



Decoding Your PFAS Footprint: What you need to know



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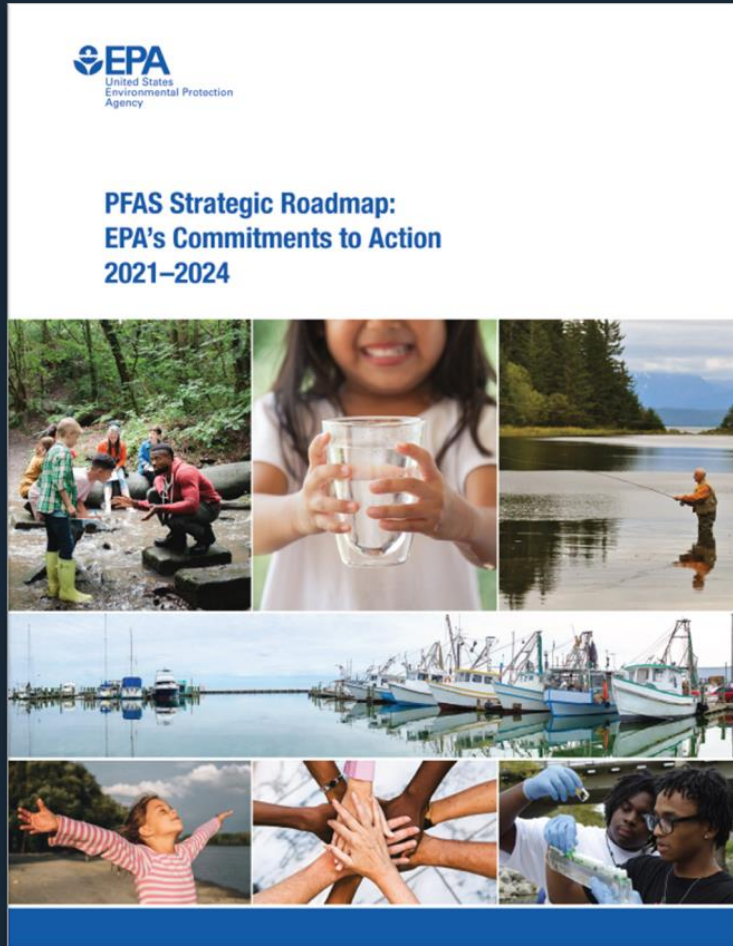


What mystery are we decoding? (topics I'll cover today)



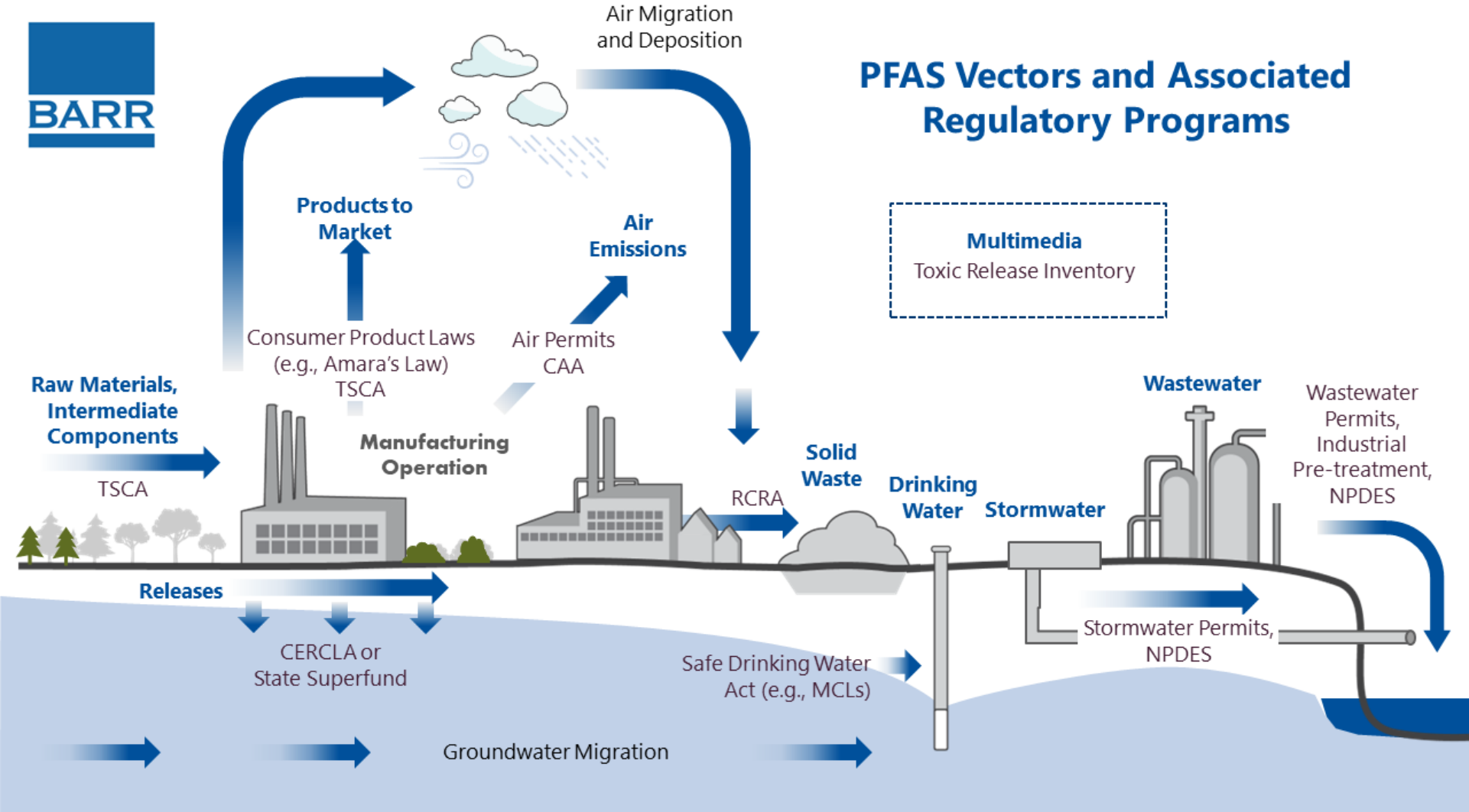
1. Why is this important?
 - Brief summary of PFAS regulatory updates and impacts
2. Approaches to Assessing PFAS Footprint
3. Chemical Inventory Desktop Assessments
4. Summary and Possible Next Steps

