



Meridian Environmental Consulting, LLC

December 9, 2020

John Hunt
Wisconsin Department of Natural Resources
223 East Steinfest Road
Antigo, WI 54409

Subject: **Ground Water Sampling Work Plan for PFAS**
Wagner Oil Spill – March 12, 2016
Hwy. 45 – Rolling Township, Langlade County, Wisconsin
DNR BRRTS No. 02-34-577387
Meridian No. 05C817

Dear John:

This letter describes our Ground Water Sampling Work Plan for PFAS compounds at the above referenced site.

PFAS refers to Per- and polyfluoroalkyl Substances. PFAS are man-made fluorinated organic chemicals. The reason we are sampling for PFAS at this site is because PFAS may be present in fire-fighting foams such as those used by the Langlade Rural Fire Dept in response to the original spill. The fire-fighting foam may have impacted ground water. The potential impacts to the ground water will be investigated by sampling the monitoring well network (Figure 1).

Sampling for PFAS can be problematic due to the widespread use of PFAS in commonly used products (e.g., clothing). The abundance of PFAS in man-made items can result in “false positives” or “cross-contamination” of the samples that are being collected and analyzed. This Work Plan describes steps that will be taken to collect ground water samples for PFAS analysis without contaminating the samples during the sample collection process.

Background Information

Please refer to the project file for information regarding the original spill and subsequent work. A brief summary is provided below.

A petroleum tanker truck rolled over March 12, 2016 on Highway 45 in southern Langlade County (near Aniwa). An estimated 1787 gallons of gasoline spilled onto the roadway and flowed easterly onto the shoulder and ditch.

Cleanup included using absorbent pads and booms (29 drums), vacuum truck(s) (14,800 gallons of gasoline/water mixture), and soil excavation (670.18 tons). The remedial excavation created a shallow pond (approximately 1 - 2 feet deep)(Figure 1).

We estimate 1500 gallons (or more) of product was recovered in the initial emergency response action. Additionally, a significant portion of the unrecovered product likely evaporated over time (especially during the hot summer months).

The site is underlain by poorly sorted silty sand to sandy silt typical of northern Wisconsin. A coarse sand layer is found about 25 feet below grade in MW-7B. This unit may be laterally continuous.

Ground water is found from 1 foot below grade (MW-6) to 15 feet below grade (MW-5). Ground water flow is southerly.

There is a surface swale that extends from the spill location east through the woods. However, there is no water in this swale (at least within 100 yards of the site).

GROUND WATER SAMPLING WORK PLAN

- **Monitoring Wells to be sampled**

Figure 1 is a map of the monitoring well network at this site. There are 12 monitoring wells (MW-1, -2, -3, -4, -5, -6, -7A, -7B, -8A, -8B, -9). Wells MW-7B, MW-8B, and MW-9 are piezometers (i.e., screened below the water table); the other monitoring wells are screened at the water table depth.

The wells are constructed of PVC.

- **Laboratory Analysis**

Pace Labs will conduct the analysis of the samples. Pace will also provide the sample containers, PFAS-free rinse water for field blanks, and a shipping container(s).

Appendix A provides a list of the parameters that will be analyzed for.

- **Sampling Procedure**

The ground water sampling will follow normal procedures, i.e., one bailer per each well, single-use nitrile gloves, etc.

The depth to water will not be measured in each well prior to sampling. This data can be skipped because sufficient ground water level measurements exist. Removing this step will decrease potential for cross-contamination.

Sampling equipment and tools (e.g., bailers, etc.) will comply with the acceptable materials list in Appendix B. Specifically, nitrile gloves, HDPE (high-density polyethylene) bailers, twine (versus nylon rope). Clothing worn by the sampler(s) will be well laundered synthetic or 100% cotton clothing that was not in contact with fabric softener.

A bailer will be lowered into the well to purge the well of 3 well volumes. After the well is purged, a ground water sample will be collected from the bailer and poured into the laboratory-supplied sampling container. The sample container will then be placed in a resealable plastic bag (i.e., Ziploc) and placed in a plastic cooler supplied by the lab.

