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DOCUMENT CATEGORY: Technical		
LEVEL OF USE: <input checked="" type="checkbox"/> Reference Level <input type="checkbox"/> Continuous Use		
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REQUIRED REVIEW DATE (or expiration date for temporary change): 10/27/2025	EFFECTIVE DATE: 04/20/2023	

REVISION/CHANGE LOG			
Revision/Change Letter	Description of Changes	Pages Affected	Date of Revision/Change
FR0	New procedure for Paducah Site Drinking Water Sampling	All	2/2/2022
FR0A	Periodic Review has been completed with no changes identified in procedure technical content. Nonintent change to correct FA, SMA, SME, Approver, and dates has been incorporated per CP3-NS-2001. Date for review cycle has been reset.	All	10/27/2022
FR0B	Added information for sampling of Perfluoroalkyl and Polyfluoroalkyl substance (PFAS) analysis. Reformatted to meet current guidance.	3-14, 17-24	01/11/2023
FR0C	Intent change to address comments and update sampling requirements.	3, 5-9, 12-14	04/19/2023

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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure defines the process for the collection of drinking water samples for laboratory analysis. This sampling process is used to ensure the site's drinking water meets Kentucky Division of Water (KDOW) drinking water standards.

Four Rivers Nuclear Partnership, LLC (FRNP) Utilities organization operate the Paducah Site drinking water facility at C-611. This facility provides potable water to most areas of the Paducah Site. This public water treatment and distribution system is registered to FRNP as a Non-Transient Non-Community Water System. FRNP utilities has the primary responsibility for ensuring compliance with the applicable standards.

1.2 Scope

This procedure shall be used by the Deactivation and Remediation (D&R) contractor personnel, and subcontractor personnel for sampling of drinking water samples at the U.S. Department of Energy (DOE) owned Paducah site.

2.0 REFERENCES

2.1 Use References

- CP2-HS-2000, *Worker Safety and Health Program for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*
- CP2-SM-1000, *Activity Level Work Planning and Control Program for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*
- CP3-ES-0043, *Temperature Control for Sample Storage*
- CP3-ES-2708, *Chain of Custody Forms, Field Sample Logs, Sample Labels, and Custody Seals*
- CP3-RP-1125, *Unrestricted Release of Material and Equipment*
- CP3-WM-9503, *Off-Site Shipments by Air Transport*
- CP4-ES-2704, *Trip, Equipment, and Field Blank Preparation*
- Text deleted
- CP4-UT-0602, *Sanitary Water Sampling Procedure for Bacteriological and Chlorine Analyses*

2.2 Source References

- 40 CFR (Code of Federal Regulations) Chapter 141. *National Primary Drinking Water Regulations*, U.S. Environmental Protection Agency (EPA), Washington, DC.
- CP2-OM-0001, *Operation and Maintenance Plan for the Sanitary Water System at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*
- CP5-TS-1000, *Per- and Polyfluoroalkyl Substances Sampling Guidelines*
- EPA's Quick Guide to Drinking Water Sample Collection, September 2016, EPA R8 2nd edition, Update.
- JHA-11055, *Sample Bottle Preparation and Preservation*

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- Kentucky Administrative Regulations (KAR), Title 401, Energy and Environmental Cabinet – Department for Environmental Protection, Chapter 8, *Public Water Supply*
- Kentucky Energy and Environmental Cabinet – Department For Environmental Protection, DEPSOP001, *Sampling Procedures for Per- and Polyfluoroalkyl Substances*
- Text deleted
- U.S. Environmental Protection Agency (USEPA), EPA/600/R-18/352, 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)*, November 2018
- Water Treatment Registration for Public Water System—PWS ID#KY0732457

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3.0 COMMITMENTS

KY0732457, Public Water System (PWS), includes 401 KAR Chapter 8, *Public Water Supply*

4.0 PRECAUTIONS AND LIMITATIONS

4.1 Precautions

- 4.1.1 The sampling personnel performing the task of drinking water sampling shall comply with the requirements of the CP2-HS-2000, *Worker Safety and Health Program*.
- 4.1.2 The sampling personnel also shall comply with additional requirements in the Job Hazard Analysis (JHA) **and** applicable Industrial Hygiene Work Permit(s) (IHWP).
- 4.1.3 A two-way radio and/or cell phone is kept at the sampling site during any sampling event for communication purposes.
- 4.1.4 Sample bottles containing acids and bases as preservatives should be handled with care.
- 4.1.5 **If** acid spills on skin or clothing, **then** remove contaminated clothing and rinse the area with water.
- 4.1.6 Gloves, eye protection, and closed toe shoes should be worn when taking water samples.
- 4.1.7 Due to the high potential for cross-contamination during sampling activities **and** because laboratory analysis for per- and polyfluoroalkyl substances (PFAS) have very low detection limits, special care should be taken when sampling **and** handling PFAS because PFAS are commonly found in many consumer products as well as equipment typically used in collecting environmental samples.
- 4.1.8 **Since** vehicle upholstery may be treated with PFAS-containing cleaners, **then** PFAS sampling equipment **and** sample bottles are **NOT** to be placed directly on uncovered vehicle seats **or** floor boards.

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4.2 Limitations

- 4.2.1 Potential for sample contamination is greater for analytes that are usually present in trace amounts (e.g., some metals, pesticides, dioxins/furans, PFAS, etc.)

