



# SOIL PFAS SAMPLING

## Guidance

### Introduction

This guidance document discusses the processes, decontamination procedures, and acceptable items and materials for sampling soil for per- and polyfluoroalkyl substances (PFAS). In addition, this guidance will be used to support the sampling objectives and procedures based on any Quality Assurance Project Plan (QAPP) developed prior to sampling activities. This guidance assumes staff has basic familiarity with and/or understanding of basic soil sampling procedures.

**NOTE:** Review the General PFAS Sampling Guidance prior to reviewing this guidance document.

The Michigan Department of Environmental Quality (DEQ) intends to update the information contained within this PFAS Sampling Guidance document as new information becomes available. The user of this PFAS Sampling Guidance is encouraged to visit the Michigan PFAS Action Response Team webpage ([www.michigan.gov/PFASresponse](http://www.michigan.gov/PFASresponse)) to access the current version of this document.

Because PFAS compounds can be analyzed at concentrations in the parts per trillion (ppt) range, precautions must be taken to prevent cross-contamination. Field sampling equipment, either rented or not, that is used at multiple sites or sampling locations (also described as non-dedicated equipment), could become highly contaminated with PFAS. If site-specific information is available, sampling should be conducted from the least to the most contaminated locations. Additional guidance on the sampling sequence can be found in **Section 4.3.3** of the **General PFAS Sampling Guidance**.

Soil sampling involves the use of non-dedicated equipment, such as scoops, trowels, shovels, augers and other drilling-related equipment, which could be a source of cross-contamination. Decontamination procedures outlined in this guidance document should be followed to avoid cross contamination and equipment should be verified as PFAS-free.

The site-specific quality assurance document will generally provide the following information:

- Sample collection objectives.
- Locations, number, and volume of samples.
- Types of chemical analyses.
- Specific quality control procedures.
- Additional sampling requirements, as necessary.

This soil sampling guidance document discusses the collection of surface and sub-surface soil samples for PFAS and methods to prevent cross-contamination that can occur from:

- Field clothing and personal protection equipment (PPE)
- Sampling equipment
- Equipment decontamination
- Sample collection and handling
- Sample shipment

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**NOTE:** Additional information about PFAS testing can be found on the Michigan PFAS Action Response Team (MPART) website:  
[www.michigan.gov/PFASresponse](http://www.michigan.gov/PFASresponse)

## 1. Potential Sources for PFAS Cross-Contamination

Potential sources for PFAS cross-contamination include items and materials used within the sampling environment, such as sampling equipment, field clothing, personal protective equipment (PPE), sun and biological protection products, personal hygiene, personal care products (PCPs), and food packaging. A detailed discussion about potential sources for PFAS cross-contamination is included in the **General PFAS Sampling Guidance**, which should be reviewed before reading this document. However, a high-level summary is presented in this guidance.

All of the items and materials discussed in each of the MDEQ's PFAS Sampling Guidance Documents are divided into three major groups:

- Prohibited (●) identifies items and materials that should not be used when sampling. It is well documented that they contain PFAS or that PFAS are used in their manufacture.
- Allowable (■) identifies items and materials that have been proven not to be sources of PFAS cross contamination and are considered acceptable for sampling.
- Needs Screening (▲) identifies items and materials that have the potential for PFAS cross-contamination due to a lack of scientific data or statements from manufacturers to prove otherwise. These items and materials are further sub-divided into two categories:
  - **Category 1:** Items and materials that will come in direct contact with the sample. These should not be used when sampling unless they are known to be PFAS-free, by collecting an equipment blank sample prior to use.
  - **Category 2:** Items and materials that will not come in direct contact with the sample. These should be avoided, if possible, unless they are known to be PFAS-free by collecting an equipment blank sample prior to use.

Please note that at this time no published research is available that documents the use of various materials and effect on sample results. Therefore, a conservative approach is recommended, and the guidance is based on the collection of multiple environmental samples at various PFAS Sites. Sampling staff should take practical and appropriate precautions to avoid items that are likely to contain PFAS at the sampling site as well as avoid specific items during the sampling event.