- **Field Reagent Blanks (FRB)**

Two field blanks will be collected. This includes a field reagent blank collected prior to sampling any wells. This will involve pouring PFAS-free rinsate water provided by the lab into a laboratory supplied container and labeling this sample FRB.

An equipment blank will be collected at the beginning of the work by pouring PFAS-free rinsate water provided by the lab into a bailer. The bailer will then be emptied into the laboratory provided sample container and this sample labeled EB (equipment blank).

- **Sampling Handling and Shipping**

All of the samples will be placed into individual resealable plastic bag (i.e., Ziploc) and placed in a plastic cooler supplied by the lab.

The samples will be placed with ice in a cooler and shipped via Fed Ex to the lab.

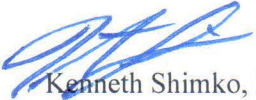
- **Disposal of purge water**

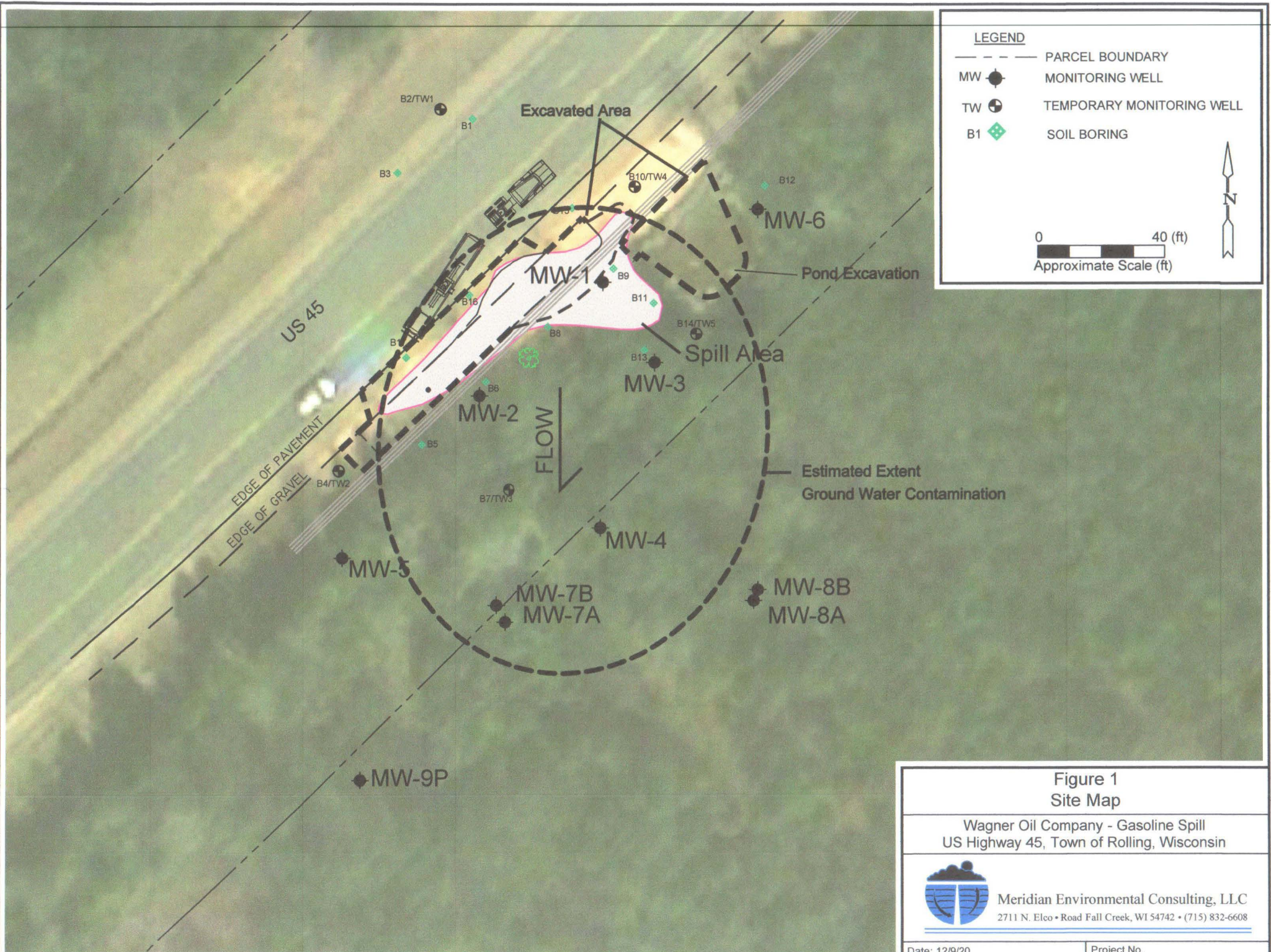
Purge water will be containerized and disposed at the City of Bloomer Waste Water Treatment Plant.

