Final Quality Assurance Project Plan (QAPP) for Public Drinking Water Per- and Polyfluoroalkyl Substances (PFAS) Sampling and Analysis

Revision 1.3

March 6, 2020

Division of Drinking and Ground Waters
March 2020

Final Quality Assurance Project Plan (QAPP) for Public Drinking Water Per- and Polyfluoroalkyl Substances (PFAS) Sampling Activities and Analysis

March 6, 2020

Prepared by
State of Ohio Environmental Protection Agency

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SECTION A – PROJECT MANAGEMENT

A1 –Approval Sheet

_____ Date: _____
Amy J Klei, Chief, Division of Drinking and Ground Waters (DDAGW)

_____ Date: _____
Mike Proffitt, Assistant Chief, South West District Office (SWDO)

_____ Date: _____
Mark Johnson, Deputy Director, Ohio Environmental Protection Agency (Ohio EPA)

_____ Date: _____
Jeff Martin, Quality Assurance (QA) Officer

_____ Date: _____
Colin White, Manager, Ohio EPA-DDAGW

_____ Date: _____
Nik Dzamov Chief, Division of Environmental Services (DES)

_____ Date: _____
Tab Brewster, Manager, Ohio EPA-DDAGW

_____ Date: _____
Bonnie Buthker, Chief, SWDO

This document, Quality Assurance Project Plan (QAPP), contains elements of the overall project management, data generation and acquisition, information management, assessment and oversight, and data validation and usability for the Ohio EPA's Public Water System (PWS) sampling for PFAS. The complete QAPP includes this document as well as other references. All project team members should follow these guidelines. Mention of trade names or commercial products in this document does not constitute endorsement or recommendation for use.

A2 –Table of Contents

A3 – Distribution List and Organization

This QAPP, which includes the associated manuals and guidelines, will be distributed to the following Ohio EPA management and staff and all contractors.

Ohio EPA PFAS QAPP Distribution List

Name/Title	Contact E-mail
Amy J Klei, Chief, DDAGW	Amy.Klei@epa.ohio.gov
Mike Proffitt, Asst. Chief, SWDO	Michael.Proffitt@epa.ohio.gov
Bonnie Buthker, Chief, SWDO	Bonnie.Buthker@epa.ohio.gov
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A4 – Project/Task Organization and Roles/Responsibilities

Roles and responsibilities are outlined below using the structure of the Organizational and Communication Chart, section A4.1 – Figure 1. *Funding, Communication, and Legal are not covered in this QAPP.

A4.1 - Ohio EPA Project Guidance Team

Receive regular and timely program and data results from Project Administrator. Direct all response actions. Meet with and advise Director's Office and other state agencies regarding project efforts and accomplishments.

Ohio EPA Project Guidance Team

Name/Title	Contact E-mail
Amy J Klei, Chief, DDAGW	Amy.Klei@epa.ohio.gov
Mark Johnson, Deputy Director	Mark.Johnson@epa.ohio.gov
Bonnie Buthker, Chief, SWDO	Bonnie.Buthker@epa.ohio.gov
Mike Proffitt, Assistant Chief, SWDO	Michael.Proffitt@epa.ohio.gov
Todd Anderson, Deputy Director-Legal	Todd.Anderson@epa.ohio.gov
Ann Fischbein, Supervising Attorney-Legal	Ann.Fischbein@epa.ohio.gov

A4.2 –Project Roles and Responsibilities

Project Roles

Role	Name/Title	Contact E-mail
Project Administrator	Amy J. Klei, Chief, DDAGW	Amy.Klei@epa.ohio.gov
Contract Manager	Mike Proffitt, Asst. Chief, Ohio EPA-SWDO	Michael.Proffitt@epa.ohio.gov
Response Manager	Colin White, Manager, OEPA-DDAGW	Colin.White@epa.ohio.gov
Project QA Officer	Jeff Martin, Program Administrator 3, OEPA-DERR	Jeffrey.Martin@epa.ohio.gov
Lab QA Officer	Nik Dzamov, Laboratory Quality Assurance Officer, Chief, DES	Nik.Dzamov@epa.ohio.gov
IT Manager	Tab Brewster, IMS Manager, DDAGW	Thomas.Brewster@epa.ohio.gov

Project Administrator
Responsible for: Oversight and overall coordination between the Project Facilitation Team members. Organization of information, data, and project reviews, including all deviations from QAPP and standard operating procedure (SOP) protocols. Review and approve sampling plans. Distribution and maintenance of QAPP. Coordinates data approval, verification, and distribution to relevant parties and provide validated data to Guidance Team and approved data for uploading to Ohio PFAS website. Ensure proper document retention for sampling conducted by Ohio EPA. Authorized to review and edit QAPP and sampling plans. Immediately notified on any issues with drinking water systems denying access for sampling.