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- 4.2.2 Collect samples in an area free of excessive dust, rain, snow, or other sources of contamination.
- 4.2.3 Sample containers must not touch the faucet, which is a potential source of contamination.
- 4.2.4 Haloacetic Acids (HAA5s) and Total Trihalomethanes (TTHMs) samples must be collected at the same time.
- 4.2.5 Volatile Organic Compounds (VOAs) and TTHMs must be resampled if bubbles are present in vial.
- 4.2.6 Bacteriological samples are collected by Utilities personnel in accordance with CP4-UT-0602, *Sanitary Water Sampling Procedure for Bacteriological and Chlorine Analyses* **and then** transported **and** relinquished to the Field Sample Team personnel for delivery to a laboratory certified by KDOW.
- 4.2.7 Radiological Control (RADCON) should be contacted, if necessary, for unrestricted offsite release of samples per procedure CP3-RP-1125, *Unrestricted Release of Material and Equipment*.
- 4.2.8 Equipment and material used to collect PFAS drinking water samples should **NOT** contain any fluorinated compounds, including polytetrafluoroethylene (PTFE), Teflon, or synthetic rubber with fluoropolymer elastomers, such as Viton. The following materials should be avoided during PFAS sampling:
- Gore-Tex brand **or** similar high-performance outdoor clothing
 - Clothing treated with ScotchGard brand **or** similar water repellent
 - Fluoropolymer-coated Tyvek
 - Wrinkle-resistant fabrics
 - Fire resistant clothing with fluorochemical treatment
 - Anything advertised as water repellent
 - New clothing that has been washed fewer than six times
 - Weatherproof log books with fluorochemical coatings
 - Waterproof or weatherproof bottle labels
 - Felt tip pens and permanent markers (fine and ultrafine Sharpie markers are acceptable)
- 4.2.9 **When** sampling for PFAS, **then** the sampling area should be clear of the following items:
- Pre-packaged food wrappers, such as, fast food sandwich wrappers, pizza boxes, etc.
 - Microwave popcorn bags
 - Blue ice containers
 - Non-stick aluminum foil
 - Kimwipes

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NOTE:
 A list of PFAS-free sunscreens and insect repellants is provided in Appendix C, *Summary of PFAS Sampling Guidance*.

- Sunscreen, insect repellent, and other personal hygiene products that may contain PFAS.
- 4.2.10 PFAS sample bottles should be polypropylene and should be pre-preserved with Trizma (white crystals) according to guidance of USEPA Document # EPA/600/R-18/352, Method 537.1, *Determination of Selected Per- And Polyfluorinated Alkyl Solutions In Drinking Water By Solid Phase Extraction And Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)*.
- 4.2.11 **Since** PFAS has a tendency to adhere to glass surfaces, **then** the Sampling Manager should be contacted if glass bottles or bottles without preservatives are sent for the PFAS sampling activity.
- 4.2.12 **If** sample vials are to be used for the PFAS sampling evolution, **then** the vials should **NOT** have PTFE- or Teflon-lined bottles or caps.
- 4.2.13 Electronic media, such as cell phones and tablets, should **NOT** be used when PFAS sampling **unless** the following precautionary measures are taken to prevent cross-contamination:
- All devices should be used with clean, ungloved hands **and, if desired, then** an approved stylus
 - Following the use of the device, hands are to be washed with soap and water, **then** clean gloves are to be donned before contacting sampling equipment, such as bottles, tubing, etc.
- 4.2.14 Bottles for PFAS samples should be segregated for use in the field from sample bottles that may contain PTFE- or Teflon-lined bottles or caps.
- 4.2.15 Personnel performing PFAS sampling activities are to don fresh nitrile gloves after handing other sample bottles and before handling PFAS sample bottles.

5.0 PREREQUISITES.

- 5.1.1 Perform planning and coordination of work activities in accordance with CP2-SM-1000, *Activity Level Work Planning and Control Program for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*.
- 5.1.2 Read and sign off on the IHWP, if required, and review task-specific JHA prior to beginning work.
- 5.1.3 Obtain chain-of-custody forms (COC), KDOW State Forms, sample data forms, and sample labels as necessary from the Sample Management Office (SMO).
- 5.1.4 **If** applicable, **then** prepare quality control samples according to CP4-ES-2704, *Trip, Equipment and Field Blank Preparation*.
- 5.1.5 A cooler or ice chest is available for transport of the samples once they have been collected.

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NOTE:

Due to the potential for blue ice containers to contain PFAS, blue ice containers **CANNOT** be used for PFAS sampling evolutions.

- 5.1.6 Ice is available to keep the samples at the recommended temperature of $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$. Ice shall be double bagged in resealable polyethylene bags (Ziploc or equivalent) to prevent leakage in the cooler.
- 5.1.7 Taps selected for sample collection should be supplied with water from a service pipe connected directly to a water main in the segment of interest.
- 5.1.8 **When** both hot-water and cold-water taps are present at a proposed location, **then** sample the cold-water tap.
- 5.1.9 Ensure PFAS sample bottles are polypropylene **and** have been preserved with Trizma (white crystals).
- 5.1.10 Ensure sample bottles for PFAS samples are segregated from sample bottles that may contain PTFE- or Teflon-lined bottles or caps.
- 5.1.11 Before handling PFAS sample bottles and after handling other sample bottles, ensure fresh nitrile gloves are donned.
- 5.1.12 **When** sampling for PFAS, **then** select a sample collection point that is before any point-of-use treatment system, such as, reverse osmosis system or granular activated carbon filter.
- 5.1.13 Ensure PFAS samples are **NOT** collected through hoses.
- 5.1.14 **If** a hose is connected to the tap selected for PFAS sampling, **then, if** possible, disconnect the hose **and** sample directly from the tap.
- 5.1.15 **If** a hose is connected to the tap selected for PFAS sampling **and** the hose **CANNOT** be disconnected, **then** attempt to locate a different sampling point for the system.
- 5.1.16 **If** possible, **then** avoid obtaining PFAS samples from any taps with visible Teflon tape, caulking compounds, or thread compounds since these materials potentially contain PFAS.
- 5.1.17 **If** performing PFAS sampling at a private residence **and** there is a point-of-entry treatment system, such as a whole house filtration system, **then** ask the owner or their representative if there is a sampling point between the residential well and the filtration system. **If** the existing treatment system **CANNOT** be bypassed without disconnecting pump components or potentially damaging the system, **then** collect a treated sample **and** document that the sample was collected post-treatment.