A general overview of PFAS contamination sources during sampling can be found in **Section 4.2** of the **General PFAS Sampling Guidance**. Any items or materials utilized that are not identified in this guidance or not discussed in **Section 4.2** should be evaluated as described in **Section 4.2.1**.

Sampling staff should take practical and appropriate precautions to avoid items that are likely to contain PFAS at the sampling site as well as avoid specific items during the sampling event (see below).

### 1.1 Field Clothing and Personal Protection Equipment (PPE)

A general overview of field clothing and PPE can be found in **Section 4.2.2** from the **General PFAS Sampling Guidance**. Materials, field clothing, and equipment screening should be performed during the QAPP development or the planning phase of sampling programs. The screening should be performed on all items and materials that are expected to come into contact with the samples and are defined as **Category 1**. This Soil Sampling Guidance assumes that the soil samples will be collected in an environment where only Level D protection (such as steel toe

**NOTE:** Both field clothing and PPE should be kept dust and fiber free.

● - Prohibited    ■ – Allowable    ▲ - Needs Screening

boots, eye protection, hardhat, etc.) is required by the Health and Safety Plan (HASP). During a PFAS investigation, PPE that contains PFAS should be avoided to prevent cross-contamination.

As with any field mobilization, it is the responsibility of all personnel to be aware of the physical, chemical, and biological hazards associated with a particular site. Personal safety is paramount. Any deviation from this guidance, including those necessary to ensure the health and safety of sampling personnel, should be recorded in field notes and discussed in the final report. Any additional field clothing and/or PPE items that might be required for the soil sampling and not discussed in the Sampling Guidance should be evaluated as described in **Sections 4.2.1 and 4.2.2** of the **General PFAS Sampling Guidance**.

Field sampling during wet weather (e.g., rainfall and snow) should be conducted while wearing the proper field clothing.

- Dust and fibers must not be allowed to collect on field clothing or PPE.
- Do not use clothing that has been advertised as waterproof, dirt and/or stain repellent that has not been verified to be made of PFAS-free materials.
- Only use clothing/PPE that has been verified to be made of PFAS-free materials.

Powderless nitrile gloves should be changed frequently any time there is an opportunity for cross-contamination. See **Section 6** of this guidance for additional glove instructions.

### 1.2 Personal Care Products (PCPs)

A number of sampling guidance documents recommend that personal hygiene and personal care products (PCPs) (e.g., cosmetics, shampoo, sunscreens, dental floss, etc.) not be used prior to and on the day(s) of sampling because the presence of PFAS in these products has been documented (OECD, 2002, Fujii, 2013, Borg and Ivarsson, 2017). However, if the MDEQ's sampling SOPs are followed, these items should not come into contact with the sampling equipment or the sample being collected. As of the date of this sampling guidance, cross-contamination of samples due to the use of PCPs has not been documented during the collection of thousands of samples. However, field personnel should be aware of the potential of cross-contamination if the sampling equipment or actual samples would come into contact with these products.

The following precautions should be taken when dealing with personal hygiene or PCPs before sampling:

- Do not handle or apply PCPs in the sampling area.
- Do not handle or apply PCPs while wearing PPE that will be present during sampling.
- Move to the staging area and remove PPE if applying personal care products becomes necessary.
- Wash hands thoroughly after the handling or application of PCPs and, when finished, put on a fresh pair of powderless nitrile gloves.

### 1.3 Food Packaging

PFAS has been used by the paper industry as a special protective coating against grease, oil, and water for paper and paperboards, including food packaging since the late 1950s (Trier et al., 2018). PFAS application for food packaging includes paper products that come into contact with food such as paper plates, food containers, bags, and wraps (OECD, 2002). Pre-wrapped food or snacks (such as candy bars, microwave popcorn, etc.) must not be in the sampling and staging areas during

sampling due to PFAS contamination of the packaging. When staff requires a break to eat or drink, they should remove their gloves, coveralls, and any other PPE, if worn, in the staging area and move to the designated area for food and beverage consumption. When finished, staff should wash their hands and put on a fresh pair of powderless nitrile gloves at the staging area, before returning to the sampling area.

