



# PFAS Risk Management Strategies

Technology Transfer and Stakeholder Communications Battelle | June 5, 2024

Antea<sup>®</sup>Group

Understanding today.  
Improving tomorrow.



# PFAS Clarity

# Question

## What is your PFAS understanding?

- a) New to PFAS but have heard about PFAS in the news
- b) Attended a handful of webinars on PFAS not specific to business risks
- c) Well versed on the PFAS topic and understand basic chemistry of PFAS and potential sources
- d) PFASs are sticky and like THE BLOB



*Non necessarily sequential*

1

## Identify

PFAS in your process  
and supply chain

2

## Collaborate

with the supply chain  
vendors to eliminate  
non-essential PFAS

3

## Regulations

keep up to date with,  
respond, and  
anticipate

4

## Substitute

research and  
development

# Four Strategic Actions

Antea<sup>®</sup>Group



# Action 1: Identification

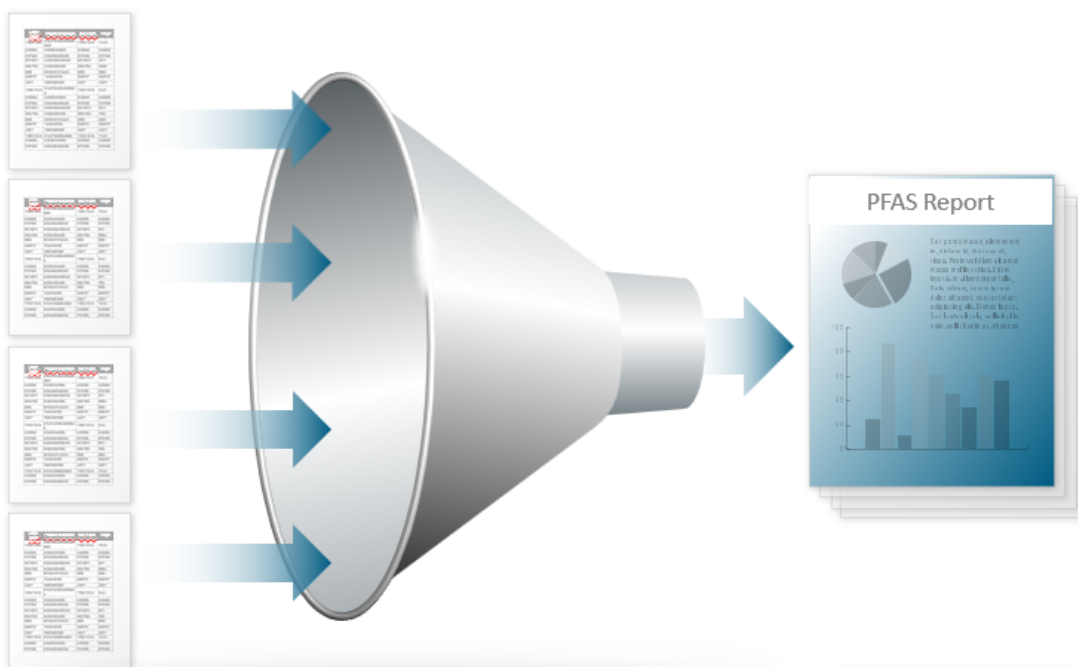
## *Desktop PFAS Screening (Audit)*

Antea®Group

Understanding today.  
Improving tomorrow.

PFAS in your process and supply chain.  
Identification is the most difficult step.

# Desktop PFAS Screening



- Use supply chain information and safety data sheets
- Consult with PFAS experts - differentiate polymers (lower risks) from non-polymers (higher risk)
- Compare CAS No regulatory toxicological lists to rank risks
- Establish a baseline PFAS risks

