





TRC

PFAS Sampling Challenges in the Field
May 2, 2019

NEWMOA

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The slide features a blue background with a central chemical structure of a perfluorinated carboxylic acid (PFAS). Surrounding the structure are several circular images: a green laboratory flask, a red fire extinguisher, a yellow granular substance, a white protective suit, a white protective cap, and a red and green jacket. The TRC logo is in the top right, and the NEWMOA logo is on the left. Social media icons and the website URL are at the bottom left.



TRC

PFAS Sampling Issues and Quality Control

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The slide features a blue background with a central image of two glass Erlenmeyer flasks containing liquid. The TRC logo is in the top right. The title "PFAS Sampling Issues and Quality Control" is centered in a dark blue banner. A small number "2" is in the bottom right corner.

How Do We Sample PFAS?



- Similar to conventional sampling (e.g., low-flow techniques, direct push, etc.)
- Special care required to prevent cross contamination
- Use of and exclusion of specific sampling equipment and materials

GENERAL PFAS SAMPLING GUIDANCE

Michigan Department of Environmental Quality

This document contains an introduction to PFAS, sampling recommendations, and general best practices to minimize the possibility of cross-contamination.

Technical Guidance Documents



General PFAS Sampling Guidance
Revised October 10, 2018



PFAS Sampling Check Reference Tool Guide
Revised October 11, 2018



Residual and PFAS Sampling Guidance
Revised October 11, 2018



Groundwater PFAS Sampling Guidance
Updated October 2018



Aqueous PFAS Sampling Guidance
Revised October 11, 2018



Surface Water PFAS Sampling Guidance
Revised November 28, 2018



Soil PFAS Sampling Guidance
Revised November 28, 2018



Pore Water PFAS Sampling Guidance
Updated January 2019

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PFAS Sampling Dos and Don'ts



WHAT SHOULD I AVOID?	USE INSTEAD
Passive diffusion bags (PDBs)	
LDPE Hydrasleeves	✓ HDPE Hydrasleeves
Post-it notes during sample handling	
Blue Ice® (chemical ice packs)	✓ Regular ice in Ziploc® bags
Waterproof field books, plastic clipboards and spiral bound notebooks	✓ Field notes recorded on loose paper ✓ Field forms maintained in aluminum or Masonite clipboards
Unnecessary handling of items with nitrile gloves	✓ Personnel collecting and handling samples should wear nitrile gloves at all times while collecting and handling samples or sampling equipment

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PFAS Sampling Dos and Don'ts



WHAT SHOULD I AVOID?	USE INSTEAD
Equipment with Teflon® (e.g., bailers, tubing, parts in pump) during sample handling or mobilization/demobilization	✓ High density polyethylene (HDPE) or silicone tubing/materials in lieu of Teflon®
Low-density polyethylene (LDPE) or glass sample containers or containers with Teflon-lined lids	✓ HDPE or polypropylene containers for sample storage ✓ HDPE or polypropylene caps
Tyvek® suits and waterproof boots	✓ Clothing made of cotton preferred ✓ Boots made with polyurethane and polyvinyl chloride (PVC)
Waterproof labels for sample bottles	✓ Paper labels with clear tape
Sunscreens, insect repellants	✓ Products that are 100% natural, DEET
Sharpies	✓ Ballpoint pens
Aluminum foil	✓ Thin HDPE sheeting

Other Special Considerations



- Field QC
- Decontamination of sampling equipment
- No pre-wrapped food or snacks
- Avoid cosmetics, moisturizers, hand creams on day of sampling.
- Visitors to site must remain at least 30 feet from sampling area.
- Wash hands with water after leaving vehicle before setting up on a well.
- **Partitioning of PFAS to surface in wells and reservoirs**



Filtering of Water Samples



- PFAS may sorb onto glass fiber filters
- Filtered/unfiltered data:
 - Is it PFAS sorbed to soil or sediment in the water sample?
 - Is it PFAS sorbed onto the glass fiber filter?
- Preferred method of dealing with particulates: low flow sampling or use of a centrifuge in the lab
- If filtering is required, do not use glass fiber filters



What Should I Wear?



- No clothing with fabric softeners
- No new clothing
- Avoid boots and other field clothing containing waterproof/resistant material
- Cotton is best

Other PFAS Sampling Precautions



- Many PFAS sampling concerns are precautionary and have no scientific data to prove
- HDPE can sorb PFAS as well (evidence of strong 6:2 FTS sorption)
- Laboratory should empty the entire sample bottle for extraction, sub-sampling from the sample bottle must be avoided
 - The empty bottle should be rinsed with methanol to desorb any PFAS on the sample bottle regardless of bottle materials
 - The rinsate should be combined with the sample materials for analysis

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The graphic features a blue background with two glass Erlenmeyer flasks containing liquid. The flask in the foreground is in sharp focus, while the one in the background is blurred. A semi-transparent blue banner is overlaid across the middle of the image, containing the text "PFAS Contamination Study". In the top right corner, the TRC logo is visible with the tagline "Results you can rely on".