EPA's PFAS RoadMap



- EPA has been implementing this plan and encouraging States to act
- EPA's Goals in the Roadmap: Research, Restrict, and Remediate
- Clock has started on implementation of a number new/revised regulations
- Rule and policy development is still ongoing
- All environmental media are affected

Regulatory programs over the PFAS life cycle



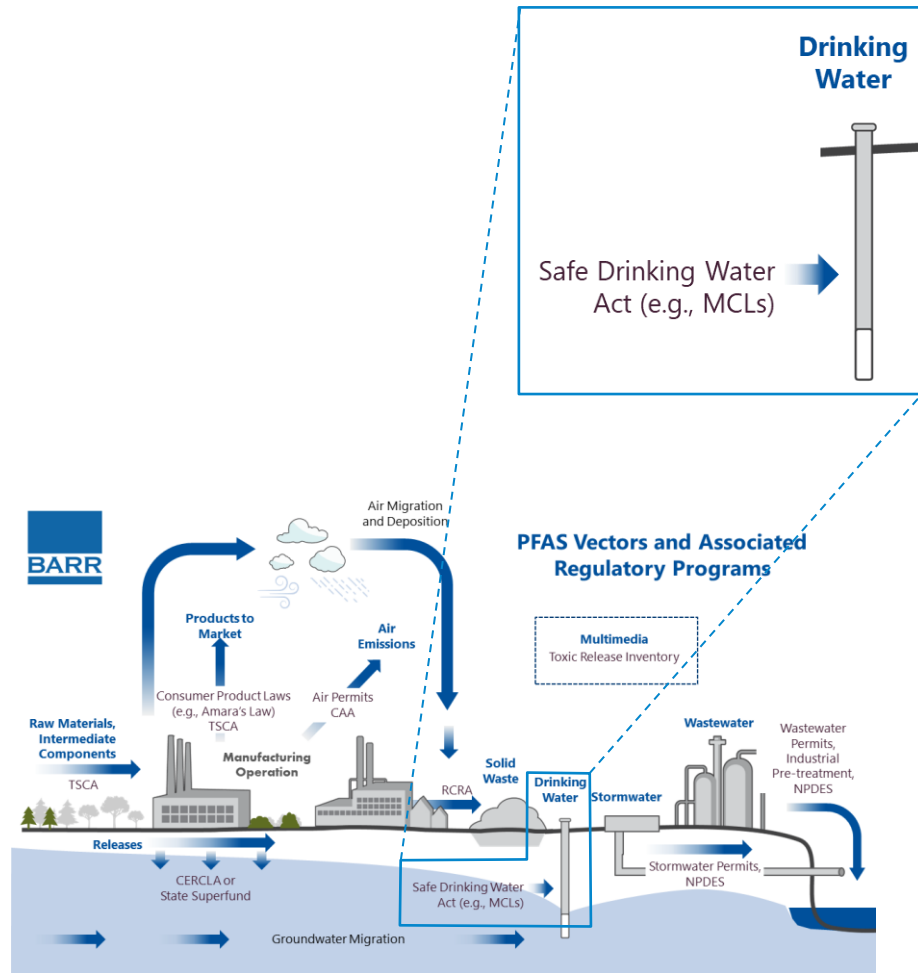
Recent PFAS Regulatory Updates



- Maximum contaminant levels (MCLs)
 - NPDES limits (at the POTW) will lead to pretreatment limits or monitoring requirements
- Listing of PFOS and PFOA as hazardous substances under CERCLA
 - Due diligence - PFAS part of Phase I ESA's
 - Additional sites with regulatory inquiry/enforcement
- Toxic Substances Control Act (TSCA) Reporting Requirements
 - Manufactured or imported
- Toxic Release Inventory (TRI) Reporting
 - De minimis threshold removed for 2024



Drinking water



Current state

- Final drinking water maximum contaminant levels for 6 PFAS (4/10/24)

