



An Overview of PFAS in Drinking Water

Vienna Town Council
November 13, 2023



Presentation Topics

- ▶ About Fairfax Water
- ▶ What is PFAS?
- ▶ Sources of exposure and how PFAS enters the water supply
- ▶ Monitoring and Occurrence
- ▶ Regulations
- ▶ Source Water Protection
- ▶ Key Take-Aways

Fairfax Water Service Areas



Retail Service

1.13 million residents
660,000 employees



Wholesale Service

988,000 residents
493,000 employees



Key terms that will be used in this presentation

PFAS

- PFAS = per- and polyfluoroalkyl substances
- PFOA = perfluorooctanoic acid
- PFOS = perfluorooctane sulfonic acid

Parts Per Trillion (PPT)

- PPT = parts per trillion
- Same as nanograms per liter (ng/L)
- 1 ppt is equivalent:
 - to traveling 6 inches out of a 93 million-mile journey toward the sun
 - a single drop of water in 20 Olympic-sized swimming pools

Minimum Reporting Level (MRL)

- The lowest level that instruments can detect an analyte
- EPA MRL is 4 PPT for PFOA and PFOS

Key terms that will be used in this presentation

Health Advisory (HA)

- Non-enforceable and non-regulatory
- Provide technical information to state agencies and other public health officials
- Results greater than the HA do not mean that there is an emergency, violation, or immediate health concern for customers
- EPA's health advisory levels offer information that may be used to protect people from adverse health effects resulting from exposure throughout their lives to contaminants in drinking water

MCL

- MCL = Maximum Contaminant Level
- The highest level of a contaminant that is allowed in drinking water
- MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration.
- **MCLs are enforceable standards.**

MCLG

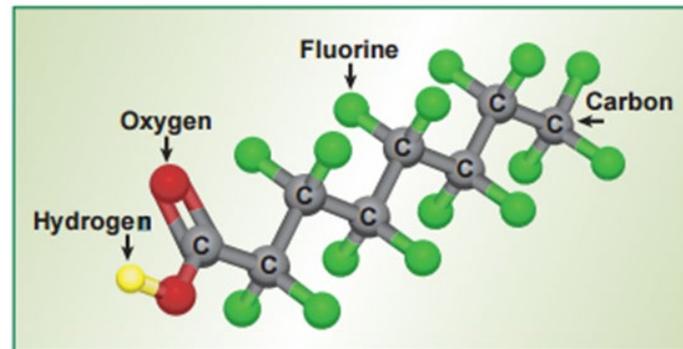
- MCLG = Maximum Contaminant Level Goal
- The level of a contaminant in drinking water below which there is no known or expected risk to health
- MCLGs allow for a margin of safety and are non-enforceable public health goals

Treatment Technique

- A required process intended to reduce the level of a contaminant in drinking water.

What are PFAS?

- PFAS = per- and polyfluoroalkyl substances
- PFAS are a group of over 6,000 man-made chemicals
- Ubiquitous in the environment
- In use since the 1940's
- Everywhere and Forever
- Evidence that continued exposure above specific levels to certain PFAS may lead to adverse health effects
- **Water utilities are “passive receivers” of PFAS**



