,3',4,5-Tetrachlorobiphenyl (78)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,3',4,5'-Tetrachlorobiphenyl (79)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,3',5,5'-Tetrachlorobiphenyl (80)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,4,4',5-Tetrachlorobiphenyl (81)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4-Pentachlorobiphenyl (82)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',5-Pentachlorobiphenyl (83)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',6-Pentachlorobiphenyl (84)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,4'-Pentachlorobiphenyl (85)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,5-Pentachlorobiphenyl (86)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,5'-Pentachlorobiphenyl (87)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,6-Pentachlorobiphenyl (88)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,6'-Pentachlorobiphenyl (89)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4',5-Pentachlorobiphenyl (90)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4',6-Pentachlorobiphenyl (91)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,5,5'-Pentachlorobiphenyl (92)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,5,6-Pentachlorobiphenyl (93)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,5,6'-Pentachlorobiphenyl (94)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,5',6-Pentachlorobiphenyl (95)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,6,6'-Pentachlorobiphenyl (96)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3',4,5-Pentachlorobiphenyl (97)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3',4,6-Pentachlorobiphenyl (98)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',4,4',5-Pentachlorobiphenyl (99)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',4,4',6-Pentachlorobiphenyl (100)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',4,5,5'-Pentachlorobiphenyl (101)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',4,5,6'-Pentachlorobiphenyl (102)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',4,5,'6-Pentachlorobiphenyl (103)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',4,6,6'-Pentachlorobiphenyl (104)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4,4'-Pentachlorobiphenyl (105)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4,5-Pentachlorobiphenyl (106)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4',5-Pentachlorobiphenyl (107)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4,5'-Pentachlorobiphenyl (108)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4,6-Pentachlorobiphenyl (109)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C

Parameter/Analyte	Nonpotable Water	Solid Hazardous Waste	Tissue
2,3,3',4',6-Pentachlorobiphenyl (110)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',5,5'-Pentachlorobiphenyl (111)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',5,6-Pentachlorobiphenyl (112)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',5',6-Pentachlorobiphenyl (113)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,4,4',5-Pentachlorobiphenyl (114)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,4,4',6-Pentachlorobiphenyl (115)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,4,5,6-Pentachlorobiphenyl (116)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,4',5,6-Pentachlorobiphenyl (117)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',4,4',5-Pentachlorobiphenyl (118)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',4,4',6-Pentachlorobiphenyl (119)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',4,5,5'-Pentachlorobiphenyl (120)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',4,5,'6-Pentachlorobiphenyl (121)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2',3,3',4,5-Pentachlorobiphenyl (122)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2',3,4,4',5-Pentachlorobiphenyl (123)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2',3,4,5,5'-Pentachlorobiphenyl (124)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2',3,4,5,6'-Pentachlorobiphenyl (125)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,3',4,4',5-Pentachlorobiphenyl (126)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,3',4,5,5'-Pentachlorobiphenyl (127)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,4'-Hexachlorobiphenyl (128)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,5-Hexachlorobiphenyl (129)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,5'-Hexachlorobiphenyl (130)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,6-Hexachlorobiphenyl (131)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,6'-Hexachlorobiphenyl (132)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',5,5'-Hexachlorobiphenyl (133)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',5,6-Hexachlorobiphenyl (134)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',5,6'-Hexachlorobiphenyl (135)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',6,6'-Hexachlorobiphenyl (136)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,4',5-Hexachlorobiphenyl (137)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,4',5'-Hexachlorobiphenyl (138)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,4',6-Hexachlorobiphenyl (139)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,4',6'-Hexachlorobiphenyl (140)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,5,5'-Hexachlorobiphenyl (141)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,5,6-Hexachlorobiphenyl (142)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,5,6'-Hexachlorobiphenyl (143)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,5',6-Hexachlorobiphenyl (144)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,6,6'-Hexachlorobiphenyl (145)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4',5,5'-Hexachlorobiphenyl (146)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4',5,6-Hexachlorobiphenyl (147)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4',5,6'-Hexachlorobiphenyl (148)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4',5',6-Hexachlorobiphenyl (149)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4',6,6'-Hexachlorobiphenyl (150)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,5,5',6-Hexachlorobiphenyl (151)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,5,6,6'-Hexachlorobiphenyl (152)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',4,4',5,5'-Hexachlorobiphenyl (153)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',4,4',5',6-Hexachlorobiphenyl (154)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',4,4',6,6'-Hexachlorobiphenyl (155)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4,4',5-Hexachlorobiphenyl (156)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C

Parameter/Analyte	Nonpotable Water	Solid Hazardous Waste	Tissue
2,3,3',4,4',5'-Hexachlorobiphenyl (157)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4,4',6-Hexachlorobiphenyl (158)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4,5,5'-Hexachlorobiphenyl (159)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4,5,6-Hexachlorobiphenyl (160)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4,5',6-Hexachlorobiphenyl (161)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4',5,5'-Hexachlorobiphenyl (162)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4',5,6-Hexachlorobiphenyl (163)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4',5',6-Hexachlorobiphenyl (164)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',5,5',6-Hexachlorobiphenyl (165)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,4,4',5,6-Hexachlorobiphenyl (166)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',4,4',5,5'-Hexachlorobiphenyl (167)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3',4,4',5',6-Hexachlorobiphenyl (168)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
3,3',4,4',5,5'-Hexachlorobiphenyl (169)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2'3,3',4,4',6-Heptachlorobiphenyl (171)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,5,6-Heptachlorobiphenyl (173)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4',5,6-Heptachlorobiphenyl (177)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',5,6,6'-Heptachlorobiphenyl (179)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,4',5,6-Heptachlorobiphenyl (181)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,5,6,6'-Heptachlorobiphenyl (186)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4',5,6,6'-Heptachlorobiphenyl (188)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4,5,5',6-Heptachlorobiphenyl (192)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4',5,5',6-Heptachlorobiphenyl (193)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,5,5',6'-Octachlorobiphenyl (199)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',5,5',6,6'-Octachlorobiphenyl (202)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C

Parameter/Analyte	Nonpotable Water	Solid Hazardous Waste	Tissue
2,2',3,4,4',5,6,6'-Octachlorobiphenyl (204)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (206)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl (207)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl (208)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
Decachlorobiphenyl (209)	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
Decachlorobiphenyl, Total	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
Dichlorobiphenyl, Total	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
Heptachlorobiphenyl, Total	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
Hexachlorobiphenyl, Total	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
Monochlorobiphenyl, Total	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
Nonachlorobiphenyl, Total	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
Octachlorobiphenyl, Total	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
Pentachlorobiphenyl, Total	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
Tetrachlorobiphenyl, Total	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C
Trichlorobiphenyl, Total	EPA 1668A/1668C	EPA 1668A/1668C	EPA 1668A/1668C

Parameter/Analyte	**Potable Water**	**Non-Potable Water**	**Solid Hazardous Waste (Liquids and Solids)**
Per-and Polyfluoroalkyl Substances (PFAS)			
1*H*,1*H*, 2*H*, 2*H*-Perfluorooctane sulfonic acid (6:2 FTS)	EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633
1*H*,1*H*, 2*H*, 2*H*-Perfluorodecane sulfonic acid (8:2 FTS)	EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	EPA 537.1 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633
N-ethyl perfluorooctanesulfonamide (NEtFOSA)	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633

Parameter/Analyte	Potable Water	Non-Potable Water	Solid Hazardous Waste (Liquids and Solids)
N-ethyl perfluorooctanesulfonamidoethanol (NEtFOSE)	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	EPA 537.1 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633
N-methyl perfluorooctanesulfonamide (NMeFOSA)	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633
N-methyl perfluorooctanesulfonamidoethanol (NMeFOSE)	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633
Perfluorobutanesulfonic acid (PFBS)	EPA 537.1 EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633
Perfluorobutanoic acid (PFBA)	EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633
Perfluorodecanesulfonate (PFDS)	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633
Perfluorodecanoic acid (PFDA)	EPA 537.1 EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633
Perfluorododecanoic acid (PFDoA)	EPA 537.1 EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633

Parameter/Analyte	Potable Water	Non-Potable Water	Solid Hazardous Waste (Liquids and Solids)
Perfluoroheptanesulfonate (PFHpS)	EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633
Perfluoroheptanonic acid (PFHpA)	EPA 537.1 EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633
Perfluorohexadecanoic acid (PFHxDA)	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15
Perfluorohexanesulfononic acid (PFHxS)	EPA 537.1 EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Perfluorohexanoic acid (PFHxA)	EPA 537.1 EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Perfluorononaoic acid (PFNA)	EPA 537.1 EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Perfluorooctanesulfonamide (PFOSA)	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Perfluorooctanesulfonic acid (PFOS)	EPA 537.1 EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633

Parameter/Analyte	**Potable Water**	**Non-Potable Water**	**Solid Hazardous Waste (Liquids and Solids)**
Perfluorooctanoic acid (PFOA)	EPA 537.1 EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Perfluoropentanoic acid (PFPeA)	EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Perfluorotetradecanoic acid (PFTeDA)	EPA 537.1 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Perfluorotridecanoic acid (PFTrDA)	EPA 537.1 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Perfluoroundecanoic acid (PFUnA)	EPA 537.1 EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Hexafluoropropylene oxide dimer acid (HFPO-DA)	EPA 537.1 EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	EPA 537.1 EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	EPA 537.1 EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633

Parameter/Analyte	**Potable Water**	**Non-Potable Water**	**Solid Hazardous Waste (Liquids and Solids)**
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	EPA 537.1 EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
1*H*,1*H*, 2*H*, 2*H*-Perfluorohexane sulfonic acid (4:2 FTS)	EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 TableB-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Perfluorononanesulfonic acid (PFNS)	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Perfluorooctadecanoic acid (PFODA)	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Perfluoropentanesulfonic acid (PFPeS)	EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft Method EPA 1633
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15
3-Perfluoropropyl propanoic acid (3:3 FTCA)	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
3-Perfluoroheptyl propanoic acid (7:3 FTCA)	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
2H,2H,3H,3H-Perfluorooctanoic acid (5:3 FTCA)	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Potassium perfluoro-4-ethylcyclohexanesufonate (PFecHS)	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15

Parameter/Analyte	**Potable Water**	**Non-Potable Water**	**Solid Hazardous Waste (Liquids and Solids)**
Sodium perfluoro-1-propanesulfonate (PFPrS)_	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15
Perfluorododecanesulfonic acid (PFDoS)	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Perfluoror(2-ethoxyethane)sulfonic acid (PFEESA)	EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Perfluoro-3-methoxypropanoic acid (PFMPA)	EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Perfluoro-4-methoxybutanoic acid (PFMBA)	EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	EPA 533 PFAS by LCMSMS Compliant with QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633	PFAS by LCMSMS Compliant with QSM 5.4 Table B-15 Draft 2 Method EPA 1633

Accredited Laboratory

A2LA has accredited

ENTHALPY ANALYTICAL, LLC

El Dorado Hills, CA

for technical competence in the field of

Environmental Testing

In recognition of the successful completion of the A2LA evaluation process that includes an assessment of the laboratory's compliance with ISO/IEC 17025:2017, the 2009/2016 TNI Environmental Testing Laboratory Standard, and the requirements of the Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in version 5.4 of the DoD Quality System Manual for Environmental Laboratories (QSM), accreditation is granted to this laboratory to perform recognized EPA methods as defined on the associated A2LA Environmental Scope of Accreditation. This accreditation demonstrates technical competence for this defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated *April 2017*).

Presented this 16th day of June 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3091.01
Valid to September 30, 2025

For the tests to which this accreditation applies, please refer to the laboratory's Environmental Scope of Accreditation.

Appendix C
Backup Laboratory Worksheets

SAP Worksheet #3—Distribution List

Name of SAP Recipients	Title/Role	Organization	Telephone Number	Email Address or Mailing Address
Kendra Clubb	RPM/Task Order Contracting Officer's Representative	NAVFAC Northwest	[redacted]	kendra.r.clubb.civ@us.navy.mil
Janice Horton	RPM	NAVFAC Northwest	[redacted]	janice.l.horton5.civ@us.navy.mil
Chan Pongkhamsing	EPA Project Manager (PM)	EPA Region 10	[redacted]	pongkhamsing.chan@epa.gov
Binod Chaudhary	Ecology PM	Ecology	[redacted]	bcha461@ecy.wa.gov
Jennifer Madsen	Activity Manager (AM)	CH2M	[redacted]	jennifer.madsen@jacobs.com
Jill Schrlau	PM	CH2M	[redacted]	jill.schrlau@jacobs.com
Paul Townley	Activity Quality Manager (AQM)	CH2M	[redacted]	paul.townley@jacobs.com
Jenny Lagerquist	Senior Technical Consultant (STC)/ PFAS Subject Matter Expert (SME)	CH2M	[redacted]	jenny.lagerquist@jacobs.com
Loren Kaehn	Health and Safety Manager (HSM)	CH2M	[redacted]	loren.kaehn@jacobs.com
Brittany Prentice	Project Task Manager (TM)	CH2M	[redacted]	brittany.prentice@jacobs.com
Adrienne Jones	Program SAP Quality Reviewer	CH2M	[redacted]	adrienne.jones@jacobs.com
Juan Acaron	Program Chemist	CH2M	[redacted]	michael.zamboni@jacobs.com
Juan Acaron	Senior Chemistry Lead/SAP Reviewer	CH2M	[redacted]	juan.acaron@jacobs.com
Travis Pitts	Project Chemist	CH2M	[redacted]	travis.pitts@jacobs.com
Nancy Weaver	Data Validator	Environmental Data Services (EDS)	[redacted]	nweaver@env-data.com
To be determined (TBD)	Field Team Leader (FTL)	CH2M	TBD	TBD
TBD	Site Safety Coordinator (SSC)	CH2M	TBD	TBD
Heather Thurston	Laboratory PM	Battelle	[redacted]	thurstonh@battelle.org

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SAP Worksheet #4—Project Personnel Sign-off Sheet

Name	Organization/Title/Role	Telephone Number	Signature/Email Receipt	Date SAP Read
Kendra Clubb	NAVFAC RPM/Task Order Contracting Officer's Representative	[redacted]		
TBD	NAVFAC QAO	TBD		
Chan Pongkhamsing	EPA PM	[redacted]		
Binod Chaudhary	Ecology PM	[redacted]		
Jennifer Madsen	CH2M/AM	[redacted]		
Jill Schrlau	CH2M/PM	[redacted]		
Paul Townley	CH2M/AQM	[redacted]		
Jenny Lagerquist	CH2M/STC/PFAS SME	[redacted]		
Loren Kaehn	CH2M/HSM	[redacted]		
Brittany Prentice	CH2M/Project TM	[redacted]		
nMike Zamboni	CH2M/Program Chemist	[redacted]		
Juan Acaron	CH2M/Senior Chemistry Lead/SAP Reviewer	[redacted]		
Travis Pitts	CH2M/Project Chemist	[redacted]		
Nancy Weaver	EDS/Data Validator	[redacted]		
TBD	CH2M FTL	TBD		
TBD	CH2M SSC	TBD		
Heather Thurston	Battelle/Laboratory PM	[redacted]		