- **Schedule**

There may still be time to collect the water samples before winter snows make sampling difficult. Alternatively, it may be necessary to wait until April depending upon the weather.

Sincerely,
MERIDIAN ENVIRONMENTAL CONSULTING, LLC


Kenneth Shimko, PG
Project Manager



LEGEND

- PARCEL BOUNDARY
- MW ● MONITORING WELL
- TW ⊕ TEMPORARY MONITORING WELL
- B1 ◆ SOIL BORING

0 40 (ft)
Approximate Scale (ft)

N

Figure 1
Site Map

Wagner Oil Company - Gasoline Spill
US Highway 45, Town of Rolling, Wisconsin

 Meridian Environmental Consulting, LLC
2711 N. Elco • Road Fall Creek, WI 54742 • (715) 832-6608

Date: 12/9/20 Project No.

APPENDIX A

List of PFAS Compounds to be Analyzed

List Report

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List: 3521 - PFAS by Isotope Dilution (36 analytes)

Method: PFAS by ID SOP

Items: 36

Prep: SOP SPE

Matrix: Aqueous

Units: ng/L

List Detail

Item	Description	CAS	LOQ	DL
29531	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	8.0	2.0
29523	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	763051-92-9	8.0	2.0
29524	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	8.0	2.0
29525	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	8.0	2.0
29526	1H, 1H, 2H, 2H-perfluorododecane sulfonic acid (10:2 FTS)	120226-60-0	8.0	2.0
29527	1H, 1H, 2H, 2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	8.0	2.0
29532	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	8.0	2.0
29530	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	8.0	2.0
29533	N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	8.0	2.0
29534	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	8.0	2.0
29528	2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE)	1691-99-2	8.0	2.0
29535	N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	16	4.0
29536	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	8.0	2.0
29529	2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE)	24448-09-7	8.0	2.0
29537	Perfluoro-1-butanefulfonic acid (PFBS)	375-73-5	4.0	1.0
29538	Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	4.0	1.0
29539	Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	4.0	1.0
29540	Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	4.0	1.0
29541	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	4.0	1.0
29542	Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	4.0	1.0
29556	Perfluorododecanesulfonic acid (PFDOS)	79780-39-5	8.0	2.0
29557	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	4.0	1.0
29543	Perfluoro-n-butanoic acid (PFBA)	375-22-4	4.0	1.0
29544	Perfluoro-n-decanoic acid (PFDA)	335-76-2	4.0	1.0
29545	Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	4.0	1.0
29546	Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	4.0	1.0
29547	Perfluoro-n-hexadecanoic acid (PFHxDA)	67905-19-5	8.0	2.0
29548	Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	4.0	1.0
29549	Perfluoro-n-nonanoic acid (PFNA)	375-95-1	4.0	1.0
29550	Perfluoro-n-octadecanoic acid (PFODA)	16517-11-6	8.0	2.0
29551	Perfluoro-n-octanoic acid (PFOA)	335-67-1	4.0	1.0
29552	Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	4.0	1.0
29553	Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	4.0	1.0
29554	Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	4.0	1.0
29555	Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	4.0	1.0
29558	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	4.0	1.0

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List Detail

Item	Description	CAS	LOQ	DL
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Surrogates