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6.0 INSTRUCTIONS

NOTE:

The following sampling steps may be performed in any order as long as the intent of the procedure is met.

6.1 General Sampling Instructions

Sample Management Office

- 6.1.1 Review the Drinking Water Plan provided by Environmental Field Compliance that describes the sampling locations, numbers, types of samples to be collected, and the quality control requirements of the project.

NOTE:

It is best to obtain sampling supplies directly from the laboratory performing the analyses.

- 6.1.2 Submit the Drinking Water Plan to the applicable certified lab yearly to ensure sampling supplies, preservatives, and procedures for sample collection are acceptable.

Field Sample Team

- 6.1.3 Obtain COCs, KDOW State Forms, sample data forms, sample labels, and custody seals as necessary from the SMO.

NOTE:

If sampling for Lead and Copper allow the water to sit undisturbed in the water line for at least six hours.

- 6.1.4 Don appropriate Personal Protective Equipment, (PPE).

- 6.1.5 Remove tap aerator (if present).

NOTE:

Do not flush tap if sampling for Lead and Copper.

- 6.1.6 Flush the tap fully open for approximately 2 to 3 minutes.

- 6.1.7 Return the stream of water to the width of a pencil.

- 6.1.8 Choose the appropriate sample bottle and preservative according to COC.

- 6.1.9 **If NOT** previously labeled, **then** obtain the appropriate sample container **and** affix the appropriate label.

- 6.1.10 Document sample collection and label sample containers according to CP3-ES-2708, *Chain of Custody Forms, Field Sample Logs, Sample Labels and Custody Seals*.

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NOTE:

The bottle top should be kept in your hand or placed facing upwards so that the portion of the cap that touches the bottle does not touch the surface. If you hold the top in your hand, ensure that nothing touches the inside of the cap or the rim.

6.1.11 Remove the sample bottle top.

A. If the sample bottle is unpreserved:

NOTE:

Do **NOT** rinse the bottle if sampling for Lead and Copper as these samples must be “first-draw”.

- Rinse the bottle with the water a few times before filling the bottle.

B. If the sample bottle contains preservative:

- Do **NOT** rinse the bottle.
- Do **NOT** touch the preservative or the inside of the bottle.

NOTE:

For TTHMs samples, do **NOT** leave any headspace (air bubbles).

6.1.12 Allow the sample container to fill to the desired volume, allowing some volume for expansion and mixing.

6.1.13 Replace the sample container lid securely.

NOTE:

If the sample is for compliance, complete the appropriate KDOW State Form.

An example of a KDOW State Form is shown in Appendix B, *KDOW State Form*.

6.1.14 Complete the COC record in accordance with CP3-ES-2708.

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NOTE:

Nearly all of the drinking water compliance sample methods require sample to be kept between 2°C and 10°C.

6.1.15 Place the sample containers in a cooler with ice or blue ice to chill the samples until the samples can be delivered to the lab. (Refer to CP3-ES-0043, *Temperature Control for Sample Storage*.)

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6.2 Specialized Sampling Instructions

6.2.1 VOCs and TTHMs

- Slowly fill the bottle, allowing the sample to gently flow down the inside of the bottle.
- Create a meniscus of water at the mouth so that the bottle is actually overfilled.
- Cap the bottle so that no air bubbles are present in the bottle.

- D.** Invert vial and tap vial on palm of one hand making sure any air bubbles are dislodged.
- E.** **If** air bubbles are present, **then** remove cap and fill with water from tap until there is no headspace.

6.2.2 Lead and Copper

NOTE:

Do **NOT** remove any screens or aeration devices.

Do **NOT** intentionally flush the water line before the start of the six-hour period.

Removing aeration devices and flushing water line may mask the added contribution of lead at the tap.

- A.** Select a cold-water faucet for sampling that is free from devices such as water softeners or point of use filters.

NOTE:

Wide-mouth bottles allow for a higher flow rate during sample collection which is more representative of the flow that a consumer may use to fill up a glass of water.

- B.** Place sample container under the faucet.
- C.** Open the faucet and collect the first water out of the tap (initial flush).
- D.** Fill the bottle to the shoulder of the bottle.
- E.** Cap the bottle tightly.

6.2.3 PFAS

NOTE:

Since PFAS has a tendency to adhere to glass surfaces, **then** sample bottles used for PFAS samples should be polypropylene, according to Method 537.1. Sample vials should **NOT** have PTFE- or Teflon-lined bottles or caps.