Near-future developments

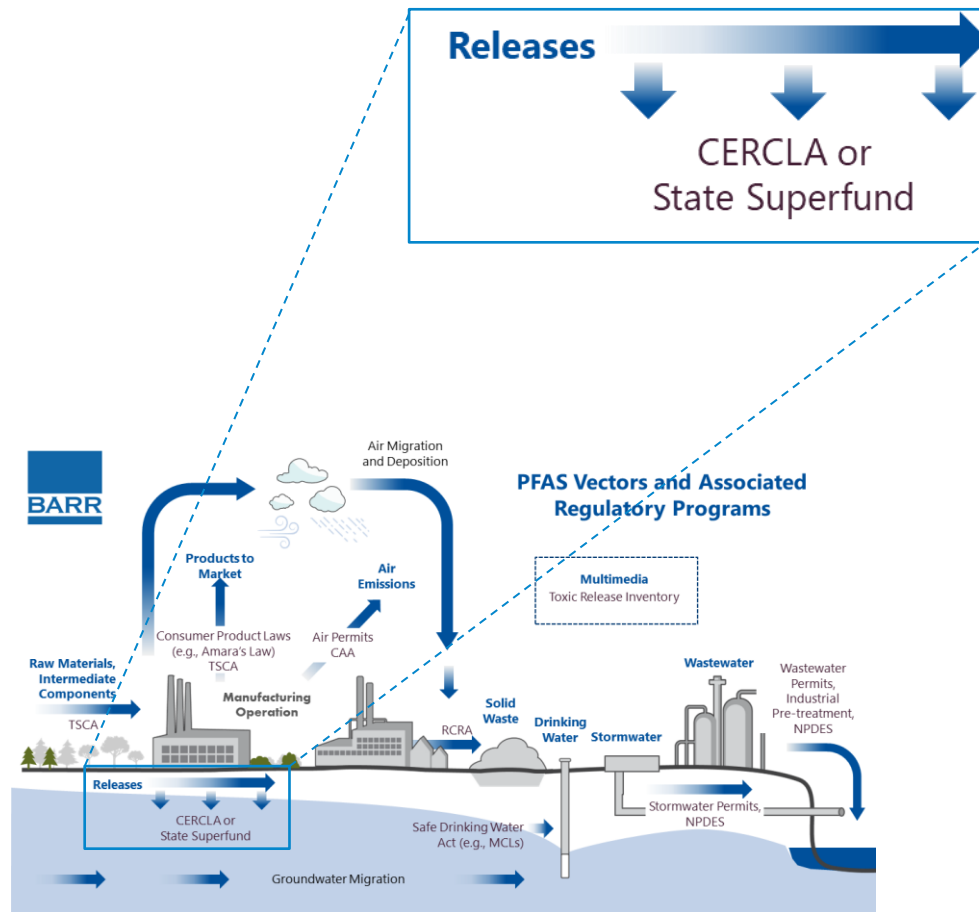
- Increased testing/monitoring of water supplies. Initial monitoring phase through 2027 and compliance through 2029.

Public Drinking Water MCLs



Compound	Final MCLG	Final MCL (enforceable levels)
PFOA	Zero	4.0 parts per trillion (ppt) (also expressed as ng/L)
PFOS	Zero	4.0 ppt
PFHxS	10 ppt	10 ppt
PFNA	10 ppt	10 ppt
HFPO-DA (commonly known as GenX Chemicals)	10 ppt	10 ppt
Mixtures containing two or more of PFHxS, PFNA, HFPO-DA, and PFBS	1 (unitless) Hazard Index	1 (unitless) Hazard Index

Environmental Releases



Current state

- 5 PFAS added to Site Cleanup Tables (5/22/22)
- Final - PFOA/PFOS as CERCLA hazardous substances (Announced 4/19/24)
- Guidance for applicability / enforcement discretion (4/19/24)
- PFAS in Phase I ESAs (7/8/24)

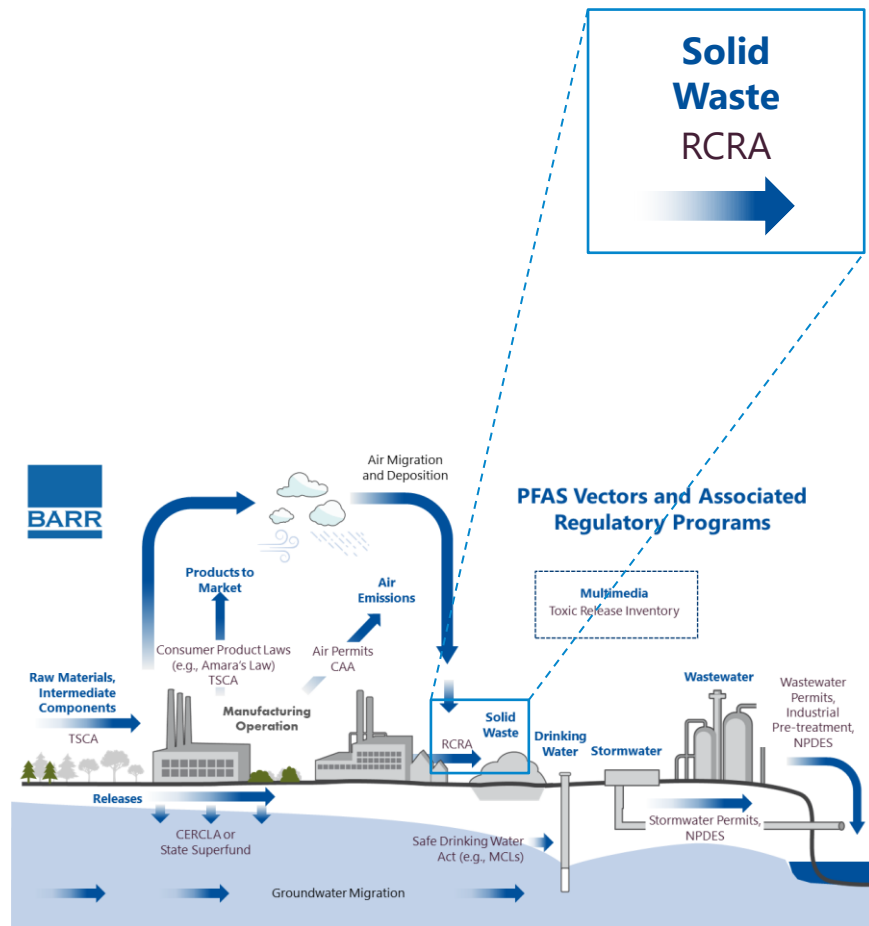
Near-future developments

- ANPRM – Seven additional PFAS as CERCLA hazardous substances: (4/13/23)