***PFAS Screening Tool Fills The Void!***

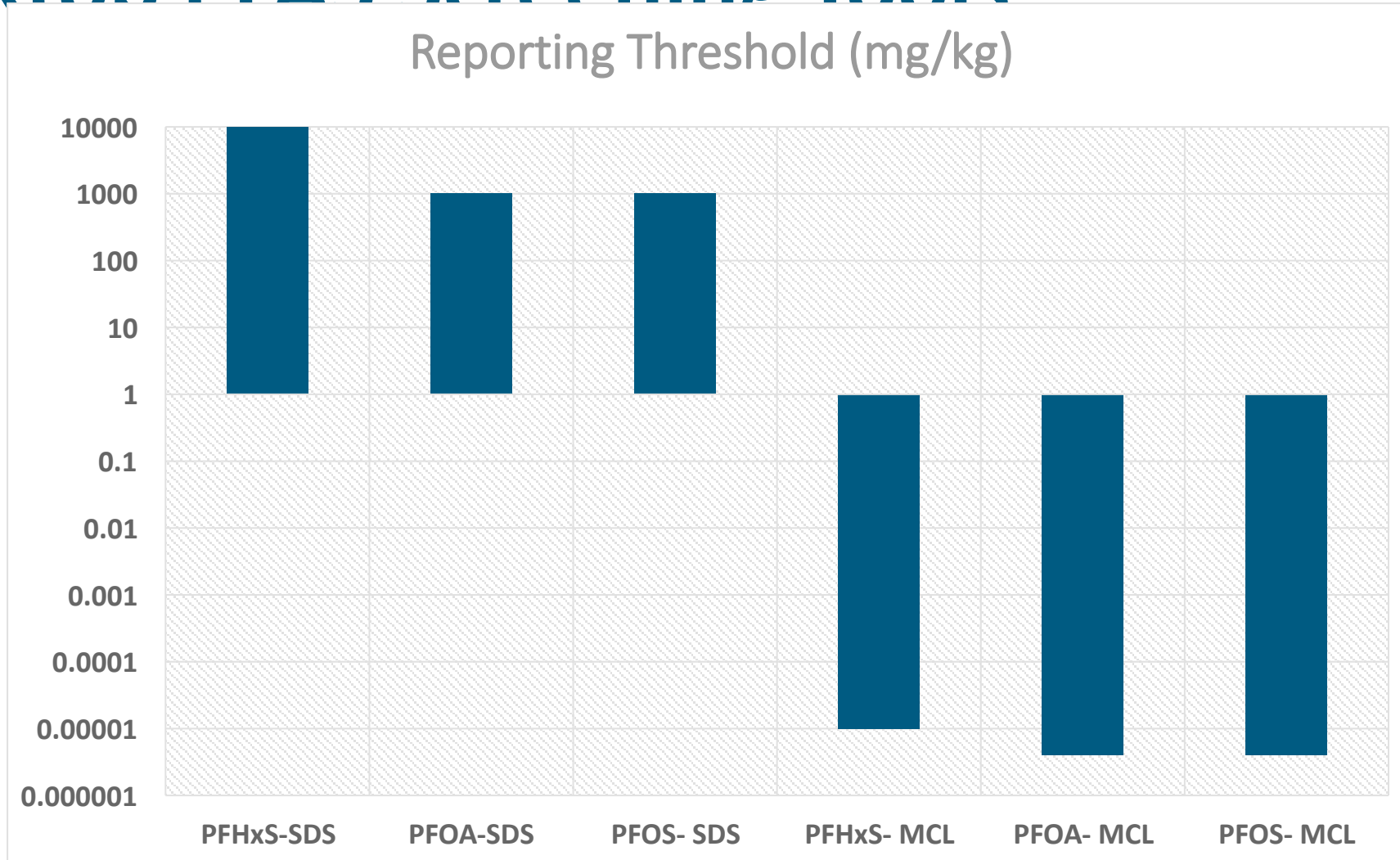
# Desktop PFAS Screening



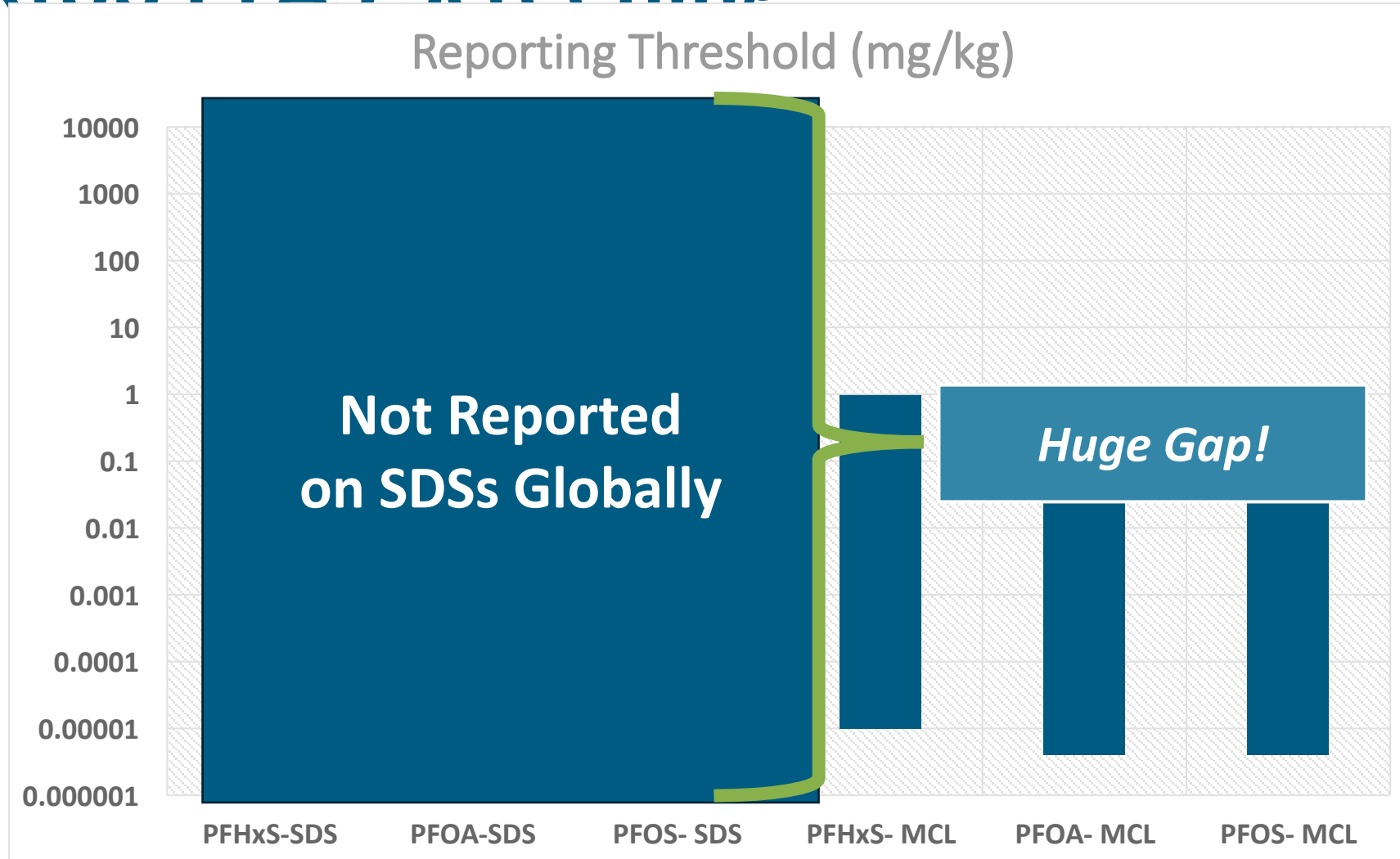
- Caution on Safety Data Sheets Only
  - Reporting thresholds
  - Hazardous or toxic
  - Vendor slow to catch up