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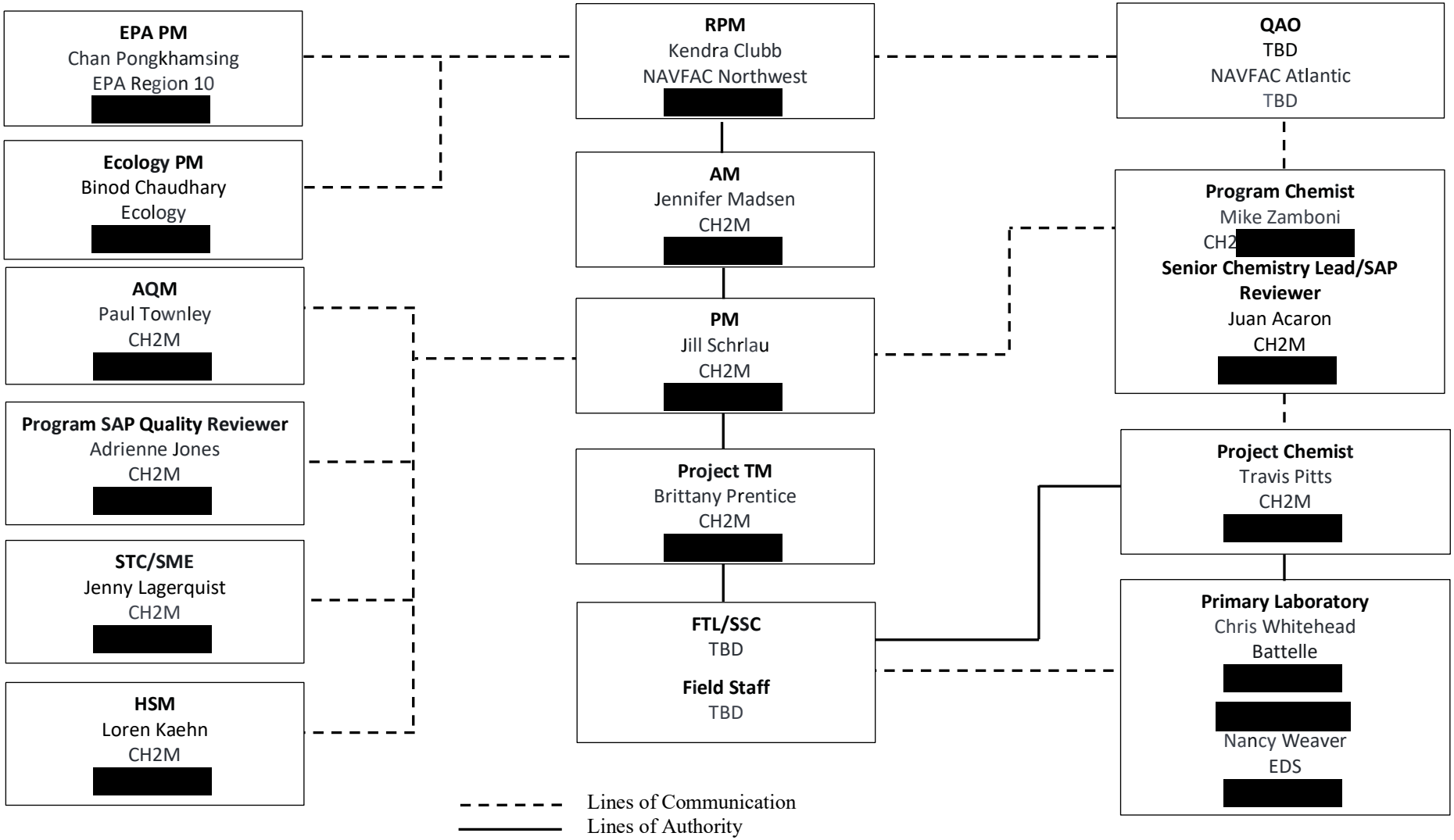
SAP Worksheet #5—Project Organizational Chart



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SAP Worksheet #6—Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure
Communication with Base	NAVFAC Northwest RPM	Kendra Clubb	kendra.r.clubb.civ@us.navy.mil [redacted]	The NAVFAC Northwest PFAS SME supports the NAVFAC Northwest RPM with changes in the field and ensures that all work is conducted in accordance with Navy policy. The PM will notify the NAVFAC Northwest PFAS SME by email or telephone call within 24 hours for field changes affecting the scope or implementation of the design.
SAP reviews	NAVFAC Atlantic Chemist/QAO	TBD	TBD	Provides review comments to Navy contractor on preliminary draft SAP via the Naval Installation Restoration Information Solution (NIRIS) submittal. Provides overall Navy guidance via direct communication with Navy contractor chemist, as warranted.
Communication with Ecology	Ecology RPM	Binod Chaudhary	bcha461@ecy.wa.gov [redacted]	Primary point of contact (POC) for Ecology; can delegate communication to other internal or external POCs. Upon notification of field changes, Ecology will have an opportunity to provide comment on the field changes.
Communication with EPA Region 10	EPA	Chan Pongkhamsing	pongkhamsing.chan@epa.gov [redacted]	Primary POC for EPA; can delegate communication to other internal or external POCs. Upon notification of field changes, EPA will have an opportunity to provide comment on the field changes. All data results will be presented and discussed during Navy, Base, and regulatory stakeholders' meetings.
Communication regarding overall project status and implementation, and primary POC with RPMs and project team	CH2M PM	Jill Schrlau	jill.schrlau@jacobs.com [redacted]	Primary POC for CH2M. Interacts and coordinates activities with the RPM. Oversees project and will be informed of project status by the TM. If field changes occur, PM will communicate in-field changes to the team by email within 24 hours. All data results will be communicated to the project team following data receipt and review. Notifies the NAVFAC RPM, who at their discretion may notify the NAVFAC QAO of any serious laboratory issues that would cause negative impacts to project delivery or would cause the project data quality objectives (DQOs) to not be met.

SAP Worksheet #6—Communication Pathways (continued)

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure
Quality issues, technical communications for project implementation, and data interpretation	CH2M STC/PFAS SME	Jenny Lagerquist	jenny.lagerquist@jacobs.com [redacted]	Responsible for technical communications related to project implementation and data interpretation and quality. The PM will work with the PFAS SME regarding all technical aspects encountered in the field, data interpretation, and report writing.
Quality issues during and technical communications for project implementation and data interpretation	CH2M AQM	Paul Townley	paul.townley@jacobs.com [redacted]	Contact the AQM regarding quality issues during project implementation. The AQM will report to the PM and the RPM.
Health and safety (H&S)	CH2M HSM	Loren Kaehn	loren.kaehn@jacobs.com [redacted]	Responsible for generation of the Health and Safety Plan (HSP) and approval of the activity hazard analyses before the start of fieldwork. The PM will contact the HSM as needed regarding questions/issues encountered in the field.
H&S	CH2M SSC	TBD	TBD	Responsible for the adherence of team members to the site safety requirements described in the HSP. Will report H&S incidents and near-misses to the PM as soon as possible.
Stop Work Order	CH2M PM CH2M FTL/SSC Field Team Members	Jill Schrlau TBD TBD	jill.schrlau@jacobs.com [redacted] TBD TBD	Any field member can immediately stop work if an unsafe condition that is immediately threatening to human health is observed. The field staff, FTL, or SSC should notify the RPM and the CH2M PM immediately. Ultimately, the FTL and PM can stop work for a period of time.
	CH2M STC/PFAS SME	Jenny Lagerquist	jenny.lagerquist@jacobs.com [redacted]	
Work plan changes in field	FTL	TBD	TBD	Documentation of deviations from the Work Plan will be made in the field logbook, and the PM will be notified immediately. Deviations will be made only with approval from the PM. The PM will communicate changes to the RPM.

SAP Worksheet #6—Communication Pathways (continued)

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure
Field changes/field progress reports	FTL	TBD	TBD	Documentation of field activities and Work Plan deviations (made with the approval of the STC and/or AQM) in field logbooks; provide daily progress reports to PM.
Reporting laboratory data quality issues	Battelle	Heather Thurston	thurstonh@battelle.org [redacted]	All quality assurance (QA)/quality control (QC) issues with project field samples will be reported by the laboratory to the Project Chemist within 2 days. In the event of serious analytical issues, the RPM will be contacted, who, at their discretion, may wish to consult with the NAVFAC chemist.
Communication regarding SAP changes	CH2M Program Chemist	Mike Zamboni	michael.zamboni@jacobs.com [redacted]	Changes to the project that would prompt a SAP change that would require NAVFAC QAO approval include: the addition of an analytical suite not previously included in the SAP, the addition of an environmental matrix not previously included in the SAP, laboratory accreditation to a new Department of Defense (DoD) Quality System Manual (QSM) version, inclusion of a new laboratory into the SAP, or updates to the conceptual site model that prompt new DQOs. Updated laboratory limit of quantitation (LOQ), limit of detection (LOD), and detection limit (DL) values will not prompt a SAP update for NAVFAC QAO approval unless those updates negatively impact the ability to meet project action limits (PALs).
	CH2M Senior Chemistry Lead/SAP Reviewer	Juan Acaron	juan.acaron@jacobs.com [redacted]	
Analytical corrective actions (CAs)	Project Chemist	Travis Pitts	travis.pitts@jacobs.com [redacted]	Any CAs for analytical issues will be determined by the FTL or the Project Chemist and reported to the PM within 4 hours. The PM will ensure SAP requirements are met by field staff for the duration of the project. In the event of serious analytical issues, the CH2M PM will contact the RPM, who at their discretion, may wish to consult with the NAVFAC chemist.

SAP Worksheet #6—Communication Pathways (continued)

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure
Data tracking from field collection to database upload release of analytical data	Project Chemist	Travis Pitts	travis.pitts@jacobs.com [redacted]	Tracks data from sample collection through database upload daily. No analytical data can be released until the Project Chemist validates and approves the data. The Project Chemist will review analytical results within 24 hours of receipt for release to the project team. The Project Chemist will inform the Navy CLEAN program chemist who will notify the NAVFAC QAO of any laboratory issues that would prevent the project from meeting project quality objectives (PQOs) or would cause significant delay in project schedule.
14BReporting data quality issues	Data validation (DV)	Nancy Weaver	nweaver@env-data.com [redacted]	The data validator reviews and qualifies analytical data as necessary. The data, along with a validation narrative, are returned to the Project Chemist within 7 calendar days.
Field CAs	FTL, PM, and Project TM	TBD Jill Schrlau Brittany Prentice	TBD jill.schrlau@jacobs.com [redacted] brittany.prentice@jacobs.com [redacted]	Field issues requiring CA will be determined by the FTL or PM on an as-needed basis; the PM will ensure SAP requirements are met by field staff for the duration of the project. The FTL will notify the PM via phone of any need for CA within 4 hours. The FTL will notify the PM and the PM may notify the Navy Technical Representative and RPM of any field issues that would negatively affect the schedule or the ability to meet project DQOs.

SAP Worksheet #7—Personnel Responsibilities Table

Name	Title/Role	Organizational Affiliation	Responsibilities
Kendra Clubb	RPM	NAVFAC Northwest	Oversees project for NAVFAC and provides Base-specific information and coordination with NAS Whidbey Island.
Jennifer Madsen	AM	CH2M	Oversees and manages NAS Whidbey Island projects and activities.
Jill Schrlau	PM	CH2M	Oversees and manages project activities and tasks.
Paul Townley	AQM	CH2M	Oversees project delivery and execution.
Jenny Lagerquist	STC/PFAS SME	CH2M	Provides PFAS-related senior technical support for project approach and execution.
Brittany Prentice	Project TM	CH2M	Oversees and manages project tasks.
Adrienne Jones	Program SAP Quality Reviewer	CH2M	Reviews and approves changes or revisions to the SAP.
Juan Acaron	Program Chemist	CH2M	Provides SAP project delivery support, reviews and approves SAP, and performs final data evaluation and QA oversight.
Juan Acaron	Senior Chemistry Lead/SAP Reviewer	CH2M	
Travis Pitts	Project Chemist	CH2M	Data management: Performs data evaluation and QA oversight; is the POC with laboratory and validator for analytical issues.
Loren Kaehn	HSM	CH2M	Prepares HSP and manages H&S for all field activities.
Nancy Weaver	Data Validator	EDS	Validates laboratory data from an analytical standpoint before data use.
TBD	FTL	CH2M	Coordinates all field activities and sampling.
TBD	Field Staff Member	CH2M	Conducts field activities.
Heather Thurston	Laboratory PM	Battelle	Manages samples tracking and maintains good communication with Project Chemist.
Teresa Morrison	Laboratory QAO	Enthalpy	Responsible for audits, CA, and checks of QA performance within the laboratory.

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SAP Worksheet #15-1—Reference Limits and Evaluation Table

Matrix: Drinking Water

Analytical Group: PFAS (EPA Method 533)

Analyte	CAS Number	PALs (ng/L)[a]	PALs Reference	Laboratory Limits (ng/L)			Accuracy Control Limit (% R)[b]		Precision Control Limit (RPD)
				LOQs (ng/L)	LODs (ng/L)	DLs (ng/L)			
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	70	2016 EPA lifetime drinking water health advisory	2.50	0.80	0.23	70	130	30
Perfluorooctanoic acid (PFOA)	335-67-1	70	2016 EPA lifetime drinking water health advisory	2.50	1.00	0.33	70	130	30
Perfluorobutane sulfonic acid (PFBS)	375-73-5	NC[c]	NC[c]	2.50	1.00	0.37	70	130	30
Perfluorodecanoic acid (PFDA)	335-76-2	NC[c]	NC[c]	2.50	1.00	0.32	70	130	30
Perfluorododecanoic acid (PFDoA)	307-55-1	NC[c]	NC[c]	2.50	1.00	0.44	70	130	30
Perfluoroheptanoic acid (PFHpA)	375-85-9	NC[c]	NC[c]	2.50	1.00	0.31	70	130	30
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	NC[c]	NC[c]	2.50	1.00	0.29	70	130	30
Perfluorohexanoic acid (PFHxA)	307-24-4	NC[c]	NC[c]	2.50	1.00	0.34	70	130	30
Perfluorononanoic acid (PFNA)	375-95-1	NC[c]	NC[c]	2.50	1.00	0.32	70	130	30
Perfluoroundecanoic acid (PFUnA)	2058-94-8	NC[c]	NC[c]	2.50	1.00	0.39	70	130	30
Hexafluoropropylene oxide dimer acid (HFPO-DA)	13252-13-6	NC[c]	NC[c]	2.50	1.00	0.41	70	130	30
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	NC[c]	NC[c]	2.50	1.00	0.33	70	130	30
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OudS)	763051-92-9	NC[c]	NC[c]	2.50	1.00	0.34	70	130	30
9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	NC[c]	NC[c]	2.50	1.00	0.34	70	130	30
1H,1H, 2H, 2H-Perfluorohexane sulfonic acid (4:2FTS)	757124-72-4	NC[c]	NC[c]	2.50	1.00	0.32	70	130	30

SAP Worksheet #15-1—Reference Limits and Evaluation Table (continued)

Analyte	CAS Number	PALs (ng/L)[a]	PALs Reference	Laboratory Limits (ng/L)			Accuracy Control Limit (%R)[b]		Precision Control Limit (RPD)
				LOQs (ng/L)	LODs (ng/L)	DLs (ng/L)			
1H,1H, 2H, 2H-Perfluorooctane sulfonic acid (6:2FTS)	27619-97-2	NC[c]	NC[c]	2.50	1.00	0.33	70	130	30
1H,1H, 2H, 2H-Perfluorodecane sulfonic acid (8:2FTS)	39108-34-4	NC[c]	NC[c]	2.50	1.00	0.31	70	130	30
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	151772-58-6	NC[c]	NC[c]	2.50	1.00	0.26	70	130	30
Perfluorobutanoic acid (PFBA)	375-22-4	NC[c]	NC[c]	2.50	2.10	1.04	70	130	30
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	113507-82-7	NC[c]	NC[c]	2.50	1.00	0.32	70	130	30
Perfluoroheptanesulfonic acid (PFHpS)[d]	375-92-8	NC[c]	NC[c]	2.50	1.00	0.38	70	130	30
Perfluoro-4-methoxybutanoic acid (PFMBA)	863090-89-5	NC[c]	NC[c]	2.50	1.00	0.43	70	130	30
Perfluoro-3-methoxypropanoic acid (PFMPA)	377-73-1	NC[c]	NC[c]	2.50	1.00	0.39	70	130	30
Perfluoropentanoic acid (PFPeA)	2706-90-3	NC[c]	NC[c]	2.50	1.00	0.33	70	130	30
Perfluoropentanesulfonic acid (PFPeS)	2706-91-4	NC[c]	NC[c]	2.50	0.80	0.22	70	130	30
PFOA + PFOS (calculated)[e]	--	70	2016 EPA lifetime drinking water health advisories	--	--	--	--	--	--

[a] Refer to **Worksheet #11** for a detailed discussion on development of PALs.