Item	Description	Low	High	Units
29560	13C2_4:2FTS	25	150	%
29561	13C2_6:2FTS	25	150	%
29562	13C2_8:2FTS	25	150	%
29579	13C2_PFD _o A	25	150	%
29559	13C2_PFH _x DA	25	150	%
29580	13C2_PFT _e DA	25	150	%
29575	13C3_PFB _S	25	150	%
29576	13C3_PFH _x S	25	150	%
29581	13C3-HFPO-DA	25	150	%
29568	13C4_PFB _A	25	150	%
29571	13C4_PFH _p A	25	150	%
29570	13C5_PFH _x A	25	150	%
29569	13C5_PFP _e A	25	150	%
29574	13C6_PFDA	25	150	%
29578	13C7_PFU _d A	25	150	%
29572	13C8_PFO _A	25	150	%
29577	13C8_PFO _S	25	150	%
29563	13C8_PFO _S A	10	150	%
29573	13C9_PFN _A	25	150	%
29564	d-EtFO _S A	10	150	%
29566	d5-EtFO _S AA	25	150	%
29583	d9-EtFO _S E	10	150	%
29565	d-MeFO _S A	10	150	%
29567	d3-MeFO _S AA	25	150	%
29582	d7-MeFO _S E	10	150	%

APPENDIX B

Acceptable Sampling Materials

FIELD SAMPLING GUIDE

MATRIX	CONTAINER	PRESERVATIVE	METHOD	NOTES
Drinking Water	2 x 250 ml HDPE or PP	Trizma	EPA Method 537 or EPA Method 537M	Trizma is a buffer and removes free chlorine.
Groundwater, surface water, waters	2 x 250 ml HDPE or PP	none	EPA Method 537M	
Effluent	2 x 250 ml HDPE or PP	Trizma	EPA Method 537M	Finished samples may require Trizma.
Soil, sediment, bio-solids	1 x 250 ml (or 4 ounce) HDPE or PP	none	EPA Method 537M	

Sample extraction = 14 days. Sample analysis = 28 days.

DO USE

DO NOT USE

Sample Container Items

- | | |
|---|--|
| <ul style="list-style-type: none"> · HDPE or Polypropylene (PP) · Lined or unlined HDPE or polypropylene caps | <ul style="list-style-type: none"> · Glass or LDPE container · Teflon™-lined cap |
|---|--|

Field Equipment

- | | |
|--|--|
| <ul style="list-style-type: none"> · High density polyethylene (HDPE) or polypropylene materials · Silicon tubing · Loose paper (non-water resistant) · Aluminum field clipboards or Masonite · Sharpies, pens · Regular Ice | <ul style="list-style-type: none"> · Teflon™ containing materials · Teflon™ tubing · Waterproof field books · Plastic clipboards, binders, or spiral notebooks · Post-It Notes · Chemical (blue) ice packs |
|--|--|

Field Clothing and Personal Protection Equipment

- | | |
|--|--|
| <ul style="list-style-type: none"> · Well-laundered clothing, defined as clothing that has been washed six or more times after purchase, made of synthetic or natural fibers. Cotton clothing preferred. · No fabric softener · Boots made with polyurethane and polyvinyl chloride (PVC) · Sunscreen that is all natural and/or organic · Insect repellents that is all natural and/or organic | <ul style="list-style-type: none"> · New clothing or water resistant, waterproof, or stain-treated clothing; no clothing containing Gore-Tex™ · Clothing laundered using fabric softener · Tyvek® · Boots containing Gore-Tex™ · Cosmetics, moisturizers, hand cream or related products as part of personal hygiene and/or showering routine the day of sampling |
|--|--|

Field Equipment Decontamination Items

- | | |
|---|--|
| <ul style="list-style-type: none"> · Alconox® and/or Liquinox® | <ul style="list-style-type: none"> · Decon 90 |
|---|--|

Food Items

- | | |
|---|--|
| <ul style="list-style-type: none"> · Bottled water and hydration drinks (i.e. Gatorade® and Powerade®) to be brought and consumed only in the staging area | <ul style="list-style-type: none"> · Food and drink other than the exceptions listed at left. |
|---|--|

Field Sampling Guidance & SOPs

Click here for a list of state and other organization issued SOPs.



