



# Rethinking Field Sampling Practices in PFAS Testing:

## Challenging Cross-Contamination Assumptions

**BUREAU VERITAS**

**A GLOBAL LEADER IN TESTING, INSPECTION & CERTIFICATION SERVICES**



**BUREAU  
VERITAS**

**2024**



# PRESENTER

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Business Development PFAS AND eDNA, Ontario  
20 Years at Bureau Veritas



# A BUSINESS TO BUSINESS TO SOCIETY COMPANY

Bureau Veritas has supported **PFAS** specific projects in Canada and the US for over a decade, providing technical expertise, method development and analytical support to practitioners and stakeholders.

Our North American laboratory network is organized into four operating groups: Environmental, Oil & Petrochemicals, Food Sciences & Safety Services, and DNA & Specialty Services

## OUR MISSION

**Shaping a World of Trust by ensuring a responsible progress.**





# WHEN WE THINK PFAS...



# WE DON'T OFTEN CONSIDER...





# HOW LOW IS LOW?



## PARTS PER BILLION (PPB)

ug/kg or ng/g for solids  
ug/l for liquids

1 second out of 32 years  
1 cm in 10,000 km

## PARTS PER TRILLION (PPT)

ng/L for liquids  
ng/kg for solids

1 second out of 32,000 years  
1 cm in 10,000,000 km (about  
250 times around earth)

## CURRENT REPORTING

Down to 2 ng/L (PPT)  
for waters  
0.1 ng/g for solids

MRLs 2 ng/L -> 30 ng/L (sum)



# SUCCESSFUL SAMPLING



What type of data is required?



Reporting deliverables



Detection limit and criteria requirements



Sampling logistics



Turnaround time requirements



Quality control and contamination

**ASK THE RIGHT QUESTIONS  
AND COMMUNICATE WITH  
YOUR LAB PARTNER**

# SUCCESSFUL SAMPLING

## WHAT DO THE METHODS SAY ABOUT PFAS SAMPLING?

### EPA 537.1

*“The sample handler must wash their hands before sampling and wear nitrile gloves while filling and sealing the sample bottles. PFAS contamination during sampling can occur from a number of common sources, such as **food packaging** and certain **foods and beverages**. Proper **hand washing** and **wearing nitrile gloves** will aid in minimizing this type of accidental contamination of the samples.”*

Ship samples at <10°C, Store < 6°C

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### EPA 533

*“Workers must **wash their hands** before sampling and **wear nitrile gloves** while filling and sealing the sample bottles. Users should seek to minimize accidental contamination of the samples.”*

Ship samples at <10°C, Store < 6°C

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### EPA 1633

“ ... ”

Ship samples at <6°C, Store < 6°C or -20°C

## COMMON TO ALL 3 METHODS

- Containers to be linerless HDPE or polypropylene
- Recommended to include Field Blank



# SUCCESSFUL SAMPLING

HDPE or Polypropylene



Glass



PTFE



# SUCCESSFUL SAMPLING

## A BROADER LOOK AT SAMPLING GUIDANCE



# SUCCESSFUL SAMPLING

PROHIBITED	ALLOWABLE
Water resistant field books. Sharpie® pens	Aluminum/metal clip boards. Regular ink pen
Water/Dirt/Stain resistant clothing/gloves	Powderless nitrile gloves
Decon 90	Alconox®, Liquinox® or Citrinox®
Chemical or “Blue” Ice packs	Regular ice, sealed in polyethylene bags
Teflon® or PTFE tubing	HDPE, LDPE, silicone tubing or steel pump
Gore-Tex®, or Tyvek®, clothing or boots	Synthetic or cotton (washed without fabric softeners)
Cosmetics, moisturizers, sunscreen, bug repellants	Natural or alternative products
Pre-packaged/wrapped food and containers	Resealable plastic food bags



# SUCCESSFUL SAMPLING

## Avoid where possible (or requires screening)

Clothing made or washed with stain resistant chemical

Latex gloves (if not screened)

Aluminum foil (shiny side away from samples)

Clothing treated for insect resistance or UV protection

Tyvek<sup>®</sup> suits or Tyvek coatings

Visiting AFFF Training site prior to sampling event

Landfills

Sampling in the rain (use PVC or vinyl rain gear)

Filling car with gas on day of sampling

# SUCCESSFUL SAMPLING

## POTENTIAL SOURCES OF FIELD CONTAMINATION

Common/  
Household



Stain- & water-  
resistance  
treatments



Nonstick  
cookware



Waterproof  
apparel



Cleaning  
products



Firefighting  
foam



Takeout  
containers



Carpets &  
textiles

Field Sources



# IN THE LAB

- GLP/QMS procedures followed
- Separate PFAS sample flow
- Processes completed in fume hoods
- Disposable fume hood liners replaced after each use
- Fragrance/product free lab space
- All equipment proofed/screened
- PFAS free water proofing
- QA/QC lab blanks, clean up blanks
- Regular lab coat laundering





# CHALLENGING THE GUIDANCE

## LAB STUDY TO DETERMINE SAMPLING PRACTICALITY

- 4 Samples
- Proofed PFAS free lab blank water
- Utilized BV consolidated EPA 1633m with low level detection limits (2-4 ng/L)
- 47 parameters

### Sample 1.

Exposed to everyday situations.