- A.** Ensure sample bottles **or** vials have been properly prepared. **If** vials have **NOT** been prepared properly **then** contact Sample Management group to obtain properly prepared bottles or vials.
- B.** Ensure PFAS sampling precautions listed in Steps **4.2.8** through **4.2.15** are met prior to beginning sampling evolution.
- C.** Wash hands with dish detergent before sampling **and** don fresh nitrile gloves at each sampling location.
- D.** Open the cold water tap and allow the system to flush for **3 to 5 minutes**, ensuring the following are met:
 - 1.** Do **NOT** open sample bottles **until** ready to obtain sample.

2. Do **NOT** obtain 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 drawn directly for the water source.
3. Avoid sampling from taps that are equipped with a point-of-use reverse osmosis or granular activated carbon filter.

E. When flushing is complete, then perform the following to obtain samples:

1. Turn the tap off briefly.
2. Remove the cap from the sample bottle.
3. Position the sample bottle under the tap and turn the tap on.

NOTE:

When filling the sample bottle, **then** the bottles should **NOT** be filled past the middle of the bottle shoulder in order to leave adequate headspace.

4. Fill the bottle, taking care **NOT** to flush out the sample preservative.
5. After collecting the sample, place the cap on the bottle **and** agitate the bottle gently by hand **until** the preservative is dissolved.
6. Affix labels to the bottle immediately after sample bottle has been closed.

NOTE:

A field reagent blank is required for each PFAS sampling area **and** is to be collected adjacent to the sample location **and** immediately flowing collection of the parent drinking water sample.

7. Collect parent sample before the field reagent blank to avoid mislabeling the sample.
8. Place sample bottles in resealable polyethylene bags (Ziploc or equivalent).

NOTE:

Blue cooler packs are **NOT** to be used when packing samples on ice, **unless** they have been tested and verified **NOT** to contain PFAS.

9. Pack samples on ice immediately for shipment to the offsite laboratory.

7.0 ACCEPTANCE CRITERIA

None

8.0 POST PERFORMANCE WORK ACTIVITIES

NOTE:

Bacteriological drinking water samples are relinquished from Utilities personnel to the Field Sample Team by signing the COC form as ‘received by’ and entering date and time of receipt.

Utilities personnel must include a completed KDOW Bacteriological State Form as shown in Appendix B, *KDOW State Form*, when relinquishing samples to Field Sample Team.

Field Sample Team

- 8.1.1 Handle and submit drinking water samples for analysis according to CP3-ES-2708.
- 8.1.2 Sign appropriate KDOW State Form as “collector name” and date of collection.
- 8.1.3 Ensure appropriate KDOW State Forms accompany drinking water samples to the applicable certified lab.
- 8.1.4 **If required, then** coordinate with RADCON, **and** release the sample(s) and related COC documentation for further handling according to CP3-WM-9503, *Off-Site Shipments by Air Transport*.
- 8.1.5 **If required, then** prepare samples for shipment off-site and ship in according to CP3-WM-9503.
- 8.1.6 Submit a copy of the COC forms and logbook pages/data forms to the SMO for entry into the PEMS.

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9.0 RECORDS

9.1 Records Generated

The following records may be generated by this procedure:

KDOW State Forms

Forms are to be completed in accordance with CP3-OP-0024, *Forms Control*.

9.2 Records Disposition

The records are to be maintained in accordance with CP3-RD-0010, *Records Management Process*.

Appendix A – Acronyms/Definitions

ACRONYMS

COC – Chain of Custody

CFR – Code of Federal Regulations

D&R – Deactivation and Remediation

DOE – U.S. Department of Energy

EPA – U.S. Environmental Protection Agency

ETFE – Ethylene-tetrafluoroethylene

FEP – Fluorinated ethylene propylene

FRNP – Four Rivers Nuclear Partnership, LLC

HAA5 – Haloacetic Acid

HDPE – High-density polyethylene

IHWP – Industrial Hygiene Work Permit

JHA – Job Hazard Analysis

KAR – Kentucky Administrative Regulations

KDOW – Kentucky Division of Water

LDPE – Low-density polyethylene

PCP – Personal care product

PCTFE – Polychlorotrifluoroethylene

PFAS – Per- and Polyfluoroalkyl Substances

PPE – Personal Protective Equipment

PTFE – Polytetrafluoroethylene

PVC – Polyvinyl chloride

PVDF – Polyvinylidene fluoride

PVF – Polyvinyl fluoride

PWS – Public Water System

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Appendix A – Acronyms/Definitions (Continued)

RADCON – Radiological Control

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SDS – Safety Data Sheet

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SMO – Sample Management Office

TTHMs – Total Trihalomethanes

USEPA – U.S. Environmental Protection Agency

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VOAs – Volatile Organic Compounds

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DEFINITIONS

Non-transient non-community water system – A public water system that is not a community water system and that regularly serves at least 25 of the same persons over 6 months per year.

