# **Risk Assessment Challenges Associated with Atmospheric Transport of PFAS**

# **PFAS Regulatory Updates**

### EPA's 2021-2024 PFAS Strategic Roadmap:

- timeline for PFAS air emission research, regulation, & future actions
- establish national PFAS testing strategy (October 2021)
- publish tox profile for GenX (Oct 2021) + 5 additional PFAS (PFBA, PFHxA, PFHxS, PFNA, & PFDA) (Fall 2021 and ongoing); PFBS finalized April 2021
- designate certain PFAS as CERCLA hazardous substances (Spring 2022 – Summer 2023)

# **Challenges Associated with PFAS Atmospheric Transport**

## **Evolving PFAS Regulatory** Guidance

- EPA working on Hazardous Air **Pollutant (HAP) PFAS designation**
- PROTECT Act of 2022 House bill requiring EPA to list all PFAS as HAPs under Clean Air Act
- EPA added 180 PFAS to 2022 TRI list; plans to remove "de minimis" exemption for PFAS (Summer 2022)
- 2020 TRI (1st Year Reporting): 39 facilities (mostly chemical manufacturers) across 20 states reported 43 PFAS. Facilities managed 841,400 lbs of production-related waste

## **Evolving PFAS Air (Stack) Emission Sampling & Analysis Methods**

- Other Test Method (OTM45) measurement of 50 Ionic PFAS (not yet subject to Federal rulemaking, but EPA reviewed/verified)
- Non-ionic PFAS EPA looking at alternate rinse solvents
- Volatile PFAS EPA evaluating Summa canister sampling
- TRC conducted PFAS air emissions testing at sewage sludge incinerator to characterize combustion products & destruction efficiency of 3 FC compounds
- Initial data confirm CF<sub>4</sub> as potential Indicator Compound to monitor by FTIR during **PFAS** incineration
- TRC will conduct additional PFAS research/testing for EPA in 2022

## **Evolving Risk-Based Approach**

- Accurately characterize background vs site-related impact Variability in screening levels / toxicity values across the US

Scientific research needed to better understand PFAS human health/ecological risks and manage PFAS remediation (e.g., disposal/destruction)

- update destruction/disposal guidance using new research (Fall 2023)
- DoD temporary moratorium on PFAS incineration (Dec 2021)
- finalize PFOA/PFOS risk assessment in biosolids to determine whether regulations needed (Winter 2024)
- Identify PFAS emission sources, establish monitoring approach for stack emissions & ambient air, increase understanding of air emission fate & transport (Fall 2022 - ongoing)