Long-term developments

- Finalization of other PFAS as CERCLA hazardous substances

Solid waste management



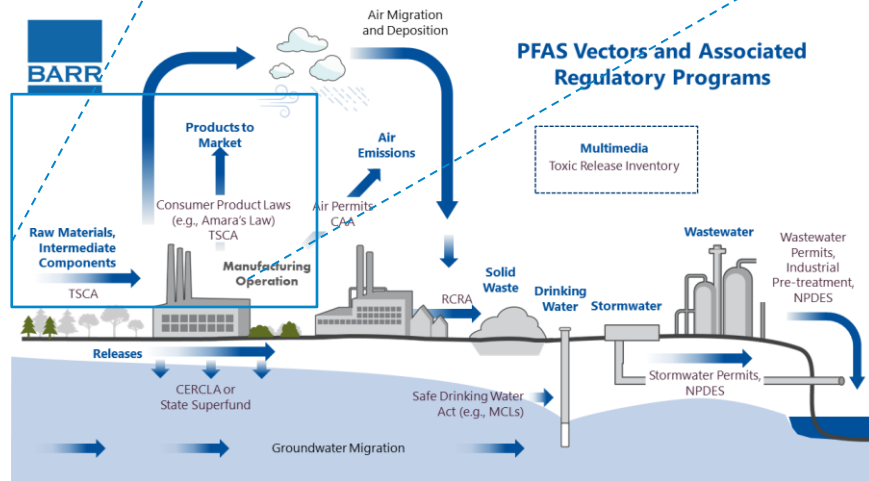
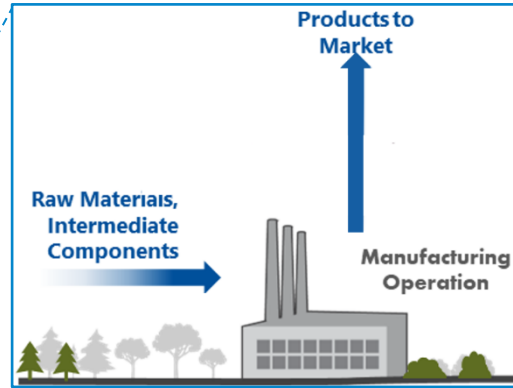
Current state / Near Future Developments

- Proposed rule – modify definition of hazardous waste to include emergency chemicals of concern (2/8/24)
- Proposed rule – add 9 PFAS as RCRA hazardous constituents

Long-term developments

- Finalize proposed rules

Raw materials, intermediate components, and products to market



Current state

- TSCA Section 8(a)(7) – Report quantities of PFAS manufactured or imported since 2011 (10/11/23)
- Significant new use rule – manufacture of inactive PFAS prohibited without review of significant new use (1/11/24)