***PFAS Screening Tool Fills This Void!***

# Desktop PFAS Screening Tools



# Desktop PFAS Screening





## ACTION 1: IDENTIFICATION

# Expect the Unexpected

## Fluorine Gas Treated Containers



- Acetone
- Charcoal lighter
- Cleaners
- Degreasers
- D-Limonene
- Electronics chemicals
- Essential oils
- Fragrances
- Gasoline
- Herbicides
- Insecticides
- Kerosene
- Lubricants
- Paint thinners
- Plant growth products
- Surfactants
- Solvents
- Trichloroethylene
- Toluene
- Wax or polish
- Wood preservatives

Not an  
Exhaustive List!

MARCH 18, 2022

### PFAS in Plastic Pesticide Containers: Latest Update

*Holland & Knight Energy and Natural Resources Blog*

Dianne R. Phillips

Understanding today.  
Improving tomorrow.



# Expect the Unexpected

What do some hand sanitizers and PFAS have in common?

DEA- C8-18 Perfluoroalkylethyl Phosphate, a listed PFAS on the TRI list

3 – COMPOSITION / INFORMATION ON INGREDIENTS

| INGREDIENT                               | C.A.S. NUMBER |
|------------------------------------------|---------------|
| Ethanol                                  | 64-17-5       |
| Water                                    | 7732-18-5     |
| DEA- C8-18 Perfluoroalkylethyl Phosphate | 65530-64-5    |

Percentages of ingredients are being withheld as trade secret information. This information will be disclosed as necessary to authorized individuals.

# Can You See the PFAS in This Product?

Fabric Protector ☒Manufacture A ☒

## SECTION 3: Composition/information on ingredients

| Ingredient                                                  | C.A.S. No.                                        | % by Wt                |
|-------------------------------------------------------------|---------------------------------------------------|------------------------|
| Acetone                                                     | 67-64-1                                           | 37 - 41 Trade Secret * |
| Isopropyl Alcohol                                           | 67-63-0                                           | 31 - 35 Trade Secret * |
| Light Alkylate Petroleum Naphtha                            | 64741-66-8                                        | 17 - 21 Trade Secret * |
| Carbon Dioxide                                              | 124-38-9                                          | 2 - 6                  |
| Fluorochemical Urethane <input checked="" type="checkbox"/> | Trade Secret* <input checked="" type="checkbox"/> | < 3                    |

\*The specific chemical identity and/or exact percentage (concentration) of this composition has been withheld as a trade secret.



ACTION 1: IDENTIFICATION



# Example of AFFF Safety Data Sheets



SECTION 3 - COMPOSITION / INFORMATION ON INGREDIENTS

| CAS        | Component Name                                              | Percent |
|------------|-------------------------------------------------------------|---------|
| 112-34-5   | Diethylene glycol monobutyl ether                           | 5-10    |
| 61789-40-0 | N-Cocamidopropyl-N,N-dimethylglycine, hydroxide, inner salt | 1-10    |

The chemical identity and/or percentage of composition is being withheld as a trade secret.

