



**2021 RRT Region 5**



# PFAS: National and Regional Perspective

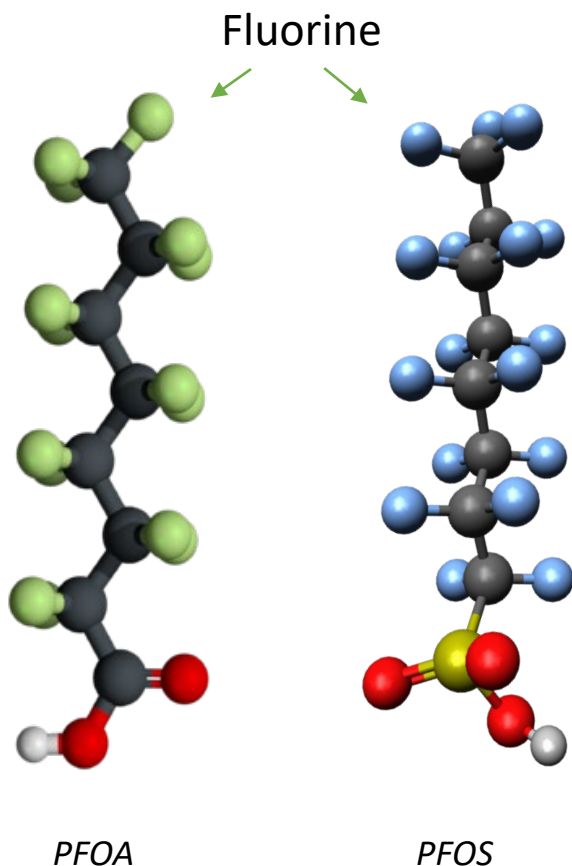
Kim Harris EPA WD, Jacqueline Clark EPA ORC, Mark Johnson ATSDR,  
and Jeff Kimble OSC

# Agenda

---

- Background
- ATSDR efforts
- NDAA highlights
- EPA efforts
- Impact
- Federal enforcement
- Case studies

# Background



Per- and polyfluoroalkyl substances (PFAS)

- Group of **man-made** chemicals used since the 1940s.
  - **Chains** of carbon (C) atoms surrounded by fluorine (F) atoms, with different terminal ends
  - **Complicated chemistry** – thousands of different variations exist in commerce
  - **Some** PFAS are known to be **PBT**:
    - **Persistent** in the environment
    - **Bioaccumulative** in organisms
    - **Toxic** at relatively low (ppt) levels

# Background: Sources and Uses

- PFAS can be found at manufacturing and processing facilities:
  - Chemical and plastics
  - Textile coatings
  - Metal plating
  - Airports (AFFF)
  - Military installations (AFFF)
- PFAS are (or have been) found in a wide array of consumer products:
  - non-stick cookware
  - food packaging and paper products
  - stain and water repellants
  - carpets
  - cosmetic and personal care products



# Background- exposure

- **In uncontaminated areas:**
  - Diet - primary exposure route to PFOA-PFOS for the general population
  - Indoor dust, household and personal care products important sources
- **In contaminated areas,** through AFFF use & industrial release, leachate, biosolids disposal, manufacturing, exposure routes include:
  - ✓ drinking, surface and ground waters
  - ✓ soil
  - ✓ air



# Toxicity Values and Health Advisories

- Because of their widespread use and environmental persistence, most people have been exposed to PFAS chemicals.
- Some PFAS chemicals can accumulate and can stay in the human body for long periods of time.
- There is evidence that exposure to certain PFAS may lead to adverse health effects.
- \*Chronic RfD for PFBS is  $3 \times 10^{-4}$  to  $1 \times 10^{-3}$  mg/kg/d
- 2016 EPA Drinking Water Health Advisory level for PFOA and PFOS is 70 ppt (individual and combined). Based on RfD set at  $2 \times 10^{-5}$  mg/kg/d for both analytes.
- HA protective of fetus or breastfed infant resulting from exposures that occur during pregnancy and lactation (nursing). Also, protective of long-term exposure for the general population. \*pending review

# R5 State PFAS Drinking Water Values (ppt)

State	PFOA	PFOS	PFBS	PFHxS	PFNA	PFHxA	PFBA	GenX
IL	2	--	140,000	140	--	560,000	--	--
MI	8	16	420	51	6	400,000	---	370
MN	35	15	2000	47	--	--	7000	--
OH	70	70	140,000	140	21	--	--	700
WI	20	20	--	--	--	--	--	--

- Proposed for regulation (red)
- Advisories or action Levels (green)

# ATSDR's Work on PFAS

Mark Johnson

Regional Director/ Toxicologist

Agency for Toxic Substances and Disease Registry (ATSDR)

Office of Community Health and Hazard Assessment

Region 5 RRT PFAS Conference

Feb. 4, 2021

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Agency for Toxic Substances and Disease Registry.