Appendix B – KDOW State Form

(EXAMPLE)

SAMPLE CATEGORY = GE
DISTRIBUTION SAMPLING

KENTUCKY DIVISION OF WATER / DRINKING WATER RESULTS
STAGE II
HALOACETIC ACIDS FIVE (HAA5) AND TOTAL TRIHALOMETHANE (TTHM)
ANALYSIS REPORT FORM

Rev. 01/10/2012

PWS ID	KY 0732457	PWS Name	Four Rivers Nuclear Partnership, LLC (PGDP)	PWS Contact	Bill Clark
PWS Address	5511 Hobbs Road, Kevil, Ky 42053	PWS Phone	270-441-5354		
Collector Name	_____				

Lab ID	□ □ □ □ □	Lab Phone	_____
Lab Analyst	_____	Lab Supervisor	_____

PWS ID	KY 0732457	Location Code	038	Location Name	C-755 Trailers East of Plant
Sample Date	□ □ □ □ □ □	Time	□ □ □ □	Sample Type	RT = Routine SP = Special
		Lab Sample Number	□ □ □ □ □ □ □ □ □ □		

Analyte Code	Analyte Name	Analysis Method Code	<	Result (mg/L) -or- Lab Minimum Reporting Limit (mg/L)	Analysis Date (MMDDYYYY)
2456	HALOACETIC ACIDS FIVE (HAA5)	□ □ □ □	□	□ □ □ □ . □ □ □ □ □ □ □ □ □ □	□ □ □ □ □ □ □ □ □ □
2950	TOTAL TRIHALOMETHANE (TTHM)	□ □ □ □	□	□ □ □ □ . □ □ □ □ □ □ □ □ □ □	□ □ □ □ □ □ □ □ □ □

PWS ID	KY 0732457	Location Code	040	Location Name	C-615-G
Sample Date	□ □ □ □ □ □	Time	□ □ □ □	Sample Type	RT = Routine SP = Special
		Lab Sample Number	□ □ □ □ □ □ □ □ □ □		

Analyte Code	Analyte Name	Analysis Method Code	<	Result (mg/L) -or- Lab Minimum Reporting Limit (mg/L)	Analysis Date (MMDDYYYY)
2456	HALOACETIC ACIDS FIVE (HAA5)	□ □ □ □	□	□ □ □ □ . □ □ □ □ □ □ □ □ □ □	□ □ □ □ □ □ □ □ □ □
2950	TOTAL TRIHALOMETHANE (TTHM)	□ □ □ □	□	□ □ □ □ . □ □ □ □ □ □ □ □ □ □	□ □ □ □ □ □ □ □ □ □

PWS ID	KY □ □ □ □ □ □ □ □	Location Code	□ □ □	Location Name	_____
Sample Date	□ □ □ □ □ □	Time	□ □ □ □	Sample Type	RT = Routine SP = Special
		Lab Sample Number	□ □ □ □ □ □ □ □ □ □		

Analyte Code	Analyte Name	Analysis Method Code	<	Result (mg/L) -or- Lab Minimum Reporting Limit (mg/L)	Analysis Date (MMDDYYYY)
2456	HALOACETIC ACIDS FIVE (HAA5)	□ □ □ □	□	□ □ □ □ . □ □ □ □ □ □ □ □ □ □	□ □ □ □ □ □ □ □ □ □
2950	TOTAL TRIHALOMETHANE (TTHM)	□ □ □ □	□	□ □ □ □ . □ □ □ □ □ □ □ □ □ □	□ □ □ □ □ □ □ □ □ □

PWS ID	KY □ □ □ □ □ □ □ □	Location Code	□ □ □	Location Name	_____
Sample Date	□ □ □ □ □ □	Time	□ □ □ □	Sample Type	RT = Routine SP = Special
		Lab Sample Number	□ □ □ □ □ □ □ □ □ □		

Analyte Code	Analyte Name	Analysis Method Code	<	Result (mg/L) -or- Lab Minimum Reporting Limit (mg/L)	Analysis Date (MMDDYYYY)
2456	HALOACETIC ACIDS FIVE (HAA5)	□ □ □ □	□	□ □ □ □ . □ □ □ □ □ □ □ □ □ □	□ □ □ □ □ □ □ □ □ □
2950	TOTAL TRIHALOMETHANE (TTHM)	□ □ □ □	□	□ □ □ □ . □ □ □ □ □ □ □ □ □ □	□ □ □ □ □ □ □ □ □ □

The signatories of this form certify by their signatures that collection and analysis of the water sample analyzed and the resulting data hereby submitted, were completed in accordance with the provisions of 401 KAR Chapter 8, and that the data submitted on this form is a true and accurate report of the results of collection and analysis performed pursuant to the above-referenced regulations. Violations of 401 KAR Chapter 8 are subject to severe penalties prescribed in KRS 224.99-010, up to \$25,000 fine per day per violation and in some cases a violation may subject the violator to prison.

Appendix C – Summary of PFAS Sampling Guidance

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Summary of Recommendations for PFAS Sampling (sources are noted at the bottom of the table)

	Acceptable	Avoid	Needs Screening
Personal Care Products (PCPs)			
Sun protection	<ul style="list-style-type: none"> ▪ Sunscreens that have been evaluated and found to be PFAS-free or not contain PFAS ingredients ▪ Sunscreen should be applied in the staging area, away from sampling bottles, equipment, and sample site area, followed by thoroughly washing hands ▪ Vetted sunscreen products: <ul style="list-style-type: none"> - Alba Organics Natural - Yes to Cucumbers - Aubrey Organics - Jason Natural Sun Block - Kiss My Face - Baby-safe sunscreens (“free” or “natural”) - Avon Skin So Soft Bug Guard-SPF 30 - Banana Boat for Men Triple Defense Continuous Spray Sunscreen SPF 30 - Banana Boat Sport Performance Coolzone Broad Spectrum SPF 30 - Banana Boat Sport Performance Sunscreen Lotion Broad Spectrum SPF 30 - Banana Boat Sport Performance Sunscreen Stick SPF 50 - Coppertone Sunscreen Lotion Ultra Guard Broad Spectrum SPF 50 - Coppertone Sport High-Performance AccuSpray Sunscreen SPF 30 - Coppertone Sunscreen Stick Kids SPF 55 	<ul style="list-style-type: none"> ▪ Any sunscreen applied in the sampling area, close to sampling bottles or field equipment ▪ Sunscreen known to contain PFAS 	<ul style="list-style-type: none"> ▪ Sunscreens that have NOT been tested for PFAS ▪ Baby sunscreens that are “free” or “natural”