# Not All PFAS Created Equal



## Higher Risk

soluble and bioavailable

- **Nonpolymer** – soluble and bioavailable, fully fluorinated

*EX: Fluorosurfactant  
perfluorooctanoate (PFOA)*



## Lower Risk

higher molecule weight,  
stable, not bioavailable

- **Polymer** – higher molecule weight, more stable, not fully fluorinated

*EX: Perfluoropolyether (PTFE)*

# Example – Facility Level Heat Map

|                                 | Operational Liability | Product | Brand | Legacy Liability |
|---------------------------------|-----------------------|---------|-------|------------------|
| Product Coatings                |                       |         |       |                  |
| Raw Materials                   | 5                     | 5       | 9     | 9                |
| Processing Aids                 |                       |         |       |                  |
| Interior Maintenance Products   |                       |         |       |                  |
| Grounds Maintenance             |                       |         |       |                  |
| Facility Construction Materials |                       |         |       |                  |
| Stormwater                      |                       |         |       |                  |
| Process Water                   |                       |         |       |                  |
| Fire Suppression                |                       |         |       |                  |
| Flammable Liquids               |                       |         |       |                  |
| Fuel                            |                       |         |       |                  |
| Solid Waste                     |                       |         |       |                  |

# PFAS Sources





## Action 2: Collaborate

### *Eliminate Non-Essential*

Antea®Group

Understanding today.  
Improving tomorrow.

Collaborate with the supply chain vendor to eliminate non-essential PFAS in your supply chain.



ACTION 2: COLLABORATE TO ELIMINATE

# Eliminate the Non-Essential PFAS From Your Supply Chain



## Floor Wax Striper

| SECTION 2-INGREDIENT INFORMATION       |           |          |        |
|----------------------------------------|-----------|----------|--------|
| CHEMICAL NAME                          | CAS NO.   | WT. %    | PEL    |
| Water                                  | 7732-18-5 | to 100   |        |
| 2-Butoxyethanol                        | 111-76-2  | 40 to 50 | 25 ppm |
| Ethanolamine                           | 141-43-5  | 0 to 5   | N/A    |
| Potassium Hydroxide                    | 1310-58-3 | 0 to 5   | N/A    |
| Nonionic Surfactant                    | 9016-45-9 | 0 to 5   |        |
| Potassium Fluoroalkyl Carboxylate (C8) | 2991-51-7 | 0 to 5   |        |
| Perfume Oils                           | N/A       | < 1      |        |

Understanding today.  
Improving tomorrow.

# Eliminate the Non-Essential PFAS From Your Supply Chain

Eliminate non-essential PFAS is a good first step

If eliminated, PFAS equipment should be cleaned or there could be unintended residual

One roadblock is the “trade secret” that obfuscate the actual PFAS composition

What are subcontractors bringing to your facility?

ACTION 2: COLLABORATE TO ELIMINATE

# Disposal Considerations



## Landfill, Incinerate, or Deep Well Injection

- Consider liability risk exposure
- Review permits and operational practices
- D&B for NAICS Code: 5622
- Cost contingent on location and method