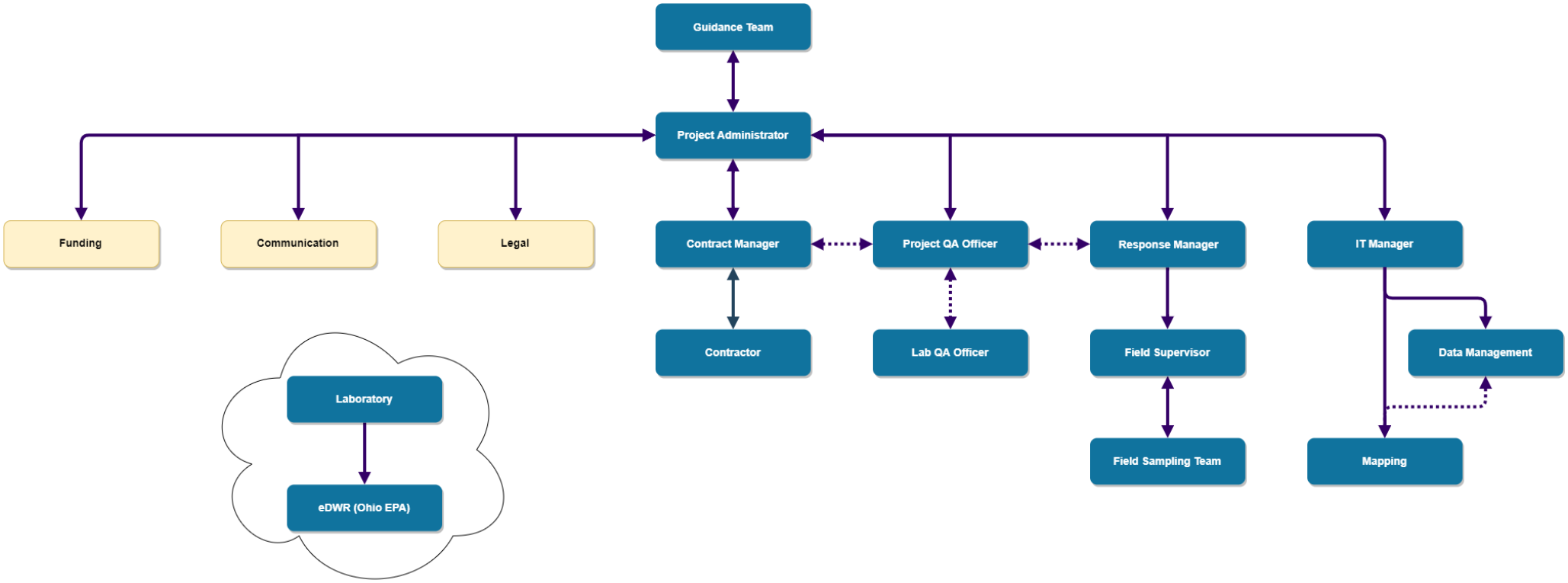
Contract Manager
Responsible for: Negotiating, preparing and revising Statement of Work (SOW) with contractors to conduct sampling of PWSs. Serves as primary point of contact for contractor to address any questions with implementation of SOW, QAPP, or SOPs. Oversees contractor to ensure that contractor is meeting requirements and deadlines as specified in the SOW. Responsible for holding weekly calls with Contractor Project Manager(s) once project commences and provide weekly updates to the Project Administrator.

Response Manager
Responsible for: Reviewing results and recommending response strategies consistent with Ohio's PFAS Action Plan; providing technical assistance to PWSs, coordination of communication to PWSs and Ohio EPA district offices. Assist in response and follow-up sampling coordination/design for public water systems. Direct Ohio EPA Field Supervisor and Field Sampling Teams.

IT Manager
Responsible for: Secure and accurate electronic records and data management. Oversight and troubleshooting of data flow from laboratories into Ohio EPA databases. Manages data spatial analysis and presentation.

QA Officers
Responsible for: Input and maintenance of all QA documents, including this QAPP. Review and approval of all QAPP changes and signatures. Notified on all significant deviations of QAPP or protocols that impact data credibility or usability. Review of QA processes and data validation. Review and approve data/information completion, accuracy, and management.

