This PFAS Sampling Fact Sheet is intended to help Public Water Systems (PWSs) ensure that properly collected, usable samples are collected for laboratory analysis of PFAS. *Sample collection is the first point at which error can be introduced into sample results*.

This Fact Sheet is applicable specifically for sampling potable water collected at PWS entry points (EPs). "Entry point" is defined in § 109.1 as, "a point acceptable to the Department at which finished water representative of each source enters the distribution system."

Sample collection, storage and transportation procedures should follow requirements outlined in EPA Method 537 Revision 1.1, EPA Method 537.1, and EPA Method 533. Sampling Personnel should familiarize themselves with these methods to ensure that all requirements are met.

- Fill out all labels completely. Indicate sample number, type of sample (ie: grab), date, time, sample collector, and preservative on the bottle labels provided by the lab.
- Record the sampling event on the Chain of Custody (COC) form provided by the laboratory.
- Fill out the COC legibly with a ballpoint pen.
- Keep sample containers (250 mL polypropylene bottles) closed until you are ready to fill the bottle.
- Protect sample bottle integrity by not touching the inside of bottle caps or bottles once bottles are opened and not allowing bottle caps to come into contact with surfaces that may be contaminated by PFAS.
- Any question about sample analysis, Field Reagent Blanks, sample preservatives, bottles, or completing the COC should be promptly directed to the accredited laboratory selected for analysis of the samples.

PFAS-Specific Sample Collection Concerns

PFAS are widely considered ubiquitous. The presence of PFAS is assumed in many household, consumer and industrial products; therefore, care is essential to minimize the likelihood of cross-contamination when collecting water samples for PFAS analysis. Substances found in consumer and industrial products that could potentially cross-contaminate drinking water samples with PFAS are listed below:

- Polytetrafluoroethylene (PTFE);
- Waterproof coatings containing PFAS;
- Fluorinated ethylene-propylene (FEP);
- Ethylene tetrafluoroethylene (ETFE);
- Polyvinylidene fluoride (PVDF);
- Pipe thread compounds (pipe dope) and Teflon® pipe thread tape;
- Polychlorotrifluoroethylene (PCTFE), including the trademark Neoflon®, which can be found in many items, including but not limited to valves, seals, gaskets, and food packaging; Fluorinated ethylene propylene (FEP), including the trademarks Teflon ® and Hostaflon ®, which can be found in many items, including but not limited to ball check-valves on certain bailers, the lining of some hoses and tubing, some wiring, certain kinds of gears, and lubricants;
- Low density polyethylene (LDPE) should not be used for any items that will come into ***direct contact*** with the sample media. LDPE can be found in many items, including but not limited to containers and bottles, plastic bags, and tubing.

Specific items often used in the field which may contain PFAS and should be avoided include:

- Paper/cardboard packaging for food or fast food.
- New or unwashed clothing.
- Clothing washed with fabric softeners or dried with anti-static sheets.
- Synthetic water-resistant/or stain-resistant materials (such as waterproof clothing and shoes such as Gore-Tex), waterproof or coated Tyvek® material (special attention to boots).

- Teflon® and other fluoropolymer-containing materials (e.g., polyvinylidene fluoride [PVDF], Kynar®, Neoflon®, Tefzel®).
- Waterproof /treated paper on field notebooks.
- Waterproof markers (such as Write-in-the-Rain® and Sharpie®, etc.).
- Chemical ice or blue ice, which may contain PFAS and may not reduce and/or maintain the temperature of the samples sufficiently. Blue ice should only be used if it is provided by the approved laboratory and they certify that it is PFAS-free.

PFAS have also been found in personal care products, including insect repellent, cosmetics and sunscreens Keep any such personal care products in containers (such as a field-appropriate back packs) and away from sampling equipment. Wash hands prior to handling any sample collection equipment and before collecting any samples. It is strongly recommended to perform due diligence on your personal care products to evaluate them for PFAS content prior to your sampling event.

Before Sampling

- Coordinate the sampling event with the accredited laboratory. The laboratory will provide sample containers, sample preservative, chain-of-custody (COC) forms, coolers, QC samples, and shipping instructions. Note: It is advisable to ask the laboratory for pre-preserved bottleware.
- Bottle labels and the COC should be completed before sample collection, except for the sample time.
- It is recommended to request extra pre-preserved bottles from the laboratory in case of damage to bottles during shipping or handling or spillage during the sampling event. Spilling any sample water from pre-preserved bottleware means that the concentration of the preservative in the collected sample will be less than the intended concentration.
- Ensure that the interior of the cooler is clean.
- Fill the cooler with wet ice in double-bagged resealable storage bags before departure for the sample collection event. Keep water drained from the cooler to avoid soaking the containers. Blue ice or reusable chemical ice should only be used if provided by the approved laboratory and the laboratory certifies that the chemical ice is free of PFAS compounds. Dry ice should never be used, because it can freeze the samples.
- Ensure an adequate number of resealable bags are available to store all sample bottles.

A two-person sampling team is recommended whenever possible. One team member will obtain the samples, while the other team member records the samples on the COC form with the sample collection information. If only one person is conducting the sampling, the sampler must take care to properly record all samples on the COC and follow all the precautions noted in this Fact Sheet. Record sample site observations in the field notebook (such as types of pipes/fittings, sample collection time, site characteristics, atmospheric conditions, personal notes such as whether a break was taken for food, etc.). Take photos to document specific conditions encountered and how the sample was collected. Record this information at the time of sampling.