Appendix C – Summary of PFAS Sampling Guidance (Continued)

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	Acceptable	Avoid	Needs Screening
	<ul style="list-style-type: none"> - L'Oréal Silky Sheer Face Lotion 50 - Meijer Clear Zinc Sunscreen Lotion Broad Spectrum SPF 50 - Meijer Sunscreen Continuous Spray Broad Spectrum SPF 30 - Meijer Clear Zinc Sunscreen Lotion Broad Spectrum SPF 15, 30 and 50 - Meijer Wet Skin Kids Sunscreen Continuous Spray Broad Spectrum SPF 70 - Neutrogena Beach Defense Water+Sun Barrier Lotion SPF 70 - Neutrogena Beach Defense Water+Sun Barrier Spray Broad Spectrum SPF 30 - Neutrogena Pure & Free Baby Sunscreen Broad Spectrum SPF 60+ - Neutrogena UltraSheer Dry-Touch Sunscreen Broad Spectrum SPF 30 		
Insect repellants	<ul style="list-style-type: none"> ▪ Insect repellants that have been evaluated and found to be PFAS-free or NOT contain PFAS ingredients ▪ Insect repellents should be applied in the staging area, away from sampling bottles and equipment followed by thoroughly washing hands. ▪ Vetted insect repellants: <ul style="list-style-type: none"> - Jason Natural Quit Bugging Me - Repel Lemon Eucalyptus - Herbal Armor - California Baby Natural Bug Spray - BabyGanics - Avon Skin So Soft Bug Guard-SPF 30 - OFF Deep Woods - Sawyer Permethrin 	<ul style="list-style-type: none"> ▪ Any insect repellent applied in the sampling area, close to sampling bottles or field equipment ▪ Insect repellent known to contain PFAS 	<ul style="list-style-type: none"> ▪ Insect repellants than have NOT been tested for PFAS
Cosmetics and hygiene products	<ul style="list-style-type: none"> ▪ PFAS-free cosmetics, hygiene products, and other Personal Cosmetic Products (PCP) applied several hours before the sampling event. 	<ul style="list-style-type: none"> ▪ Any PCP applied in the sampling area, close to sampling bottles or field equipment ▪ PCPs known to contain PFAS 	<ul style="list-style-type: none"> ▪ PCPs that have NOT been tested for PFAS

Appendix C – Summary of PFAS Sampling Guidance (Continued)

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	Acceptable	Avoid	Needs Screening
	<ul style="list-style-type: none"> Where necessary, PCPs should be applied in the staging area, away from sampling bottles and equipment followed by thoroughly washing hands. 		
Field Clothing			
Clothing/gear	<ul style="list-style-type: none"> PFAS-free clothing, made of or with 100% cotton, synthetic and natural fibers, polyurethane, polyvinyl chloride (PVC), wax coated fabrics, rubber/neoprene, and uncoated Tyvek 	<ul style="list-style-type: none"> Clothing and rain gear made of or with: Gore-Tex or similar water-resistant/breathable synthetics Clothing treated with ScotchGard or other aftermarket fabric protectors Wrinkle-resistant, water-repellant, or stain-resistant fabrics Fluoropolymer-coated Tyvek Flame resistant clothing with fluorochemical treatment 	<ul style="list-style-type: none"> Waterproof clothing or gear of unknown manufacture or materials
Laundry	<ul style="list-style-type: none"> Well-laundered clothing (laundered at least 6 times prior to sampling) Clothing should be kept dust and fiber free 	<ul style="list-style-type: none"> New or unlaundered clothing. Clothing recently laundered with fabric softeners Clothing recently dry-cleaned 	
Personal Protective Equipment			
Eye and face protection	<ul style="list-style-type: none"> High-density polyethylene (HDPE) safety glasses 	<ul style="list-style-type: none"> Antifogging spray 	<ul style="list-style-type: none"> Safety glasses NOT made of HDPE
Hand protection	<ul style="list-style-type: none"> Powderless nitrile gloves Hands should be washed, and new pair of nitrile gloves shall be donned before or after the following activities at each sample location: <ul style="list-style-type: none"> Prior to collecting each sample Decontamination of re-us-able sampling equipment Handling non-PFAS-free boots and first-aid adhesive wrappers Insertion of silicon tubing into the peristaltic pump or completion of monitor well purging when collecting groundwater 	<ul style="list-style-type: none"> Gore-Tex gloves and any PFAS containing material gloves Vinyl gloves Water resistant, stain resistant or water repellent gloves or accessories 	<ul style="list-style-type: none"> Latex gloves

Appendix C – Summary of PFAS Sampling Guidance (Continued)