[b] Limits shown are for spikes greater than the LOQ. Limits are 50 to 150% for spikes at or below the LOQ. These limit requirements follow EPA Method 533.

[c] NC is No criteria for this compound.

[e] If both PFOS and PFOA are detected, the combined concentration must be less than 70 ng/L. Otherwise, the chemicals will be compared to 70 ng/L individually.

-- = Value does not exist.

%R = percent recovery

CAS = Chemical Abstracts Service

SAP Worksheet #15-2—Reference Limits and Evaluation Table

Matrix: Drinking Water

Analytical Group: PFAS (EPA Method 537.1 Version 2)

Analyte	CAS Number	PALs (ng/L)	PALs Reference	Laboratory Limits (ng/L)			Accuracy Control Limit (%R)[c]		Precision Control Limit (RPD)
				LOQs (ng/L)	LODs (ng/L)	DLs (ng/L)			
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	2991-50-6	NC[b]	NC[b]	2.50	1.50	0.675	70	130	30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	2355-31-9	NC[b]	NC[b]	2.50	1.25	0.542	70	130	30
Perfluorotetradecanoic Acid (PFTA)	376-06-7	NC[b]	NC[b]	2.50	1.25	0.439	70	130	30
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	NC[b]	NC[b]	2.50	1.25	0.42	70	130	30

[a] Limits shown are for spikes greater than the LOQ. Limits are 50 to 150% for spikes at or below the LOQ. These limit requirements follow EPA Method 537.1 Version 2.

[b] NC is No criteria for this compound.

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SAP Worksheet #19—Analytical SOP Requirements Table

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Containers	Sample Volume	Preservation Requirements (Chemical, Temperature, Light-protected)[a]	Maximum Holding Time[b] (Preparation/Analysis)
Drinking Water	PFAS	EPA Method 533/ SOP 5-379-01	Two 250-mL polypropylene or polyethylene	250 mL	Ammonium acetate (1 gram per liter); received within 2 days of collection < 10°C and laboratory to store < 6°C	28 days/28 days
Drinking Water	PFAS	EPA Method 537.1 Version 2/ SOP 5-371-07	Two 250-mL polypropylene	250 mL	Trizma (5.0 grams per liter); ≤10°C at laboratory receipt, storage in the laboratory ≤ 6°C, but not frozen	14 days/28 days

[a] For both Method 533 and Method 537.1 Version 2, the same lot of preservative must be used for the FRBs as for the field samples.

[b] Maximum holding time is calculated from the time the sample is collected to the time the sample is prepared/extracted.

< = less than

< = less than or equal to

mL = milliliter(s)

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SAP Worksheet #23—Analytical SOP References Table

Lab SOP Number	Title, Revision Date, and/or Number	Date Reviewed if not Revised	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Variance to QSM (Yes/No)	Modified for Project Work? (Yes/No)
5-379-01	Analysis of Poly and Perfluoroalkyl Substances in Drinking Water Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS) Following Method 533 Version 1, 02/11/2021, revision 1	November, 2022	Definitive	Drinking Water/PFAS	LC-MS/MS	Battelle	N/A	No
5-371-07	Analysis of Poly and Perfluoroalkyl Substances in Drinking Water Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS) Following Method 537.1 Version 2, 05/25/2023, revision 7	N/A	Definitive	Drinking Water/PFAS	LC-MS/MS	Battelle	N/A	No
6-010-20	Sample Receipt, Custody, and Handling; 05/31/2023; Rev. 20	N/A	N/A	N/A	N/A	Battelle	None	No
5-291-18	Determination of Method Detection Limits in the Analytical Laboratory, 10/20/2021, revision 18	November, 2022	N/A	N/A	N/A	Battelle	None	No
5-114-11	The Storage and Disposal of Regulated and Non-Regulated Waste; 02/19/2021; Rev. 11	July, 2022	N/A	N/A	N/A	Battelle	None	No

Notes:

DoD ELAP certification is required for all definitive data. Battelle has DoD ELAP certification that is valid through Apirl 30, 2025.

ELAP = Environmental Laboratory Accreditation Program

LC-MS/MS = liquid chromatography with tandem mass spectrometry

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SAP Worksheet #24—Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 533	Mass Calibration	Instrument must have a valid mass calibration prior to any sample analysis.	The target analyte ions should be within 0.3 m/z of the expected mass.	If the mass calibration fails, then recalibrate. If it fails again, consult manufacturer instructions on corrective maintenance.	Analyst	5-379-01
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 533	Ion Transitions (Precursor-> Product)	All samples	In order to avoid biasing results high due to known interferences for some transitions, the following transitions must be used for the quantification of the following analytes: PFOS: 499 → 80 PFHxS: 399 → 80 If these transitions are not used, the reason must be technically justified and documented (e.g., alternate transition was used due to observed interferences).	N/A	Analyst	5-379-01
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 533	Initial Calibration (ICAL)	ICAL prior to sample analysis	Minimum five-point ICAL for target analytes, lowest concentration standard at or below the reporting limit with either a linear or quadratic regression. Weighting may be used. Forcing the calibration curve through the origin is mandatory for this method. When each calibration standard is calculated as an unknown using the calibration curve, analytes fortified at or below the LOQ should be within 50 to 150% of the true value. Analytes fortified at all other levels should be within 70 to 130% of the true value. Isotope dilution analogues (IDA) should be within 70 to 130% for all calibration points.	If criteria cannot be met, CA is recommended such as reanalyzing the calibration standards, restricting the range of calibration, or performing instrument maintenance. If the cause for failure to meet the criteria is due to contamination or standard degradation, prepare fresh calibration standards and repeat the ICAL.	Analyst	5-379-01

SAP Worksheet #24—Analytical Instrument Calibration Table (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 533	Retention Time Windows	Prior to sample analysis.	Ensure that each method analyte, including earlier eluting branched isomers, elutes entirely within the assigned window during each analysis batch. Make this observation by viewing the quantitation ion for each analyte in the CCCs analyzed during an analysis batch.	If an analyte peak drifts out of the assigned window, then data for that analyte is invalid in all injections acquired since the last valid CCC. In addition, all peaks representing multiple isomers of an analyte must elute entirely within the same multiple reaction monitoring window.	Analyst	5-379-01
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 533	Continuing Calibration Check (CCC)	Verify ICAL by analyzing a low-level CCC (concentrations at or below the LOQ for each analyte) at the beginning of each analysis batch. Subsequent CCCs are required after every tenth field sample and to complete the batch. Alternate subsequent CCCs between the mid- and high-calibration levels.	The lowest level CCC must be within 50 to 150% of the true value. All other levels must be within 70 to 130% of the true value. The recovery for each analogue must be within a range of 70 to 130%. The absolute area of the quantitation ion for each of the three isotope performance standards must be within 50 to 150% of the average area measured during the ICAL.	Failure to meet the CCC QC performance criteria requires CA. Following a minor remedial action, such as servicing the autosampler or flushing the column, check the calibration with a mid-level CCC and a CCC at the LOQ, or recalibrate.	Analyst	5-379-01
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 533	Calibration Verification using QC Sample	Perform a calibration verification at least quarterly.	Results must be within 70 to 130% of the true value.	If the accuracy for any analyte fails the recovery criterion, prepare fresh standard dilutions and repeat the calibration verification.	Analyst	5-379-01

SAP Worksheet #24—Analytical Instrument Calibration Table (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 537.1 Version 2	Mass Calibration	Instrument must have a valid mass calibration prior to any sample analysis.	The target analyte ions should be within 0.3 m/z of the expected mass.	If the mass calibration fails, then recalibrate. If it fails again, consult manufacturer instructions on corrective maintenance.	Analyst	5-371-07
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 537.1 Version 2	ICAL	ICAL prior to sample analysis.	Minimum five-point linear regression or six-point quadratic calibration curve, forced through zero for each analyte. Weighting may be used. The lowest calibration point must be at or below the minimum reporting limit (or LOQ). Each target compound within each calibration level must be within 70 to 130% of the true value, except for the lowest point of the curve, which must be within 50 to 150% of the true value. Surrogate concentrations must be within 70 to 130% of the true value.	Evaluate standards, chromatography, and mass spectrometer response. If problem found with above, correct as appropriate, then repeat ICAL.	Analyst	5-371-07
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 537.1 Version 2	Peak Asymmetry Verification	With ICAL, using a midrange calibration standard.	For the first two eluting peaks, calculated factor in the range of 0.8 to 1.5.	Change instrument conditions to correct, then repeat ICAL.	Analyst	5-371-07

SAP Worksheet #24—Analytical Instrument Calibration Table (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 537.1 Version 2	Retention Time Windows	Prior to sample analysis.	Retention time windows should be based on measurements of actual retention time variation for each method analyte over the course of time. A value of plus or minus three times the standard deviation of the retention time obtained for each method analyte while establishing the ICAL and completing the initial demonstration of capability can be used to calculate a suggested retention time window size. However, the experience of the analyst should weigh heavily on the determination of the appropriate retention window size.	Dilute extract and reanalyze. Recalibrate if necessary to reestablish retention times.	Analyst	5-371-07
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 537.1 Version 2	Second-source QC Sample	Analyze at least quarterly or when preparing new standards.	All reported analytes and labeled compounds within ± 30% of true value.	Evaluate data. If problem (e.g., concentrated standard, plugged transfer line) found, correct, then repeat second-source verification. If it still fails, then repeat ICAL.	Analyst	5-371-07

SAP Worksheet #24—Analytical Instrument Calibration Table (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
LC/MS/MS (for PFAS in Drinking Water) by EPA Method 537.1 Version 2	CCC	Verify ICAL by analyzing a low-level (at the LOQ or below) CCC prior to analyzing samples. CCCs are then injected after every 10 samples and after the last sample, rotating concentrations to cover the calibrated range of the instrument.	Recovery for each analyte and surrogate must be within 70 to 130% of the true value for all but the lowest level of calibration. Recovery for each analyte in the lowest calibration level CCC must be within 50 to 150% of the true value, and the surrogate must be within 70 to 130% of the true value.	If this criteria is not met, then all data for the problem analyte must be considered invalid, and remedial action should be taken which may require recalibration. Any field or QC samples that have been analyzed since the last acceptable calibration verification that are still within holding time must be reanalyzed after adequate calibration has been restored, with the following exception. If the CCC fails because the calculated concentration is greater than 130% (150% for the low-level CCC) for a particular method analyte, and field sample extracts show no detection for that method analyte, nondetects may be reported without reanalysis.	Analyst	5-371-07

Notes:

EPA Method 533 and EPA Method 537.1 Version 2 are the basis for method performance criteria in this table.

± = plus or minus

m/z = mass-to-charge ratio

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SAP Worksheet #25—Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
LC/MS/MS	Clean Curtain Plate	PFAS	Visual inspection of curtain plate for residue.	As needed when curtain plate has visible residue present	No visible residue on curtain plate	Remove and clean the instrument curtain plate	Analyst	5-371-07/ 5-379-01
LC/MS/MS	Preventative Maintenance	PFAS	Degradation of instrument performance	Every 6 months or when instrument performance deteriorates	ICAL within acceptance criteria on **Worksheet #24** and internal standards (IS) recovery within acceptance criteria on **Worksheet #28**	Service provider performs Preventative Maintenance and mass calibration. Run tune check. Reanalyze samples with new ICAL, initial calibration curve (ICC), instrument sensitivity check (ISC), and instrument blank.	Analyst	5-371-07/ 5-379-01
LC/MS/MS	Replace analytical column	PFAS	Review peak shape, retention times, and peak separation on ICAL, ICC, and continuing calibration verification samples.	Performed when chromatography deteriorates	ICAL within acceptance criteria on **Worksheet #24** and IS recovery within acceptance criteria on **Worksheet #28**	Replace analytical column. Reanalyze samples with new ICAL, ICC, ISC, and instrument blank.	Analyst	5-371-07/ 5-379-01

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SAP Worksheet #28-1—Laboratory QC Samples Table

Matrix: Drinking Water
Analytical Group: PFAS
Analytical Method/ SOP Reference: USEPA Method 533/SOP 5-379-01

QC Sample[a]	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicators
Laboratory Reagent Blank	One per prep batch of up to 20 samples.	For the determination of native PFAS, the levels measured in the method blank of all method analytes must be below 1/3 the LOQ.	Verify instrument is clean (evaluate calibration blank and samples prior to method blank), then reanalyze. Evaluate to determine if systematic issue within laboratory, correct, then reprep and reanalyze the method blank and all samples processed with the contaminated blank.	Analyst/ Supervisor	Bias/ Contamination
Isotope Performance Standards	All standards and sample extracts.	Peak area counts for each isotope performance standard must be within 50 to 150% of the average peak area in the ICAL.	If an isotope performance standard area for a sample does not meet these criteria, reanalyze the extract in a subsequent analysis batch. If the isotope performance standard area fails to meet the acceptance criteria in the repeat analysis, extraction of the sample must be repeated, provided the sample is still within holding time.	Analyst/ Supervisor	Accuracy
IDA	All samples prior to extraction.	50% to 200% recovery for each analogue.	If an IDA fails to meet the recovery criterion, evaluate the area of the isotope performance standard to which the analogue is referenced and the recovery of the analogues in the CCCs. If necessary, recalibrate and service the LC/MS/MS system. Take CA, then analyze the failed extract in a subsequent analysis batch. If the repeat analysis meets the 50 to 200% recovery criterion, report only data for the reanalyzed extract. If the repeat analysis fails the recovery criterion after CA, extraction of the sample must be repeated provided a sample is available and still within the holding time.	Analyst/ Supervisor	Accuracy/ Precision
Laboratory Fortified Blank (LFB)	One LFB is required for each extraction batch of up to 20 field samples. Rotate the fortified concentrations between low, medium, and high amounts.	For analytes fortified at concentrations ≤ 2 times the LOQ, the result must be within 50 to 150% of the true value; 70 to 130% of the true value if fortified at concentrations greater than 2 times the LOQ.	Reanalyze LFB once. If acceptable, report. Evaluate samples for detections, and LFB for high bias. If LFB has high bias, and samples nondetect, report with case narrative comment. If LFB has low bias, or if there are detections for critical chemicals of concern, evaluate and reprepare and reanalyze the LFB and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	Analyst/ Supervisor	Accuracy/ Bias

SAP Worksheet #28-1—Laboratory QC Samples Table (continued)

QC Sample[a]	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicators
LFSM	Include one LFSM per extraction batch. Fortify the LFSM with method analytes at a concentration close to but greater than the native concentrations (if known).	For analytes fortified at concentrations ≤ 2 times the LOQ, the result must be within 50 to 150% of the true value; 70 to 130% of the true value if fortified at concentrations greater than 2 times the LOQ.	Evaluate the data, and reprep/reanalyze the native sample and LFSM/LFSMD pair if laboratory error is indicated.	Analyst/ Supervisor	Accuracy/ Bias
LFSMD or FD (FD)	Include at least one LFSMD or FD with each extraction batch.	For analytes fortified at concentrations ≤ 2 times the LOQ, the result must be within 50 to 150% of the true value; 70 to 130% of the true value if fortified at concentrations greater than 2 times the LOQ. For LFSMDs or FDs, relative percent differences must be ≤ 30% (≤ 50% if analyte concentration ≤ 2 times the LOQ).	Evaluate the data, and reprepare/reanalyze the native sample and LFSM/LFSMD pair if laboratory error is indicated.	Analyst/ Supervisor	Precision/ Accuracy/ Bias
LOD Verification	Quarterly for every analyte.	Spike a quality system matrix at concentration 2 to 4 times the DL. Must meet 3:1 signal-to-noise ratio, or for data systems that do not measure noise, results must be at least 3 standard deviations greater than the mean method blank concentration.	If verification fails, the DL determination must be repeated and a LOD verification. Alternatively pass two consecutive LOD verification at a higher spike and set the LOD at the higher concentration.	Analyst/ Supervisor	Accuracy/ Sensitivity
LOQ Verification	Quarterly for every analyte.	Spike a quality system matrix at a concentration equal to or greater than the low point of the calibration curve.	Must meet laboratory-specified precision and bias limits. If LOQ fails, repeat at a higher level until limits are met.	Analyst/ Supervisor	Precision/ Bias

[a] EPA Method 533 is the basis for method performance criteria in this table.

