PFAS in WV & OH

FROM AIR TO SOILS TO GROUNDWATER: EXPLORING PFAS TRANSPORT FROM SOURCE TO TAP

Per- and Poly-fluorinated Alkyl Substances (PFAS) Background

- Highly stable and unreactive:
  - Extremely persistent compounds in the environment
  - Tendency to migrate quickly in the environment
  - Some PFAS have long half-lives in the human body
    - Continued exposure results in increasing body burden
- Animal studies link PFAS to:
  - Immuno and endocrine disruption
  - Liver toxicity
  - Immuno toxicity
  - tumorogenesis

Background

- Teflon Production at the DuPont, Parkersburg, WV plant resulted in the release of PFOA into the environment.
  - Releases have been documented through air, water and waste disposal.
  - Air releases of PFOA resulted in contamination in soils, surface waters and ground water in an area exceeding 400 square miles in WV & OH
  - PFAS have been shown to migrate freely through surface waters and soils (Y. Yingling, MN)

PFOA to GenX

- DuPont replaced PFOA with HFPO-Dimer Acid (GenX) as a processing aide for the production of Teflon.
  - Pilot-scale testing began in 2011
  - Complete replacement of PFOA occurred in 2013
  - Shorter chain molecule showed much shorter half life in animals and humans
  - Leading DuPont to believe it would be less toxic

Problem Statement

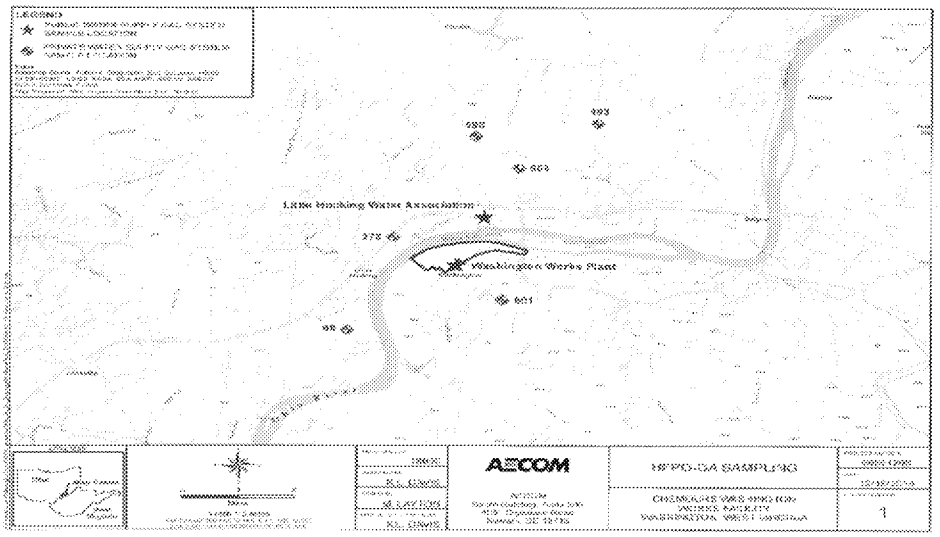
- PFOA detected in ground water many miles from the Chemours plant
- GenX detected in surface water and soils many miles from the plant
- GenX detected in ground water only about a mile short distance from the plant

- How long will it take for GenX to migrate from surface soils and surface waters into ground water aquifers used as drinking water sources?
  - Knowing this would help us determine when and how far from the plant Chemours should start sampling drinking water wells

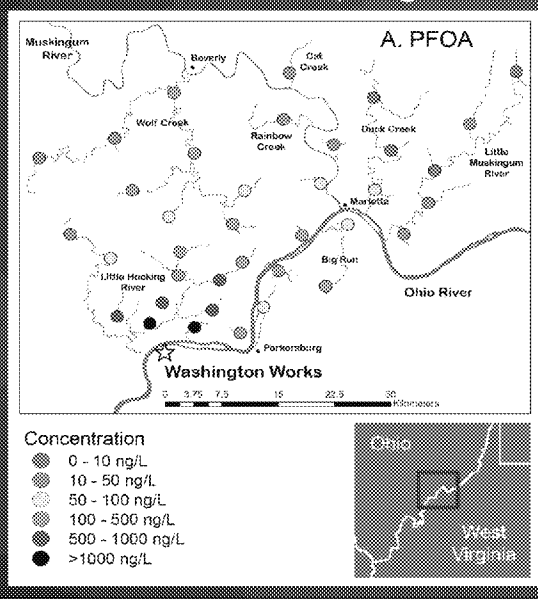
PFOA Private Well Monitoring Locations & Results

Ex. 6 Personal Privacy (PP)

HFPO-DA (GenX) Water Well Sampling Locations



Surface Water Sampling Results Near Washington Works



Evidence of Air Dispersion: HFPO-DA and PFOA in OH/WV Surface Water and Soil Near a Fluoropolymer Production Facility

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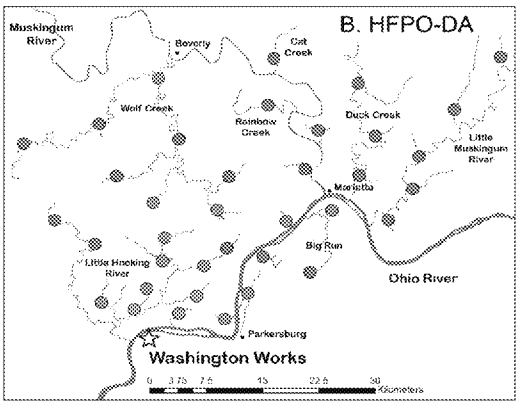

RARE Study Proposal

- This proposal seeks $200,000 over two years for field and laboratory implementation of an effort to evaluate the potential for migration of fluorochemical compounds in this region from contaminated soils to surface water and underlying groundwater resources in partnership with EPA Office of Research & Development and EPA Regions 3 and 5.
- Region 5 is proposing to contribute funding to this project.

Project Goals

- Expand understanding of the geographical range of soil, surface water, and groundwater contamination near and downwind from a major fluorochemical plant in Parkersburg WV
- Data will characterize and refine the extent of existing impacts and help predict migration pathways of PFAS through soils to groundwater resources.
  - Results should be useful in other PFAS contamination contexts
  - A cooperative federalism research approach will be employed by forming a strategic collaboration among EPA's Office of Research & Development, Regions 3 and 5, the West Virginia Department of Environmental Protection, and the Ohio Environmental Protection Agency.

Project Goals (cont d)

- The proposed study will be accomplished via three objectives including:
  1. *Systematically characterize soil PFAS contamination in areas impacted by emissions from the facility.*
  2. *Systematically characterize PFAS concentrations in surface water and groundwater and their relationship to areas with documented soil contamination.*
  3. *Develop a baseline measurement of other PFAS chemicals that may be present in drinking water.*
- Provide data to help predict when and where HFPO-DA contaminated soils are anticipated to affect surface and groundwater quality and provide tangible results that can be used to schedule and prioritize mitigation efforts that may be needed to reduce or eliminate PFAS exposures in Mid-Ohio Valley communities.

This project supports:

- EPA's Feb 2019 PFAS Action Plan
- EPA's priority for protecting human health through reduction of risks through drinking water exposure
- EPA's priority for cooperative federalism and support to states
- ORD's priorities for researching environmental fate and transport of PFAS compounds:
  - ORD's Path Forward Research Action Plan: Safe and Sustainable Water Resources Task 3.02B: characterization of sources of contaminants of emerging concern to surface water and groundwater