

Purpose

The purpose of this bench procedure is to present guidelines for collecting environmental samples to submit to a laboratory PFAS analysis.

Scope

Per- and polyfluoroalkyl Substances (PFAS) are a class of emerging contaminants composed of more than 3,000 human-made, fluorinated, organic chemicals (Buck et al., 2011, Wang et al., 2017). The actual number of compounds is continuously changing, as some PFAS are no longer produced due to regulatory and voluntary actions, while new ones are created as alternatives. The carbon-fluorine bond that exists in PFAS is one of the strongest bonds in nature; they are tough to break and are resistant to thermal, chemical, and biological degradation.

This bench procedure provides instruction, guidelines, and considerations for collecting water and soil/sediment samples for PFAS analyses. PFAS are persistent pollutants and are found in many areas of the environment and in items used in daily life. It is imperative to take precautions to avoid unintentional sample contamination.

Responsibility

It is the responsibility of the individual collecting samples to ensure that these guidelines are adhered to so that inadvertent sample contamination or analyte loss does not occur.

Procedural Steps

1.0 Considerations

- 1.1 Potential sources of PFAS cross-contamination in the typical sampling environment include water used during drilling or decontamination, materials used within the sampling environment, sampling equipment, field clothing and personal protective equipment (PPE), sun and biological protection products, personal hygiene and personal care products (PCPs), food packaging, and the environment itself. Wash hands thoroughly before sampling.
- 1.2 When collecting samples for PFAS analysis, avoid contact with the following items prior to collecting samples:
 - 1.2.1 Aluminum foil
 - 1.2.2 Fast food wrappers, popcorn bags, snack wrappers
 - 1.2.3 Any item that is or could be made from Teflon (PTFE)
 - 1.2.4 Lotions, moisturizers, and sunscreens
 - 1.2.5 Non-stick, stain-resistant, and waterproof items or textiles
- 1.3 Containers that **ARE** acceptable for sample collection include:
 - 1.3.1 Pre-cleaned Polypropylene (PP)
 - 1.3.2 Pre-cleaned Polyethylene (HDPE)
- 1.4 Containers that are **NOT** acceptable for sample collection include:

1.4.1 Glass

1.4.2 Containers with Teflon lined caps

1.4.3 Containers that are or could be made from Teflon or other perfluorinated compounds

1.5 It is recommended that samples not be placed in Ziploc (or similar) bags.

2.0 Sampling Water

Sampling containers to be used: Polypropylene bottles with polypropylene screw caps (for example, 500 mL bottles, Fisher Scientific, Cat. No. 02-896-E or equivalent).

Selection of the sampling site:

On-shore sampling:

(i) Select an accessible point on the shore where sampling does not pose the danger of falling into the water and the depth of the water would allow the sampling bottle to be submerged entirely without disturbing the sediment. Try identifying a location that is easy to spot using a landmark, should repeated sampling at later times may be needed.

(ii) Wear a clean pair of gloves (powderless nitrile), unscrew the cap and rinse the bottle at least twice with water to be sampled before filling the bottle to ~90% of the volume and recapping it. Avoid dirt, debris and sediment getting into the bottle, whenever possible.

(iii) Record the GPS locations of the sampling site and fill-out the sampling log.

(iv) Attach an appropriate label to the bottle or mark the bottle itself with a sample ID.

(v) Place the bottle into an ice chest, remove the gloves and proceed to the next sampling location.

(vi) Repeat steps (i) through (v) at each sampling site.

A field blank should be used to ensure that the sampling containers provided and the process do not introduce contaminants. The researchers are advised to determine what is the most appropriate "field blank" depending on a situation. For example, collection of the water upstream of the point source may be appropriate if there is no retrograde movement of the water. In some instances no appropriate "field blank" can be obtained.

At least 500 mL of sample is recommended for analysis to fulfill quality control requirements.

3.0 Sampling Soil/Sediment

3.1 Soil/sediment samples are to be collected in containers known to be free of perfluorinated compounds.

3.2 Avoid using plastic spoons/spatulas for sampling; uncoated metal is acceptable.

- 3.3 For soil/sediment samples, it is acceptable to scoop sample into sampling container without an apparatus.
- 3.4 Use a fresh pair of gloves (powderless nitrile) and change them often.
- 3.5 At least a 5 g sample needed for analysis to fulfill quality control requirements.

4.0 References

Buck, Robert C et al. "Perfluoroalkyl and Polyfluoroalkyl Substances in the Environment: Terminology, Classification, and Origins." *Integrated Environmental Assessment and Management* 7(4) (2011): 513– 541. PMC. Web. 11 June 2018. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3214619/>

Wang, Zhanyun et al. "A Never-Ending Story of Per- and Polyfluoroalkyl Substances (PFASs)?" *Environmental Science & Technology* 51(5) (2017): 2508-2518. ACES Publications. Web. 11 June 2018. <https://pubs.acs.org/doi/pdf/10.1021/acs.est.6b04806>

Revision History

Page # Paragraph or Section	Revision Number	Date	Purpose of Revision	Approved By
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