MDEQ PFAS SAMPLING QUICK REFERENCE FIELD GUIDE¹

All Items Used During Sampling Event

● Prohibited

- Items or materials that contain fluoropolymers such as
 - Polytetrafluoroethylene (PTFE), that includes the trademarks Teflon® and Hostaflon®
 - Polyvinylidene fluoride (PVDF), that includes the trademark Kynar®
 - Polychlorotrifluoroethylene (PCTFE), that includes the trademark Neoflon®
 - Ethylene-tetrafluoro-ethylene (ETFE), that includes the trademark Tefzel®
 - Fluorinated ethylene propylene (FEP), that includes the trademarks Teflon® FEP and Hostaflon® FEP
- Items or materials that contain any other fluoropolymer

Pumps, Tubing, and Sampling Equipment

● Prohibited

- Items or materials containing any fluoropolymer (potential items include tubing, valves, or pipe thread seal tape)

■ Allowable

- High-density polyethylene (HDPE)
- Low-density polyethylene (LDPE) tubing
- Polypropylene
- Silicone
- Stainless-steel
- Any items used to secure sampling bottles made from:
 - Natural rubber
 - Nylon (cable ties)
 - Uncoated metal springs
 - Polyethylene

▲ Needs Screening²

- Any items or materials that will come into direct contact with the sample that have **not** been verified to be PFAS-free
 - Do not assume that any sampling items or materials are PFAS-free based on composition alone

Sample Storage and Preservation

● Prohibited

- Polytetrafluoroethylene (PTFE): Teflon® lined bottles or caps

■ Allowable

- Glass jars⁴
- Laboratory-provided PFAS-Free bottles:
 - HDPE or polypropylene
- Regular wet ice
- Thin HDPE sheeting
- LDPE resealable storage bags (i.e. Ziploc®) that will not contact the sample media⁶

▲ Needs Screening²

- Aluminium foil⁴
- Chemical or blue ice⁵
- Plastic storage bags other than those listed as ■ Allowable
- Low-density polyethylene (LDPE) bottles

Field Documentation

● Prohibited

- Clipboards coated with PFAS
- Notebooks made with PFAS treated paper
- PFAS treated loose paper
- PFAS treated adhesive paper products

■ Allowable

- Loose paper (non-waterproof, non-recycled)
- Rite in the Rain® notebooks
- Aluminium, polypropylene, or Masonite field clipboards
- Ballpoint pens, pencils, and Fine or Ultra-Fine Point Sharpie® markers

▲ Needs Screening²

- Plastic clipboards, binders, or spiral hard cover notebooks
- All markers not listed as ■ Allowable
- Post-It® Notes or other adhesive paper products
- Waterproof field books

Decontamination

● Prohibited

- Decon 90®
- PFAS treated paper towel

■ Allowable

- Alconox®, Liquinox®, or Citranox®
- Triple rinse with PFAS-free deionized water
- Cotton cloth or untreated paper towel

▲ Needs Screening²

- Municipal water
- Recycled paper towels or chemically treated paper towels

Clothing, Boots, Rain Gear, and PPE

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

Food and Beverages

● Prohibited	■ Allowable
<ul style="list-style-type: none"> • No food should be consumed in the staging or sampling areas, including pre-packaged food or snacks. <ul style="list-style-type: none"> ■ 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. 	<ul style="list-style-type: none"> • Brought and consumed only outside the vicinity of the sampling area: <ul style="list-style-type: none"> ○ Bottled water ○ Hydration drinks (i.e. Gatorade®, Powerade®)

Personal Care Products (PCPs) - for day of sample collection⁶

● Prohibited	■ Allowable	▲ Needs Screening ²
<ul style="list-style-type: none"> • Any PCPs⁶, sunscreen, and insect repellent applied in the sampling area. 	<p>PCPs⁶, sunscreens, and insect repellents applied in the staging area, away from sampling bottles and equipment followed by thoroughly washing hands:</p> <p>PCPs⁶:</p> <ul style="list-style-type: none"> • Cosmetics, deodorants/antiperspirants, moisturizers, hand creams, and other PCPs⁶ <p>Sunscreens:</p> <ul style="list-style-type: none"> • 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 • 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 <p>Insect Repellents:</p> <ul style="list-style-type: none"> • OFF® Deep Woods • Sawyer® Permethrin 	<ul style="list-style-type: none"> • Products other than those listed as <ul style="list-style-type: none"> ■ Allowable

¹ 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.

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

³ **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.

⁴ **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.

⁵ 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.

⁶ 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.