≤ = less than or equal to.

SAP Worksheet #28-2—Laboratory QC Samples Table

Matrix: Drinking Water
Analytical Group: PFAS
Analytical Method/ SOP Reference: USEPA Method 537.1 Version 2/SOP 5-371-07

QC Sample[a]	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicators
Laboratory Reagent Blank	One per prepatory batch of up to 20 samples.	For the determination of native PFAS, the levels measured in the method blank of all method analytes must be below 1/3 the LOQ.	Correct problem. Reprepare and reanalyze method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, the data must be qualified and explained in the case narrative.	Analyst/ Supervisor	Bias/ Contamination
LFB	One LFB is required for each extraction batch of up to 20 field samples. Rotate the fortified concentrations between low, medium, and high amounts.	Results of LFB analyses must be 70 to 130% of the true value for each method analyte for all fortified concentrations except the lowest calibration point. Results of the LFBs corresponding to the lowest calibration point for each method analyte must be 50 to 150% of the true value.	Correct problem, reprepare, and reanalyze LFB and all samples in associated batch for failed analytes. If reanalysis cannot be performed, the data must be qualified and explained in the case narrative.	Analyst/ Supervisor	Accuracy/ Bias
LFSM	Analyze one LFSM per extraction batch (20 samples or less) fortified with method analytes at a concentration close to but greater than the native concentration, if known.	Recoveries at mid and high levels must be within 70 to 130% and within 50 to 150% at the low-level fortified amount (near the LOQ).	Evaluate the data to determine if the failed criteria are due to sample matrix or laboratory error. Reprepare if sufficient sample is available when laboratory error is suspected; otherwise, qualify data with narrative.	Analyst/ Supervisor	Accuracy/ Bias
LFSMD	Analyze one LFSMD per extraction batch (20 samples or less) fortified with method analytes at a concentration close to but greater than the native concentration, if known.	Recoveries at mid and high levels must be within 70 to 130% and within 50 to 150% at the low-level fortified amount (near the LOQ). Method analyte RPDs for the LFSMD or FD must be ≤ 30% at mid and high levels of fortification and ≤ 50% near the LOQ.	Evaluate the data to determine if the failed criteria are due to sample matrix or laboratory error. Reprepare if sufficient sample is available when laboratory error is suspected; otherwise, qualify data with narrative.	Analyst/ Supervisor	Precision/ Accuracy/ Bias

SAP Worksheet #28-2—Laboratory QC Samples Table (continued)

QC Sample[a]	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicators
Surrogates Standards	Every field sample, standard, blank, and QC sample.	Within 70 to 130% of true value.	Identify and correct the problem. Reprepare and reanalyze all samples with failed surrogates in the associated preparatory batch. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary. Qualify all applicable data if acceptance criteria are not met and explain in case narrative.	Analyst/ Supervisor	Accuracy/ Precision
IS	Every field sample, standard, blank, and QC sample.	Peak area counts for all ISs in all injections must be within ± 50% of the average peak area calculated during the ICAL and 70 to 140% from the most recent CCC. If ISs do not meet this criterion, corresponding target results are invalid.	If peak areas are unacceptable, analyze a second aliquot of the extract or sample if enough extract remains. If there is not enough extract, reanalyze the first aliquot. If second analysis meets acceptance criteria, report the second analysis. If it fails, either analysis may be reported with the appropriate flags.	Analyst/ Supervisor	Accuracy
LOD Verification	Quarterly for every analyte.	Spike a quality system matrix at concentration 2-4x the DL. Must meet 3:1 signal-to-noise ratio, or for data systems that do not measure noise, results must be at least 3 standard deviations greater than the mean method blank concentration.	If verification fails, the DL determination must be repeated and a LOD verification. Alternatively pass two consecutive LOD verification at a higher spike and set the LOD at the higher concentration.	Analyst/ Supervisor	Accuracy/ Sensitivity
LOQ Verification	Quarterly for every analyte.	Spike a quality system matrix at a concentration equal to or greater than the low point of the calibration curve.	Must meet laboratory-specified precision and bias limits. If LOQ fails, repeat at a higher level until limits are met.	Analyst/ Supervisor	Precision/ Bias

[a] EPA Method 537.1 Version 2 is the basis for method performance criteria in this table.

≤ = less than or equal to

PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

Perry Johnson Laboratory Accreditation, Inc.
has assessed the Organization of:

Battelle
141 Longwater Drive, Suite 202, Norwell, MA 02061

(Hereinafter called the Organization) and hereby declares that Organization has met the requirements of ISO/IEC 17025:2017 General Requirements for the competence of Testing and Calibration Laboratories and the United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP) requirements identified within the DoD/DOE Quality Systems Manual (DoD/DOE QSM) Version 5.4 October 2021 and is accredited in accordance with the:

United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP)

This accreditation demonstrates the technical competence for the defined scope and the operation of a laboratory quality management system
(as outlined by the joint ISO-ILAC-IAF Communiqué dated April 2017):

Environmental Testing
(As detailed in the supplement)

Accreditation claims for such activities shall only be made from the addresses referenced within this certificate. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation Body's duty to observe and comply with the said rules.

Initial Accreditation Date:	*Issue Date:*	*Expiration Date*
November 17, 2016	March 28, 2023	April 30, 2025

For PJLA

Tracy Szerszen
President

Accreditation No:	*Certificate No:*
91667	L23-262

Perry Johnson Laboratory Accreditation, Inc. (PJLA)
755 W. Big Beaver, Suite 1325
Troy, Michigan 48084

The validity of this certificate is maintained through ongoing assessments based on a continuous accreditation cycle. The validity of this certificate should be confirmed through the PJLA website: **www.pjlabs.com**

Certificate of Accreditation: Supplement

Battelle
141 Longwater Drive, Suite 202, Norwell, MA 02061
Contact Name: Jonathan Thorn Phone: 781-681-5565

Accreditation is granted to the facility to perform the following testing:

	Code
Organic	
Draft EPA Method 1633 by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)	10123429
Aqueous	
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	9490
1H, 1H, 2H, 2H-Perfluorodecanesulfonic Acid (8:2 Fluorotelomersulfonic Acid, 8:2FTS)	6948
1H, 1H, 2H, 2H-Perfluorohexanesulfonic Acid (4:2 Fluorotelomersulfonic Acid, 4:2FTS)	6946
1H, 1H, 2H, 2H-Perfluorooctanesulfonic Acid (6:2 Fluorotelomersulfonic Acid, 6:2FTS)	6947
2H,2H,3H,3H-Perfluorodecanoic Acid (7:3 FTCA, 3-Perfluoroheptyl Propanoic Acid)	9340
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3 FTCA)	9338
4,4,5,5,6,6,6-Heptafluorohexanoi Acid (3:3 FTCA, 3-Perfluoropropyl Propanoic Acid)	9353
4,8-dioxa-3H-perfluorononanoic Acid (ADONA)	6951
9-Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid (9-Cl-PF3ONS)	6952
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	9460
N-ethyl perfluorooctanesulfonamide (EtFOSA)	9395
N-ethyl perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	4847
N-ethyl perfluorooctanesulfonamidoethanol (EtFOSE)	9431
N-methyl perfluorooctanesulfonamide (MeFOSA)	9433
N-methyl perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	4846
N-methyl perfluorooctanesulfonamidoethanol (MeFOSE)	6949
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	6956
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	6957
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	6965
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	6966
Perfluorobutanesulfonic Acid (PFBS)	6918
Perfluorobutanoic Acid (PFBA)	6915
Perfluorodecanesulfonic Acid (PFDS)	6920
Perfluorodecanoic Acid (PFDA)	6905
Perfluorododecanesulfonic Acid (PFDoS)	6923
Perfluorododecanoic Acid (PFDoA)	6903
Perfluoroheptanesulfonic Acid (PFHpS)	9470
Perfluoroheptanoic Acid (PFHpA)	6908
Perfluorohexanesulfonic Acid (PFHxS)	6927
Perfluorohexanoic Acid (PFHxA)	6913
Perfluorononanesulfonic Acid (PFNS)	6929
Perfluorononanoic Acid (PFNA)	6906
Perfluorooctanesulfonamide (PFOSA)	6917
Perfluorooctanesulfonic Acid (PFOS)	6931
Perfluorooctanoic Acid (PFOA)	6912
Perfluoropentanesulfonic Acid (PFPeS)	6934

Certificate of Accreditation: Supplement

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Contact Name: Jonathan Thorn Phone: 781-681-5565

Accreditation is granted to the facility to perform the following testing:

	Code
Organic	
Draft EPA Method 1633 by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)	10123429
Aqueous	
Perfluoropentanoic Acid (PFPeA)	6914
Perfluorotetradecanoic Acid (PFTeDA)	6902
Perfluorotridecanoic Acid (PFTrDA)	9563
Perfluoroundecanoic Acid (PFUnA)	6904
Solid	
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	9490
1H, 1H, 2H, 2H-Perfluorodecanesulfonic Acid (8:2 Fluorotelomersulfonic Acid, 8:2FTS)	6948
1H, 1H, 2H, 2H-Perfluorohexanesulfonic Acid (4:2 Fluorotelomersulfonic Acid, 4:2FTS)	6946
1H, 1H, 2H, 2H-Perfluorooctanesulfonic Acid (6:2 Fluorotelomersulfonic Acid, 6:2FTS)	6947
2H,2H,3H,3H-Perfluorodecanoic Acid (7:3 FTCA, 3-Perfluoroheptyl Propanoic Acid)	9340
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3 FTCA)	9338
4,4,5,5,6,6,6-Heptafluorohexanoi Acid (3:3 FTCA, 3-Perfluoropropyl Propanoic Acid)	9353
4,8-dioxa-3H-perfluorononanoic Acid (ADONA)	6951
9-Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid (9-Cl-PF3ONS)	6952
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	9460
N-ethyl perfluorooctanesulfonamide (EtFOSA)	9395
N-ethyl perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	4847
N-ethyl perfluorooctanesulfonamidoethanol (EtFOSE)	9431
N-methyl perfluorooctanesulfonamide (MeFOSA)	9433
N-methyl perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	4846
N-methyl perfluorooctanesulfonamidoethanol (MeFOSE)	6949
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	6956
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	6957
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	6965
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	6966
Perfluorobutanesulfonic Acid (PFBS)	6918
Perfluorobutanoic Acid (PFBA)	6915
Perfluorodecanesulfonic Acid (PFDS)	6920
Perfluorodecanoic Acid (PFDA)	6905
Perfluorododecanesulfonic Acid (PFDoS)	6923
Perfluorododecanoic Acid (PFDoA)	6903
Perfluoroheptanesulfonic Acid (PFHpS)	9470
Perfluoroheptanoic Acid (PFHpA)	6908
Perfluorohexanesulfonic Acid (PFHxS)	6927
Perfluorohexanoic Acid (PFHxA)	6913
Perfluorononanesulfonic Acid (PFNS)	6929

Certificate of Accreditation: Supplement

Battelle
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Accreditation is granted to the facility to perform the following testing:

	Code
Organic	
Draft EPA Method 1633 by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)	10123429
Solid	
Perfluorononanoic Acid (PFNA)	6906
Perfluorooctanesulfonamide (PFOSA)	6917
Perfluorooctanesulfonic Acid (PFOS)	6931
Perfluorooctanoic Acid (PFOA)	6912
Perfluoropentanesulfonic Acid (PFPeS)	6934
Perfluoropentanoic Acid (PFPeA)	6914
Perfluorotetradecanoic Acid (PFTeDA)	6902
Perfluorotridecanoic Acid (PFTrDA)	9563
Perfluoroundecanoic Acid (PFUnA)	6904
Tissue	
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	9490
1H, 1H, 2H, 2H-Perfluorodecanesulfonic Acid (8:2 Fluorotelomersulfonic Acid, 8:2FTS)	6948
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2H,2H,3H,3H-Perfluorodecanoic Acid (7:3 FTCA, 3-Perfluoroheptyl Propanoic Acid)	9340
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N-ethyl perfluorooctanesulfonamidoethanol (EtFOSE)	9431
N-methyl perfluorooctanesulfonamide (MeFOSA)	9433
N-methyl perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	4846
N-methyl perfluorooctanesulfonamidoethanol (MeFOSE)	6949
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	6956
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	6957
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	6965
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	6966
Perfluorobutanesulfonic Acid (PFBS)	6918
Perfluorobutanoic Acid (PFBA)	6915
Perfluorodecanesulfonic Acid (PFDS)	6920
Perfluorodecanoic Acid (PFDA)	6905
Perfluorododecanesulfonic Acid (PFDoS)	6923
Perfluorododecanoic Acid (PFDoA)	6903

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Battelle
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Accreditation is granted to the facility to perform the following testing:

	Code
Organic	
Draft EPA Method 1633 by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)	10123429
Tissue	
Perfluoroheptanesulfonic Acid (PFHpS)	9470
Perfluoroheptanoic Acid (PFHpA)	6908
Perfluorohexanesulfonic Acid (PFHxS)	6927
Perfluorohexanoic Acid (PFHxA)	6913
Perfluorononanesulfonic Acid (PFNS)	6929
Perfluorononanoic Acid (PFNA)	6906
Perfluorooctanesulfonamide (PFOSA)	6917
Perfluorooctanesulfonic Acid (PFOS)	6931
Perfluorooctanoic Acid (PFOA)	6912
Perfluoropentanesulfonic Acid (PFPeS)	6934
Perfluoropentanoic Acid (PFPeA)	6914
Perfluorotetradecanoic Acid (PFTeDA)	6902
Perfluorotridecanoic Acid (PFTrDA)	9563
Perfluoroundecanoic Acid (PFUnA)	6904
EPA 533 by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)	10091619
Drinking Water	
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	9490
1H, 1H, 2H, 2H-Perfluorodecane Sulfonic Acid (8:2 FTS)	6948
1H, 1H, 2H, 2H-Perfluorohexane Sulfonic Acid (4:2 FTS)	6946
1H, 1H, 2H, 2H-Perfluorooctane Sulfonic Acid (6:2 FTS)	6947
9-Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid (9-Cl-PF3ONS)	6952
Ammonium 4,8-Dioxa-3H-Perfluorononanoate (ADONA)	6953
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA) – GenX	9460
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	6956
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	6957
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	6965
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	6966
Perfluorobutanesulfonic Acid (PFBS)	6918
Perfluorobutanoic Acid (PFBA)	6915
Perfluorodecanoic Acid (PFDA)	6905
Perfluorododecanoic Acid (PFDoA)	6903
Perfluoroheptanesulfonic Acid (PFHpS)	9470
Perfluoroheptanoic Acid (PFHpA)	6908
Perfluorohexanesulfonic Acid (PFHxS)	6927
Perfluorohexanoic Acid (PFHxA)	6913
Perfluorononanoic Acid (PFNA)	6906