A4.3 – Figure 1: Organizational and Communication Chart



A5 – Problem Definition/Background

Per- and polyfluoroalkyl substances (PFAS) are a group of synthetic chemicals that have been in use since the 1940s. PFAS are found in a wide array of consumer and industrial products. PFAS manufacturing and processing facilities, facilities using PFAS in production of other products, airports, and military installations are some of the contributors of PFAS releases into the air, soil, and water. Due to their widespread use and persistence in the environment, most people in the United States have been exposed to PFAS. There is evidence that continued exposure above specific levels to certain PFAS may lead to adverse health.

On Sept. 27, 2019, Governor Mike DeWine announced the establishment of an inter-agency workgroup to address the emerging issue of PFAS in Ohio, both for the protection of our natural resources and public health. In his announcement, he directed the Ohio EPA and Ohio Department of Health (ODH) to work together on developing a statewide PFAS action plan to address potential threats to both public and private drinking water systems. On December 2, 2019, the State of Ohio released the statewide action plan (State of Ohio, 2019) and unveiled the state's new website: pfas.ohio.gov. The Plan calls for Ohio EPA to gather data from public water systems statewide to determine if PFAS is present in drinking water.

Interpreting data from analysis of PFAS in a variety of environmental sample types can be challenging due to variations in analytical protocols, quality control types and criteria, and data review procedures across laboratories and general ubiquity in the environment. Moreover, PFAS are analyzed at the parts-per-trillion level, leaving little room between action levels and method detection limits. Stringent quality control is needed to ensure data quality and reliability to allow information decisions regarding site specific actions. This document outlines the level of quality control necessary such that any drinking water sample analyzed and reviewed by Ohio EPA using U.S. EPA Method 537.1 can be relied upon for decision making purposes.

A6 – Project Overview

The purpose of the sampling project is to evaluate the state-wide occurrence of PFAS compounds at approximately 1500 community and non-transient noncommunity public water systems across the state. The results will clearly indicate any PFAS compounds at or above the minimum reporting levels (MRLs) and action level exceedances for six PFAS. Laboratories will report the following six (6) PFAS compounds: PFOA, PFOS, PFHxS, PFHBS, PFNA and GenX (Appendix A).

Sampling efforts will be coordinated by Ohio EPA under contracts with qualified consultants and laboratories. Contract labs will conduct analyses in accordance with this QAPP and U.S. EPA-approved methods for drinking water. Some sampling may also be conducted by trained technicians from Ohio EPA and analyzed by Ohio EPA's Division of Environmental Services (DES), which has also been approved for U.S. EPA methods. PFAS sampling results for public water systems will be reported via EPA's electronic drinking water reporting application and published on Ohio's PFAS web page to allow public access to the data.

Ohio EPA's contractors will complete initial sampling at community and non-transient non-community public water systems in two phases. The first phase is for a smaller set of sites to be completed by three sampling contractors and one laboratory in the first quarter 2020. The larger second phase of sampling will likely involve multiple contractors and laboratories as designated by Ohio EPA. All sub-contracted laboratories must be approved by Ohio EPA prior to sample collection. Sub-contracted laboratories will be required, at a minimum, to meet method specific requirements for U.S. EPA Method 537.1, be National Environmental Laboratory Accreditation Program (NELAP) certified, demonstrate analytical proficiency

for the method, meet quality control and quality assurance requirements, meet volume and technical holding time requirements, provide laboratory supplies, and provide final data in an electronic data deliverable format acceptable to the agency.

Samples will be collected from finished water (drinking water) sources and where possible, raw water (ground or surface water) sources. Standard operating procedures (SOP) are cited within this document to ensure consistent methodologies are followed to minimize variables in results. Laboratory generated data will be submitted to Ohio EPA in an electronic format acceptable to the agency, uploaded to electronic Drinking Water Reports (eDWR) and stored in Ohio EPA's secure database (SDWIS).

Results from the initial round of sampling will be evaluated by Ohio EPA and additional sampling at public water systems may be conducted by Ohio EPA field crews or by Ohio EPA contractors. All sampling will be completed in accordance with this QAPP.