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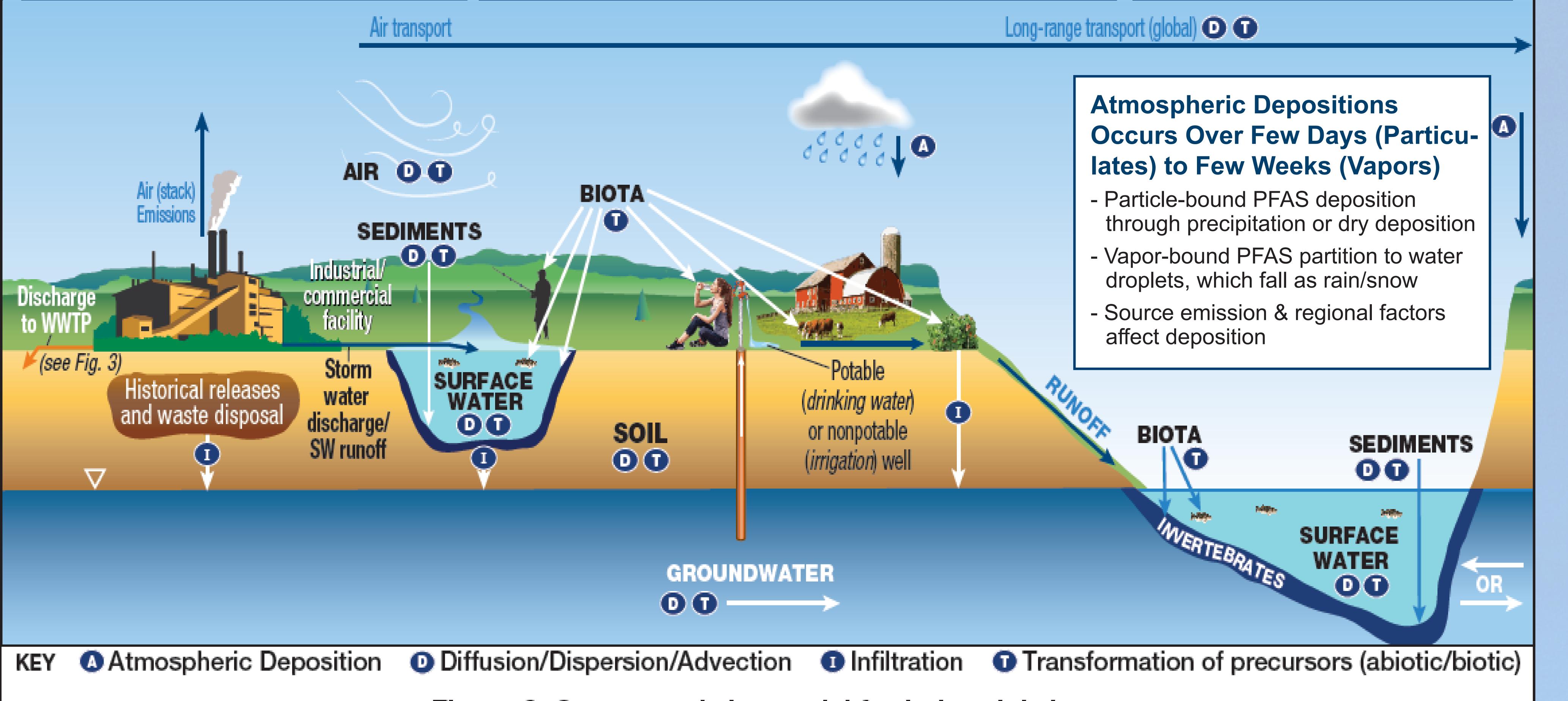
#### **Emission Particles and Vapors**

- Particles dominated by anionic PFAAs
- PFOA sorbs to smaller particles
- PFOS sorbs to larger particles
- Vapors dominated by neutral FTOHs

## **Atmospheric Transport of PFAS**

#### **Neutral FTOH Precursors Transform into PFOA**, **PFNA, PFOS through Photolysis/Oxidation of OH**

- Transformation rates can be slow



## Figure 2. Conceptual site model for industrial sites.

(Source: Adapted from figure by L. Trozzolo, TRC, used with permission)

Source: April 2020 ITRC Factsheet: Environmental Fate & Transport for PFAS

						A CONTRACTOR
	Air Standards (μg/m³)					
State	APFO	PFBA	PFHxS	PFOA	PFOS	Notes:
MI [a]	AA	AM	AMA (	0.07	0.07	[a] Advisory
MN [b]		10	0.034	0.063	0.011	[b] Risk ass
NH	0.024 [c]; 0.05 [d]	NA II	AM	NA () () ()	A A A A A A A A A A A A A A A A A A A	
NY [e]		NA II	NA	0.0053	A A A A A A A A A A A A A A A A A A A	[c] Regulate
тх	<b>0.01</b> [e]; <b>0.1</b> [f]	<u>INA</u>	AM	0.005 [e]; 0.05 [f]	<b>0.01</b> [e]; <b>0.1</b> [f]	- TYNE

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#### Long Atmospheric Half-life

- PFOA T1/2 = 90 D
- PFOS T1/2 = 114 D

NA = not available

- y level (24-hour)
- sessment advice (all durations)
- tory level (annual)

- [d] Regulatory level (24-hour)
- [e] Advisory level (annual average)
- [f] Advisory level (1-hour)