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Accreditation is granted to the facility to perform the following testing:

	Code
Organic	
EPA 533 by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)	10091619
Drinking Water	
Perfluorooctanesulfonic Acid (PFOS)	6931
Perfluorooctanoic Acid (PFOA)	6912
Perfluoropentanesulfonic Acid (PFPeS)	6934
Perfluoropentanoic Acid (PFPeA)	6914
Perfluoroundecanoic Acid (PFUnA)	6904
EPA 537.1.1 by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)	10091642
Drinking Water	
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	9490
9-Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid (9-Cl-PF3ONS)	6952
Ammonium 4,8-Dioxa-3H-Perfluorononanoate (ADONA)	6953
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA) – GenX	9460
N-Ethylperfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	4846
N-Methylperfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	4847
Perfluorobutanesulfonic Acid (PFBS)	6918
Perfluorodecanoic Acid (PFDA)	6905
Perfluorododecanoic Acid (PFDoA)	6903
Perfluoroheptanoic Acid (PFHpA)	6908
Perfluorohexanesulfonic Acid (PFHxS)	6927
Perfluorohexanoic Acid (PFHxA)	6913
Perfluorononanoic Acid (PFNA)	6906
Perfluorooctanesulfonic Acid (PFOS)	6931
Perfluorooctanoic Acid (PFOA)	6912
Perfluorotetradecanoic Acid (PFTeDA)	6902
Perfluorotridecanoic Acid (PFTrDA)	9563
Perfluoroundecanoic Acid (PFUnA)	6904
EPA 8081 MOD (Battelle SOP 5-128) by Gas Chromatography Electron Capture Detector (GC/ECD)	10178402
Aqueous	
2,4'-DDD	8580
2,4'-DDE	8585
2,4'-DDT	8590
4,4'-DDD	7355
4,4'-DDE	7360
4,4'-DDT	7365
Aldrin	7025
alpha-BHC (a-BHC, alpha-Hexachlorocyclohexane)	7110
alpha-Chlordane (cis-Chlordane)	7240

Battelle
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Accreditation is granted to the facility to perform the following testing:

	Code
Organic	
EPA 8081 MOD (Battelle SOP 5-128) by Gas Chromatography Electron Capture Detector (GC/ECD)	10178402
Aqueous	
beta-BHC (b-BHC, beta-Hexachlorocyclohexane)	7115
Chlorpyrifos (Dursban)	7300
cis-Nonachlor	7925
delta-BHC (d-BHC)	7105
Dieldrin	7470
Endosulfan I	7510
Endosulfan II	7515
Endosulfan Sulfate	7520
Endrin	7540
Endrin Aldehyde	7530
Endrin Ketone	7535
gamma-BHC (γ-BHC, Lindane)	7120
gamma-Chlordane	7245
Heptachlor	7685
Heptachlor Epoxide	7690
Hexachlorobenzene	6275
Methoxychlor	7810
Mirex	7870
Oxychlordane	3890
PCB-101 (2,2',4,5,5'-Pentachlorobiphenyl)	8980
PCB-105 (2,3,3',4,4'-Pentachlorobiphenyl)	8985
PCB-110 (2,3,3',4',6-Pentachlorobiphenyl)	8990
PCB-118 (2,3',4,4',5-Pentachlorobiphenyl)	8995
PCB-126 (3,3',4,4',5-Pentachlorobiphenyl)	9015
PCB-128 (2,2',3,3',4,4'-Hexachlorobiphenyl)	9020
PCB-129 (2,2',3,3',4,5-Hexachlorobiphenyl)	9118
PCB-138 (2,2',3,4,4',5'-Hexachlorobiphenyl)	9025
PCB-153 (2,2',4,4',5,5'-Hexachlorobiphenyl)	9040
PCB-169 (3,3',4,4',5,5'-Hexachlorobiphenyl)	9060
PCB-170 (2,2',3,3',4,4',5-Heptachlorobiphenyl)	9065
PCB-18 (2,2',5-Trichlorobiphenyl)	8930
PCB-180 (2,2',3,4,4',5,5'-Heptachlorobiphenyl)	9134
PCB-183 (2,2',3,4,4',5',6-Heptachlorobiphenyl)	9075
PCB-184 (2,2',3,4,4',6,6'-Heptachlorobiphenyl)	9139
PCB-187 (2,2',3,4',5,5',6-Heptachlorobiphenyl)	9080
PCB-195 (2,2',3,3',4,4',5,6-Octachlorobiphenyl)	9103

Certificate of Accreditation: Supplement

Battelle
141 Longwater Drive, Suite 202, Norwell, MA 02061
Contact Name: Jonathan Thorn Phone: 781-681-5565

Accreditation is granted to the facility to perform the following testing:

	Code
Organic	
EPA 8081 MOD (Battelle SOP 5-128) by Gas Chromatography Electron Capture Detector (GC/ECD)	10178402
Aqueous	
PCB-206 (2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl)	9095
PCB-209 (2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl)	9105
PCB-28 (2,4,4'-Trichlorobiphenyl)	9252
PCB-44 (2,2',3,5'-Tetrachlorobiphenyl)	8945
PCB-49 (2,2',4,5'-Tetrachlorobiphenyl)	8950
PCB-52 (2,2',5,5'-Tetrachlorobiphenyl)	8955
PCB-66 (2,3',4,4'-Tetrachlorobiphenyl)	8960
PCB-77 (3,3',4,4'-Tetrachlorobiphenyl)	8965
PCB-8 (2,4'-Dichlorobiphenyl)	9256
PCB-87 (2,2',3,4,5'-Pentachlorobiphenyl)	8975
trans-Nonachlor	7910
Solid	
2,4'-DDD	8580
2,4'-DDE	8585
2,4'-DDT	8590
4,4'-DDD	7355
4,4'-DDE	7360
4,4'-DDT	7365
Aldrin	7025
alpha-BHC (a-BHC, alpha-Hexachlorocyclohexane)	7110
alpha-Chlordane (cis-Chlordane)	7240
beta-BHC (b-BHC, beta-Hexachlorocyclohexane)	7115
Chlorpyrifos (Dursban)	7300
cis-Nonachlor	7925
delta-BHC (d-BHC)	7105
Dieldrin	7470
Endosulfan I	7510
Endosulfan II	7515
Endosulfan Sulfate	7520
Endrin	7540
Endrin Aldehyde	7530
Endrin Ketone	7535
gamma-BHC (γ-BHC, Lindane)	7120
gamma-Chlordane	7245
Heptachlor	7685
Heptachlor Epoxide	7690

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	Code
Organic	
EPA 8081 MOD (Battelle SOP 5-128) by Gas Chromatography Electron Capture Detector (GC/ECD)	10178402
Solid	
Hexachlorobenzene	6275
Methoxychlor	7810
Mirex	7870
Oxychlordane	3890
PCB-101 (2,2',4,5,5'-Pentachlorobiphenyl)	8980
PCB-105 (2,3,3',4,4'-Pentachlorobiphenyl)	8985
PCB-110 (2,3,3',4',6-Pentachlorobiphenyl)	8990
PCB-118 (2,3',4,4',5-Pentachlorobiphenyl)	8995
PCB-126 (3,3',4,4',5-Pentachlorobiphenyl)	9015
PCB-128 (2,2',3,3',4,4'-Hexachlorobiphenyl)	9020
PCB-129 (2,2',3,3',4,5-Hexachlorobiphenyl)	9118
PCB-138 (2,2',3,4,4',5'-Hexachlorobiphenyl)	9025
PCB-153 (2,2',4,4',5,5'-Hexachlorobiphenyl)	9040
PCB-169 (3,3',4,4',5,5'-Hexachlorobiphenyl)	9060
PCB-170 (2,2',3,3',4,4',5-Heptachlorobiphenyl)	9065
PCB-18 (2,2',5-Trichlorobiphenyl)	8930
PCB-180 (2,2',3,4,4',5,5'-Heptachlorobiphenyl)	9134
PCB-183 (2,2',3,4,4',5',6-Heptachlorobiphenyl)	9075
PCB-184 (2,2',3,4,4',6,6'-Heptachlorobiphenyl)	9139
PCB-187 (2,2',3,4',5,5',6-Heptachlorobiphenyl)	9080
PCB-195 (2,2',3,3',4,4',5,6-Octachlorobiphenyl)	9103
PCB-206 (2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl)	9095
PCB-209 (2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl)	9105
PCB-28 (2,4,4'-Trichlorobiphenyl)	9252
PCB-44 (2,2',3,5'-Tetrachlorobiphenyl)	8945
PCB-49 (2,2',4,5'-Tetrachlorobiphenyl)	8950
PCB-52 (2,2',5,5'-Tetrachlorobiphenyl)	8955
PCB-66 (2,3',4,4'-Tetrachlorobiphenyl)	8960
PCB-77 (3,3',4,4'-Tetrachlorobiphenyl)	8965
PCB-8 (2,4'-Dichlorobiphenyl)	9256
PCB-87 (2,2',3,4,5'-Pentachlorobiphenyl)	8975
trans-Nonachlor	7910
Tissue	
2,4'-DDD	8580
2,4'-DDE	8585
2,4'-DDT	8590

Certificate of Accreditation: Supplement

Battelle
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Contact Name: Jonathan Thorn Phone: 781-681-5565

Accreditation is granted to the facility to perform the following testing:

	Code
Organic	
EPA 8081 MOD (Battelle SOP 5-128) by Gas Chromatography Electron Capture Detector (GC/ECD)	10178402
Tissue	
4,4'-DDD	7355
4,4'-DDE	7360
4,4'-DDT	7365
Aldrin	7025
alpha-BHC (a-BHC, alpha-Hexachlorocyclohexane)	7110
alpha-Chlordane (cis-Chlordane)	7240
beta-BHC (b-BHC, beta-Hexachlorocyclohexane)	7115
Chlorpyrifos (Dursban)	7300
cis-Nonachlor	7925
delta-BHC (d-BHC)	7105
Dieldrin	7470
Endosulfan I	7510
Endosulfan II	7515
Endosulfan Sulfate	7520
Endrin	7540
Endrin Aldehyde	7530
Endrin Ketone	7535
gamma-BHC (γ-BHC, Lindane)	7120
gamma-Chlordane	7245
Heptachlor	7685
Heptachlor Epoxide	7690
Hexachlorobenzene	6275
Methoxychlor	7810
Mirex	7870
Oxychlordane	3890
PCB-101 (2,2',4,5,5'-Pentachlorobiphenyl)	8980
PCB-105 (2,3,3',4,4'-Pentachlorobiphenyl)	8985
PCB-110 (2,3,3',4',6-Pentachlorobiphenyl)	8990
PCB-118 (2,3',4,4',5-Pentachlorobiphenyl)	8995
PCB-126 (3,3',4,4',5-Pentachlorobiphenyl)	9015
PCB-128 (2,2',3,3',4,4'-Hexachlorobiphenyl)	9020
PCB-129 (2,2',3,3',4,5-Hexachlorobiphenyl)	9118
PCB-138 (2,2',3,4,4',5'-Hexachlorobiphenyl)	9025
PCB-153 (2,2',4,4',5,5'-Hexachlorobiphenyl)	9040
PCB-169 (3,3',4,4',5,5'-Hexachlorobiphenyl)	9060
PCB-170 (2,2',3,3',4,4',5-Heptachlorobiphenyl)	9065

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	Code
Organic	
EPA 8081 MOD (Battelle SOP 5-128) by Gas Chromatography Electron Capture Detector (GC/ECD)	10178402
Tissue	
PCB-18 (2,2',5-Trichlorobiphenyl)	8930
PCB-180 (2,2',3,4,4',5,5'-Heptachlorobiphenyl)	9134
PCB-183 (2,2',3,4,4',5',6-Heptachlorobiphenyl)	9075
PCB-184 (2,2',3,4,4',6,6'-Heptachlorobiphenyl)	9139
PCB-187 (2,2',3,4',5,5',6-Heptachlorobiphenyl)	9080
PCB-195 (2,2',3,3',4,4',5,6-Octachlorobiphenyl)	9103
PCB-206 (2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl)	9095
PCB-209 (2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl)	9105
PCB-28 (2,4,4'-Trichlorobiphenyl)	9252
PCB-44 (2,2',3,5'-Tetrachlorobiphenyl)	8945
PCB-49 (2,2',4,5'-Tetrachlorobiphenyl)	8950
PCB-52 (2,2',5,5'-Tetrachlorobiphenyl)	8955
PCB-66 (2,3',4,4'-Tetrachlorobiphenyl)	8960
PCB-77 (3,3',4,4'-Tetrachlorobiphenyl)	8965
PCB-8 (2,4'-Dichlorobiphenyl)	9256
PCB-87 (2,2',3,4,5'-Pentachlorobiphenyl)	8975
trans-Nonachlor	7910
EPA 8270E MOD (Battelle SOP 5-157) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Aqueous	
1,4-Dichlorobenzene	4620
1-Methylnaphthalene	6380
1-Methylphenanthrene	9501
2,3,5-Trimethylnaphthalene	6852
2,6-Dimethylnaphthalene	6188
2-Chloronaphthalene	5795
2-Methylnaphthalene	6385
2-Methylphenanthrene	4953
3,6-Dimethylphenanthrene	5957
Acenaphthene	5500
Acenaphthylene	5505
Anthracene	5555
Benzo(a)Anthracene	5575
Benzo(a)Pyrene	5580
Benzo(b)Fluoranthene	5585
Benzo(b)Thiophene	NC
Benzo(e)Pyrene	5605

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	Code
Organic	
EPA 8270E MOD (Battelle SOP 5-157) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Aqueous	
Benzo(g,h,i)Perylene	5590
Benzo(k)Fluoranthene	5600
Chrysene	5855
cis-Decalin	4621
Dibenz(a,h)Anthracene	5895
Dibenzofuran	5905
Dibenzothiophene	5910
Fluoranthene	6265
Fluorene	6270
Indeno(1,2,3,cd)Pyrene	6315
Naphthalene	5005
Perylene	6608
Phenanthrene	6615
Pyrene	6665
trans-Decalin	9587
Solid	
1,4-Dichlorobenzene	4620
1-Methylnaphthalene	6380
1-Methylphenanthrene	9501
2,3,5-Trimethylnaphthalene	6852
2,6-Dimethylnaphthalene	6188
2-Chloronaphthalene	5795
2-Methylnaphthalene	6385
2-Methylphenanthrene	4953
3,6-Dimethylphenanthrene	5957
Acenaphthene	5500
Acenaphthylene	5505
Anthracene	5555
Benzo(a)Anthracene	5575
Benzo(a)Pyrene	5580
Benzo(b)Fluoranthene	5585
Benzo(b)Thiophene	NC
Benzo(e)Pyrene	5605
Benzo(g,h,i)Perylene	5590
Benzo(k)Fluoranthene	5600
Chrysene	5855

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Accreditation is granted to the facility to perform the following testing:

	Code
Organic	
EPA 8270E MOD (Battelle SOP 5-157) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Solid	
cis-Decalin	4621
Dibenz(a,h)Anthracene	5895
Dibenzofuran	5905
Dibenzothiophene	5910
Fluoranthene	6265
Fluorene	6270
Indeno(1,2,3,cd)Pyrene	6315
Naphthalene	5005
Perylene	6608
Phenanthrene	6615
Pyrene	6665
trans-Decalin	9587
Tissue	
1,4-Dichlorobenzene	4620
1-Methylnaphthalene	6380
1-Methylphenanthrene	9501
2,3,5-Trimethylnaphthalene	6852
2,6-Dimethylnaphthalene	6188
2-Chloronaphthalene	5795
2-Methylnaphthalene	6385
2-Methylphenanthrene	4953
3,6-Dimethylphenanthrene	5957
Acenaphthene	5500
Acenaphthylene	5505
Anthracene	5555
Benzo(a)Anthracene	5575
Benzo(a)Pyrene	5580
Benzo(b)Fluoranthene	5585
Benzo(b)Thiophene	NC
Benzo(e)Pyrene	5605
Benzo(g,h,i)Perylene	5590
Benzo(k)Fluoranthene	5600
Chrysene	5855
cis-Decalin	4621
Dibenz(a,h)Anthracene	5895
Dibenzofuran	5905