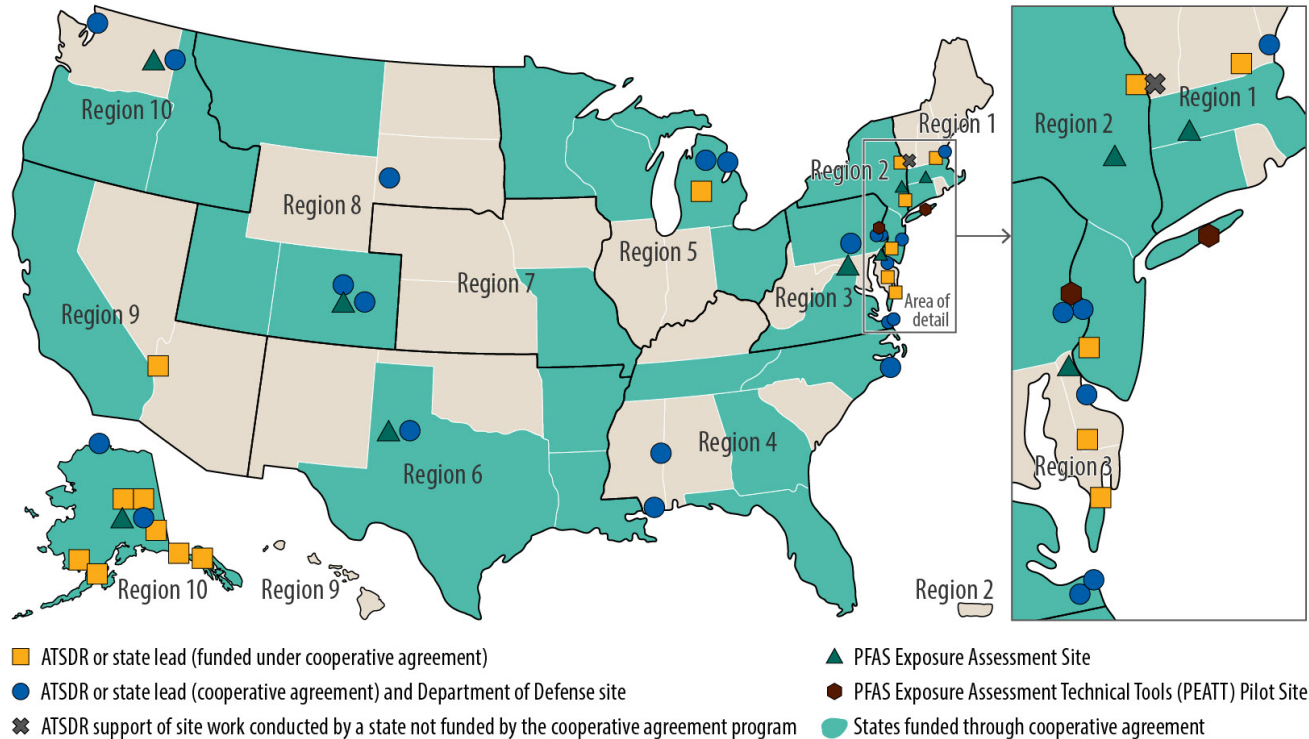
## Intermediate Oral Minimal Risk Levels (MRLs)\* PFAS Compounds

PFAS	Provisional MRL (mg/kg/day)
PFOA	$3 \times 10^{-6}$
PFOS	$2 \times 10^{-6}$
PFHxS	$2 \times 10^{-5}$
PFNA	$3 \times 10^{-6}$

\*15-364 days; MRL: An estimate of the daily human exposure to a hazardous substance that is likely to be without appreciable risk of adverse noncancer health effects over a specified duration of exposure

<https://www.atsdr.cdc.gov/pfas/resources/mrl-pfas.html>

# ATSDR Support in Communities



- CDC/ATSDR PFAS Exposure Assessments
- CDC/ATSDR Multisite Health Study
- ATSDR has conducted or supported work at more than 40 sites

# ATSDR Role in Addressing PFAS



Investigate exposure to PFAS



Address community health concerns



Take action on the basis of scientific information



Provide information to communities and health care providers so they may take action

# ATSDR PFAS Research Activities

- Assess PFAS exposure in communities near current or former military installations
- Compare PFAS levels in blood and urine from each community to levels in the general population
- Identify and assess environmental factors that affect exposure

- Expands science on the relationship between PFAS exposure and health outcomes
- Helps people better understand their risk for health effects

## Multi-Site Health Study

- Expands science on the relationship between PFAS exposure and health outcomes
- Evaluates study procedures and methods to improve the design of multi-site health study