# Action 3: Regulations

## *Understand*

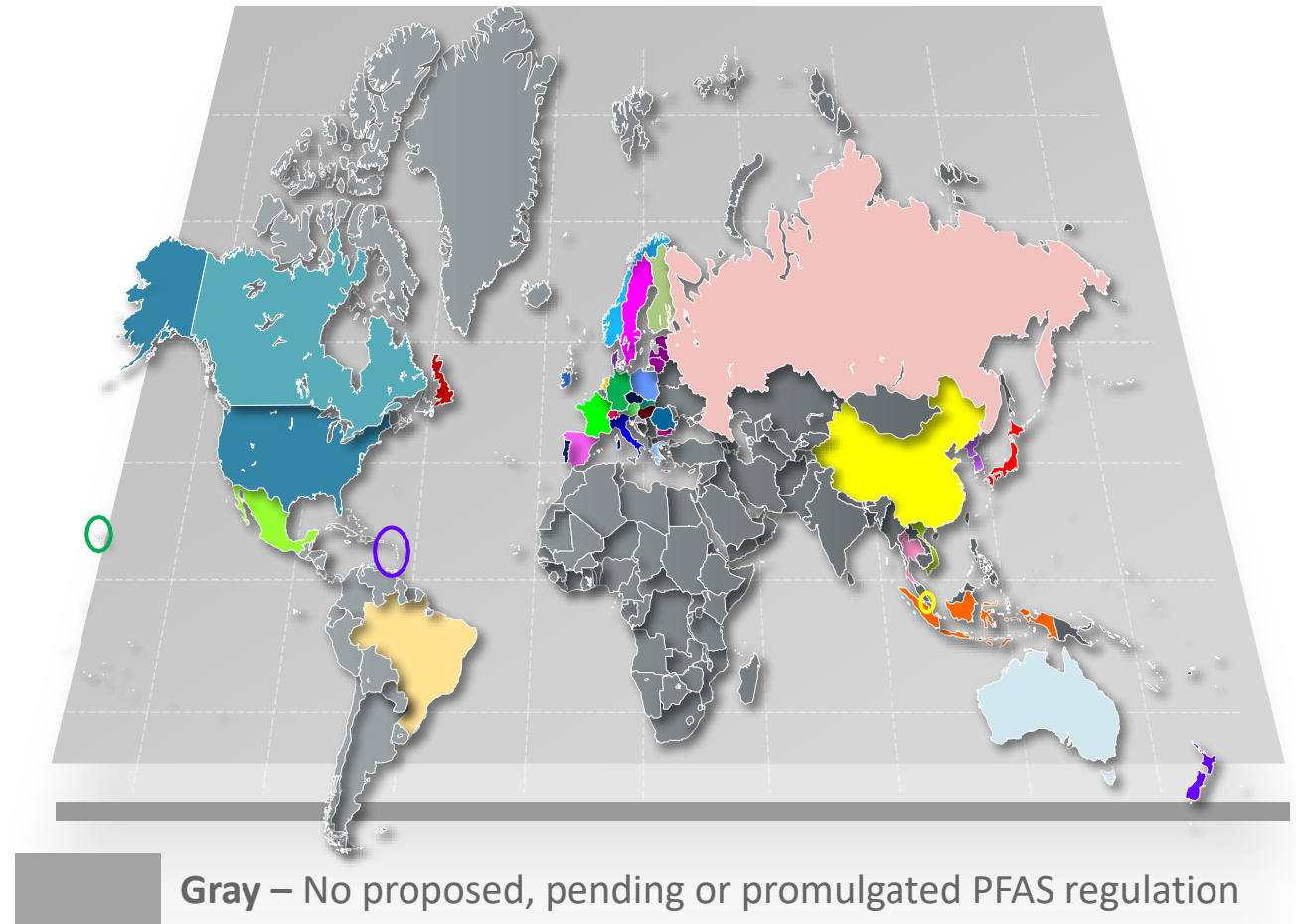
Antea®Group

Understanding today.  
Improving tomorrow.

Keep up to date with, respond to, and anticipate regulations.

# Inconsistent Regulations Globally

- Various regulation
- Different definitions
- Regulation is fast moving
- Australia, U.S., Nordic countries, the Netherlands, Flanders (Belgium) have pioneered regulation
- Asia, South America are ramping up
- Below are some examples



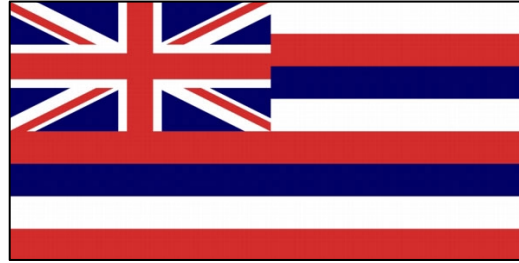
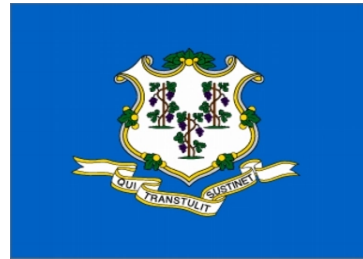
# Recent EPA PFAS Regulations



- PFAS Reporting TRI and TSCA
- Drinking Water Maximum Contaminant Levels
- CERCLA Hazardous Substance Designation
- RCRA Hazardous Constituent Designation

**New Reporting Obligations –  
Compliance Threats**

# U.S. PFAS Consumer Goods Bans



- 30 states have banned consumer goods containing PFAS range from textiles, toys, food packaging, cosmetics
- Intentionally added
- Maine and Minnesota most comprehensive

Pay attention to  
what's on shelf  
and effective  
dates in these  
states

# Existing EU PFAS Consumer Goods Restrictions

## European Parliament on POP Prohibits

- **June 2019 – PFOS** and salts  
UNLESS:
  - *< 10 mg/kg (0.001 % by weight) in substances, mixtures*
- **April 2020 – PFOA** and salts  
UNLESS:
  - *< 0.025 mg/kg (0.0000025 % by weight)*

## REACH Prohibits

- **August 2021 – Perfluorocarboxylic acids (C9-C14 PFCAs)** and salts UNLESS:
  - *< 25 ppb for the sum of C9-C14 PFCAs and their salts*

# Proposed PFAS Ban in EU

European Chemical Agency  
(ECHA) Ban Proposal

Broadest restriction  
proposal in history

Phase out within 18 months to  
up to 12 years

Over 5000 comments: focus three sectors: textiles, mining,  
oil/gas, and food packaging



National Institute for Public Health  
and the Environment  
*Ministry of Health, Welfare and Sport*