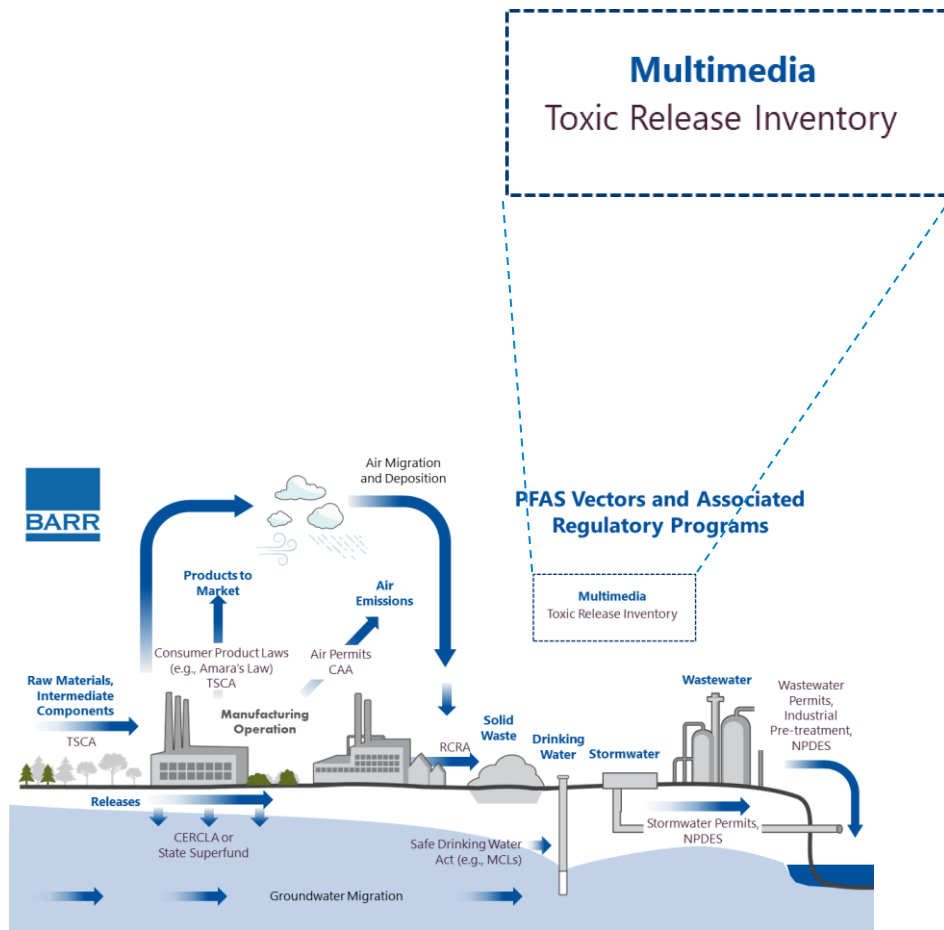
Near-future developments

- State-led bans on PFAS – Maine, Minnesota, others

Long-term developments

- Potential growth in PFAS product bans in states and nationally

Multimedia Release Reporting



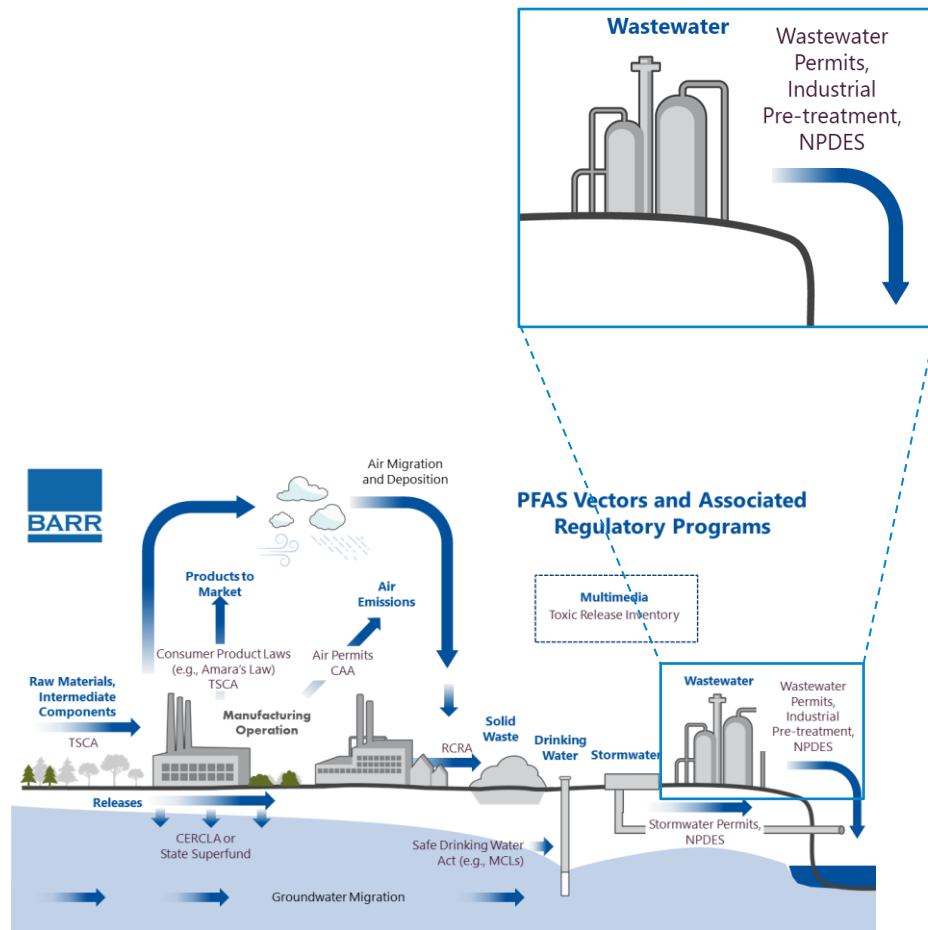
Current state

- Final rule – removal of de minimis exemption, influences threshold determination calculations (10/31/23)

Near-future developments

- Reflect changes to methodology from de minimis exemption removal for reporting year 2024 (Due July 1, 2025)

Wastewater Discharges



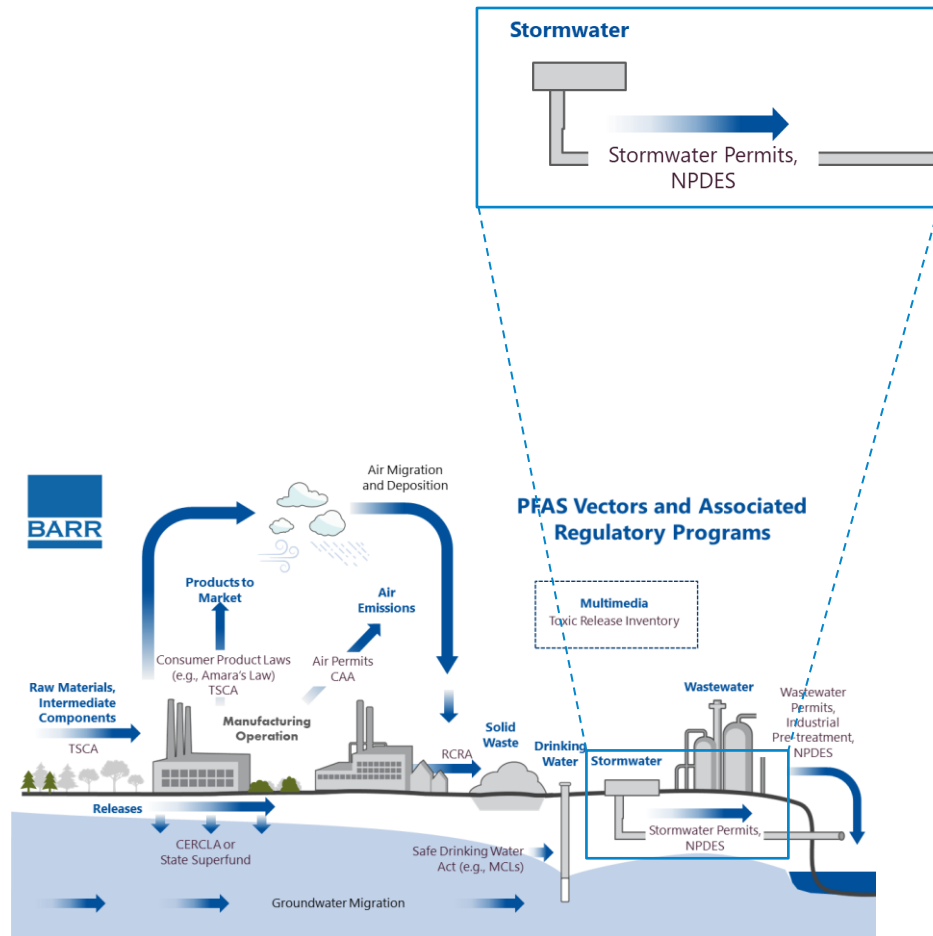
Current state

- EPA adds PFAS conditions in federally-issued NPDES discharge permits (4/28/22)
- EPA memo to states for addressing PFAS in NPDES discharge permits (12/5/22)
- Draft Aquatic Life Water Quality Criteria