General Project Schedule

Activity	**Date**	**Participants**
Phase 1a Sampling	January-February 2020	OEPA/Contractors
Phase 1 Sampling	February-April 2020	OEPA/Contractors
Phase 2 Sampling	March-December 2020	OEPA/Contractors
Follow Up Sampling at PWS	Ongoing February 2020 – December 2021	Ohio EPA
Quarterly Report	April, July, November 2020	OEPA/Contractors
Project Summary Report	January 2021	Ohio EPA

A7 – Quality Objectives and Criteria

A7.1 – PFAS Quality Objectives

Management decisions regarding the control of PFAS in drinking water are based on the ability to reliably detect and quantify PFAS in drinking water. For PFAS, the possibility of outside contamination of samples is high, and the target action level concentrations are in the low parts-per-trillion range. To reliably achieve such low analytical detection and reporting limits, and to assure samples are free of outside contamination, robust analytical methods and sampling and analysis protocols are required. The generation of quality data therefore is a process that relies on planning at the outset of a sampling project. The data verification process may identify potential sampling errors, such as preservation and sample handling methods, which are out of conformance with the sampling plans' data quality objectives.

Water quality managers and environmental professionals use the Data Quality Objectives (DQO) process (US EPA, 2006) to develop QAPP and work plans with sampling protocols that assure that samples are collected without bias to represent water quality at a production facility. After the completion of the QAPP and workplans, the project managers will select a laboratory that can analyze data within the requirements set forth in the QAPP. The laboratory will have their own quality management procedures in place that use recognized methods of analysis with accompanying quality control data. This control data provides measures of accuracy and precision and whether good laboratory management was

practiced. The laboratory will evaluate the data generated for the project, note any quality system issues, and generate a report that will include measures of quality control that demonstrate the acceptability of the data.

Data will be acceptable if 1) approved SOPs are followed to ensure outside contamination is not introduced, 2) appropriate quality assurance/quality control (QA/QC) samples are collected to ensure outside contamination is not present from either the laboratory or sampling methodology, 3) data generated can be verified or validated through established procedures listed in Section D of this QAPP, and 4) the detection limits achieved from the analysis are below the specified minimum reporting levels (MRL) (Table 5). Laboratories must report the following six (6) PFAS compounds in the acid form: PFOA, PFOS, PFHxS, PFBS, HFPO-DA and PFNA to the nearest 0.1 nanogram/liter (ng/L).

A7.2 – QC Performance criteria for water chemistry

Quality control (QC) samples will be collected at rates consistent with Method 537.1. The results will be evaluated as described in Section 9 of Method 537.1 and US EPA Data Review and Validation Guidelines for PFASs (US EPA, 2018a).

A8 – Special Training

Samplers will be trained to ensure they follow Ohio EPA approved PFAS sampling SOPs to minimize PFAS contamination during sampling. When field reagent blanks have PFAS present, replicate sample results are inconsistent, or when field audits document that SOPs are not being followed, additional training will be provided. Ohio EPA will provide a required training for all sampling contractors.

A9 – Documents and Records

The final QAPP will be provided to the appropriate project personnel by email as detailed in the distribution list. As the plan is updated, each person on the distribution list will be sent an email with the most current document. The most current date of revision will be included in the document name and in the header of the document. The most current document will also be maintained on SharePoint.

The chain-of-custody forms, sample submission forms, and field logs shall be maintained in their original form by the entity or their representative collecting the sample. Information from contractors and Ohio EPA staff sampling teams will be maintained in Agency databases. These databases are backed up on secure servers. Sampling contractors will submit all original forms to Ohio EPA's contract manager at conclusion of the project. Analytical results will be submitted to Ohio EPA using the provided Excel spreadsheet and Ohio EPA will upload results via eDWR directly into Ohio EPA databases. This will allow extra validation of data and minimize transcription errors that can occur from transferring results manually into databases. The data will be placed directly into Agency databases that have secure backup and ease of retrieval. Non-U.S. EPA Method 537.1 data can be maintained in Ohio EPA databases after manual entry into eDWR.

The format for all data recording will be consistent with the requirements and procedures used for data assessment, verification and validation described in this QAPP. Files generated according to applicable standard operating procedures (such as raw data, results of QC checks, problems encountered, etc.) will be documented and reported to the Project QA Officer or their designee.

All communications regarding study plan changes or refinements, such as changes to sites, staff, parameters, etc. will be filed in the SharePoint project file by the PFAS Project Administrator or their designee. Ohio EPA will provide updates to contractors through designated contract managers.

A9.1 – Document/record control

The recording media for the project will be a combination of PFAS-free paper and electronic means to document site conditions. Data gathered using paper will be recorded using ballpoint pens or pencil, and changes to such data records will be made by drawing a single line through the error with an initial by the responsible person. Similar methods will be used for electronic data recording.

Agency management, Project Administrator, Contract Manager and Quality Assurance Officers will approve updates to the QAPP, as needed. The Project Administrator shall retain copies of all management reports, memoranda, and all correspondence between team members identified in Section A. Retention of records should emphasize any deviations from the signed QAPP, including the rationale for those changes.