Bundesanstalt für Arbeitsschutz  
und Arbeitsmedizin



Swedish Chemicals Agency



Norwegian  
Environment  
Agency



Ministry of Environment  
of Denmark

Environmental  
Protection Agency



# Action 4: Substitution *Alternatives*

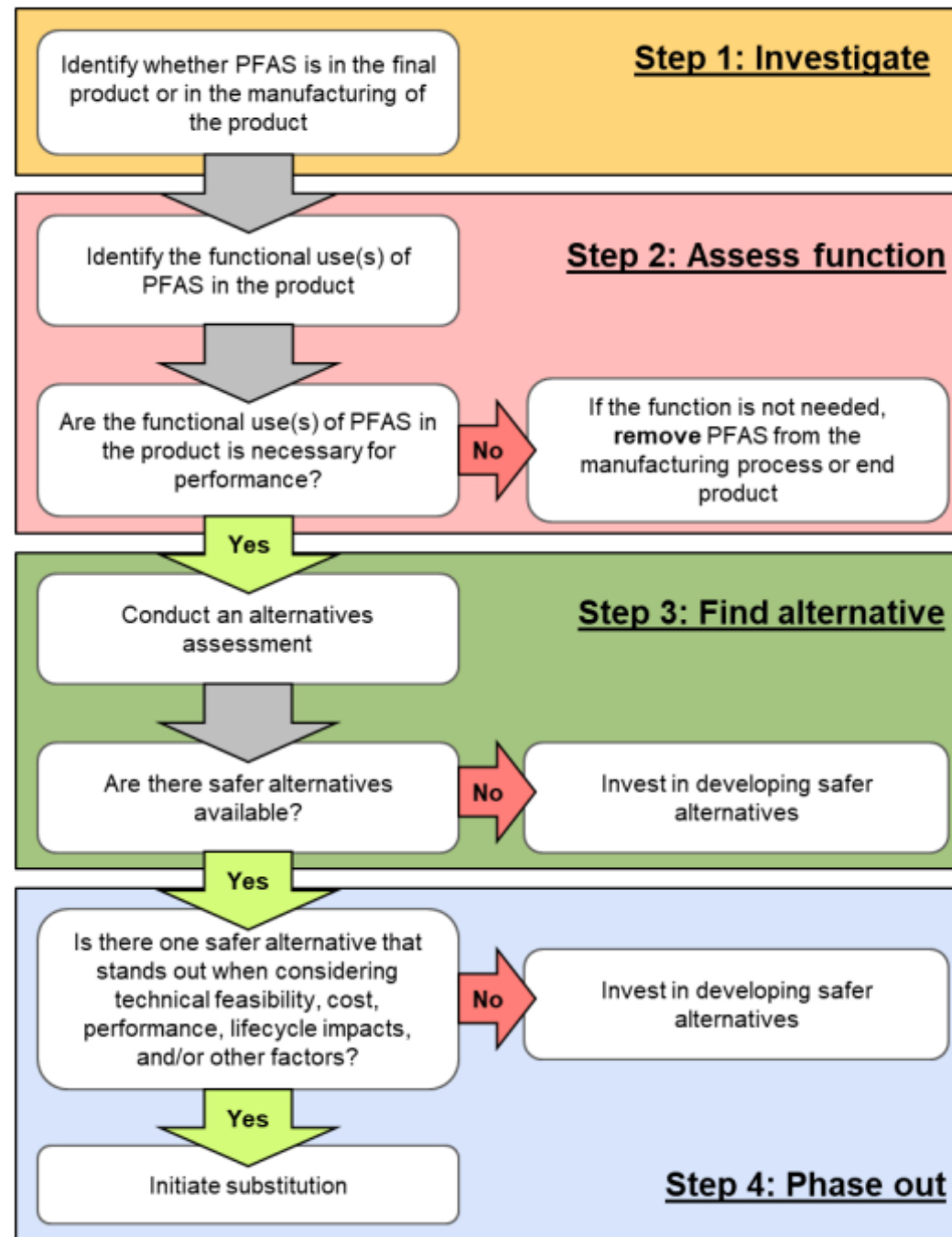
Antea®Group

Understanding today.  
Improving tomorrow.

Research and development for substitutions –  
fluorine-free alternatives?

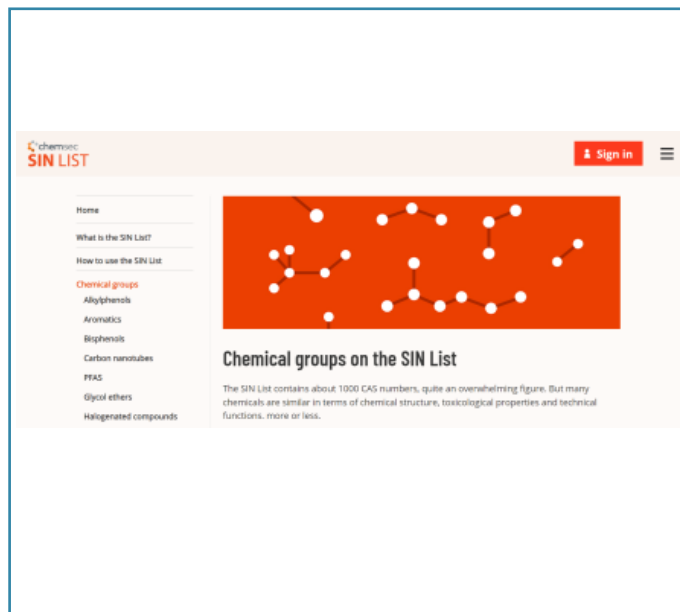
## ACTION 4: SUBSTITUTION

# Research and Development for Potential Substitution



# Potential Substitution Resources

[sinlist.chemsec.org](https://sinlist.chemsec.org)