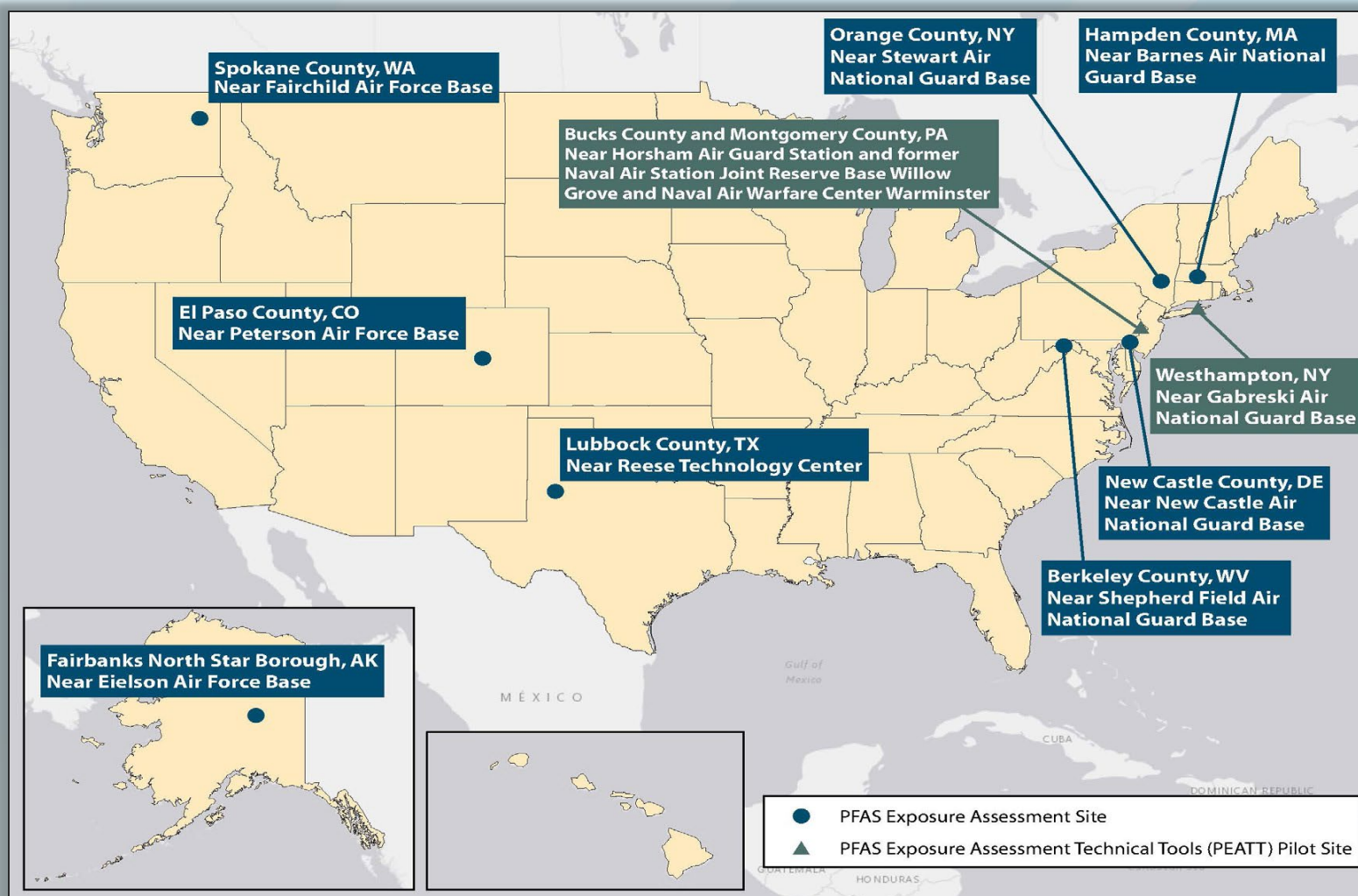
## Exposure Assessments★ Pease Study

ATSDR PFAS Related Activities

# PFAS Exposure Assessments

- ❑ Assessing PFAS exposure in ten U.S. communities to determine:
  - Distribution of PFAS serum concentrations
  - PFAS concentrations in indoor dust and drinking water from a subset of participants' homes

# ATSDR Exposure Assessment Locations





# Exposure Assessment Process



# PFAS Resources

- Pediatric Environmental Health Specialty Units (PEHSU)
  - [https://www.pehsu.net/PFAS\\_Resources.html](https://www.pehsu.net/PFAS_Resources.html)
- Updates on CDC/ATSDR PFAS Initiatives
  - [https://www.atsdr.cdc.gov/pfas/related\\_activities.html](https://www.atsdr.cdc.gov/pfas/related_activities.html)
- ATSDR Guidance for Health Professionals
  - <https://www.atsdr.cdc.gov/pfas/info-for-health-professionals.html>
- PFAS Overview
  - <https://www.atsdr.cdc.gov/pfas/index.html>
- National Report on Human Exposure to Environmental Chemicals, 2018
  - [https://www.cdc.gov/exposurereport/pdf/FourthReport\\_UpdatedTables\\_Volume1\\_Mar2018.pdf](https://www.cdc.gov/exposurereport/pdf/FourthReport_UpdatedTables_Volume1_Mar2018.pdf)
- EPA Data on unregulated contamination
  - <https://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule>
- State Public Health Department Websites





**For more information, please contact Agency for Toxic Substances and Disease Registry**

4770 Buford Highway NE, Chamblee, GA 30341

Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348

Web: <http://www.atsdr.cdc.gov>

**The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Agency for Toxic Substances and Disease Registry.**

# 2020 National DEFENSE AUTHORIZATION ACT

## Some provisions directly impacting EPA:

- EPA must include PFAS analytes to the UCMR5
- EPA must add ~150 PFAS chemicals to TRI
- EPA must publish interim guidance on PFAS destruction and disposal within 1 year

## Some provisions indirectly impacting EPA:

- DoD, when disposing of PFAS, must ensure that incineration is sufficient to break down PFAS, and complies with the CAA and RCRA
- DOD must establish monitoring data-sharing partnerships with municipalities and water utilities, and maintain a publicly available website on DOD-related PFAS exposures, cleanup, and treatment
- DOD, upon request of a state, must finalize a cooperative agreement for PFAS testing, monitoring, removal, and remedial actions. Cooperative agreements must meet the most stringent available standards among enforceable state, federal standards, or EPA drinking water health advisory.

# 2021 National DEFENSE AUTHORIZATION ACT

## Provision directly impacting EPA:

- Interagency body on research related to PFAS

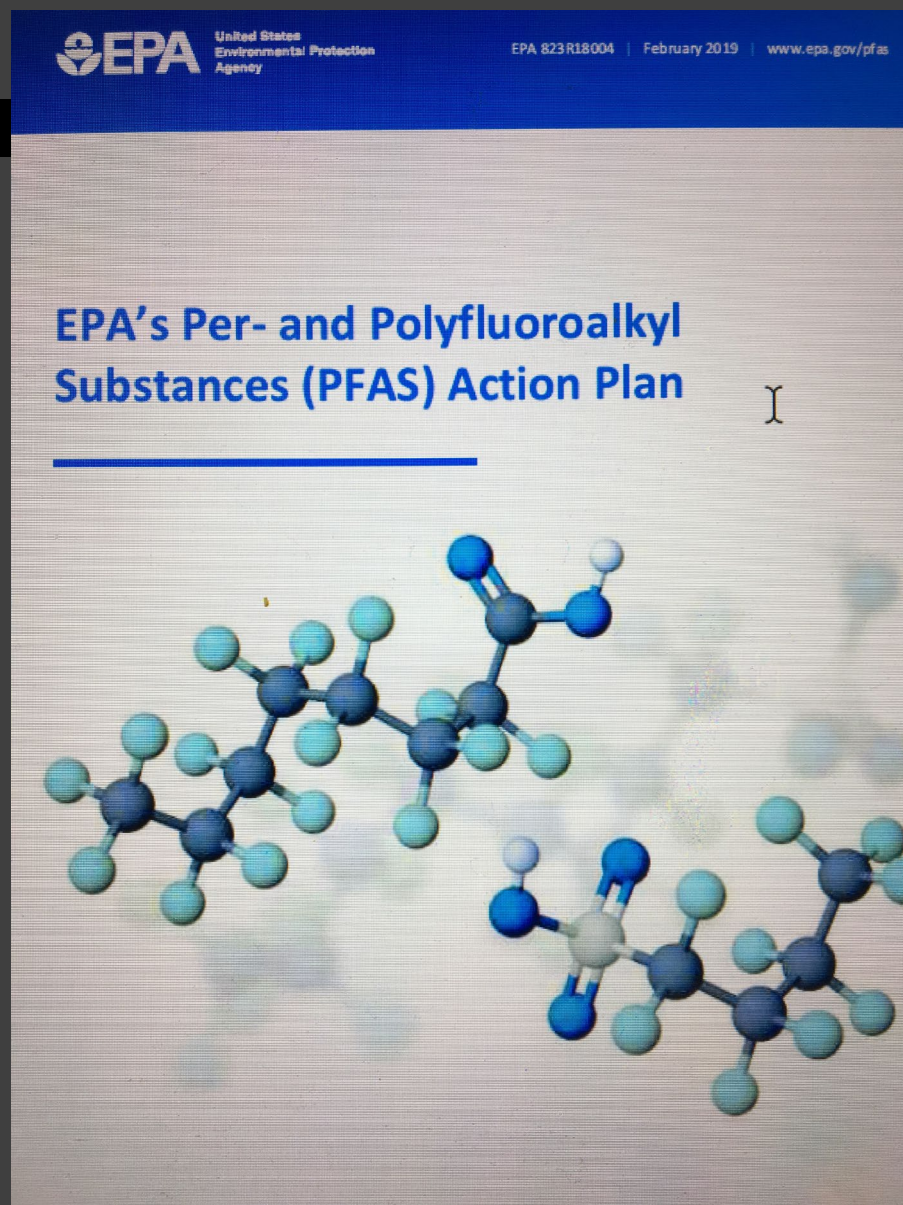
## Some provisions indirectly impacting EPA:

- Increased transparency through reporting on usage and spills of AFFF at military installations
- Prizes for development of non-PFAS-containing fire-fighting agent
- Survey of technologies for DoD application in phasing out the use of AFFF
- Restriction on DoD procurement of certain items containing PFOS or PFOA
- Notification to agriculture operations located in areas exposed to DoD PFAS Use
- Increase in funding for CDC study on health implications of PFAS contamination in drinking water

# PFAS ACTION PLAN

February 2019

[www.epa.gov/pfas](http://www.epa.gov/pfas)



# Highlighted Actions

---

## Drinking Water

- ✓ Published new validated test methods to accurately test for and measure 29 PFAS chemicals.
- ✓ January 2021, EPA proposed to require monitoring for 29 PFAS in drinking water under the fifth Unregulated Contaminant Monitoring Rule (UCMR5).
- ✓ January 2021, EPA announced final regulatory determinations to regulate PFOA and PFOS in drinking water.
- ✓ EPA also intends to fast track evaluation of additional PFAS for future drinking water regulatory determinations if necessary information and data become available.



# Highlighted Actions

---

## Wastewater

- ✓ November 2020, EPA released an interim strategy to provide guidance on how to address potential PFAS discharges for EPA-issued NPDES permits
- ✓ January 2021, EPA finalized Effluent Guidelines Program Plan 14 and announced an Advanced Notice of Proposed Rulemaking to collect data and information regarding PFAS manufacturers

# Highlighted Actions

---

## Cleanup

- ✓ January 2021, EPA issued an Advance Notice of Proposed Rulemaking (ANPRM) for consideration of additional authorities for addressing PFAS in the environment
- ✓ December 2020, EPA issued interim guidance on the destruction and disposal of PFAS and materials containing PFAS for public input
- ✓ December 2019, EPA developed an interim guidance to facilitate cleanup of contaminated groundwater

# Highlighted Actions

---

## Toxics

EPA added 172 PFAS to the Toxics Release Inventory and issued a Significant New Use Rule (SNUR) for Long-Chain PFAS

- ✓ June 2020, EPA issued a final regulation adding a list of 172 PFAS chemicals to Toxics Release Inventory reporting as required by the National Defense Authorization Act for Fiscal Year 2020.
- ✓ July 2020, EPA published its final rule supplemental proposal to ensure that new uses of certain persistent long-chain PFAS chemicals in surface coatings cannot be manufactured or imported into the US without notification and review under TSCA.
- ✓ January 2021, EPA issued final guidance documents outlining imported articles covered by the agency's July 2020 SNUR.



# Highlighted Actions

---

## Surface Water Protection and Biosolids

- ✓ EPA plans to develop national Clean Water Act human health and aquatic life criteria for PFAS, as data supports.
- ✓ EPA will be developing risk assessments for PFOA and PFOS in biosolids to understand any potential health impacts.

# Highlighted Actions

---

## Research

- ✓ January 2021, EPA released a toxicity assessment for PFBS.
- ✓ EPA is applying high-throughput toxicology testing to study the toxicity of the larger universe of PFAS.
- ✓ The Agency is validating analytical methods for surface water, ground water, wastewater, soils, sediments and biosolids; developing new methods to test for PFAS in ambient air and in emissions; and improving laboratory methods to discover unknown PFAS.
- ✓ Status info can be found EPA's PFAS Analytical Methods Development and Sampling Research page:

[www.epa.gov/water-research/pfas-analytical-methods-development-and-sampling-research](https://www.epa.gov/water-research/pfas-analytical-methods-development-and-sampling-research)

# Highlighted Actions

---

## Research, continued

- ✓ EPA is developing exposure models to understand how PFAS moves through the environment to impact people and ecosystems.
- ✓ EPA is working to develop tools to assist officials with the cleanup of contaminated sites.
- ✓ July 2020, EPA added new treatment information for removing PFAS from drinking water (<https://www.epa.gov/pfas/treating-pfas-drinking-water>)

# Highlighted Actions

---

## Research, continued

- ✓ EPA is evaluating the effectiveness of technologies and evaluating data on methods for managing the end-of life disposal of PFAS-contaminated materials e.g. via landfills, incineration, and other technologies.
- ✓ EPA is funding research to generate science-based recommendations for managing PFAS in rural and agricultural areas, and to expand the understanding of environmental risks posed by PFAS in water and waste streams.

# Highlighted Actions

---

## **Enforcement**

- ✓ EPA continues to use enforcement tools, when appropriate, to address PFAS exposure in the environment and assists states in enforcement activities.

## **Risk Communications**

- ✓ EPA is working collaboratively to develop a risk communication toolbox that includes multi-media materials and messaging for federal, state, tribal, and local partners to use with the public.