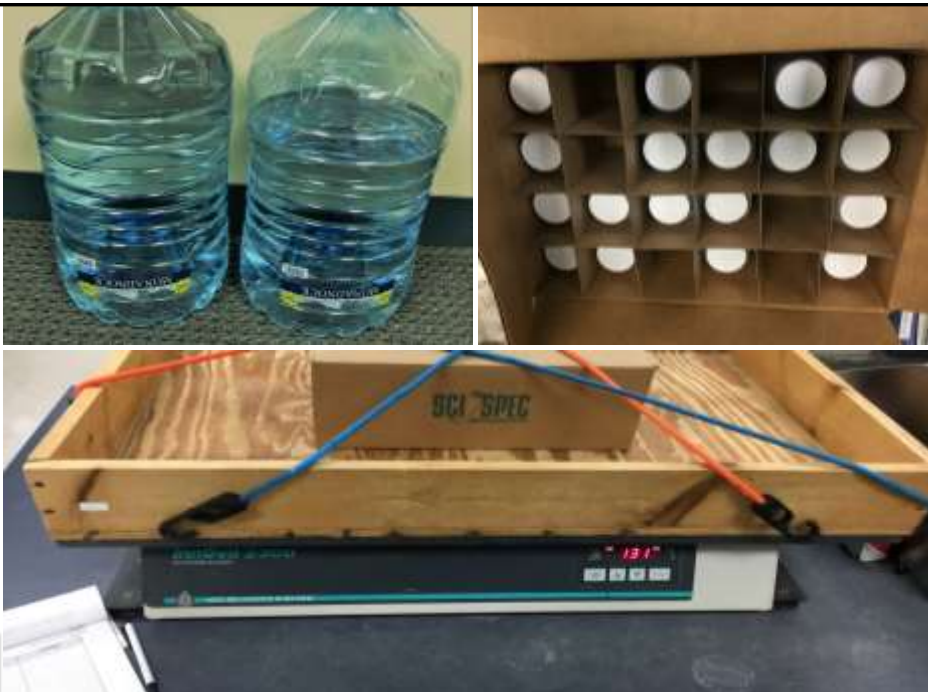
PFAS Contamination Study

Purpose of Study



- To evaluate the potential for PFAS cross-contamination from commonly used products
 - Determine the relative concentrations of PFAS
 - Determine the types of PFAS

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Quality Control:

Method Blanks

LCS

Calibration Checks

Extracted IS

Matrix Spikes

**Experimental Design
Analysis**

Solid phase extraction

LC/MS/MS, isotope dilution

24-compound target list

RL = 2 ng/L

Analyte	Acronym	CAS #
4:2 Fluorotelomer sulfonic acid	4:2FTS	n/a
6:2 Fluorotelomer sulfonic acid	6:2FTS	27619-97-2
8:2 Fluorotelomer sulfonic acid	8:2FTS	39108-34-4
N-methyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6
N-ethyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9
Perfluorooctane sulfonamide	FOSA	754-91-6
Perfluorobutanoic acid	PFBA	375-22-4
Perfluorobutanesulfonic acid	PFBS	375-73-5
Perfluorodecanoic acid	PFDA	335-76-2
Perfluorododecanoic acid	PFDoA	307-55-1
Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluoroheptanoic acid	PFHpA	375-85-9
Perfluoroheptanesulfonic acid	PFHpS	375-92-8
Perfluorohexanoic acid	PFHxA	307-24-4
Perfluorohexanesulfonic acid	PFHxS	355-46-4
Perfluorononanoic acid	PFNA	375-95-1
Perfluorononanesulfonic acid	PFNS	68259-12-1
Perfluorooctanoic acid	PFOA	335-67-1
Perfluorooctanesulfonic acid	PFOS	1763-23-1
Perfluoropentanoic acid	PFPeA	2706-90-3
Perfluoropentanesulfonic acid	PFPeS	2706-91-4
Perfluorotetradecanoic acid	PFTeDA	376-06-7
Perfluorotridecanoic acid	PFTrDA	72629-94-8
Perfluoroundecanoic acid	PFUnA	2058-94-8



Some Conclusions of the Study



- Generally low levels of PFAS may leach off of specific sampling materials.
- These are conservative results.
 - Tubing stored in wells for extended period of time may be exception
- Forensic evaluation of sample data.
- You still need to collect equipment blanks.



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Take-Away Messages



- Understand the potential for PFAS to be in the sampling materials you are using.
- Collect equipment blanks.
- Use common sense.

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Questions?

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Thank you