[ewg.org](https://ewg.org)



[saferalternatives.org](https://saferalternatives.org)



# Potential Substitution Resources

[oecd.org](https://oecd.org)



Portal on Per and Poly Fluorinated Chemicals

HOME

ABOUT  
PFASS

RISK  
REDUCTION

ALTERNATIVES

The need to gather scientific data

[pfascentral.org/](https://pfascentral.org/)



NEWS SCIENCE POLICY EVENTS [PFAS-FREE](#) D



PFAS-Free Products



# Take Away

- There are several **risk management strategies**, we only reviewed four
- **Screening for PFAS** in supply chain recommended, but finding PFAS is not easy – hire an expert
- **Alternatives** are still limited but growing
- Eliminate **non-essential**
- Stay up to date on **regulations**
- Keep **records**

# PFAS Key Contacts

If you have more questions...

Antea®Group

Understanding today.  
Improving tomorrow.



**Bob Karls**  
Senior Consultant  
Antea Group USA



**Scott A. Recker**  
Senior Consultant  
Remediation Practice Lead  
Antea Group USA



**Caron Koll, PG**  
Consultant  
PFAS SME and Innovator  
Antea Group USA



**Jack Sheldon**  
Senior Professional  
Senior Remediation Specialist  
Antea Group USA



**Marshall Stageberg**  
Senior Project Manager  
Information Technology  
Antea Group USA



**Jolanda Boisson**  
Ingénierie Projects R&D  
Antea Group France

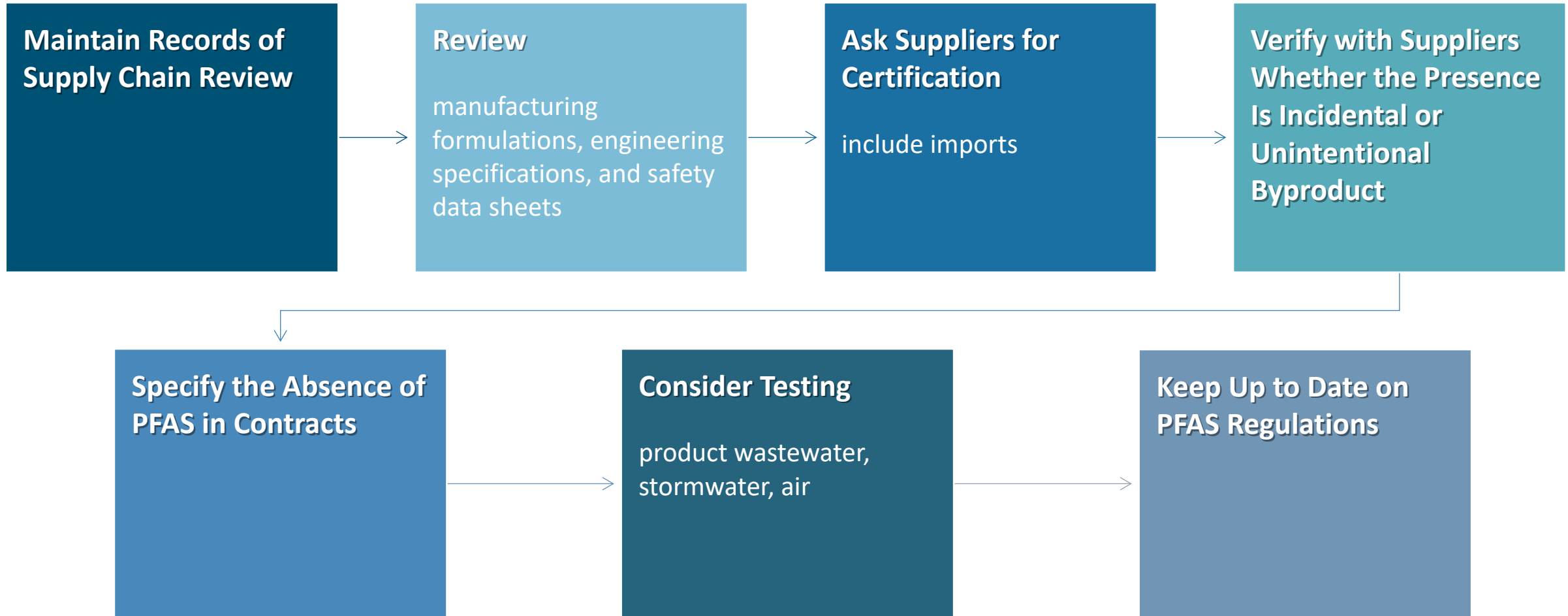


**Ivar Lanting**  
Senior Advisor  
Antea Group Netherlands

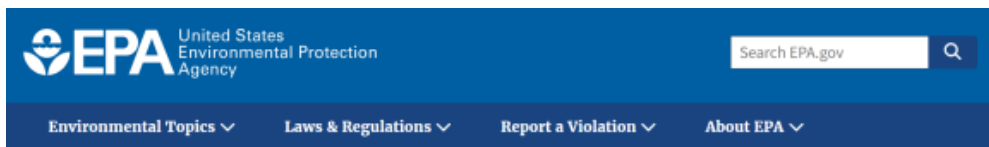


## Q&A Backup Slides Only

# Regulatory Compliance Recommendations antea<sup>®</sup>group



# TWO PFAS DEEMED HAZARDOUS

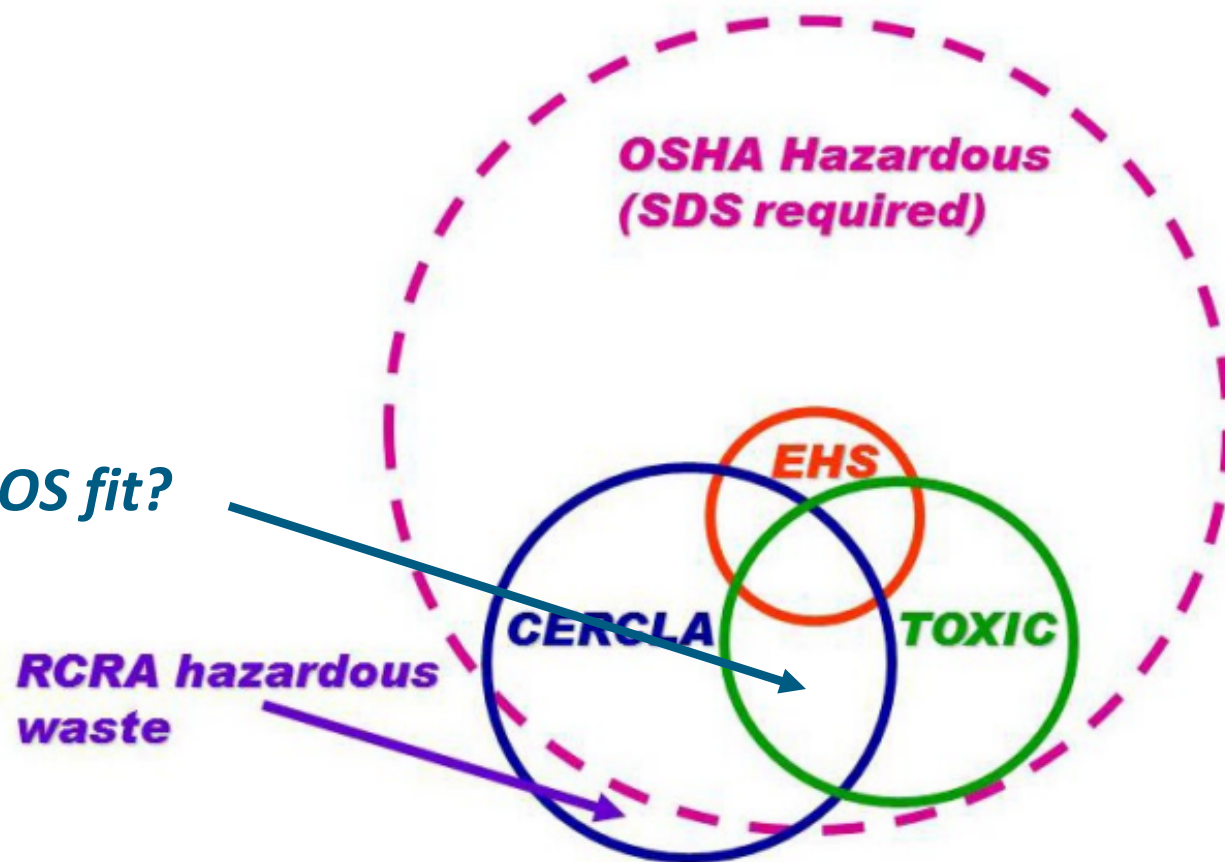


News Releases: [Headquarters](#) | [Land and Emergency Management \(OLEM\)](#)

[CONTACT US](#)

**Biden-Harris Administration Finalizes Critical Rule to Clean up PFAS Contamination to Protect Public Health**

*Where does PFOA/PFOS fit?*



Extremely Hazardous Substances (EHS)

Understanding today.  
Improving tomorrow.