- Do not handle, consume, or otherwise interact with pre-wrapped food or snacks, carry-out food, fast food, or other food items while on-site during sampling.
- Move to the staging area and remove PPE prior to leaving the sampling and staging areas if consuming food on site becomes necessary.

## 2. Soil Sampling Equipment

Soil sampling equipment is categorized into **Category 1** and **Category 2**:

**Category 1:** Any item that will directly contact with the soil, including shovels, trowels, spoons, bowls, hand augers buckets and extensions, and augers and direct push equipment, including any split spoon or sampling barrels. This equipment has a high likelihood of cross-contamination occurring if the proper decontamination procedures are not followed. These items should be known to be PFAS free.

**NOTE:** As a precautionary action, an equipment rinsate blank should be collected even if the sampling materials are made of materials that are not expected to contain PFAS.

**Category 2:** Any item that will not directly contact the soil, including field books, Munsell® color charts, Post-It® Notes, aluminum foil, and recycled paper towels.

Although these items will not directly contact soil samples, cross-contamination may still occur. Every effort should be made to ensure these items are PFAS-free. Be aware that surfaces of this field equipment or the containers in which they are kept may contain PFAS.

Do not use any equipment that contains any known fluoropolymers or that potentially has been cross-contamination with PFAS such as, but not limited to:

- Do not use Polytetrafluoroethylene (PTFE) that includes the trademark Teflon® and Hostaflon®, which can be found in many items, including but not limited to the lining of some hoses and tubing, some wiring, certain kinds of gears, and some objects that require the sliding action of parts.
- Do not use Polyvinylidene fluoride (PVDF) that includes the trademark Kynar®, which can be found in many items, including but not limited to tubing, films/coatings on aluminum, galvanized or aluminized steel, wire insulators, and lithium-ion batteries.
- Do not use Polychlorotrifluoroethylene (PCTFE), that includes the trademark Neoflon®, which can be found in many items, including but not limited to valves, seals, gaskets, and food packaging.
- Do not use Ethylene-tetrafluoro-ethylene (ETFE) that includes the trademark Tefzel®, which can be found in many items, including but not limited to wire and cable insulation and covers, films for roofing and siding, liners in pipes, and some cable tie wraps.
- Do not use Fluorinated ethylene propylene (FEP), that includes the trademarks Teflon® FEP and Hostaflon® FEP,

**NOTE:** Manufacturers can change the chemical composition of any product. As a result, all materials that will come into contact with the sample matrices (defined as Category 1) should be tested to confirm they are “PFAS-free”, i.e. will not contaminate samples at detectable levels. **There is no guarantee that materials in the ‘Allowable’ category will always be PFAS-free.**

● - Prohibited    ■ – Allowable    ▲ - Needs Screening

and may also include Neoflon®, which can be found in many items, including but not limited to wire and cable insulation and covers, pipe linings, and some labware.

- Do not use low density polyethylene (LDPE) 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.
  - ▲ **However**, LDPE may be used if an equipment blank has confirmed it to be PFAS-free. LDPE does not contain PFAS in the raw material but may contain PFAS cross-contamination from the manufacturing process.
- LDPE bags (e.g. Ziploc®) that **do not** come into direct contact with the sample media and do not introduce cross-contamination with samples may be used.
- Use items and materials that are either made of high density polyethylene (HDPE), polypropylene, silicone, or acetate.
- ▲ Post-It® Notes should be screened before use.

Staff should follow the **MDEQ PFAS Sampling Quick Reference Field Guide** table for approved and prohibited items for documenting and sampling residential wells for PFAS.