# Highlighted Actions

---

## **COLLABORATION**

- ✓ Environmental Council of the States (ECOS) to ensure state priorities are addressed.
- ✓ USDA and FDA to examine the impacts of PFAS on agriculture, rural communities, and food supplies.
- ✓ National Institute of Environmental Health Sciences' (NIEHS) National Toxicology Program on assessing PFAS toxicity.
- ✓ DOD on analytical methods and approaches for PFAS cleanup.

# How Did Region 5 Get Involved With PFAS?

- 3M disposed of PFAS wastes in various sites and landfills.
- Major contamination of drinking water wells, aquatic life, soil, area lakes and the Mississippi River.
- Region 5 PFAS Team formed in 2007 following request for help from former MN Governor Pawlenty.



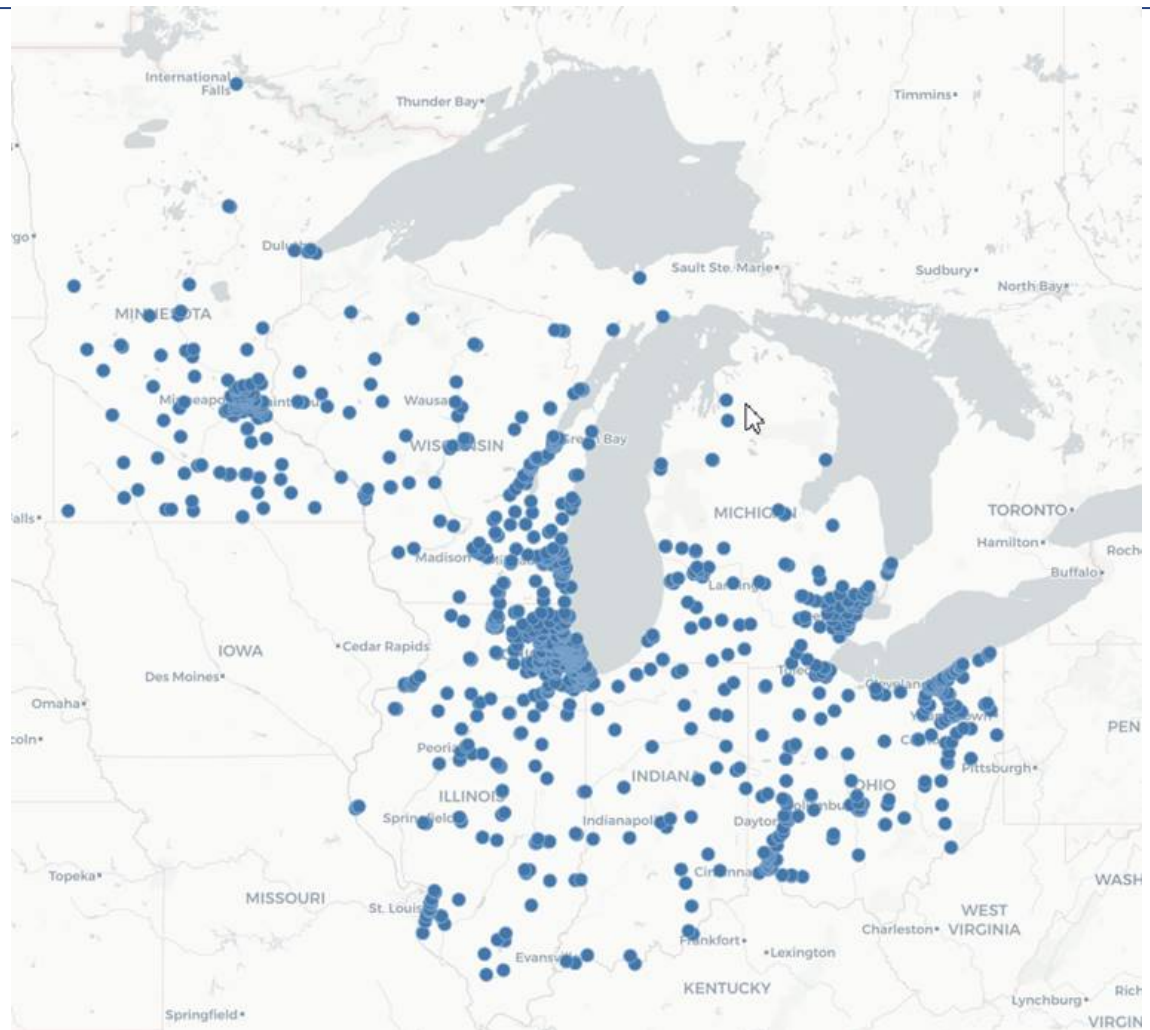
# Regional Support to States

- Research
  - Michigan chromium electroplater study
  - Foam Exposure Research Study with Minnesota
- Working Group with MN, WI, MI and others on PFAS foam-containing water bodies
- GLNPO effort
- Laboratory Analytical Services
- State support on site investigations