Products Containing PFAS

Paper and packaging

Clothing and carpets

Outdoor textiles and sporting equipment

Non-stick cookware

Cleaning agents and fabric softeners

Polishes and waxes

Latex paints

Pesticides and herbicides

Windshield wipers

Paints, varnishes, dyes, inks

Adhesives

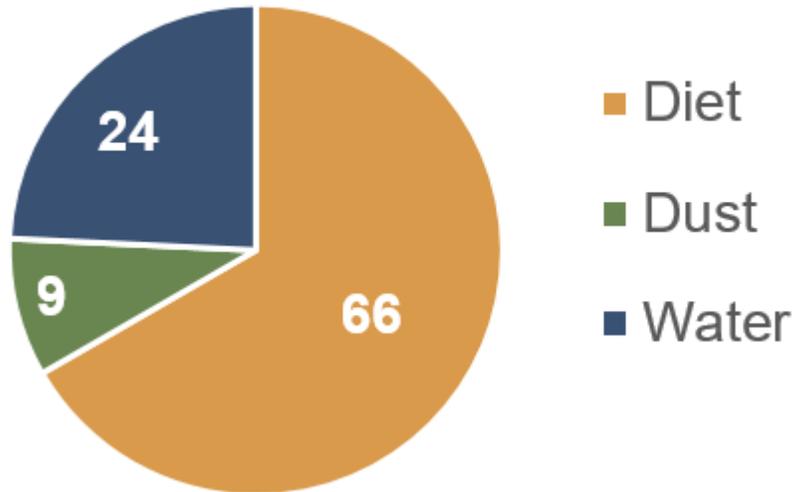
Medical products

Personal care products (shampoo, conditioner, sunscreen, cosmetics, toothpaste, dental floss)

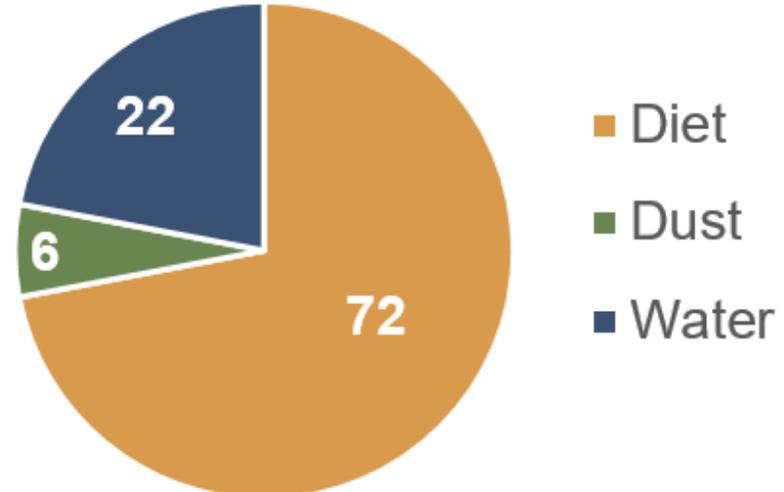
PFAS Exposure Points

- ▶ Humans are most often exposed to PFAS through food
- ▶ Other exposures are dust, consumer products, clothing and water