A9.2 – Document storage

The Project Administrator will maintain a central project file, uploaded to the PFAS SharePoint site, that will act as a repository for all data collected or generated as part of this project. The project file will include both hardcopy and electronic data and will be stored at the Ohio EPA office. Project photos will be moved to and stored in the Lynx Photo Management System.

All files will be retained by Ohio EPA according to the Ohio EPA records retention policy.

SECTION B – DATA GENERATION AND ACQUISITION

B1 – Sampling Process Design

General sampling design is described below, and Ohio EPA will provide contractors with site-specific sampling instructions prior to all sampling events.

B1.1 – Types and numbers of samples required

The number of samples will vary depending on the site. At minimum, a finished water and field reagent blank (FRB) will be collected at each public water system and raw water samples will be collected at water systems which have a readily accessible raw water tap. No distribution system samples will be collected and are not considered in the QAPP. Collected water will be preserved using appropriate methods, as outlined in the SOP (Ohio EPA, 2020) and U.S. EPA Method 537.1 (US EPA, 2018b). Any other type of sample will be documented in the field log and indicated on the chain of custody.

B1.2 – Design of the sampling

Samples will be discrete grab samples from a public water system.

B1.3 – Sampling locations and frequencies

Finished water samples will be collected at the designated entry point tap, which is a location in the PWS after the pressure tank, treatment or chemical addition, but before the distribution system. Raw water samples will be collected at a raw water tap location before the pressure tank, treatment or chemical addition. This project requires a one-time sampling event at the public water systems (contractor-collected), and Ohio EPA may follow up with additional sampling.

B1.4 – Sample matrices

Finished water samples will be designated as drinking water. Raw ground water samples collected will be designated as ground water matrix. Surface water samples will be designated as surface water matrix. Field Reagent Blanks and any associated quality control samples are defined in U.S. EPA Method 537.1 and are indicated as such.

B2 – Sampling Methods

All chemical data, field data, and data analysis methods and procedures shall adhere to those specified in the SOP (Ohio EPA, 2020) and U.S. EPA Method 537.1 (US EPA, 2018b).

B3 – Sample Handling and Custody

Sample handling shall be consistent with the SOP (Ohio EPA, 2020). A unique number will be assigned to each sample. Upon collection, each sample will be labeled and include sample ID, location ID, date/time, sampler initials and analysis requested. Each sample ID will include 5 identification parts that describe the facility ID, sample location, date, sampler's initials, and other information as needed.

Facility ID	Location	Date	Sampler Initials	Other
Seven-digit Ohio EPA Facility ID XXXXXXX	RS	YYMMDD	XZ	-FD
	EP			-SMD[1]
				-SM[1]
				-FRB
				-FNBX
				-WLXX
				-DSXX
				-MWXX

Examples

Field reagent blank at a PWS performed at the treated water before distribution tap on February 5, 2020 by Colin White:
1234567EP200205CWFRB

A field duplicate sample collected at the raw water tap for a surface water PWS on February 15, 2020 by Colin White:
1234567RS200215CWFD

[1] For Pace Analytical, the SM and SMD bottles should <u>not</u> be labeled with the "SM" or "SMD" qualifiers. The SM and SMD bottles should be labeled the same as the sample and the COC should indicate the total number of sample bottles.

	Description
Facility ID	This describes the facility where the EP or RS is located
XXXXXXX	Location-specific seven-digit facility ID

Location	This describes the point where the sample was collected
RS	Raw water tap
EP	Entry point to the distribution (finished water)

Date and Time	Documents the date collected, 2 integers each
YYMMDD	YearMonthDay

Sampler Initials	Use 2 initials for sampler name
XZ	FirstLast

Other	This describes other data identifiers when applicable
-FD	Field Duplicate
-SMD	Laboratory Fortified Sample Matrix Duplicate
-SM	Laboratory Fortified Sample Matrix
-FRB	Field Reagent Blank
-FNBX	See field notebook for details. Notes should be numbered sequentially, 1, 2, 3…
-WLXX	Well number XX. For example, WL01
-DSXX	Distribution sample XX. For example, DS04
-MWXX	Monitoring well XX. For example, MW11

B4 – Quality Control

Quality control samples will match those required in U.S. EPA Method 537.1 (US EPA, 2018b). Field instruments shall be calibrated daily, using manufacturer guidelines and requirements as noted below in Section B5.