- Sampling taps and plumbing should be free of materials containing Teflon® and other fluoropolymer-containing materials (such as Teflon® tape at plumbing joints). If these cannot be avoided, ensure the tap has been flushed for at least 5 minutes. The presence of Teflon® and other fluoropolymer-containing materials should be clearly noted in the field notebook. Be sure to remove aerators, screens, washers, hoses, and water filters, if any, from the tap prior to flushing.
- Wash hands before and after each sampling event.
- Wear powderless nitrile gloves while filling and sealing the sample bottles, using a new pair of nitrile gloves at each sample site.
- Use laboratory-provided and preserved bottle wear for samples.
- Ensure that each sample container is labeled appropriately, and check that the label ID number on the sample container matches the COC form.

- Indelible pens that are ballpoint or gel ink are acceptable to use to add the sample collection times on the labels and the COC.

Sampling Area and Staging Area

To minimize the likelihood of cross contamination, sampling personnel should designate a Sampling Area and a Staging Area. The Sampling Area will be the ambient area at the EP. To the fullest extent practicable, PFAS containing clothing and equipment should not be introduced to this area. Sampling personnel must wash hands with PFAS-free soap and water and don powderless nitrile gloves before entering this area. The Sampling Area does not need to be roped off or physically segregated but should be established prior to sampling. The Sampling Area's boundaries should be understood by all individuals in the vicinity of the EP at the time of sampling. There should be a 10-foot radius around the EP. Extra caution must be taken when uncapping sample bottles and handling the bottle cap.

The Staging Area will likely be directly adjacent the sample area. In some cases, the staging area will be in the same room as the sampling area and in other cases the staging area may be located outside Care should be taken when transporting empty bottles to the staging area to keep the bottles sealed and in the packaging provided by the laboratory (eg: coolers or bags). Care should be taken while in the sampling area to minimize contact of the bottles/lids with the outside environment. Full bottles must be sealed and preserved as outlined in the lab's guidance and following approved EPA methods. By following protocols established in approved EPA methods, cross contamination can be prevented. Meals or breaks should not be taken in the Staging Area. Sampling personnel should always wash hands with PFAS-free soap and rinse with PFAS-free water after eating or drinking during sampling events.

QA/QC:

The purpose of the QA/QC process is to ensure a high level of confidence in the sample results. QA/QC is required for all sampling events. Portions of the QA/QC strategy that apply to sample collection, preservation, shipment, and storage are described in approved EPA methods. Additional components of the QA/QC strategy that apply to sampling personnel and collecting/delivering samples includes documentation of custody (COC forms), bottle labels, custody seals, field data sheets and call sheets.

- **Field Duplicates (FD1 and FD2)** – Two separate samples collected at the same time and place, under identical circumstances, and treated in the exact same manner throughout field and laboratory procedures. Analyses of FD1 and FD2 give a measure of the precision associated with sample collection, preservation, and storage, as well as with laboratory procedures.
- **Field Reagent Blanks (FRB)** – Field reagent blanks are prepared in the field using laboratory-supplied reagent water. As per Method 537.1: "At the sampling site, the sampler must open the shipped FRB and pour the preserved reagent water into the empty shipped sample bottle, seal and label this bottle as the FRB. The FRB is shipped back to the laboratory along with the samples and analyzed to ensure that PFAS were not introduced into the sample during sample collection/handling," (Shoemaker and Tettenhorst, 2018). FRBs must be prepared with the same batch of preservative as the EP samples and must also be prepared at each EP sample site.

Reagents and bottles:

- Use the appropriate 250-mL polypropylene prefixed bottles, lids and reagents (Trizma T-7193 or equiv.) provided by the lab.
- When a new lot of supplies is received, the shipment should be stored in a lockable office, away from direct sunlight and at "normal indoor temperatures" (appx. 50°F to appx 90°F).
- Use fresh preservatives. All preservatives should have an expiration date, provided by the manufacturer, of **1 year** from date of manufacture.
- Bottles and preservative used for a sampling event (including samples, duplicates and field blanks) must be from the same lot.

Shipment and storage:

- Samples must be chilled during shipment and must not exceed 10°C during the first 48 hours after collection. Achieving this will require packaging samples collected in the field in a cooler with ice. If chemical (blue) ice packs are used, the ice packs should be provided by the laboratory and certified by the laboratory to be PFAS-free. Temperature requirements are also met by storing samples in a refrigerated environment once in the lab.
- Note: Concern may arise regarding PFAS presence in ice or other temperature controlling items. As such, once bottles are filled with sample, those bottles should be placed in an approved self-sealing plastic bag (*e.g.* a Ziploc); once that bag is closed and a custody seal placed in a manner that prevents access to the filled bottles, a second bag should be placed over the custody sealed bottle/bag packaged such that the sample is double-bagged. Double bagging the samples will protect the custody seal and ensure the filled sample bottles will not come in contact with ice or ice-water in the cooler.
- ***Note:*** *Samples should be iced immediately after collection.*

Chain of Custody:

- COC forms should be provided by the laboratory and included with each shipment of bottles, FRB water, and reagent.
- The COC forms serve three purposes: the first is to track site specific sample information; the second is to document who is responsible for sample collection; the third is to provide essential information to the laboratory so that a formal request for analysis can be made.
- Certain portions of the COC should be completed by both the sample team and the laboratory personnel at the time the samples are delivered to the lab. Those sections are:
    - Relinquished by, date and time
    - Received by, date and time

Bottle labels

- Bottle labels are provided by the laboratory and will document the date and time a sample was collected as well as the individual who collected the sample. Bottle labels may also include laboratory specific information such as client identifiers, order numbers and other such information useful for the administration of a project.

Custody seals

- Custody seals are applied to bags containing the 250mL sample bottles for each EP sample plus and Field Blank bottles collected at that EP.
- Custody seals are applied to a bag containing bottles rather than individual bottles to limit the exposure of glue (a potential contaminant) to the sample.
- Custody seals must be signed and dated by sampling personnel to be considered valid by lab.
- The custody seal should be completed in the field.