### Sample 2.

Direct exposure to known potential sources

### Sample 3.

Handled without gloves after exposure

### Sample 4.

Opened. Handled with gloves after hands exposed

# CHALLENGING THE GUIDANCE

## LAB STUDY TO DETERMINE SAMPLING PRACTICALITY

### Sample 1. Exposed to everyday situations

- Laundry 1 Week
- Bathroom 1 Week
- Office 1 Week
- “Blue” Ice packs 5 Days
- Garage 5 Days
- Everyday Road Trip



# CHALLENGING THE GUIDANCE

## LAB STUDY TO DETERMINE SAMPLING PRACTICALITY

### Sample 2. Direct exposure to known potential sources

- Direct contact
- Plumber's Teflon<sup>®</sup> tape
- Gore-Tex ski gloves





# CHALLENGING THE GUIDANCE

## LAB STUDY TO DETERMINE SAMPLING PRACTICALITY

### Sample 3. Handled without gloves after exposure

- Teflon<sup>®</sup> tape
- Sunscreen, moisturizer
- Bug repellent



# CHALLENGING THE GUIDANCE

## LAB STUDY TO DETERMINE SAMPLING PRACTICALITY

### Sample 4. Opened. Handled with gloves after hands exposed

- Unwashed hands from Sample 3
- Gloved with standard nitrile lab/field gloves
- Transferred sample from one container another





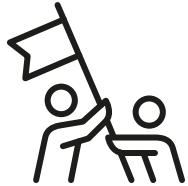
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**CHALLENGING THE  
GUIDANCE  
ANALYSIS RESULTS**

# CHALLENGING THE GUIDANCE

## ANALYSIS RESULTS

**SAMPLE 1.  
EVERYDAY  
EXPOSURE**



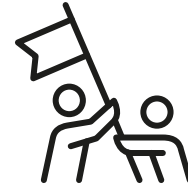
**Non-Detect  
for all**

**SAMPLE 2.  
DIRECT  
CONTACT**



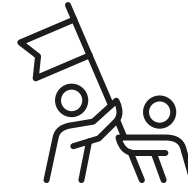
**PFBA 3.4 ng/L  
PFOA 58 ng/L**

**SAMPLE 3.  
NO GLOVE  
EXPOSURE**



**Non-Detect  
for all**

**SAMPLE 4.  
WITH GLOVE  
EXPOSURE**



**Non-Detect  
for all**



# CHALLENGING THE GUIDANCE



## EXPOSURE

- › Everyday exposure **may not** be a significant source of PFAS contamination
- › Standard good field practices **could be sufficient** to avoid cross contamination – ok to shower on sampling day?



## DIRECT CONTACT

- › Direct exposure of sample matrix to known sources containing PFAS, could **likely** result in contamination
- › Gloves appear effective in minimizing sample contamination



## LIMITED STUDY

- › Expanded sample set and exposure situations should be studied before abandoning all precautionary practices – however evidence to suggest *“it’s not everywhere”* (at least with respect to sampling)

# SUCCESSFUL SAMPLING

- Have a solid and defensible field QA program
- Consider your possible sources of PFAS exposure
- Follow good field sampling protocols
- Use proofed containers and equipment
- Include PFAS-free field blank
- Adsorption of PFAS can be rapid and must be accounted for – avoid contact with known products
- Wear approved gloves
- Engage laboratory and discuss data objectives



# WHEN “FREE” DOESN’T MEAN NONE

1 PPB or (1000 ng/L)  
VS  
Health Canada 30 ng/L



# BUT WAIT! THERE'S MORE.

## Field Sampling Materials Unlikely Source of Contamination for Perfluoroalkyl and Polyfluoroalkyl Substances in Field Samples

Alix E. Rodowa, Emerson Christie, Jane Sedlak, Graham F. Peaslee, Dorin Bogdan, Bill DiGuseppi, and Jennifer A. Field

Material	PFOA + PFOS (ng/cm <sup>2</sup> )	Material area to achieve 70 ng/L in (cm <sup>2</sup> )	Material area to achieve 10 ng/L (cm <sup>2</sup> )
First aid adhesive wrapper	0.45	160 (4.7 wrappers <sup>b</sup> )	22 (0.7 wrappers)
PTFE tape 2	0.44	160 (130 cm)	23 (19 cm)
Aluminum foil	2.7	26	3.7
Paper towel 1	0.49	140	20
Lab notebook cover	0.39	180	26
Resusable ice pack	0.023 <sup>d</sup>	3000 (6.7 ice packs)	430 (1.0 ice packs)



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QUESTIONS?



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