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	Code
Organic	
EPA 8270E MOD (Battelle SOP 5-157) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Tissue	
Dibenzothiophene	5910
Fluoranthene	6265
Fluorene	6270
Indeno(1,2,3,cd)Pyrene	6315
Naphthalene	5005
Perylene	6608
Phenanthrene	6615
Pyrene	6665
trans-Decalin	9587
EPA 8270E MOD (Battelle SOP 5-315) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Aqueous	
2,4'-DDD	8580
2,4'-DDE	8585
2,4'-DDT	8590
4,4'-DDD	7355
4,4'-DDE	7360
4,4'-DDT	7365
Biphenyl	5640
PCB-1 (2-Chlorobiphenyl, 2-Monochlorobiphenyl)	8915
PCB-100 (2,2',4,4',6-Pentachlorobiphenyl)	9177
PCB-101 (2,2',4,5,5'-Pentachlorobiphenyl)	8980
PCB-104 (2,2',4,6,6'-Pentachlorobiphenyl)	9182
PCB-105 (2,3,3',4,4'-Pentachlorobiphenyl)	8985
PCB-11 (3,3'-Dichlorobiphenyl)	8925
PCB-110 (2,3,3',4',6-Pentachlorobiphenyl)	8990
PCB-114 (2,3,4,4',5-Pentachlorobiphenyl)	9005
PCB-115 (2,3,4,4',6-Pentachlorobiphenyl)	9219
PCB-118 (2,3',4,4',5-Pentachlorobiphenyl)	8995
PCB-12 (3,4-Dichlorobiphenyl)	9270
PCB-123 (2,3',4,4',5'-Pentachlorobiphenyl)	9000
PCB-124 (2,3',4',5,5'-Pentachlorobiphenyl)	9222
PCB-125 (2,3',4',5',6-Pentachlorobiphenyl)	9224
PCB-126 (3,3',4,4',5-Pentachlorobiphenyl)	9015
PCB-127 (3,3',4,5,5'-Pentachlorobiphenyl)	9260
PCB-128 (2,2',3,3',4,4'-Hexachlorobiphenyl)	9020
PCB-13 (3,4'-Dichlorobiphenyl)	9269

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Accreditation is granted to the facility to perform the following testing:

	Code
Organic	
EPA 8270E MOD (Battelle SOP 5-315) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Aqueous	
PCB-130 (2,2',3,3',4,5'-Hexachlorobiphenyl)	9117
PCB-131 (2,2',3,3',4,6-Hexachlorobiphenyl)	9121
PCB-134 (2,2',3,3',5,6-Hexachlorobiphenyl)	9128
PCB-135 (2,2',3,3',5,6'-Hexachlorobiphenyl)	9127
PCB-136 (2,2',3,3',6,6'-Hexachlorobiphenyl)	9130
PCB-137 (2,2',3,4,4',5-Hexachlorobiphenyl)	9138
PCB-138 (2,2',3,4,4',5'-Hexachlorobiphenyl)	9025
PCB-139 (2,2',3,4,4',6-Hexachlorobiphenyl)	9141
PCB-140 (2,2',3,4,4',6'-Hexachlorobiphenyl)	9140
PCB-141 (2,2',3,4,5,5'-Hexachlorobiphenyl)	9030
PCB-144 (2,2',3,4,5',6-Hexachlorobiphenyl)	9150
PCB-146 (2,2',3,4',5,5'-Hexachlorobiphenyl)	9144
PCB-149 (2,2',3,4',5',6-Hexachlorobiphenyl)	9151
PCB-15 (4,4'-Dichlorobiphenyl)	9273
PCB-151 (2,2',3,5,5',6-Hexachlorobiphenyl)	9035
PCB-153 (2,2’,4,4’,5,5’-Hexachlorobiphenyl)	9040
PCB-154 (2,2',4,4',5,6'-Hexachlorobiphenyl)	9174
PCB-155 (2,2',4,4',6,6'-Hexachlorobiphenyl)	9176
PCB-156 (2,3,3',4,4',5-Hexachlorobiphenyl)	9050
PCB-157 (2,3,3’,4,4’,5’-Hexachlorobiphenyl)	9045
PCB-158 (2,3,3',4,4',6-Hexachlorobiphenyl)	9193
PCB-16 (2,2',3-Trichlorobiphenyl)	9173
PCB-163 (2,3,3',4',5,6-Hexachlorobiphenyl)	9199
PCB-164 (2,3,3',4',5',6-Hexachlorobiphenyl)	9201
PCB-166 (2,3,4,4',5,6-Hexachlorobiphenyl)	9217
PCB-167 (2,3',4,4',5,5'-Hexachlorobiphenyl)	9055
PCB-169 (3,3',4,4',5,5'-Hexachlorobiphenyl)	9060
PCB-17 (2,2',4-Trichlorobiphenyl)	9185
PCB-170 (2,2',3,3',4,4',5-Heptachlorobiphenyl)	9065
PCB-171 (2,2',3,3',4,4',6-Heptachlorobiphenyl)	9106
PCB-172 (2,2',3,3',4,5,5'-Heptachlorobiphenyl)	9110
PCB-173 (2,2',3,3',4,5,6-Heptachlorobiphenyl)	9113
PCB-174 (2,2',3,3',4,5,6'-Heptachlorobiphenyl)	9116
PCB-175 (2,2',3,3',4,5',6-Heptachlorobiphenyl)	9115
PCB-176 (2,2',3,3',4,6,6'-Heptachlorobiphenyl)	9119
PCB-177 (2,2',3,3',4,5',6'-Heptachlorobiphenyl)	9114

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	Code
Organic	
EPA 8270E MOD (Battelle SOP 5-315) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Aqueous	
PCB-178 (2,2',3,3',5,5',6-Heptachlorobiphenyl)	9124
PCB-179 (2,2',3,3',5,6,6'-Heptachlorobiphenyl)	9126
PCB-18 (2,2',5-Trichlorobiphenyl)	8930
PCB-180 (2,2',3,4,4',5,5'-Heptachlorobiphenyl)	9134
PCB-183 (2,2',3,4,4',5',6-Heptachlorobiphenyl)	9075
PCB-184 (2,2',3,4,4',6,6'-Heptachlorobiphenyl)	9139
PCB-185 (2,2',3,4,5,5',6-Heptachlorobiphenyl)	9143
PCB-187 (2,2',3,4',5,5',6-Heptachlorobiphenyl)	9080
PCB-188 (2,2',3,4',5,6,6'-Heptachlorobiphenyl)	9146
PCB-189 (2,3,3',4,4',5,5'-Heptachlorobiphenyl)	9085
PCB-19 (2,2',6-Trichlorobiphenyl)	9188
PCB-190 (2,3,3',4,4',5,6-Heptachlorobiphenyl)	9191
PCB-191 (2,3,3',4,4',5',6-Heptachlorobiphenyl)	9192
PCB-193 (2,3,3',4',5,5',6-Heptachlorobiphenyl)	9195
PCB-194 (2,2',3,3',4,4',5,5'-Octachlorobiphenyl)	9090
PCB-195 (2,2',3,3',4,4',5,6-Octachlorobiphenyl)	9103
PCB-197 (2,2',3,3',4,4',6,6'-Octachlorobiphenyl)	9104
PCB-198 (2,2',3,3',4,5,5',6-Octachlorobiphenyl)	9109
PCB-199 (2,2',3,3',4,5,5',6'-Octachlorobiphenyl)	9108
PCB-200 (2,2',3,3',4,5,6,6'-Octachlorobiphenyl)	9111
PCB-201 (2,2',3,3',4,5',6,6'-Octachlorobiphenyl)	9112
PCB-202 (2,2',3,3',5,5',6,6'-Octachlorobiphenyl)	9123
PCB-203 (2,2',3,4,4',5,5',6-Octachlorobiphenyl)	9133
PCB-205 (2,3,3',4,4',5,5',6-Octachlorobiphenyl)	9190
PCB-206 (2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl)	9095
PCB-207 (2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl)	9101
PCB-208 (2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl)	9107
PCB-209 (2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl)	9105
PCB-22 (2,3,4'-Trichlorobiphenyl)	9241
PCB-24 (2,3,6-Trichlorobiphenyl)	9247
PCB-25 (2,3',4-Trichlorobiphenyl)	9240
PCB-26 (2,3',5-Trichlorobiphenyl)	8935
PCB-27 (2,3',6-Trichlorobiphenyl)	9248
PCB-28 (2,4,4'-Trichlorobiphenyl)	9252
PCB-29 (2,4,5-Trichlorobiphenyl)	9253
PCB-3 (4-Chlorobiphenyl, 4-Monochlorobiphenyl)	9274

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	Code
Organic	
EPA 8270E MOD (Battelle SOP 5-315) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Aqueous	
PCB-30 (2,4,6-Trichlorobiphenyl)	9254
PCB-31 (2,4',5-Trichlorobiphenyl)	8940
PCB-32 (2,4',6-Trichlorobiphenyl)	9255
PCB-33 (2,3',4'-Trichlorobiphenyl)	9239
PCB-37 (3,4,4'-Trichlorobiphenyl)	9266
PCB-4 (2,2'-Dichlorobiphenyl)	9189
PCB-40 (2,2',3,3'-Tetrachlorobiphenyl)	9132
PCB-41 (2,2',3,4-Tetrachlorobiphenyl)	9163
PCB-42 (2,2',3,4'-Tetrachlorobiphenyl)	9162
PCB-43 (2,2',3,5-Tetrachlorobiphenyl)	9169
PCB-44 (2,2',3,5'-Tetrachlorobiphenyl)	8945
PCB-45 (2,2',3,6-Tetrachlorobiphenyl)	9172
PCB-46 (2,2',3,6'-Tetrachlorobiphenyl)	9171
PCB-47 (2,2',4,4'-Tetrachlorobiphenyl)	9178
PCB-48 (2,2',4,5-Tetrachlorobiphenyl)	9181
PCB-49 (2,2',4,5'-Tetrachlorobiphenyl)	8950
PCB-5 (2,3-Dichlorobiphenyl)	8920
PCB-50 (2,2',4,6-Tetrachlorobiphenyl)	9184
PCB-51 (2,2',4,6'-Tetrachlorobiphenyl)	9183
PCB-52 (2,2',5,5'-Tetrachlorobiphenyl)	8955
PCB-53 (2,2',5,6'-Tetrachlorobiphenyl)	9186
PCB-54 (2,2',6,6'-Tetrachlorobiphenyl)	9187
PCB-56 (2,3,3',4'-Tetrachlorobiphenyl)	9207
PCB-6 (2,3'-Dichlorobiphenyl)	9249
PCB-60 (2,3,4,4'-Tetrachlorobiphenyl)	9221
PCB-63 (2,3,4',5-Tetrachlorobiphenyl)	9233
PCB-64 (2,3,4',6-Tetrachlorobiphenyl)	9236
PCB-66 (2,3',4,4'-Tetrachlorobiphenyl)	8960
PCB-67 (2,3',4,5-Tetrachlorobiphenyl)	9232
PCB-7 (2,4-Dichlorobiphenyl)	9257
PCB-70 (2,3',4',5-Tetrachlorobiphenyl)	9230
PCB-71 (2,3',4',6-Tetrachlorobiphenyl)	9237
PCB-74 (2,4,4',5-Tetrachlorobiphenyl)	9250
PCB-75 (2,4,4',6-Tetrachlorobiphenyl)	9251
PCB-77 (3,3',4,4'-Tetrachlorobiphenyl)	8965
PCB-8 (2,4'-Dichlorobiphenyl)	9256

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	Code
Organic	
EPA 8270E MOD (Battelle SOP 5-315) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Aqueous	
PCB-80 (3,3',5,5'-Tetrachlorobiphenyl)	9264
PCB-81 (3,4,4',5-Tetrachlorobiphenyl)	8970
PCB-82 (2,2',3,3',4-Pentachlorobiphenyl)	9122
PCB-83 (2,2',3,3',5-Pentachlorobiphenyl)	9129
PCB-84 (2,2',3,3',6-Pentachlorobiphenyl)	9131
PCB-85 (2,2',3,4,4'-Pentachlorobiphenyl)	9142
PCB-87 (2,2',3,4,5'-Pentachlorobiphenyl)	8975
PCB-9 (2,5-Dichlorobiphenyl)	9258
PCB-91 (2,2',3,4',6-Pentachlorobiphenyl)	9160
PCB-92 (2,2',3,5,5'-Pentachlorobiphenyl)	9164
PCB-95 (2,2',3,5',6-Pentachlorobiphenyl)	9166
PCB-97 (2,2',3,4',5'-Pentachlorobiphenyl)	9154
PCB-99 (2,2',4,4',5-Pentachlorobiphenyl)	9175
Solid	
2,4'-DDD	8580
2,4'-DDE	8585
2,4'-DDT	8590
4,4'-DDD	7355
4,4'-DDE	7360
4,4'-DDT	7365
Biphenyl	5640
PCB-1 (2-Chlorobiphenyl, 2-Monochlorobiphenyl)	8915
PCB-100 (2,2',4,4',6-Pentachlorobiphenyl)	9177
PCB-101 (2,2',4,5,5'-Pentachlorobiphenyl)	8980
PCB-104 (2,2',4,6,6'-Pentachlorobiphenyl)	9182
PCB-105 (2,3,3',4,4'-Pentachlorobiphenyl)	8985
PCB-11 (3,3'-Dichlorobiphenyl)	8925
PCB-110 (2,3,3',4',6-Pentachlorobiphenyl)	8990
PCB-114 (2,3,4,4',5-Pentachlorobiphenyl)	9005
PCB-115 (2,3,4,4',6-Pentachlorobiphenyl)	9219
PCB-118 (2,3',4,4',5-Pentachlorobiphenyl)	8995
PCB-12 (3,4-Dichlorobiphenyl)	9270
PCB-123 (2,3',4,4',5'-Pentachlorobiphenyl)	9000
PCB-124 (2,3',4',5,5'-Pentachlorobiphenyl)	9222
PCB-125 (2,3',4',5',6-Pentachlorobiphenyl)	9224
PCB-126 (3,3',4,4',5-Pentachlorobiphenyl)	9015

Battelle
141 Longwater Drive, Suite 202, Norwell, MA 02061
Contact Name: Jonathan Thorn Phone: 781-681-5565

Accreditation is granted to the facility to perform the following testing:

	Code
Organic	
EPA 8270E MOD (Battelle SOP 5-315) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Solid	
PCB-127 (3,3',4,5,5'-Pentachlorobiphenyl)	9260
PCB-128 (2,2',3,3',4,4'-Hexachlorobiphenyl)	9020
PCB-13 (3,4'-Dichlorobiphenyl)	9269
PCB-130 (2,2',3,3',4,5'-Hexachlorobiphenyl)	9117
PCB-131 (2,2',3,3',4,6-Hexachlorobiphenyl)	9121
PCB-134 (2,2',3,3',5,6-Hexachlorobiphenyl)	9128
PCB-135 (2,2',3,3',5,6'-Hexachlorobiphenyl)	9127
PCB-136 (2,2',3,3',6,6'-Hexachlorobiphenyl)	9130
PCB-137 (2,2',3,4,4',5-Hexachlorobiphenyl)	9138
PCB-138 (2,2',3,4,4',5'-Hexachlorobiphenyl)	9025
PCB-139 (2,2',3,4,4',6-Hexachlorobiphenyl)	9141
PCB-140 (2,2',3,4,4',6'-Hexachlorobiphenyl)	9140
PCB-141 (2,2',3,4,5,5'-Hexachlorobiphenyl)	9030
PCB-144 (2,2',3,4,5',6-Hexachlorobiphenyl)	9150
PCB-146 (2,2',3,4',5,5'-Hexachlorobiphenyl)	9144
PCB-149 (2,2',3,4',5',6-Hexachlorobiphenyl)	9151
PCB-15 (4,4'-Dichlorobiphenyl)	9273
PCB-151 (2,2',3,5,5',6-Hexachlorobiphenyl)	9035
PCB-153 (2,2’,4,4’,5,5’-Hexachlorobiphenyl)	9040
PCB-154 (2,2',4,4',5,6'-Hexachlorobiphenyl)	9174
PCB-155 (2,2',4,4',6,6'-Hexachlorobiphenyl)	9176
PCB-156 (2,3,3',4,4',5-Hexachlorobiphenyl)	9050
PCB-157 (2,3,3’,4,4’,5’-Hexachlorobiphenyl)	9045
PCB-158 (2,3,3',4,4',6-Hexachlorobiphenyl)	9193
PCB-16 (2,2',3-Trichlorobiphenyl)	9173
PCB-163 (2,3,3',4',5,6-Hexachlorobiphenyl)	9199
PCB-164 (2,3,3',4',5',6-Hexachlorobiphenyl)	9201
PCB-166 (2,3,4,4',5,6-Hexachlorobiphenyl)	9217
PCB-167 (2,3',4,4',5,5'-Hexachlorobiphenyl)	9055
PCB-169 (3,3',4,4',5,5'-Hexachlorobiphenyl)	9060
PCB-17 (2,2',4-Trichlorobiphenyl)	9185
PCB-170 (2,2',3,3',4,4',5-Heptachlorobiphenyl)	9065
PCB-171 (2,2',3,3',4,4',6-Heptachlorobiphenyl)	9106
PCB-172 (2,2',3,3',4,5,5'-Heptachlorobiphenyl)	9110
PCB-173 (2,2',3,3',4,5,6-Heptachlorobiphenyl)	9113
PCB-174 (2,2',3,3',4,5,6'-Heptachlorobiphenyl)	9116

Certificate of Accreditation: Supplement

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Accreditation is granted to the facility to perform the following testing:

	Code
Organic	
EPA 8270E MOD (Battelle SOP 5-315) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Solid	
PCB-175 (2,2',3,3',4,5',6-Heptachlorobiphenyl)	9115
PCB-176 (2,2',3,3',4,6,6'-Heptachlorobiphenyl)	9119
PCB-177 (2,2',3,3',4,5',6'-Heptachlorobiphenyl)	9114
PCB-178 (2,2',3,3',5,5',6-Heptachlorobiphenyl)	9124
PCB-179 (2,2',3,3',5,6,6'-Heptachlorobiphenyl)	9126
PCB-18 (2,2',5-Trichlorobiphenyl)	8930
PCB-180 (2,2',3,4,4',5,5'-Heptachlorobiphenyl)	9134
PCB-183 (2,2',3,4,4',5',6-Heptachlorobiphenyl)	9075
PCB-184 (2,2',3,4,4',6,6'-Heptachlorobiphenyl)	9139
PCB-185 (2,2',3,4,5,5',6-Heptachlorobiphenyl)	9143
PCB-187 (2,2',3,4',5,5',6-Heptachlorobiphenyl)	9080
PCB-188 (2,2',3,4',5,6,6'-Heptachlorobiphenyl)	9146
PCB-189 (2,3,3',4,4',5,5'-Heptachlorobiphenyl)	9085
PCB-19 (2,2',6-Trichlorobiphenyl)	9188
PCB-190 (2,3,3',4,4',5,6-Heptachlorobiphenyl)	9191
PCB-191 (2,3,3',4,4',5',6-Heptachlorobiphenyl)	9192
PCB-193 (2,3,3',4',5,5',6-Heptachlorobiphenyl)	9195
PCB-194 (2,2',3,3',4,4',5,5'-Octachlorobiphenyl)	9090
PCB-195 (2,2',3,3',4,4',5,6-Octachlorobiphenyl)	9103
PCB-197 (2,2',3,3',4,4',6,6'-Octachlorobiphenyl)	9104
PCB-198 (2,2',3,3',4,5,5',6-Octachlorobiphenyl)	9109
PCB-199 (2,2',3,3',4,5,5',6'-Octachlorobiphenyl)	9108
PCB-200 (2,2',3,3',4,5,6,6'-Octachlorobiphenyl)	9111
PCB-201 (2,2',3,3',4,5',6,6'-Octachlorobiphenyl)	9112
PCB-202 (2,2',3,3',5,5',6,6'-Octachlorobiphenyl)	9123
PCB-203 (2,2',3,4,4',5,5',6-Octachlorobiphenyl)	9133
PCB-205 (2,3,3',4,4',5,5',6-Octachlorobiphenyl)	9190
PCB-206 (2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl)	9095
PCB-207 (2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl)	9101
PCB-208 (2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl)	9107
PCB-209 (2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl)	9105
PCB-22 (2,3,4'-Trichlorobiphenyl)	9241
PCB-24 (2,3,6-Trichlorobiphenyl)	9247
PCB-25 (2,3',4-Trichlorobiphenyl)	9240
PCB-26 (2,3',5-Trichlorobiphenyl)	8935
PCB-27 (2,3',6-Trichlorobiphenyl)	9248

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Organic	
EPA 8270E MOD (Battelle SOP 5-315) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Solid	
PCB-28 (2,4,4'-Trichlorobiphenyl)	9252
PCB-29 (2,4,5-Trichlorobiphenyl)	9253
PCB-3 (4-Chlorobiphenyl, 4-Monochlorobiphenyl)	9274
PCB-30 (2,4,6-Trichlorobiphenyl)	9254
PCB-31 (2,4',5-Trichlorobiphenyl)	8940
PCB-32 (2,4',6-Trichlorobiphenyl)	9255
PCB-33 (2,3',4'-Trichlorobiphenyl)	9239
PCB-37 (3,4,4'-Trichlorobiphenyl)	9266
PCB-4 (2,2'-Dichlorobiphenyl)	9189
PCB-40 (2,2',3,3'-Tetrachlorobiphenyl)	9132
PCB-41 (2,2',3,4-Tetrachlorobiphenyl)	9163
PCB-42 (2,2',3,4'-Tetrachlorobiphenyl)	9162
PCB-43 (2,2',3,5-Tetrachlorobiphenyl)	9169
PCB-44 (2,2',3,5'-Tetrachlorobiphenyl)	8945
PCB-45 (2,2',3,6-Tetrachlorobiphenyl)	9172
PCB-46 (2,2',3,6'-Tetrachlorobiphenyl)	9171
PCB-47 (2,2',4,4'-Tetrachlorobiphenyl)	9178
PCB-48 (2,2',4,5-Tetrachlorobiphenyl)	9181
PCB-49 (2,2',4,5'-Tetrachlorobiphenyl)	8950
PCB-5 (2,3-Dichlorobiphenyl)	8920
PCB-50 (2,2',4,6-Tetrachlorobiphenyl)	9184
PCB-51 (2,2',4,6'-Tetrachlorobiphenyl)	9183
PCB-52 (2,2',5,5'-Tetrachlorobiphenyl)	8955
PCB-53 (2,2',5,6'-Tetrachlorobiphenyl)	9186
PCB-54 (2,2',6,6'-Tetrachlorobiphenyl)	9187
PCB-56 (2,3,3',4'-Tetrachlorobiphenyl)	9207
PCB-6 (2,3'-Dichlorobiphenyl)	9249
PCB-60 (2,3,4,4'-Tetrachlorobiphenyl)	9221
PCB-63 (2,3,4',5-Tetrachlorobiphenyl)	9233
PCB-64 (2,3,4',6-Tetrachlorobiphenyl)	9236
PCB-66 (2,3',4,4'-Tetrachlorobiphenyl)	8960
PCB-67 (2,3',4,5-Tetrachlorobiphenyl)	9232
PCB-7 (2,4-Dichlorobiphenyl)	9257
PCB-70 (2,3',4',5-Tetrachlorobiphenyl)	9230
PCB-71 (2,3',4',6-Tetrachlorobiphenyl)	9237
PCB-74 (2,4,4',5-Tetrachlorobiphenyl)	9250

Certificate of Accreditation: Supplement

Battelle
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Organic	
EPA 8270E MOD (Battelle SOP 5-315) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Solid	
PCB-75 (2,4,4',6-Tetrachlorobiphenyl)	9251
PCB-77 (3,3',4,4'-Tetrachlorobiphenyl)	8965
PCB-8 (2,4'-Dichlorobiphenyl)	9256
PCB-80 (3,3',5,5'-Tetrachlorobiphenyl)	9264
PCB-81 (3,4,4',5-Tetrachlorobiphenyl)	8970
PCB-82 (2,2',3,3',4-Pentachlorobiphenyl)	9122
PCB-83 (2,2',3,3',5-Pentachlorobiphenyl)	9129
PCB-84 (2,2',3,3',6-Pentachlorobiphenyl)	9131
PCB-85 (2,2',3,4,4'-Pentachlorobiphenyl)	9142
PCB-87 (2,2',3,4,5'-Pentachlorobiphenyl)	8975
PCB-9 (2,5-Dichlorobiphenyl)	9258
PCB-91 (2,2',3,4',6-Pentachlorobiphenyl)	9160
PCB-92 (2,2',3,5,5'-Pentachlorobiphenyl)	9164
PCB-95 (2,2',3,5',6-Pentachlorobiphenyl)	9166
PCB-97 (2,2',3,4',5'-Pentachlorobiphenyl)	9154
PCB-99 (2,2',4,4',5-Pentachlorobiphenyl)	9175
Tissue	
2,4'-DDD	8580
2,4'-DDE	8585
2,4'-DDT	8590
4,4'-DDD	7355
4,4'-DDE	7360
4,4'-DDT	7365
Biphenyl	5640
PCB-1 (2-Chlorobiphenyl, 2-Monochlorobiphenyl)	8915
PCB-100 (2,2',4,4',6-Pentachlorobiphenyl)	9177
PCB-101 (2,2',4,5,5'-Pentachlorobiphenyl)	8980
PCB-104 (2,2',4,6,6'-Pentachlorobiphenyl)	9182
PCB-105 (2,3,3',4,4'-Pentachlorobiphenyl)	8985
PCB-11 (3,3'-Dichlorobiphenyl)	8925
PCB-110 (2,3,3',4',6-Pentachlorobiphenyl)	8990
PCB-114 (2,3,4,4',5-Pentachlorobiphenyl)	9005
PCB-115 (2,3,4,4',6-Pentachlorobiphenyl)	9219
PCB-118 (2,3',4,4',5-Pentachlorobiphenyl)	8995
PCB-12 (3,4-Dichlorobiphenyl)	9270
PCB-123 (2,3',4,4',5'-Pentachlorobiphenyl)	9000

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Organic	
EPA 8270E MOD (Battelle SOP 5-315) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Tissue	
PCB-124 (2,3',4',5,5'-Pentachlorobiphenyl)	9222
PCB-125 (2,3',4',5',6-Pentachlorobiphenyl)	9224
PCB-126 (3,3',4,4',5-Pentachlorobiphenyl)	9015
PCB-127 (3,3',4,5,5'-Pentachlorobiphenyl)	9260
PCB-128 (2,2',3,3',4,4'-Hexachlorobiphenyl)	9020
PCB-13 (3,4'-Dichlorobiphenyl)	9269
PCB-130 (2,2',3,3',4,5'-Hexachlorobiphenyl)	9117
PCB-131 (2,2',3,3',4,6-Hexachlorobiphenyl)	9121
PCB-134 (2,2',3,3',5,6-Hexachlorobiphenyl)	9128
PCB-135 (2,2',3,3',5,6'-Hexachlorobiphenyl)	9127
PCB-136 (2,2',3,3',6,6'-Hexachlorobiphenyl)	9130
PCB-137 (2,2',3,4,4',5-Hexachlorobiphenyl)	9138
PCB-138 (2,2',3,4,4',5'-Hexachlorobiphenyl)	9025
PCB-139 (2,2',3,4,4',6-Hexachlorobiphenyl)	9141
PCB-140 (2,2',3,4,4',6'-Hexachlorobiphenyl)	9140
PCB-141 (2,2',3,4,5,5'-Hexachlorobiphenyl)	9030
PCB-144 (2,2',3,4,5',6-Hexachlorobiphenyl)	9150
PCB-146 (2,2',3,4',5,5'-Hexachlorobiphenyl)	9144
PCB-149 (2,2',3,4',5',6-Hexachlorobiphenyl)	9151
PCB-15 (4,4'-Dichlorobiphenyl)	9273
PCB-151 (2,2',3,5,5',6-Hexachlorobiphenyl)	9035
PCB-153 (2,2’,4,4’,5,5’-Hexachlorobiphenyl)	9040
PCB-154 (2,2',4,4',5,6'-Hexachlorobiphenyl)	9174
PCB-155 (2,2',4,4',6,6'-Hexachlorobiphenyl)	9176
PCB-156 (2,3,3',4,4',5-Hexachlorobiphenyl)	9050
PCB-157 (2,3,3’,4,4’,5’-Hexachlorobiphenyl)	9045
PCB-158 (2,3,3',4,4',6-Hexachlorobiphenyl)	9193
PCB-16 (2,2',3-Trichlorobiphenyl)	9173
PCB-163 (2,3,3',4',5,6-Hexachlorobiphenyl)	9199
PCB-164 (2,3,3',4',5',6-Hexachlorobiphenyl)	9201
PCB-166 (2,3,4,4',5,6-Hexachlorobiphenyl)	9217
PCB-167 (2,3',4,4',5,5'-Hexachlorobiphenyl)	9055
PCB-169 (3,3',4,4',5,5'-Hexachlorobiphenyl)	9060
PCB-17 (2,2',4-Trichlorobiphenyl)	9185
PCB-170 (2,2',3,3',4,4',5-Heptachlorobiphenyl)	9065
PCB-171 (2,2',3,3',4,4',6-Heptachlorobiphenyl)	9106