B5 – Instrument/Equipment Testing and Calibration, Inspection, and Maintenance

All procedures shall adhere to U.S. EPA Method 537.1 (US EPA, 2018b) and manufacturer's calibration, inspection and maintenance recommendations. Ohio EPA contractors will be responsible for inspecting and checking supplies and consumables associated with sampling and analytical procedures.

B6 – Data Management

Each PFAS data result obtained from a PWS will be identified by PWS ID and sample (SMP) ID and will be submitted by the laboratory to the contractors. Analytical results will be submitted to Ohio EPA using the provided Excel spreadsheet and Ohio EPA will upload results via eDWR directly into Ohio EPA databases. Modifications to the process will have to be made if the sample point does not have a SMP ID in SDWIS. In this case, private, monitoring, observation, or other non-PWS well data could be housed in alternate

Ohio EPA databases. In both cases (PWS and non-PWS), the data generated from the project are not compliance data.

Field notebooks and/or field sampling data form entries will include the following information at a minimum:

- Project name
- PWS ID and sampling location
- Sampling team name(s)
- PWS contact(s)
- Samples and QA/QC samples collected (EPs, RWs, FRBs, duplicates, SM and SMDs)
- ID, time and date for each sample (*a copy of the chain of custody form is acceptable*)
- Raw water source(s) used within previous 24 hours
- Photograph log
- Field observations and any issues encountered, including significant deviations from the work plan, SOP or QAPP
- Any site visitors and associated interaction

B6.2 – Laboratory Data Management

The data will be maintained in an electronic or hard-copy format. All material records will be maintained for the full duration of the project.

B6.3 – Data Management Summary

The Project Administrator will maintain the project file in a dedicated folder on DDAGW PFAS SharePoint. The objective is to have a complete record of all decisions about modifications of data collection, assessment, verification, validation, or interpretation between the QAPP signoff and project report completion. Data received via eDWR from the laboratory will be stored in Ohio EPA's SDWIS database. This database will be the sole source of information to populate Ohio EPA GIS-based mapping software for geographic visualization of the data. Data will be stored by the contractor electronically as determined by the Contractor Project Manager.

SECTION C: ASSESSMENT AND OVERSIGHT

C1 – During Sampling Assessments/Analysis and Response Actions

C1.1 – Assessments

Periodic assessment of PWS sample sites, field equipment, and laboratory equipment is necessary to ensure that sampling is efficient, and data obtained meets quality objectives. This is an ongoing process that continues every day the project is implemented. Multiple contractors may be involved in this project so routine assessments and communication is required to ensure any problems are quickly identified and resolved.

The Ohio EPA Contract Manager will hold weekly calls with the contactor's project manager to review the upcoming scheduled sampling, ensure that prior notification has been conducted with the public water systems, discuss any access issues or other problems encountered during the previous week. Following these calls, Ohio EPA's Contract Manager will send a summary to the Project Administrator, Response Manager and the Contractor Project Managers.

Summary QA assessments will include field sampling team audits, sample completeness and QA/QC result

reviews, data verification and validation report reviews, quality system target and process reviews, and the project resource status reviews. These assessments will be completed by the Project QA Officers.

C1.2 – Response Actions

Despite best preparations, assessments may find situations requiring corrective actions. Small day-to-day level assessment findings are often addressed by the individual doing the assessment in the field or in the lab and are common enough to the process to not necessitate a formal response.

QA staff are aware that response may be necessary (many of these will result in changes to the analytical reporting via data qualifiers and comments) if any of the following occur:

- QC data are outside the warning or acceptable windows for precision and accuracy
- Blanks contain target analytes above acceptable levels
- Undesirable trends are detected in spike recoveries or relative percent difference between duplicates
- There are unusual changes in detection limits
- Deficiencies are detected by the laboratory, Project Administrator, and Project QA Officer during any internal or external audits or from the results of performance evaluation samples
- Inquiries concerning data quality are received

Corrective action implementation will be determined by the likelihood that the situation may affect the quality of the data.

Lab corrective actions will follow regular laboratory procedures and SOPs. Any lab corrective action with the potential to affect data quality will be communicated within 24 hours to the PFAS Project Administrator. The laboratory will evaluate if data requires any additional qualifiers and/or if it is usable for its originally intended purpose.

Field corrective actions may include site access issues or sampling tap access or cross contamination concerns. The need for correcting any of these issues will be minimized to the best of the field staff's ability with ample planning and preparation. Site access issues encountered by the contractors will be discussed during the weekly calls with Ohio EPA's Contract Manager.