Near-future developments

- Impacts from finalized MCLs

Stormwater Discharges



Current state

- Permitting authorities in several states considering benchmarks or effluent limits for certain stormwater discharge permits
- Some permits contain narrative conditions and suggested BMPs

Draft Aquatic Life Water Quality Criteria



Table 1. Draft Recommended Freshwater Aquatic Life Water Quality Criteria for PFOA and PFOS

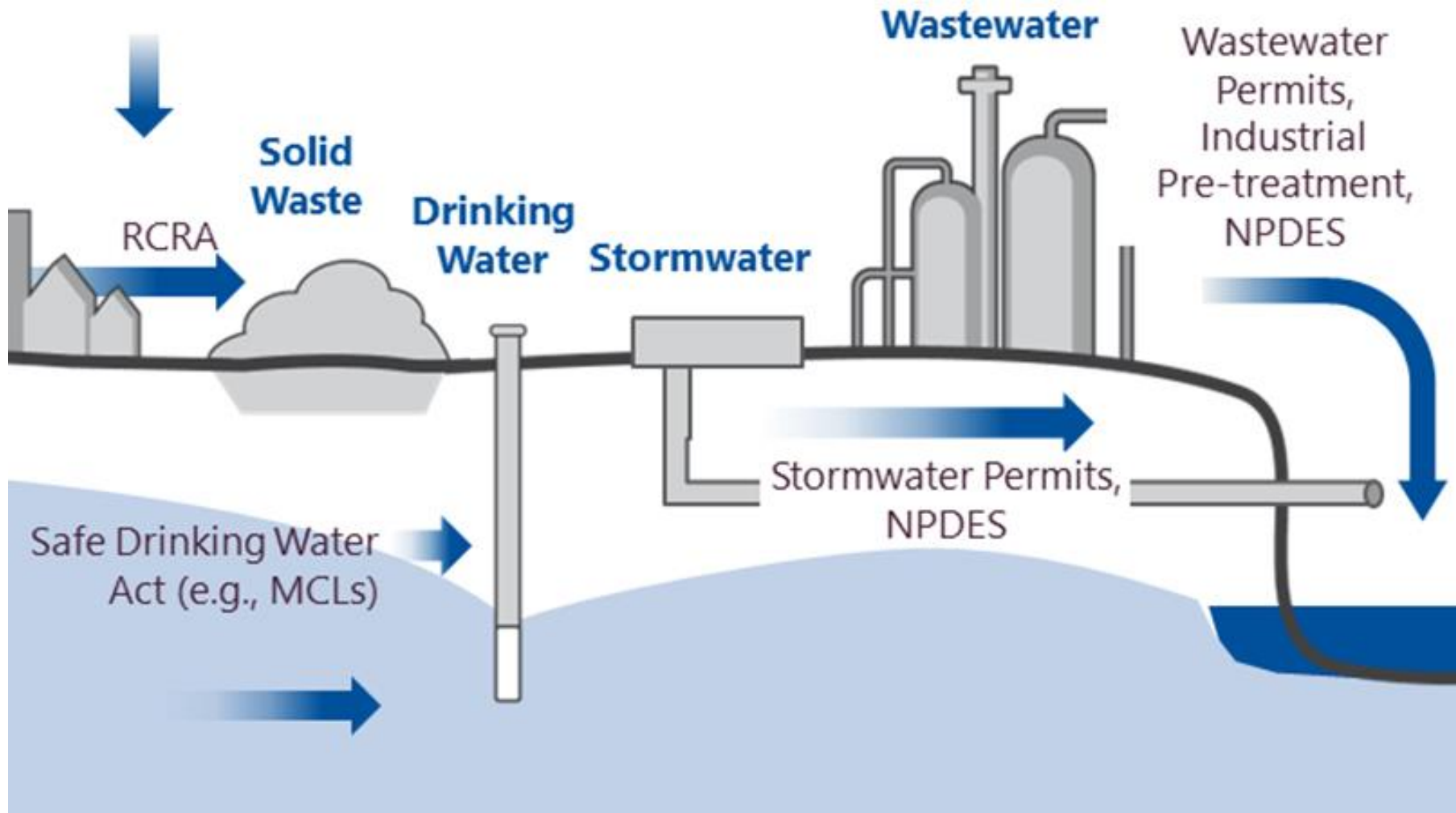
Criteria Component	Acute Water Column (CMC) ¹	Chronic Water Column (CCC) ²	Invertebrate Whole-Body	Fish Whole-Body	Fish Muscle
PFOA Magnitude	49 mg/L	0.094 mg/L	1.11 mg/kg ww	6.10 mg/kg ww	0.125 mg/kg ww
PFOS Magnitude	3.0 mg/L	0.0084 mg/L	0.937 mg/kg ww	6.75 mg/kg ww	2.91 mg/kg ww
Duration	1-hour average	4-day average	Instantaneous ³		
Frequency	Not to be exceeded more than once in three years, on average	Not to be exceeded more than once in three years, on average	Not to be exceeded more than once in ten years, on average		

¹ Criterion Maximum Concentration.

² Criterion Continuous Concentration.

³ Tissue data provide instantaneous point measurements that reflect integrative accumulation of PFOA or PFOS over time and space in aquatic life population(s) at a given site.

Water Regulatory Connections



- MCLs may be a driver for NPDES permit and/or POTW Industrial pretreatment permit requirements
- Consideration for impacts to groundwater; remediation and action levels



Approaches to Assessing Your PFAS footprint



- **Request further information from vendors**

Disparate information provided

PFAS "not knowingly" added - impurities can be a big deal

Incomplete analysis – only analyzed for a small subset of PFAS

- **Chemical inventory desktop review**

- **Sample raw materials**

Potential challenges of analytical resolution due to matrix interferences

- **Sample discharges/emissions or environmental media**

Stormwater runoff, end of pipe, air emissions, soil, sediment, etc.