**NOTE:** Special care and consideration should be given to the field sampling equipment when stored and handled outside the site boundaries or between different sample locations.

Many times, the release of PFAS in the environment occurs concurrently with other chemicals. For example, the release of PFAS present in the aqueous film forming foam (AFFF) is generally associated with the release of flammable liquids, such as jet fuels. As a result, sampling soil for PFAS may occur within plumes of volatile organic compounds (VOCs). For staff protection, the use of a photoionization detector (PID) is recommended to measure VOCs that might be present in the soil. The PID used during PFAS sampling to screen for VOCs may be made of materials that contain PFAS. However, the PID is a **Category 2** field equipment item and will have a very low possibility of cross contamination.

### 3. Soil Sampling Methods

Soils are usually sampled to define the subsurface geology and presence of aquifers or aquitards (lithology), or to determine the presence or absence of contaminants—in this case, PFAS (chemical analysis).

#### 3.1 Soil Sampling for Lithologic Description

Soil samples are collected to determine the lithologic and physical makeup of the sample (i.e.: clay, sand, gravel, brown, mottled, etc.). This is done to determine the subsurface geologic stratigraphy of the site and help identify possible aquifers and aquitards in the subsurface. Soil can be collected loose or cored.

##### 3.1.1 Loose Soil Samples

A loose soil sample is usually obtained by auger or rotary drilling processes, where the process delivers loose drilled soil to the surface for collection and interpretation. In the auger drilling process, the auger flights deliver soil cuttings to the surface around the auger string. These soils can be collected by a shovel and bagged in LDPE bags (e.g. Ziploc) or piled for later lithologic analysis and entry into a geologic log.



### 3.1.2 Cored Soil Samples

A cored soil sample is collected with a coring type of mechanism in a way that preserves the soil structure. Most coring mechanisms consist of a steel core barrel with a clear plastic liner (use an acetate or other PFAS-free liner) into which the soil core enters. Once the core barrel is retrieved at the surface, this liner is removed and cut open. The soil core is then sliced open to reveal a clean face. This clean face is examined for lithology and structure.

### 3.2 Soil Sampling for Chemical Analysis

Soils collected for chemical analysis are usually collected by using the core soil sample method. The soil samples need to be as undisturbed as possible. The requirement of an undisturbed soil sample **excludes** the use of loose auger cuttings or rotary methods of soil collection.

During the soil sampling process, the soil sampling device is removed from the ground. The liner is removed and placed on the cutting board and opened using a liner cutting device. The soil sample is visually inspected, and observations recorded in the site field book. The core is cut open to reveal a "clean" face for sampling. This process avoids the possibility of picking up any contaminants that may have gotten smeared onto the soil surface as the soil core entered the liner.

## 4. Equipment Decontamination Before Sampling

It is customary with soil sampling that the equipment is decontaminated at the conclusion of the sampling event. If the previous user of the equipment is not known, and it is unclear how the equipment was handled—especially rental equipment—decontaminate the equipment prior to sampling.

Disposable **Category 1** sampling equipment should be used, especially for sample bottles and other materials that are used where the soil sample may be in contact with the sampling equipment for an extended period of time. Field sampling equipment used at multiple sites or sampling locations can become highly contaminated with PFAS. Decontamination procedures should be implemented to prevent cross-contamination, including between individual sample locations.

For non-dedicated **Category 1** sampling equipment, the following items, materials, and procedures should be used for decontamination:

- Do not use Decon 90®.
- Laboratory supplied PFAS-free deionized water is preferred for decontamination.
- Alconox®, Liquinox®, and Citranox® can be used for equipment decontamination.
- Sampling equipment can be scrubbed using a polyethylene or Polyvinyl chloride (PVC) brush to remove particulates.
- Decontamination procedures should include triple rinsing with PFAS-free water.
- Commercially available deionized water in an HDPE container may be used for decontamination if the water is verified to be PFAS-free.
- ▲ Municipal drinking water may be used for decontamination purposes if it is known to be PFAS-free.