# Potential AIR SOURCES in R5



## AIR SOURCES OF INTEREST

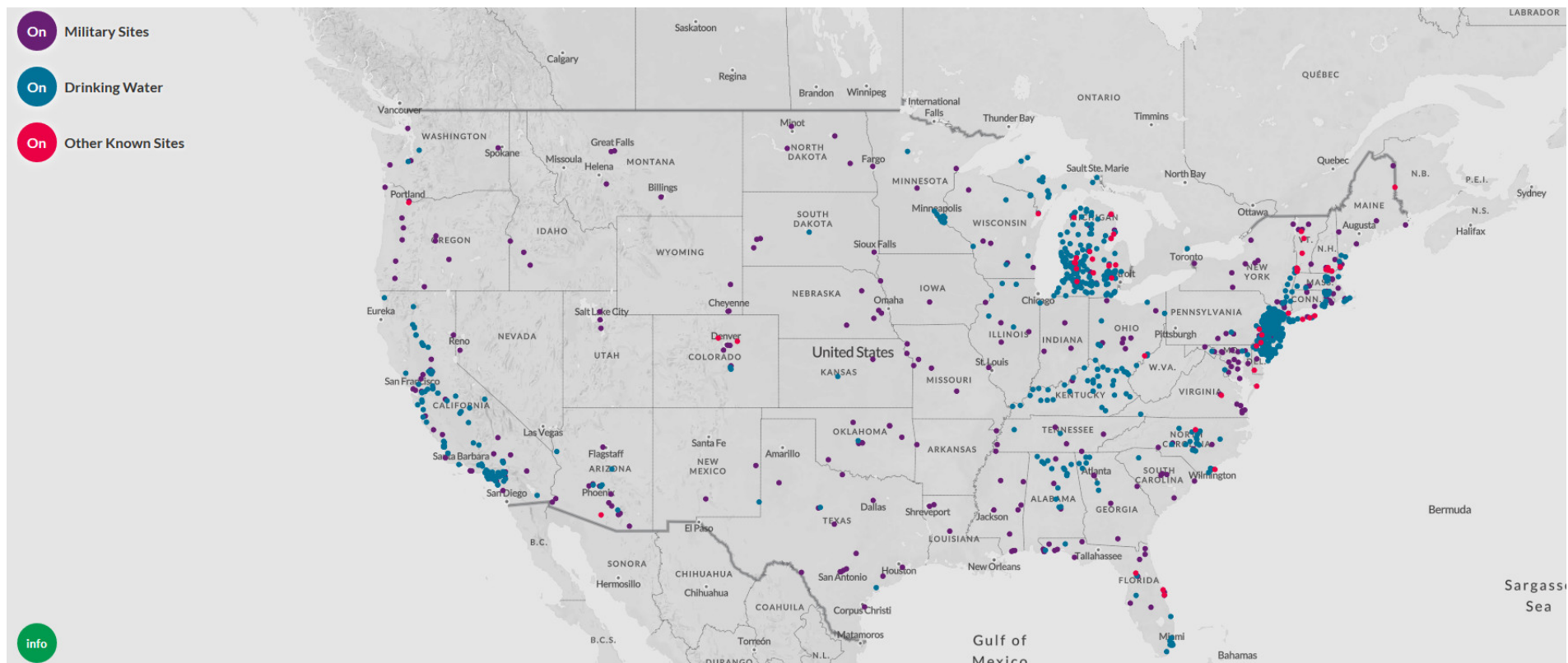
- Hazardous Waste Incinerators
- Municipal Waste Combustors
- Cement Kilns
- Sewage Sludge Incinerators
- AFFF Manufacturing
- Chemical Manufacturing
- Burn Off Ovens
- Chromium Electroplating Facilities
- Coating Processes (Glass, Paper, Textiles, Tanneries)

- Region 5 is home to multiple incinerators that accept PFAS wastes.
- Accept PFAS wastes from outside our Region.
- Region 5 has been working to define the issue.
- Many of these facilities are in EJ areas.
- High levels of interest from stakeholders (states, community groups, Congress)
- Have little to no data to show destruction.

# SEWAGE SLUDGE INCINERATORS

- Had about two dozen of these facilities in Region 5
- Air Toxics Rule updated in 2016
- Led to closures of many facilities
- As states put in rules to end land application of biosolids, municipalities contacted R5 for permits to build new SSIs
- Concerns SSI temperatures are not high enough for PFAS destruction

# Where are the PFAS sites?



# Identified PFAS Sites



## State Actions

Some states have initiated sampling and surveys for PFAS contamination; usually have state standards

Some states intentionally not sampling for PFAS; usually no state standards

Some states sampling, use federal HAs but also waiting on Federal standards



## Federal Actions

SDWA Third Unregulated Contaminant Monitoring Rule (UCMR3) and UCMR5

DOD sites

Requests from states for assistance

RCRA corrective action sites

NPL sites - 5 year reviews

# Impact: contaminated sites



If you look for it, you will probably find it

Soils, water, crops, human blood



Responsibility

Federal facilities, industrial sources, landfills



Pathways to release

Air deposition, disposal, discharge to surface and ground waters



Allocation

Multiple sources = multiple responsible parties


# Federal enforcement

State and local responses



Federal action where appropriate

Addressing sites uniquely



**Federal authorities potentially applicable to PFAS contamination:**

CAA §§ 114, 303

CWA §§ 308, 309, 504(a)

RCRA §§ 3004(u), 3004(v),  
3005(c)(3)(omnibus  
authority), 3007, 3008(h),  
3013, 7003(a)

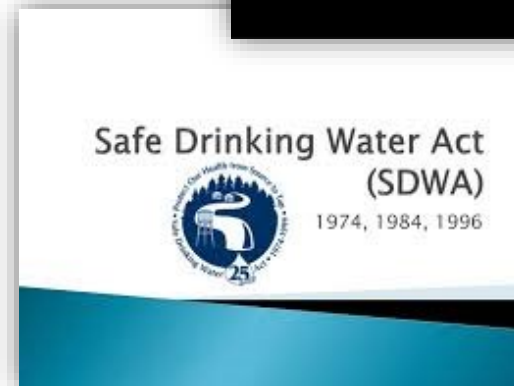
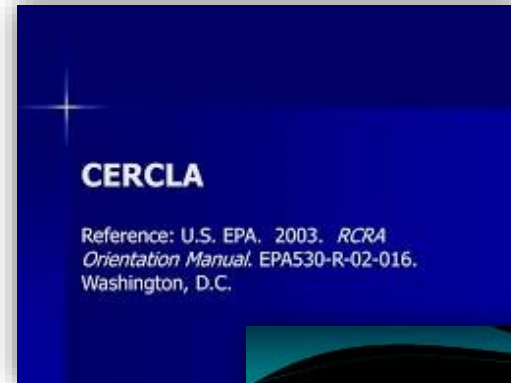
SDWA §§ 1431, 1445(a)(1)(A),  
1445(a)(1)(b)

CERCLA §§ 104, 122



# Sample of Federal Actions

- RCRA § 3007
- CWA § 308
- CERCLA § 104
- SDWA § 1431
- TSCA § 5(e)
- Information requests, sampling, clean-up of co-mingled wastes, provision of alternate drinking water, NOVs



# Federal Response - CERCLA

PFAS are not hazardous substances listed under CERCLA nor are they hazardous substances by definition pursuant to designation under