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Organic	
EPA 8270E MOD (Battelle SOP 5-315) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Tissue	
PCB-172 (2,2',3,3',4,5,5'-Heptachlorobiphenyl)	9110
PCB-173 (2,2',3,3',4,5,6-Heptachlorobiphenyl)	9113
PCB-174 (2,2',3,3',4,5,6'-Heptachlorobiphenyl)	9116
PCB-175 (2,2',3,3',4,5',6-Heptachlorobiphenyl)	9115
PCB-176 (2,2',3,3',4,6,6'-Heptachlorobiphenyl)	9119
PCB-177 (2,2',3,3',4,5',6'-Heptachlorobiphenyl)	9114
PCB-178 (2,2',3,3',5,5',6-Heptachlorobiphenyl)	9124
PCB-179 (2,2',3,3',5,6,6'-Heptachlorobiphenyl)	9126
PCB-18 (2,2',5-Trichlorobiphenyl)	8930
PCB-180 (2,2',3,4,4',5,5'-Heptachlorobiphenyl)	9134
PCB-183 (2,2',3,4,4',5',6-Heptachlorobiphenyl)	9075
PCB-184 (2,2',3,4,4',6,6'-Heptachlorobiphenyl)	9139
PCB-185 (2,2',3,4,5,5',6-Heptachlorobiphenyl)	9143
PCB-187 (2,2',3,4',5,5',6-Heptachlorobiphenyl)	9080
PCB-188 (2,2',3,4',5,6,6'-Heptachlorobiphenyl)	9146
PCB-189 (2,3,3',4,4',5,5'-Heptachlorobiphenyl)	9085
PCB-19 (2,2',6-Trichlorobiphenyl)	9188
PCB-190 (2,3,3',4,4',5,6-Heptachlorobiphenyl)	9191
PCB-191 (2,3,3',4,4',5',6-Heptachlorobiphenyl)	9192
PCB-193 (2,3,3',4',5,5',6-Heptachlorobiphenyl)	9195
PCB-194 (2,2',3,3',4,4',5,5'-Octachlorobiphenyl)	9090
PCB-195 (2,2',3,3',4,4',5,6-Octachlorobiphenyl)	9103
PCB-197 (2,2',3,3',4,4',6,6'-Octachlorobiphenyl)	9104
PCB-198 (2,2',3,3',4,5,5',6-Octachlorobiphenyl)	9109
PCB-199 (2,2',3,3',4,5,5',6'-Octachlorobiphenyl)	9108
PCB-200 (2,2',3,3',4,5,6,6'-Octachlorobiphenyl)	9111
PCB-201 (2,2',3,3',4,5',6,6'-Octachlorobiphenyl)	9112
PCB-202 (2,2',3,3',5,5',6,6'-Octachlorobiphenyl)	9123
PCB-203 (2,2',3,4,4',5,5',6-Octachlorobiphenyl)	9133
PCB-205 (2,3,3',4,4',5,5',6-Octachlorobiphenyl)	9190
PCB-206 (2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl)	9095
PCB-207 (2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl)	9101
PCB-208 (2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl)	9107
PCB-209 (2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl)	9105
PCB-22 (2,3,4'-Trichlorobiphenyl)	9241
PCB-24 (2,3,6-Trichlorobiphenyl)	9247

Certificate of Accreditation: Supplement

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	Code
Organic	
EPA 8270E MOD (Battelle SOP 5-315) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Tissue	
PCB-25 (2,3',4-Trichlorobiphenyl)	9240
PCB-26 (2,3',5-Trichlorobiphenyl)	8935
PCB-27 (2,3',6-Trichlorobiphenyl)	9248
PCB-28 (2,4,4'-Trichlorobiphenyl)	9252
PCB-29 (2,4,5-Trichlorobiphenyl)	9253
PCB-3 (4-Chlorobiphenyl, 4-Monochlorobiphenyl)	9274
PCB-30 (2,4,6-Trichlorobiphenyl)	9254
PCB-31 (2,4',5-Trichlorobiphenyl)	8940
PCB-32 (2,4',6-Trichlorobiphenyl)	9255
PCB-33 (2,3',4'-Trichlorobiphenyl)	9239
PCB-37 (3,4,4'-Trichlorobiphenyl)	9266
PCB-4 (2,2'-Dichlorobiphenyl)	9189
PCB-40 (2,2',3,3'-Tetrachlorobiphenyl)	9132
PCB-41 (2,2',3,4-Tetrachlorobiphenyl)	9163
PCB-42 (2,2',3,4'-Tetrachlorobiphenyl)	9162
PCB-43 (2,2',3,5-Tetrachlorobiphenyl)	9169
PCB-44 (2,2',3,5'-Tetrachlorobiphenyl)	8945
PCB-45 (2,2',3,6-Tetrachlorobiphenyl)	9172
PCB-46 (2,2',3,6'-Tetrachlorobiphenyl)	9171
PCB-47 (2,2',4,4'-Tetrachlorobiphenyl)	9178
PCB-48 (2,2',4,5-Tetrachlorobiphenyl)	9181
PCB-49 (2,2',4,5'-Tetrachlorobiphenyl)	8950
PCB-5 (2,3-Dichlorobiphenyl)	8920
PCB-50 (2,2',4,6-Tetrachlorobiphenyl)	9184
PCB-51 (2,2',4,6'-Tetrachlorobiphenyl)	9183
PCB-52 (2,2',5,5'-Tetrachlorobiphenyl)	8955
PCB-53 (2,2',5,6'-Tetrachlorobiphenyl)	9186
PCB-54 (2,2',6,6'-Tetrachlorobiphenyl)	9187
PCB-56 (2,3,3',4'-Tetrachlorobiphenyl)	9207
PCB-6 (2,3'-Dichlorobiphenyl)	9249
PCB-60 (2,3,4,4'-Tetrachlorobiphenyl)	9221
PCB-63 (2,3,4',5-Tetrachlorobiphenyl)	9233
PCB-64 (2,3,4',6-Tetrachlorobiphenyl)	9236
PCB-66 (2,3',4,4'-Tetrachlorobiphenyl)	8960
PCB-67 (2,3',4,5-Tetrachlorobiphenyl)	9232
PCB-7 (2,4-Dichlorobiphenyl)	9257

Certificate of Accreditation: Supplement

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Organic	
EPA 8270E MOD (Battelle SOP 5-315) by Gas Chromatography Mass Spectrometry (GC/MS)	10242543
Tissue	
PCB-70 (2,3',4',5-Tetrachlorobiphenyl)	9230
PCB-71 (2,3',4',6-Tetrachlorobiphenyl)	9237
PCB-74 (2,4,4',5-Tetrachlorobiphenyl)	9250
PCB-75 (2,4,4',6-Tetrachlorobiphenyl)	9251
PCB-77 (3,3',4,4'-Tetrachlorobiphenyl)	8965
PCB-8 (2,4'-Dichlorobiphenyl)	9256
PCB-80 (3,3',5,5'-Tetrachlorobiphenyl)	9264
PCB-81 (3,4,4',5-Tetrachlorobiphenyl)	8970
PCB-82 (2,2',3,3',4-Pentachlorobiphenyl)	9122
PCB-83 (2,2',3,3',5-Pentachlorobiphenyl)	9129
PCB-84 (2,2',3,3',6-Pentachlorobiphenyl)	9131
PCB-85 (2,2',3,4,4'-Pentachlorobiphenyl)	9142
PCB-87 (2,2',3,4,5'-Pentachlorobiphenyl)	8975
PCB-9 (2,5-Dichlorobiphenyl)	9258
PCB-91 (2,2',3,4',6-Pentachlorobiphenyl)	9160
PCB-92 (2,2',3,5,5'-Pentachlorobiphenyl)	9164
PCB-95 (2,2',3,5',6-Pentachlorobiphenyl)	9166
PCB-97 (2,2',3,4',5'-Pentachlorobiphenyl)	9154
PCB-99 (2,2',4,4',5-Pentachlorobiphenyl)	9175
PFAS by LC/MS/MS Compliant with Table B-15 of QSM 5.3 or Latest Version by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)	90000451
Aqueous	
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	9490
1H, 1H, 2H, 2H-Perfluorodecane Sulfonic Acid (8:2 FTS)	6948
1H, 1H, 2H, 2H-Perfluorododecane Sulfonic Acid (10:2 FTS)	9616
1H, 1H, 2H, 2H-Perfluorohexane Sulfonic Acid (4:2 FTS)	6946
1H, 1H, 2H, 2H-Perfluorooctane Sulfonic Acid (6:2 FTS)	6947
2H,2H,3H,3H-Perfluorodecanoic Acid (7:3 FTCA, 3-Perfluoroheptyl Propanoic Acid)	9340
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3 FTCA)	9338
4,4,5,5,6,6,6-Heptafluorohexanoi Acid (3:3 FTCA, 3-Perfluoropropyl Propanoic Acid)	9353
9-Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid (9-Cl-PF3ONS)	6952
Ammonium 4,8-Dioxa-3H-Perfluorononanoate (ADONA)	6953
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA) – GenX	9460
N-Ethyl Perfluorooctanesulfonamide (NEtFOSA)	9395
N-Ethyl Perfluorooctanesulfonamidoethanol (NEtFOSE)	9431
N-Ethylperfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	4846

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Organic	
PFAS by LC/MS/MS Compliant with Table B-15 of QSM 5.3 or Latest Version by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)	90000451
Aqueous	
N-Methylperfluorooctanesulfonamide (NMeFOSA)	6954
N-Methylperfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	4847
N-Methylperfluorooctanesulfonamidoethanol (MeFOSE)	6949
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	6956
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	6957
Perfluoro-1-Octanesulfonamide (PFOSA)	9665
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	6965
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	6966
Perfluorobutanesulfonic Acid (PFBS)	6918
Perfluorobutanoic Acid (PFBA)	6915
Perfluorodecanesulfonic Acid (PFDS)	6920
Perfluorodecanoic Acid (PFDA)	6905
Perfluorododecanesulfonic Acid (PFDoS)	6923
Perfluorododecanoic Acid (PFDoA)	6903
Perfluoroheptanesulfonic Acid (PFHpS)	9470
Perfluoroheptanoic Acid (PFHpA)	6908
Perfluorohexadecanoic Acid (PFHxDA)	6958
Perfluorohexanesulfonic Acid (PFHxS)	6927
Perfluorohexanoic Acid (PFHxA)	6913
Perfluorononanesulfonic Acid (PFNS)	6929
Perfluorononanoic Acid (PFNA)	6906
Perfluorooctadecanoic Acid (PFODA)	6916
Perfluorooctanesulfonic Acid (PFOS)	6931
Perfluorooctanoic Acid (PFOA)	6912
Perfluoropentanesulfonic Acid (PFPeS)	6934
Perfluoropentanoic Acid (PFPeA)	6914
Perfluorotetradecanoic Acid (PFTeDA)	6902
Perfluorotridecanoic Acid (PFTrDA)	9563
Perfluoroundecanoic Acid (PFUnA)	6904
Solid	
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	9490
1H, 1H, 2H, 2H-Perfluorodecane Sulfonic Acid (8:2 FTS)	6948
1H, 1H, 2H, 2H-Perfluorododecane Sulfonic Acid (10:2 FTS)	9616
1H, 1H, 2H, 2H-Perfluorohexane Sulfonic Acid (4:2 FTS)	6946
1H, 1H, 2H, 2H-Perfluorooctane Sulfonic Acid (6:2 FTS)	6947

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Organic	
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Solid	
2H,2H,3H,3H-Perfluorodecanoic Acid (7:3 FTCA, 3-Perfluoroheptyl Propanoic Acid)	9340
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3 FTCA)	9338
4,4,5,5,6,6,6-Heptafluorohexanoi Acid (3:3 FTCA, 3-Perfluoropropyl Propanoic Acid)	9353
9-Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid (9-Cl-PF3ONS)	6952
Ammonium 4,8-Dioxa-3H-Perfluorononanoate (ADONA)	6953
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA) – GenX	9460
N-Ethyl Perfluorooctanesulfonamide (NEtFOSA)	9395
N-Ethyl Perfluorooctanesulfonamidoethanol (NEtFOSE)	9431
N-Ethylperfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	4846
N-Methylperfluorooctanesulfonamide (NMeFOSA)	6954
N-Methylperfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	4847
N-Methylperfluorooctanesulfonamidoethanol (MeFOSE)	6949
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Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	6957
Perfluoro-1-Octanesulfonamide (PFOSA)	9665
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	6965
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	6966
Perfluorobutanesulfonic Acid (PFBS)	6918
Perfluorobutanoic Acid (PFBA)	6915
Perfluorodecanesulfonic Acid (PFDS)	6920
Perfluorodecanoic Acid (PFDA)	6905
Perfluorododecanesulfonic Acid (PFDoS)	6923
Perfluorododecanoic Acid (PFDoA)	6903
Perfluoroheptanesulfonic Acid (PFHpS)	9470
Perfluoroheptanoic Acid (PFHpA)	6908
Perfluorohexadecanoic Acid (PFHxDA)	6958
Perfluorohexanesulfonic Acid (PFHxS)	6927
Perfluorohexanoic Acid (PFHxA)	6913
Perfluorononanesulfonic Acid (PFNS)	6929
Perfluorononanoic Acid (PFNA)	6906
Perfluorooctadecanoic Acid (PFODA)	6916
Perfluorooctanesulfonic Acid (PFOS)	6931
Perfluorooctanoic Acid (PFOA)	6912
Perfluoropentanesulfonic Acid (PFPeS)	6934
Perfluoropentanoic Acid (PFPeA)	6914

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	Code
Organic	
PFAS by LC/MS/MS Compliant with Table B-15 of QSM 5.3 or Latest Version by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)	90000451
Solid	
Perfluorotetradecanoic Acid (PFTeDA)	6902
Perfluorotridecanoic Acid (PFTrDA)	9563
Perfluoroundecanoic Acid (PFUnA)	6904
Tissue	
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	9490
1H, 1H, 2H, 2H-Perfluorodecane Sulfonic Acid (8:2 FTS)	6948
1H, 1H, 2H, 2H-Perfluorohexane Sulfonic Acid (4:2 FTS)	6946
1H, 1H, 2H, 2H-Perfluorooctane Sulfonic Acid (6:2 FTS)	6947
2H,2H,3H,3H-Perfluorodecanoic Acid (7:3 FTCA, 3-Perfluoroheptyl Propanoic Acid)	9340
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4,4,5,5,6,6,6-Heptafluorohexanoi Acid (3:3 FTCA, 3-Perfluoropropyl Propanoic Acid)	9353
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Ammonium 4,8-Dioxa-3H-Perfluorononanoate (ADONA)	6953
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA) – GenX	9460
N-Ethylperfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	4846
N-Methylperfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	4847
Perfluoro-1-Octanesulfonamide (PFOSA)	9665
Perfluorobutanesulfonic Acid (PFBS)	6918
Perfluorobutanoic Acid (PFBA)	6915
Perfluorodecanesulfonic Acid (PFDS)	6920
Perfluorodecanoic Acid (PFDA)	6905
Perfluorododecanoic Acid (PFDoA)	6903
Perfluoroheptanesulfonic Acid (PFHpS)	9470
Perfluoroheptanoic Acid (PFHpA)	6908
Perfluorohexanesulfonic Acid (PFHxS)	6927
Perfluorohexanoic Acid (PFHxA)	6913
Perfluorononanesulfonic Acid (PFNS)	6929
Perfluorononanoic Acid (PFNA)	6906
Perfluorooctanesulfonic Acid (PFOS)	6931
Perfluorooctanoic Acid (PFOA)	6912
Perfluoropentanesulfonic Acid (PFPeS)	6934
Perfluoropentanoic Acid (PFPeA)	6914
Perfluorotetradecanoic Acid (PFTeDA)	6902
Perfluorotridecanoic Acid (PFTrDA)	9563
Perfluoroundecanoic Acid (PFUnA)	6904

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Accreditation is granted to the facility to perform the following testing:

		Code
Preparation		
Aqueous		
EPA 3510C	Separatory Funnel Liquid-Liquid Extraction	
EPA 3640A MOD (Battelle SOP 5-191)	Gel-Permeation Cleanup	
EPA 3660B MOD (Battelle SOP 5-328)	Sulfur Cleanup	
Solid		
EPA 3640A MOD (Battelle SOP 5-191)	Gel-Permeation Cleanup	
EPA 3660B MOD (Battelle SOP 5-328)	Sulfur Cleanup	
NOAA NOS ORCA 71	Orbital Shaker	
Tissue		
EPA 3640A MOD (Battelle SOP 5-191)	Gel-Permeation Cleanup	
EPA 3660B MOD (Battelle SOP 5-328)	Sulfur Cleanup	
NOAA NOS ORCA 71	Orbital Shaker Tissuemizer	

Footnotes:
> Method codes are typically based on The NELAC Institute (TNI) Laboratory Accreditation Management System (LAMS) and are used to compare to the laboratory reported Performance Test (PT) results. Although the method code may not represent the specific method version, it is the method code used to represent the method/technology used to report PTs. (NC = No Code)