PFOA Exposure Routes

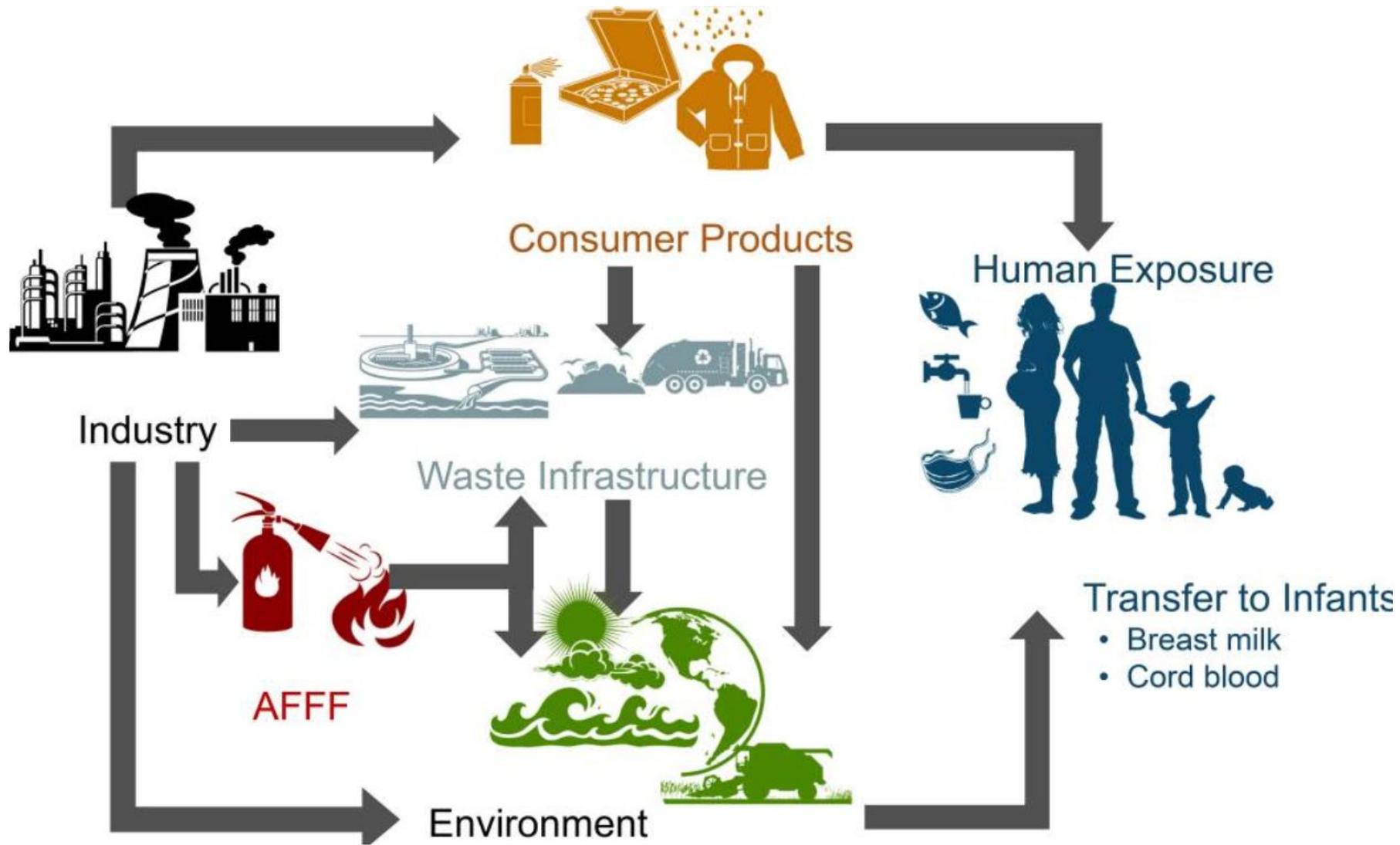


PFOS Exposure Routes



Data from:

- *Environmental science & technology* 2011; 45: 8006–8014.
- *Journal of exposure science & environmental epidemiology* 2011; 21: 150–168



Source: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6380916/>

PFAS in our daily lives – collecting a PFAS sample for laboratory analysis

Here are some examples of the measures laboratories require of the sample collectors, in order to assure the results are accurate:

Microbac Sampling Precautions

NO:

- Gore-Tex or Tyvek clothing/materials
- Clothes washed with fabric softener
- Cosmetics, moisturizers, sunscreen, or insect repellent
- Permanent markers or sharpies
- Plastic clipboards, binders, or hard covers

Eurofins Sampling Precautions

- Sample for PFAS at beginning of workday
- No new clothing; must have been washed 5x or more
- Shower only with PFAS-free soap/shampoo
- Brush teeth with fluoride-free toothpaste and avoid flossing before sampling
- Do not handle any packaged food or drinks, aluminum foil, etc. around sampling site
- Ball-point pen only
- Untreated paper and aluminum clipboards only

EPA and PFAS in Drinking Water

- 2013-2015 Unregulated Contaminant Monitoring Rule 3 (UCMR3)
 - Methods had much higher reporting levels
 - Minimum reporting levels (MRL) were in the 20-40 PPT range
 - PFAS not detected in many areas
- 2016 – EPA issues a Health Advisory for PFOA and PFOS
 - PFOA + PFOS < 70 ppt
- 2022 – EPA issues interim updated Health Advisory for PFOA, PFOS, PFBS and GenX
 - PFOA < 4 ppt
 - PFOS < 2 ppt
 - PFBS < 2,000 ppt
 - GenX < 10 ppt
- 2023 – EPA issues Proposed National Primary Drinking Water Standard for six PFAS compounds