	Acceptable	Avoid	Needs Screening
	<ul style="list-style-type: none"> - Handling of any quality assurance/quality control samples including field blanks and equipment blanks - Handling of any non-dedicated sampling equipment, contact with non-decontaminated surfaces, or when judged necessary by field personnel ▪ Hands should be washed and new gloves donned after handling materials potentially containing PFAS ▪ New gloves should be donned prior to collecting each sample 		
Foot protection	<ul style="list-style-type: none"> ▪ Safety footwear will consist of steel-toed boots made with polyurethane and PVC, untreated leather boots, or well-worn leather boots. Newer leather boots may be worn if they are covered with polypropylene, polyethane, or PVC boot covers 	<ul style="list-style-type: none"> ▪ Boots with a PFAS-containing material (e.g., Gore-Tex or Tyvek covers) as an outer layer, as it contains a Polytetrafluoroethylene (PTFE) membrane ▪ Boots with chemical waterproofing or stain resistant treatment applied 	<ul style="list-style-type: none"> ▪ Boots with waterproof inner layers (it may be acceptable for boots to include a PFAS-containing material as an inner layer if the material is NOT exposed)
Other protection	<ul style="list-style-type: none"> ▪ Field gear made of cotton construction, polyurethane, PVC, wax-coated fabrics, rubber, or neoprene, and well laundered (i.e., washed a minimum of 6 times before use after purchase). ▪ Polyurethane, PVC, or rubber raingear ▪ HDPE hard hats ▪ Polyethylene foam and nylon shell fabric life jackets ▪ Waders made of Neoprene or other PFAS-free material ▪ Well-washed cotton coveralls ▪ Waterproof snake gaiters should be washed 6 times prior to use 	<ul style="list-style-type: none"> ▪ Waders made of Gore-Tex or other known PFAS-containing materials ▪ Water-resistant, waterproof, or stain-treated PPE gear during the field sampling ▪ New gear while sampling or handling samples 	<ul style="list-style-type: none"> ▪ Hard hats made of a material other than HDPE

Appendix C – Summary of PFAS Sampling Guidance (Continued)

	Acceptable	Avoid	Needs Screening
Sampling Equipment and Supplies	<ul style="list-style-type: none"> ▪ HDPE, low-density polyethylene (LDPE), polypropylene, stainless steel, acetate, and silicon materials ▪ Peristaltic, ProActive SS Pumps with PVC leads or Geotech SS Geosub pumps ▪ For deeper wells (greater than 150 feet bgs), a Grundfos RediFlo pump (or similar) may be used because of the pumping limitations of stainless-steel pumps ▪ Acetate liners to collect soil samples ▪ Kemmerer bottle made of stainless steel with polyurethane end seal, and Van Dorn sampler with transparent acrylic tube and PFAS-free end stoppers for surface water sampling ▪ Cable ties made of natural rubber, nylon, or uncoated metal springs ▪ Tubing for sampling ports made of HDPE, polypropylene, silicone, PVC, or other PFAS-free materials ▪ Stainless steel spoon, bowl, or shovel for the collection of soil/sediment samples ▪ Wooden (untreated) measuring boards, and weight scales with a stainless-steel hook for fish attachment when collecting fish tissues ▪ Stainless steel knives and processing tables during fish sampling 	<ul style="list-style-type: none"> ▪ If PFAS are listed on the equipment Safety Data Sheet (SDS), it is recommended the equipment or supply NOT be used ▪ PTFE/Teflon- or PVDF- containing materials (e.g., PTFE tubing, bailers, tape, plumbing paste, or other PTFE materials) or other materials with ingredients containing fluoro, perfluoro, or fluorosurfactant since they contain fluorinated compounds ▪ Polychlorotrifluoroethylene (PCTFE) nor ethylene-tetrafluoroethylene (ETFE) or other fluoropolymer-containing materials (e.g., Kynar, Neoflon, Tefzel) ▪ Containers made of LDPE materials because PFAS are used in the manufacturing process of LDPE materials and can cross-contaminate the samples ▪ Plumber sealant tape (thread tape) or plumbing paste 	<ul style="list-style-type: none"> ▪ Any equipment or materials that will come into direct contact with the sample that have NOT been verified to be PFAS-free
Field documentation	<ul style="list-style-type: none"> ▪ Aluminum, polypropylene, or Masonite field clipboards ▪ Rite in the Rain notebooks ▪ Loose paper (non-waterproof, non-recycled) ▪ Ballpoint pens and pencils and Fine or Ultra-Fine Point Sharpie markers 	<ul style="list-style-type: none"> ▪ Clipboards coated with PFAS-containing materials (look for "waterproof" label) ▪ Notebooks made with PFAS treated paper ▪ PFAS treated loose paper ▪ Post-It Notes or other adhesive paper products 	<ul style="list-style-type: none"> ▪ Waterproof field notebooks ▪ Plastic clipboards, binders, or spiral hard cover notebooks

Appendix C – Summary of PFAS Sampling Guidance (Continued)

	Acceptable	Avoid	Needs Screening
	<ul style="list-style-type: none"> ▪ Preprinted standard (non-weatherproof) Avery sample labels ▪ Sample labels should be placed on the containers after sampling is complete and the container lids are in place to prevent possible cross-contamination ▪ Fill out field documentation before sampling or when sampling is completed to avoid cross-contamination 	<ul style="list-style-type: none"> ▪ Standard Sharpie markers ▪ Coated materials, including paper towels ▪ Felt-tip pens or permanent markers ▪ Kimwipes 	
Other field supplies	<ul style="list-style-type: none"> ▪ Polyethylene resealable plastic bags ▪ Untreated paper towels or cotton cloths 	<ul style="list-style-type: none"> ▪ Non-stick Aluminum foil ▪ PTFE/Teflon plumber sealant tape (thread tape) and plumbing paste ▪ Recycled or chemically treated paper towels 	<ul style="list-style-type: none"> ▪ Glass equipment (avoid prolonged contact with aqueous samples)
Sample Containers			
Sample containers	<ul style="list-style-type: none"> ▪ Keep sample containers sealed and only open during collection ▪ Once open, sample containers should not be stored or in contact with materials suspected to contain PFAS ▪ Polypropylene or HDPE sampling bottles with unlined polypropylene caps (no PTFE- or Teflon-lined caps) ▪ PFAS-free labels and packing tape 	<ul style="list-style-type: none"> ▪ LDPE bottles ▪ Bottle with PTFE- or Teflon-lined caps ▪ Glass bottles or containers ▪ Containers made of or with PFAS or fluoropolymers such as, PTFE, PVDF, polyvinyl fluoride (PVF), or fluorinated ethylene propylene (FEP) ▪ Sample bottles that appear to be discolored, dusty, or structurally compromised (get new sample bottles from the laboratory) 	<ul style="list-style-type: none"> ▪ LDPE containers may be used if an equipment blank has confirmed it to be PFAS-free