C1.3 – Reporting and Resolution of Issues

Any audits or other assessments that reveal findings of practice or procedure that do not conform to the written QAPP or the Ohio EPA PFAS Sampling SOP will be corrected as soon as possible. Ohio EPA Project Administrator and Project QA Officer will be notified regarding deviations. The Ohio EPA Project Guidance Team will be contacted as necessary.

C1.4 – Data Completeness

Overall success of the project will require 95% of described sampling resulting in successful useable results. Potential data gaps will be monitored as the project progresses, and the schedule will be revised to fill these gaps where they are determined to be significant or to potentially impact the fulfillment of project objectives.

C2 – Reports to Management

If an external party uses this QAPP to produce data under contract with the Ohio EPA, weekly written progress reports are to be provided to the PFAS Contract Manager, as identified in Section C1 and the Contract Scope of Work. The Scope of Work may identify specific reporting requirements beyond those listed here. Reports will include, but not be limited to sample schedules, summaries of activities performed, technical support, etc.

Ohio EPA staff shall be in continuous contact with their immediate supervisor or the Project Administrator. Reports will include, but not be limited to sample schedules, summaries of activities performed, technical support, etc.

Once sampling has commenced, Ohio EPA's Project Administrator will send out weekly updates to the Ohio EPA Project Guidance Team.

C2.1 –Sample Results

Laboratories will report the following six (6) PFAS compounds at the specified minimum reporting levels: PFOA, PFOS, PFHxS, PFHBS, and PFNA is 5 ng/L and for GenX is 25 ng/L. Sampling results shall be reported to the nearest 0.1 ng/L. All analytical laboratory reports shall only report on the 6 analytes listed above.

Data shall be reported electronically using the Agency's provided Excel spreadsheet within 10 days of receipt of a completed laboratory report (not including validated data packages). The provided Excel spreadsheet will be completed following the instructions provided within the spreadsheet. Ohio EPA will upload the data to the electronic data reporting portal (eDWR).

Full lab reports (in PDF format) shall also be submitted within 60 Days of electronic reporting via CD, USB drive, the FTP site, or upon request. Data with qualifiers shall be appropriately flagged, particularly when detections are found in blanks at or above the MRL. PDFs of qualified data shall be submitted to the Division within five days of being requested by the PFAS Project Administrator or PFAS QA Officer. Raw instrument data shall also be made available within 10 days of a request.

SECTION D: DATA USABILITY

D1 – Verification and Validation Methods

The analytical data generated during this project must be of sufficient quality to decide whether a PWS exceeds or is within 50% of the action level for any of the six PFAS compounds being investigated using U.S. EPA Method 537.1 (Appendix A). To ensure that this DQO is achieved, Ohio EPA will implement and adhere to the following requirements, laboratory audits and data verification and validation activities:

- Ohio EPA will certify all laboratories located in Ohio providing PFAS analysis services for this project based on requirements identified in Chapter 3745-89 of the Administrative Code. Ohio EPA may also accept laboratories certified by U.S. EPA, the National Environmental Laboratory Accreditation Program (NELAP), or by another environmental laboratory accreditation program for the field of accreditation of drinking water for PFAS analysis via US EPA 537.1 upon receipt and review of the following:

    1. A copy of the current certificate of accreditation, issued to the laboratory by an accrediting body.

2. An evaluation of the most recent Proficiency Testing (PT) sample study for US EPA method 537.1; the PT sample provider must be accredited by a Proficiency Testing Provider Accreditor that meets the National Environmental Laboratory Accreditation Conference (NELAC) requirements.

3. Reports from the most recent on-site inspection by the accrediting body issuing the certification to the laboratory. The on-site inspection must be completed by a U.S. EPA-certified Certification Officer.

- All laboratories must comply with the quality control requirements for Method 537.1 (Section 9.0).

- All laboratories will provide verification that U.S. EPA Method 537.1 data meet the quality control standards that would be evaluated by a Tier 1 data validation. Appendix B provides an example checklist for Tier I data verification. Upon receipt of a laboratory data report, the LOE contractor will provided a Tier 1 data verification review. In addition, Ohio EPA staff will also provide Tier 1 data verification review for selected laboratory reports.

- All public water systems that exhibit PFAS detections exceeding or within 50% of an action level will be resampled and reanalyzed by Ohio EPA to verify the detection. Resampling will significantly reduce the potential for analytical false positives.