Summary of Proposed EPA PFAS Rule

- ▶ PFOA and PFOS
 - ▶ Proposed MCL of 4 ppt for each
 - ▶ Proposed MCLg of 0 ppt for each
- ▶ GenX, PFBS, PFNA, PFHxS
 - ▶ Hazard index (HI) for combined effects
 - ▶ Unitless measurement
 - ▶ MCL and MCLg, HI < 1
- ▶ Quarterly monitoring required for the six PFAS compounds
 - ▶ Compliance based on running annual average
- ▶ Public notification requirements for exceeding the MCLs
- ▶ Utilities will have 3 years to comply once the rule is finalized
- ▶ Rule expected to be finalized in late 2023 or early 2024

PFAS Monitoring at Fairfax Water

- ▶ Initiated voluntary quarterly monitoring in April 2021
- ▶ Participated in Virginia Department of Health Studies in 2021 and 2023
- ▶ Treated Water from the Occoquan Reservoir does not comply with the proposed EPA rule

PFAS Compound	Proposed MLCG	Proposed MCL	Potomac River (Corbalis WTP) Average Result	Occoquan Reservoir (Griffith WTP) Average Result
PFOS	0 ppt	4 ppt	1.4 ppt	4.2 ppt
PFOA	0 ppt	4 ppt	0.9 ppt	5.4 ppt
GenX, PFBS, PFHxS, PFNA	HI < 1	HI < 1	HI = 0.0007	HI = 0.13

*Reflects results from eight sampling events since April 2021 utilizing EPA Method 533 and/or 537.1 through September 2023.

If EPA's Proposed Rule is Finalized

- ▶ Additional water treatment infrastructure must be constructed at Griffith (Occoquan) water treatment plant
- ▶ Conceptual level treatment costs have been developed
- ▶ Further study underway

Conceptual Level Costs for Treatment at the Griffith Plant

Technology	Capital Cost	Annual O&M Cost
Granular Activated Carbon (GAC) Filtration	\$225 to \$250 Million	\$10 to \$45 Million
Ion Exchange	\$180 to \$240 Million	\$10 to \$20 Million
Reverse Osmosis	\$720 Million to \$1.54 Billion	\$20 to \$30 Million

Preparing for the PFAS Rule

- ▶ Bench scale treatment alternatives study underway for Griffith (Occoquan) plant
- ▶ Continue PFAS Monitoring
 - ▶ Voluntary quarterly
 - ▶ UCMR5 monitoring in 2024
- ▶ Customer education and awareness
- ▶ Identification and reduction of sources of PFAS
 - ▶ Occoquan Reservoir
 - ▶ Reviewing existing watershed occurrence data
 - ▶ Developing watershed study
 - ▶ Potomac River
 - ▶ Proposed study in collaboration with Potomac Drinking Water Source Protection Partnership



Fairfax Water SUMMER 2023
STRAIGHT FROM THE TAP

In the News: Poly- and Perfluoroalkyl Substances (PFAS)

What are PFAS, and how do they get into drinking water?
PFAS are a group of over 12,000 man-made chemicals manufactured and used in home and consumer products, such as carpets, clothing, food packaging, and cookware, since the 1940s. They are also used in firefighting foam and other industrial processes. Most of a person's exposure to PFAS is through food and other consumer products. Drinking water makes up a small portion of a person's total exposure to PFAS. Peer-reviewed studies show that exposure to elevated levels of PFAS may lead to adverse health outcomes in humans.

Due to years of use, PFAS are everywhere in the environment. Industrial sites might release PFAS into the water or air. The use of household products containing PFAS may release PFAS when those products are thrown away or washed down the drain. These chemicals do not break down naturally. They build up in the environment over time, eventually entering our bodies through food and drinking water.

What is Fairfax Water doing about PFAS?
Fairfax Water has been proactively testing for PFAS for 2 years. This has helped us get a clear understanding of PFAS levels in our source water prior to any US Environmental Protection Agency (EPA) regulations. While our testing has shown the presence of PFAS compounds, they are at extremely low levels. To learn more about our PFAS sampling and results, please visit the link at the bottom of the page.

PFAS results are posted on our website:
<https://www.fairfaxwater.org/water-quality/facts-about-pfas>



Questions?