Appendix C – Summary of PFAS Sampling Guidance (Continued)

	Acceptable	Avoid	Needs Screening
Decontamination Procedures			
Rinse water	<ul style="list-style-type: none"> ▪ Triple rinse with PFAS-free water ▪ PFAS-free water can include: <ul style="list-style-type: none"> - Laboratory supplied PFAS-free deionized water (recommended for final rinse of handheld equipment) - Commercially available deionized water in an HDPE or polypropylene container verified to be PFAS-free - Municipal drinking water that has been tested for PFAS with no detections of PFAS above reporting limits less than project screening levels 	<ul style="list-style-type: none"> ▪ Water containing PFAS at concentrations greater than project screening levels 	<ul style="list-style-type: none"> ▪ Untested municipal drinking water
Detergents	<ul style="list-style-type: none"> ▪ Become familiarized with the detergent SDS before beginning decontamination ▪ Alconox ▪ Liquinox 	<ul style="list-style-type: none"> ▪ Decon 90 ▪ Dawn dish detergent 	
Scrub pad or brush	<ul style="list-style-type: none"> ▪ Cotton cloth or untreated paper towels ▪ Polyethylene or PVC brushes 	<ul style="list-style-type: none"> ▪ PFAS treated paper towel (look for "bamboo or recycled paper" label) ▪ Cloth made of PFAS-containing materials 	
Other considerations	<ul style="list-style-type: none"> ▪ Decontaminated equipment should be placed on clean plastic sheeting (PFAS-free) to prevent contact with contaminated soil and allowed to air dry ▪ If the equipment is not used immediately, it can be covered or wrapped in plastic sheeting or uncoated aluminum foil to minimize airborne contamination ▪ Equipment blanks should be collected to verify decontamination efficacy ▪ Sampling equipment can be air-dry on a PFAS-free surface ▪ Properly dispose of decontamination water, solids, or PPE in designated areas 	<ul style="list-style-type: none"> ▪ Reusing non-dedicated equipment without decontaminating ▪ Low-density polyethylene (LDPE) plastic sheeting. Equipment blanks should be collected for sampling equipment contacting LDPE sheeting. 	

Appendix C – Summary of PFAS Sampling Guidance (Continued)

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	Acceptable	Avoid	Needs Screening
Sample Shipment			
Sample shipment	<ul style="list-style-type: none"> ▪ Regular ice ▪ Overnight shipping ▪ Packed with lab-approved PFAS-free cushioning material, such as bubble wrap ▪ The chain of custody forms should be placed in single bagged LDPE Ziploc bags and taped to the inside of the cooler lid ▪ The cooler should be taped closed with a lab-supplied custody seal 	<ul style="list-style-type: none"> ▪ Blue or chemical ice (use may be acceptable if tested and shown to be PFAS free) ▪ PFAS-containing shipping materials (such as, water-resistant cushioned shipping roll) 	<ul style="list-style-type: none"> ▪ LDPE packing foam
Other			
Food	<ul style="list-style-type: none"> ▪ Food handled and consumed outside the sampling area followed by washing hands and donning fresh gloves 	<ul style="list-style-type: none"> ▪ Handling, consuming, or otherwise interacting with pre-wrapped food or snacks, carry-out food, fast food, or other food items or their wrappers in the sampling area, close to sampling bottles or field equipment 	
Drinks	<ul style="list-style-type: none"> ▪ HDPE or polypropylene bottled water or hydration drinks 	<ul style="list-style-type: none"> ▪ Any beverages in the sampling area, close to sampling bottles or field equipment 	
General	<ul style="list-style-type: none"> ▪ Carefully following standard sample hygiene practices (e.g., frequent handwashing, donning fresh gloves after handling materials potentially containing PFAS, donning fresh gloves prior to collecting each sample) 	<ul style="list-style-type: none"> ▪ Any field supply, container, or equipment made with: <ul style="list-style-type: none"> - PTFE (such as, Teflon and Hostafion) - Polyvinylidene fluoride (PVDF) (such as, Kynar) - PCTFE (such as, Neoflon) - ETFE (such as, Tefzel) - FEP (such as, Teflon FEP and Hostafion FEP) 	<ul style="list-style-type: none"> ▪ Any supply, container, or equipment that will directly contact samples that has NOT been verified to be PFAS-free

Note:

This table was adapted using the information from: RIDOH 2017; ILEPA 2019; SWRCBa,b 2020; EGLE 2020; AZDEQ 2021; IDNR 2021; MDDWP 2021; ODEQa-c 2022; NYSDEC 2022; WDNR 2022; ITRC 2022a; FDEP 2019.