**NOTE:** All samples should be collected using PFAS-free High-Density Polyethylene (HDPE), glass, or polypropylene bottles provided by the laboratory, with Teflon®-

## 5. Sample Collection and Handling

The following considerations should be observed for sample collection:

- Dust and fibers must be kept out of sample bottles.
- The sample cap should never be placed directly on the ground during sampling.
  - ▲ If sampling staff must set the sample bottle cap down during sample collection and a second member of the sampling crew (wearing a fresh pair of powderless nitrile gloves) is not available, set the cap on a clean surface (cotton sheeting, HDPE sheeting, triple rinsed cooler lid, etc.).
- Do not sample without powderless nitrile gloves.
- Regular size Sharpie® are to be avoided. Thicker markers may contain PFAS.
- Fine and Ultra-Fine point Sharpie® markers are acceptable.
- Ballpoint pens may be used when labeling sample containers. If ballpoint pens do not write on the sample container labels, preprinted labels from the laboratory may be used.
- Bottles should only be opened immediately prior to sampling.
- Hands should be well washed and gloved.
- Use HDPE, glass, or polypropylene sample bottles with Teflon®-free caps, provided by the laboratory.
- Glass bottles or containers may be used if they are known to be PFAS-free, however, PFAS have been found to adsorb to glass, especially when the sample is in contact with the glass for a long period of time (e.g. being stored in a glass container). If the sample comes into direct contact with the glass for a short period of time (e.g. using a glass container to collect the sample, then transferring the sample to a non-glass sample bottle), the adsorption is minimal.
- Commercially bought sample bottles used with automatic sampling equipment should be decontaminated prior to sampling and equipment blank samples should be collected using laboratory supplied PFAS-free water.
- Samples should be double bagged using resealable low density polyethylene (LDPE) bags (e.g., Ziploc®).
- Follow any guidance or requirements in the PFAS analytical reference method that will be used for testing samples, for sample collection, storage, preservation, and holding times.
- If a published testing method is not used, and in the absence of formal United States Environmental Protection Agency (USEPA) guidance for PFAS sample storage, the documentation in USEPA Method 537 Rev. 1.1 should be used as a guide for thermal preservation (holding temperature) and holding times for soil or other samples. Samples must be chilled during storage and shipment and must not exceed 50°F (10° C) during the first 48 hours after collection.
- ▲ Latex gloves should be screened before use.

**NOTE:** USEPA Method 537 Rev. 1.1 was developed for the analysis of finished drinking water samples only. It was not designed for soils or other matrices that could cause significant interferences to the method. Other analytical methods such as ASTM D7968-14 or D7968-17a may be better at resolving interferences in soil samples. These methods were developed specifically for other matrices such as soil and sediments.

If site-specific information is available, sampling should be conducted from the least to the most contaminated location. Additional guidance on the sampling sequence can be found in **Section 4.3.3** of the **General PFAS Sampling Guidance**.

If possible, collect PFAS samples prior to collecting non-PFAS samples or field parameters (pH, temperature, etc.).

● - Prohibited    ■ – Allowable    ▲ - Needs Screening



Powderless nitrile gloves should be changed any time there is an opportunity for cross-contamination during sampling, including, but not limited to:

- Immediately prior to sample collection
- Each time sampling equipment is placed in and then removed from soil at a new location
- Handling of any sample, including quality assurance/quality control (QA/QC) samples
- After the handling of any non-dedicated sampling equipment
- After contact with non-decontaminated surfaces
- After decontamination of sampling equipment
- When judged necessary by field personnel

## 6. Sample Shipment

The following procedures should be used for sample shipment:

- Regular ice should be used to cool and maintain the sample at or below 42.8°F (6°C).
  - ▲ Chemical or blue ice may be used if it is known to be PFAS-free and it is absolutely certain that the sample is cooled and maintained at or below 42.8°F (6°C) during collection and through transit to the laboratory.
- Check the cooler periodically to ensure samples are well iced and at the proper temperature.
- Refresh with regular ice, if needed, double bagged in LDPE resealable storage bags if needed.
- Chain of Custody and other forms should be single bagged in LDPE (e.g. Ziploc®) storage bags and taped to the inside of the cooler lid.
- The cooler should be taped closed with a custody seal and shipped by overnight courier.
- Samples should be shipped as soon as possible (e.g. overnight) to ensure the samples arrive within the analytical holding time specified by the lab.

## 7. Equipment Decontamination After Sampling

It is customary to decontaminate soil sampling equipment at the end of the sampling event, whether it is a single sampling location or the conclusion of the workday. This is to ensure sampling equipment is decontaminated ahead of time for the next sampling event.

- Do not put equipment away without decontaminating it.
- Do decontaminate sampling equipment after sampling at each location, or at the end of the workday. Follow the decontamination guidelines in **Section 4 (Equipment Decontamination Before Sampling)** of this document.

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# MDEQ PFAS SAMPLING QUICK REFERENCE FIELD GUIDE<sup>1</sup>

## All Items Used During Sampling Event

● Prohibited
<ul style="list-style-type: none"> <li>• Items or materials that contain fluoropolymers such as               <ul style="list-style-type: none"> <li>○ Polytetrafluoroethylene (PTFE), that includes the trademarks Teflon® and Hostaflon®</li> <li>○ Polyvinylidene fluoride (PVDF), that includes the trademark Kynar®</li> <li>○ Polychlorotrifluoroethylene (PCTFE), that includes the trademark Neoflon®</li> <li>○ Ethylene-tetrafluoro-ethylene (ETFE), that includes the trademark Tefzel®</li> <li>○ Fluorinated ethylene propylene (FEP), that includes the trademarks Teflon® FEP and Hostaflon® FEP</li> </ul> </li> <li>• Items or materials that contain any other fluoropolymer</li> </ul>

## Pumps, Tubing, and Sampling Equipment

● Prohibited	■ Allowable	▲ Needs Screening <sup>2</sup>
<ul style="list-style-type: none"> <li>• Items or materials containing any fluoropolymer (potential items include tubing, valves, or pipe thread seal tape)</li> </ul>	<ul style="list-style-type: none"> <li>• High-density polyethylene (HDPE)</li> <li>• Low-density polyethylene (LDPE) tubing</li> <li>• Polypropylene</li> <li>• Silicone</li> <li>• Stainless-steel</li> <li>• Any items used to secure sampling bottles made from:               <ul style="list-style-type: none"> <li>○ Natural rubber</li> <li>○ Nylon (cable ties)</li> <li>○ Uncoated metal springs</li> <li>○ Polyethylene</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Any items or materials that will come into direct contact with the sample that have <b>not</b> been verified to be PFAS-free               <ul style="list-style-type: none"> <li>○ Do not assume that any sampling items or materials are PFAS-free based on composition alone</li> </ul> </li> </ul>

## Sample Storage and Preservation

● Prohibited	■ Allowable	▲ Needs Screening <sup>2</sup>
<ul style="list-style-type: none"> <li>• Polytetrafluoroethylene (PTFE): Teflon® lined bottles or caps</li> </ul>	<ul style="list-style-type: none"> <li>• Glass jars<sup>4</sup></li> <li>• Laboratory-provided PFAS-Free bottles:               <ul style="list-style-type: none"> <li>○ HDPE or polypropylene</li> </ul> </li> <li>• Regular wet ice</li> <li>• Thin HDPE sheeting</li> <li>• LDPE resealable storage bags (i.e. Ziploc®) that will not contact the sample media<sup>6</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Aluminium foil<sup>4</sup></li> <li>• Chemical or blue ice<sup>5</sup></li> <li>• Plastic storage bags other than those listed as ■ Allowable</li> <li>• Low-density polyethylene (LDPE) bottles</li> </ul>