- CWA, RCRA, CAA, TSCA

Therefore, PFAS are pollutants or contaminants under CERCLA

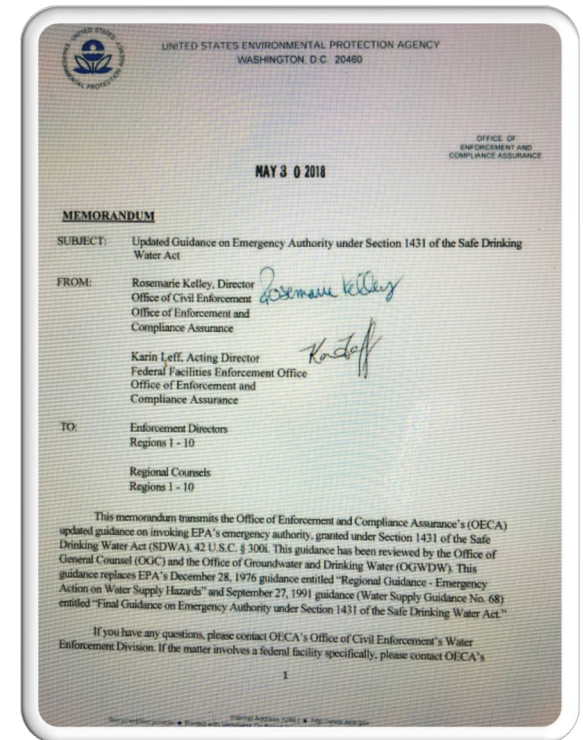
- 104 response authority
- **no 106 order authority**
- **no cost recovery**

Federal CERCLA responses are currently likely to include:

- Clean up where co-mingled with haz sub
- ARARs
- 5 year reviews

# Federal Response - SDWA § 1431

- APPLIES TO
  - Public water (PWS)
  - Private wells (Underground Sources of Drinking Water)
- REQUIRES
  - The contaminant **may** present an “imminent and substantial endangerment” to human health or the environment, and
  - The appropriate state and local authorities have not acted to protect public health.



# Federal Response - SDWA § 1431



Provision of alternative water  
supplies

Interim  
Permanent



Extent of Contamination Investigation



RI/FS



Engineering Studies



Source Control and Cleanup

# Federal/State Enforcement and Response: Case Studies

---

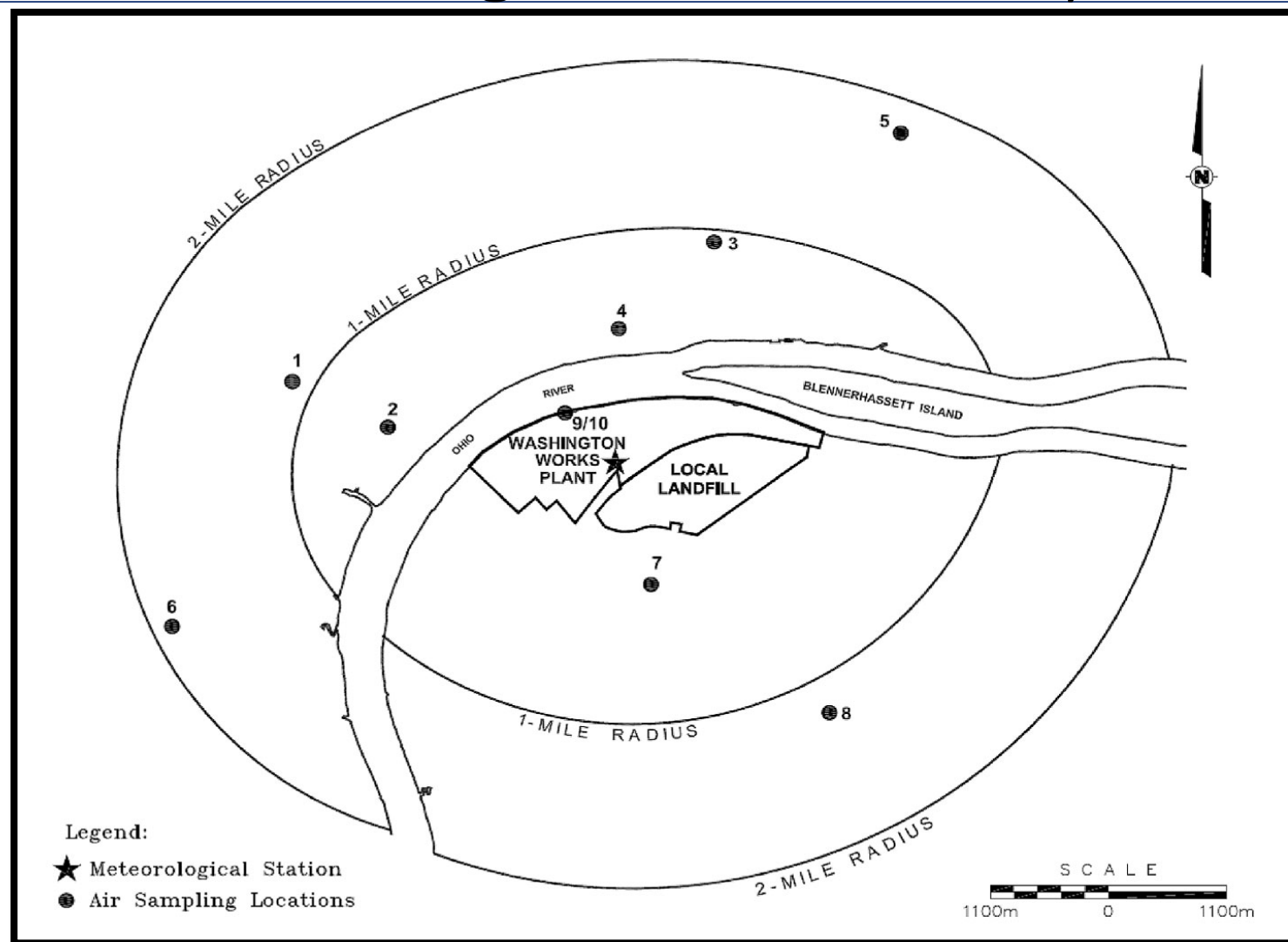
- Washington works facility in Parkersburg, WV
- Wolverine World Wide Tannery and House Street Dump in Kent County, Michigan