Challenges of Chemical Inventory Desktop Assessments

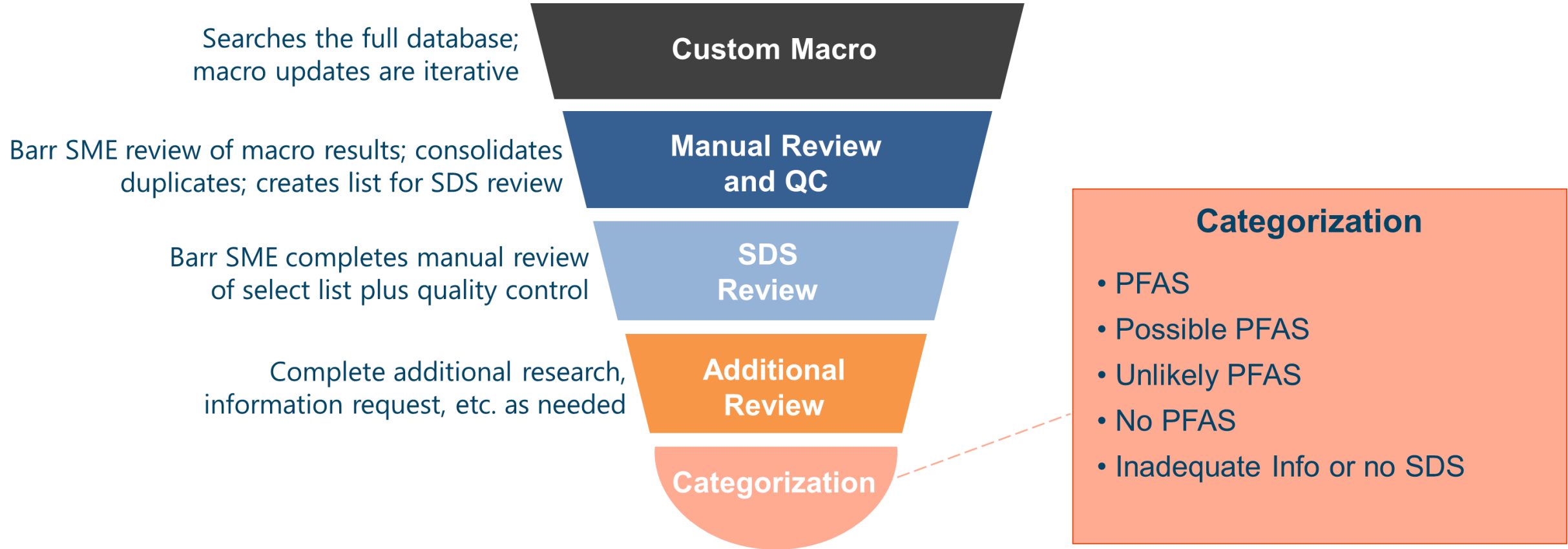


SECTION 3: Composition/information on ingredients

Ingredient	C.A.S. No.	% by Wt
Non-volatile components NJTS Reg No. 4499600-6765	Trade Secret*	10 - 30 Trade Secret *
2-Methylpentane	107-83-5	10 - 20 Trade Secret *
Acetone	67-64-1	10 - 20 Trade Secret *
Cyclohexane	110-82-7	10 - 20 Trade Secret *
Isobutane	75-28-5	10 - 20 Trade Secret *
Propane	74-98-6	10 - 20 Trade Secret *
Ethyl Alcohol	64-17-5	< 5 Trade Secret *
Pentane	109-66-0	< 5 Trade Secret *
Petroleum Resins	64742-16-1	< 5 Trade Secret *
Non-Volatile Resin	Trade Secret*	< 5 Trade Secret *
Terpene Phenolic	Trade Secret*	< 5 Trade Secret *
Hexane	110-54-3	< 0.5 Trade Secret *
Toluene	108-88-3	< 0.3 Trade Secret *

- Potentially large database of records
- Common sources (SDSs) generally don't list CAS numbers for PFAS
- Proprietary information
- Ensuring consistency and QAQC of results

Chemical Inventory Screening Approach



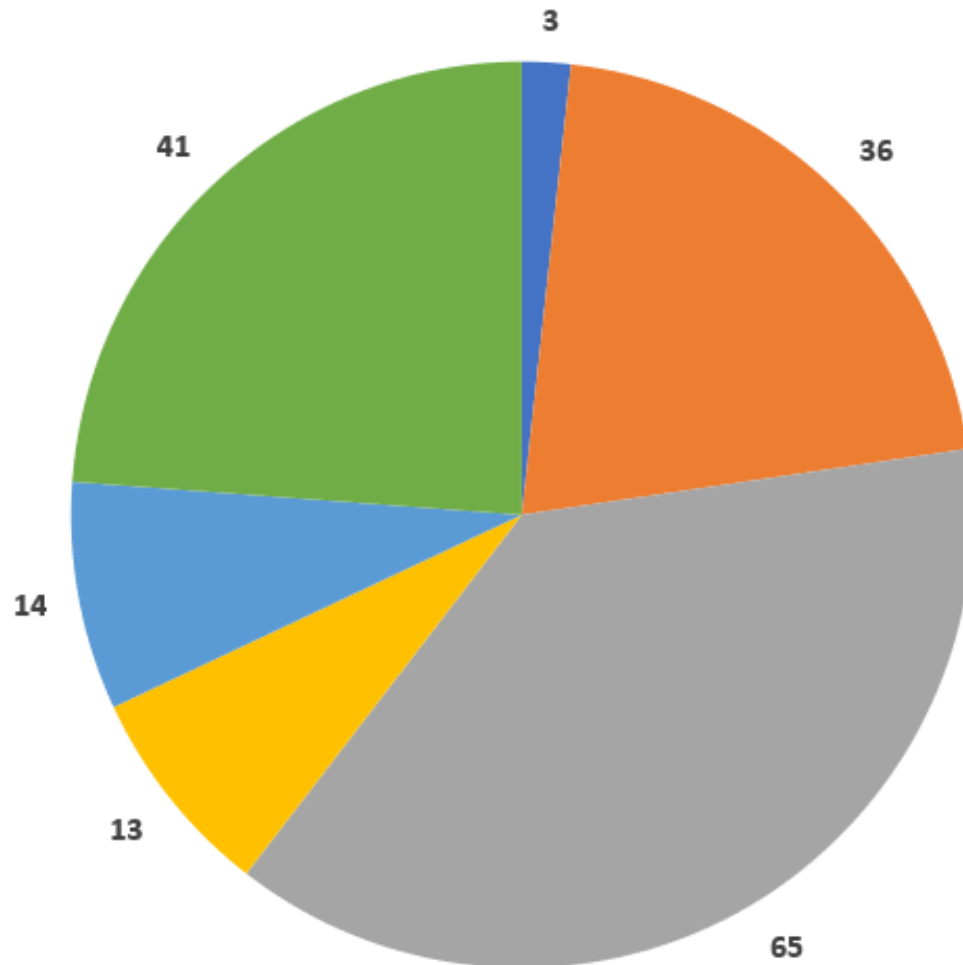
Chemical Inventory Desktop Assessment – High-Level Categorization