- Full data validation (Tier 1 and Tier 2) for <u>one</u> sample delivery set (EP sample, RW sample, FRB, SM and SMD) will be performed by a third-party validator for each laboratory used to provide PFAS analyses. The purpose of this validation is to evaluate each laboratory's QA/QC protocol. Ohio EPA will review and follow up on the data validation as necessary to ensure project DQOs are met.

- If concerns arise regarding data quality that cannot be addressed through the criteria listed above, Ohio EPA may implement Tier 1 or Tier 2 validation activities by a third-party data validator. Ohio EPA will review and follow up on the data validation as necessary to ensure project DQOs are met.

The Project QA Officer will evaluate all components of the sampling process and analytical reports to determine whether the data quality objective has been met and that data are appropriate as a basis for decisions regarding the presence of PFAS in public water systems.

APPENDIX A

List of Method 537.1 PFAS parameters to be analyzed/measured

Parameters	Analyte	Reg # (CAS)	Holding Time	MRL
PFBS	Perfluorobutanesulfonic acid	375-73-5	14 days to extraction; 28 days from extraction to analysis	5 ng/L
PFHxS	Perfluorohexanesulfonic acid	355-46-4	14 days to extraction; 28 days from extraction to analysis	5 ng/L
PFNA	Perfluorononanoic acid	375-95-1	14 days to extraction; 28 days from extraction to analysis	5 ng/L
PFOA	Perfluorooctanoic acid	335-67-1	14 days to extraction; 28 days from extraction to analysis	5 ng/L
PFOS	Perfluorooctanesulfonic acid	1763-23-1	14 days to extraction; 28 days from extraction to analysis	5 ng/L
HFPO-DA	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6[a]	14 days to extraction; 28 days from extraction to analysis	25 ng/L

a. HFPO-DA is one component of the GenX processing aid technology.

APPENDIX B
Tier 1 Data Verification/Usability Checklist (Example)

Review Date: _____ **Lab Report ID:** _____

QA Officer: _____ **Lab Report Date:** _____

QA Reviewer: _____ **Laboratory/ Division:** _____

OH EPA Contact: _____ **Analysis Method:** _____

Project Title: _____ **Sample Matrix/ Analytes:** _____

ITEMS REVIEWED	Yes	No	NA	Comments
Sample Information				
Are samples uniquely identified and correctly transcribed throughout the data package to the summary of results?				
Does sample collection documentation indicate that samples were collected as described in the QAPP?				
If calculations were used for sample collection information (e.g., air volumes), are these calculations correct?				
Does sample collection documentation indicate appropriate preservation?				
If applicable, is chain-of-custody documentation complete?				
Sampling and Analysis Method Information				
Were methods specified in QAPP used?				
If method modifications were used, are these modifications appropriate and well documented?				

ITEMS REVIEWED	Yes	No	NA	Comments
Were sample preparation and analytical method holding times met?				
Summary of Results				
Are the correct units reported?				
Are reported results correct (verify any calculations performed[1])?				
Were QC samples (blanks, second source checks, surrogates, spikes, replicates) analyzed at the frequency specified in the QAPP?				
Did QC results meet the requirements specified in the QAPP?				
Data Qualifiers				
If QC requirements were not met, were corrective actions performed?				
If necessary, were data qualified appropriately?				

[1]A percentage of input values for software program-generated calculations and hand calculations must be verified, as determined to be appropriate by the QA Officer. If problems are identified, additional verification is needed.

REFERENCES

Ohio Environmental Protection Agency. 2015. Operating Procedures Document for Ambient Ground Water Quality Monitoring Program, Div. of Drinking and Ground Waters, Columbus, Ohio. December 2015.

Ohio Environmental Protection Agency. 2020. DDAGW Standard Operating Procedure for PFAS Sampling at Public Water Systems, Ohio EPA LOE Contractors, Div. of Drinking and Ground Waters, Columbus, Ohio. March 2020.

Ohio Environmental Protection Agency. 2018. Technical Guidance Manual for Hydrogeologic Investigations and Ground Water Monitoring, Div. Environmental Response and Revitalization, 2018.

State of Ohio. 2019. Ohio Per- and Polyfluoroalkyl Substances (PFAS) Action Plan for Drinking Water. December 2019.

US Environmental Protection Agency. 2006. Guidance on Systematic Planning Using the Data Quality Objectives Process. EPA Document No.: EPA/240/F-06/001. February 2006.

US Environmental Protection Agency. 2018a. Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using Method 537. EPA Document No. EPA/910/R-18/001. November 2018.

US Environmental Protection Agency. 2018b. Method 537.1 Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). EPA Document No.: EPA/600/R-18/352; Version 1.0, November 2018.a