# Federal Enforcement: Washington Works Facility

---

- Washington Works facility owned and operated by Dupont until 2015, when spin-off Chemours took ownership (DuPont still operating certain parts of the facility via rental agreement with Chemours)
- PFOA manufactured and released from facility starting in 1951
- Facility abuts Ohio river
- Air deposition from facility generated wide-spread PFOA groundwater contamination in Ohio and West Virginia

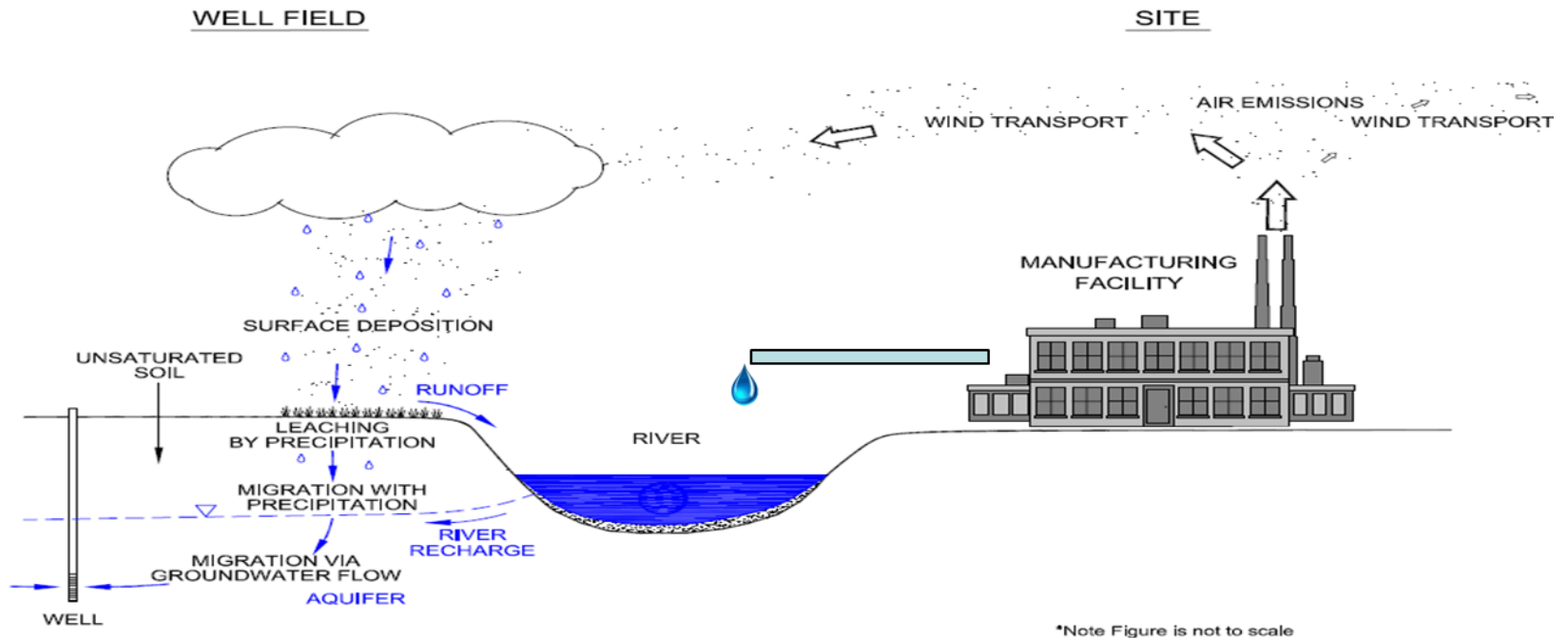
# Federal Enforcement: Washington Works facility



Barton et al. *Journal of the Air & Waste Management Association* 2010, 60, 402–411

# Federal Enforcement: Washington Works Facility

Davis et al. Chemosphere 67 (2007) 2011–2019





# Federal Enforcement: Washington Works Facility

---

- Average blood serum concentration of PFOA in residents living in the vicinity of the facility is 6 times higher than the average U.S. population PFOA blood serum concentration
- Blood serum is approximately 20 times higher than blood serum concentration in residents living downstream from the facility
- Site-specific half-life in blood serum ranges from approximately 2 to 10.9 years
- Site-specific health studies conclude residents living in the vicinity of the facility experience increased adverse health effects, including liver toxicity, kidney toxicity, developmental effects, immune effects, and cancer.

# Federal Enforcement: Washington Works Facility

---

- 2002, 2006, and 2009 Regions 3 and 5 entered into emergency orders on consent under safe drinking water act authority with DuPont to address PFOA contamination in public and private water supplies in Ohio and West Virginia
  - Set a PFOA action level at or above which DuPont was required to provide alternate drinking water, both temporary and permanent
  - Each successive order superseded the prior order and established a lower action level as a result of evolving science
- 2017 Amendment to the 2009 order added Chemours and requires additional actions to reduce exposure to PFOA in drinking water (action level is 70 ppt)
- Chemours is also voluntarily sampling for GenX (HPFO-Dimer Acid) at EPA's request

# Disclaimer

---

*The views expressed in this presentation are those of the individual author and do not necessarily reflect the views and policies of the US EPA and ATSDR. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.*

Questions?

## CONTACTS

Jacqueline Clark, US EPA-Region 5 Associate Regional Counsel

[clark.jacqueline@epa.gov](mailto:clark.jacqueline@epa.gov)

312-353-4191

Kim Harris, US EPA-Region 5 Multimedia PFAS Advisor

[harris.kimberly@epa.gov](mailto:harris.kimberly@epa.gov)

312-886-4239

Mark D. Johnson, ATSDR-CDC Toxicologist/Region 5 Director

[mdjohnson@cdc.gov](mailto:mdjohnson@cdc.gov)

312-353-3436

Jeff Kimble, US EPA-Region 5 On-Scene Coordinator

[kimble.jeffrey@epa.gov](mailto:kimble.jeffrey@epa.gov)

734-214-4895