## Field Documentation

● Prohibited	■ Allowable	▲ Needs Screening <sup>2</sup>
<ul style="list-style-type: none"> <li>• Clipboards coated with PFAS</li> <li>• Notebooks made with PFAS treated paper</li> <li>• PFAS treated loose paper</li> <li>• PFAS treated adhesive paper products</li> </ul>	<ul style="list-style-type: none"> <li>• Loose paper (non-waterproof, non-recycled)</li> <li>• Rite in the Rain® notebooks</li> <li>• Aluminium, polypropylene, or Masonite field clipboards</li> <li>• Ballpoint pens, pencils, and Fine or Ultra-Fine Point Sharpie® markers</li> </ul>	<ul style="list-style-type: none"> <li>• Plastic clipboards, binders, or spiral hard cover notebooks</li> <li>• All markers not listed as ■ Allowable</li> <li>• Post-It® Notes or other adhesive paper products</li> <li>• Waterproof field books</li> </ul>

## Decontamination

● Prohibited	■ Allowable	▲ Needs Screening <sup>2</sup>
<ul style="list-style-type: none"> <li>• Decon 90®</li> <li>• PFAS treated paper towel</li> </ul>	<ul style="list-style-type: none"> <li>• Alconox®, Liquinox®, or Citranox®</li> <li>• Triple rinse with PFAS-free deionized water</li> <li>• Cotton cloth or untreated paper towel</li> </ul>	<ul style="list-style-type: none"> <li>• Municipal water</li> <li>• Recycled paper towels or chemically treated paper towels</li> </ul>

## Clothing, Boots, Rain Gear, and PPE

● Prohibited	■ Allowable	▲ Needs Screening <sup>2</sup>
<ul style="list-style-type: none"> <li>• New or unwashed clothing</li> <li>• Anything made of or with:               <ul style="list-style-type: none"> <li>○ Gore-Tex™ or other water-resistant synthetics</li> </ul> </li> <li>• Anything applied with or recently washed with:               <ul style="list-style-type: none"> <li>○ Fabric softeners</li> <li>○ Fabric protectors, including UV protection</li> <li>○ Insect resistant chemicals</li> <li>○ Water, dirt, and/or stain resistant chemicals</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Powderless nitrile gloves</li> <li>• Well-laundered synthetic or 100% cotton clothing, with most recent launderings not using fabric softeners</li> <li>• Made of or with:               <ul style="list-style-type: none"> <li>○ Polyurethane</li> <li>○ Polyvinyl chloride (PVC)</li> <li>○ Wax coated fabrics</li> <li>○ Rubber / Neoprene</li> <li>○ Uncoated Tyvek®</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Latex gloves</li> <li>• Water and/or dirt resistant leather gloves</li> <li>• Any special gloves required by a HASP</li> <li>• Tyvek® suits, clothing that contains Tyvek®, or coated Tyvek®</li> </ul>

## Food and Beverages

● Prohibited	■ Allowable
<ul style="list-style-type: none"> <li>• No food should be consumed in the staging or sampling areas, including pre-packaged food or snacks.               <ul style="list-style-type: none"> <li>■ If consuming food on-site becomes necessary, move to the staging area and remove PPE. After eating, wash hands thoroughly and put on new PPE.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Brought and consumed only outside the vicinity of the sampling area:               <ul style="list-style-type: none"> <li>○ Bottled water</li> <li>○ Hydration drinks (i.e. Gatorade®, Powerade®)</li> </ul> </li> </ul>