- PFAS
 - Aqueous Film Forming Foams (AFFF)
 - Non-Polymer PFAS
 - Polymer PFAS
 - Greases, Lubricants, or Sealants
 - Engineering Fluids or Solvents
 - Miscellaneous PFAS Products
- PFAS Structure or Possible PFAS
- Unlikely PFAS
- No PFAS
- Inadequate Information or No SDS



PFAS Categorization



PFAS Categorization

- AFFF
- Engineering Fluids and Solvents
- Greases/Lubricants/Sealants
- Miscellaneous PFAS Products
- Non-polymer PFAS
- Polymer PFAS

Chemical Inventory Chemical Assessment – SDS Components



1. Identification
2. Hazards Identification
3. Composition/Information on Ingredients
4. First Aid Measures
5. Firefighting Measures
6. Accidental Release Measures
7. Handling and Storage
8. Exposure Controls/Personal Protection
9. Physical and Chemical Properties
10. Stability and Reactivity
11. Toxicological Information (Optional)
12. Ecological Information (Optional)
13. Disposal Consideration (Optional)
14. Transport Information (Optional)
15. Regulatory Information (Optional)
16. Other Information (Optional)

Chemical Inventory Desktop Assessment – SDS Review Process



SECTION 2. HAZARDS IDENTIFICATION

Other hazards

The thermal decomposition vapors of fluorinated plastics may cause polymer fume fever with flu-like symptoms in humans, especially when smoking contaminated tobacco.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Components

Chemical name	CAS-No.	Concentration (% w/w)
Sodium nitrite	7632-00-0	$\geq 1 - < 5$

SECTION 5. FIRE-FIGHTING MEASURES

Hazardous combustion products : Hydrogen fluoride
carbonyl fluoride
potentially toxic fluorinated compounds
aerosolized particulates
Carbon oxides
Nitrogen oxides (NOx)
Metal oxides

Chemical Inventory Desktop Assessment – SDS Review Process



SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational exposure limits of decomposition products

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Hydrofluoric acid	7664-39-3	TWA	0.5 ppm (Fluorine)	ACGIH
		C	2 ppm (Fluorine)	ACGIH
		C	6 ppm 5 mg/m ³	NIOSH REL
		TWA	3 ppm 2.5 mg/m ³	NIOSH REL
		TWA	3 ppm	OSHA Z-2
Carbonyl difluoride	353-50-4	TWA	2 ppm	ACGIH
		STEL	5 ppm	ACGIH
		TWA	2 ppm 5 mg/m ³	NIOSH REL
		ST	5 ppm 15 mg/m ³	NIOSH REL

SECTION 10. STABILITY AND REACTIVITY

Hazardous decomposition products

Thermal decomposition : Hydrofluoric acid
 Carbonyl difluoride
 Carbon dioxide
 Carbon monoxide

Chemical Inventory Desktop Assessment –SDS Review Process



SECTION 15. REGULATORY INFORMATION

Pennsylvania Right To Know

PFPE fluid

Trade secret

Fluoropolymer

Trade secret

Sodium nitrite

7632-00-0

California Prop. 65

WARNING: This product can expose you to chemicals including Pentadecafluorooctanoic acid, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov. **Note to User:** This product is not made with PFOA nor is PFOA intentionally present in the product; however, it is possible that PFOA may be present as an impurity at background (environmental) levels.

Chemical Inventory Desktop Assessment – Not Always Straightforward



SECTION 2: Hazards identification

SECTION 3: Composition/information on ingredients

- **3.2 Mixtures**
- **Description:** Mixture of substances listed below with nonhazardous additions.
- **Dangerous components:** None in reportable quantities.
- **Additional information:**
For the wording of the listed risk phrases refer to section 16.
For the listed ingredients, the identity and exact percentages are being withheld as a trade secret.

SECTION 5: Firefighting measures

- **5.2 Special hazards arising from the substance or mixture**
Formation of toxic gases is possible during heating or in case of fire.

Chemical Inventory Desktop Assessment – Not Always Straightforward



SECTION 10: Stability and reactivity

- 10.6 Hazardous decomposition products: Carbon monoxide and carbon dioxide

SECTION 15: Regulatory information

- IARC (International Agency for Research on Cancer)

9002-84-0 | Polytetrafluoroethylene

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Additional Considerations



- Understand that a product may not be “PFAS-free” even if it claims to be (e.g. long chain vs. short chain)
- Confirm proprietary information with vendors
- When considering product replacements, be sure to know if those replacement options are TRI reportable
- Determine if the chemicals are PFAS precursors



Questions and Discussion



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