## Personal Care Products (PCPs) - for day of sample collection<sup>6</sup>

● Prohibited	■ Allowable	▲ Needs Screening <sup>2</sup>
<ul style="list-style-type: none"> <li>• Any PCPs<sup>6</sup>, sunscreen, and insect repellent applied in the sampling area.</li> </ul>	<p>PCPs<sup>6</sup>, sunscreens, and insect repellents applied in the staging area, away from sampling bottles and equipment followed by thoroughly washing hands:</p> <p><b>PCPs<sup>6</sup>:</b></p> <ul style="list-style-type: none"> <li>• Cosmetics, deodorants/antiperspirants, moisturizers, hand creams, and other PCPs<sup>6</sup></li> </ul> <p><b>Sunscreens:</b></p> <ul style="list-style-type: none"> <li>• Banana Boat® for Men Triple Defense Continuous Spray Sunscreen SPF 30</li> <li>• Banana Boat® Sport Performance Coolzone Broad Spectrum SPF 30</li> <li>• Banana Boat® Sport Performance Sunscreen Lotion Broad Spectrum SPF 30</li> <li>• Banana Boat® Sport Performance Sunscreen Stick SPF 50</li> <li>• Coppertone® Sunscreen Lotion Ultra Guard Broad Spectrum SPF 50</li> <li>• Coppertone® Sport High Performance AccuSpray Sunscreen SPF 30</li> <li>• Coppertone® Sunscreen Stick Kids SPF 55</li> <li>• L'Oréal® Silky Sheer Face Lotion 50</li> <li>• Meijer® Clear Zinc Sunscreen Lotion Broad Spectrum SPF 50</li> <li>• Meijer® Sunscreen Continuous Spray Broad Spectrum SPF 30</li> <li>• Meijer® Clear Zinc Sunscreen Lotion Broad Spectrum SPF 15, 30 and 50</li> <li>• Meijer® Wet Skin Kids Sunscreen Continuous Spray Broad Spectrum SPF 70</li> <li>• Neutrogena® Beach Defense Water+Sun Barrier Lotion SPF 70</li> <li>• Neutrogena® Beach Defense Water+Sun Barrier Spray Broad Spectrum SPF 30</li> <li>• Neutrogena® Pure &amp; Free Baby Sunscreen Broad Spectrum SPF 60+</li> <li>• Neutrogena® UltraSheer Dry-Touch Sunscreen Broad Spectrum SPF 30</li> </ul> <p><b>Insect Repellents:</b></p> <ul style="list-style-type: none"> <li>• OFF® Deep Woods</li> <li>• Sawyer® Permethrin</li> </ul>	<ul style="list-style-type: none"> <li>• Products other than those listed as               <ul style="list-style-type: none"> <li>■ Allowable</li> </ul> </li> </ul>

<sup>1</sup> This table is not considered to be a complete listing of prohibited or allowable materials. All materials should be evaluated prior to use during sampling. The manufacturers of various products should be contacted in order to determine if PFAS was used in the production of any particular product.

<sup>2</sup> Equipment blank samples should be taken to verify these products are PFAS-free prior to use during sampling.

<sup>3</sup> **For surface water foam samples:** LDPE storage bags may be used in the sampling of foam on surface waters. In this instance, it is allowable for the LDPE bag to come into direct contact with the sample media.

<sup>4</sup> **For fish and other wildlife samples:** Depending on the project objectives, glass jars and aluminum foil might be used for PFAS sampling. PFAS has been found to bind to glass and if the sample is stored in a glass jar, a rinse of the jar is required during the sample analysis. PFAS are sometimes used as a protective layer for some aluminum foils. An equipment blank sample should be collected prior to any aluminum foil use.

<sup>5</sup> Regular ice is recommended as there are concerns that chemical and blue ice may not cool and maintain the sample at or below 42.8°F (6°C) (as determined by EPA 40 CFR 136 – NPDES) during collection and through transit to the laboratory.

<sup>6</sup> Based on evidence, avoidance of PCPs is considered to be precautionary because none have been documented as having cross-contaminated samples due to their use. However, if used, application of PCPs must be done at the staging area and away from sampling bottles and equipment, and hands must be thoroughly washed after the use of any PCPs prior to sampling.