PFAS: Overview and Action Plan

June 8, 2023



DELAWARE HEALTH AND SOCIAL SERVICES

Division of Public Health



What are PFAS?

- Per- and polyfluorinated substances (PFAS) are man-made chemicals that have been used since the 1940's
- They have wide-spread use in consumer and industrial products such as nonstick coatings, firefighting foams, waterproofing, and more
- PFAS are often referred to as "forever chemicals' as some take over 1000 years to degrade
- There are over 9000 PFAS compounds. Some of the most well known include PFOS, PFOA, and GenX









Previously Used Terms and Acronyms

- Perfluorinated chemicals (PFCs)
- Perfluorochemicals (PFCs)
- Perfluoroalkyls (PFAs)
- Perfluorinated alkyl acids (PFAAs)
- Polyfluorinated chemicals (PFCs)
- Polyfluorinated compounds (PFC)s



For clarity, PFAS is the inclusive acronym.



ELAWARE HEALTH AND SOCIAL SERVICES



Development of PFAS

PFAS Development...

...and Evolution





DELAWARE HEALTH AND SOCIAL SERVICES



Associated Health Effects

Center for Disease Control (CDC) has listed the following health effects related to elevated PFAS levels in blood.
High cholesterol
Decreased immune response in children
High blood pressure
Increased risk of kidney or testicular cancer
Decrease in infant birth weights

Suspected Health Effects PFNA is a presumed human reproductive toxicant to the unborn child
Suspected human carcinogen
Specific target organ toxicity – liver, thymus, and spleen
Can be introduced to child through breast feeding

a second construction second

Bioaccumulation

•PFAS accumulates in animals and humans once entered into the system through contaminated water or food sources

•Have earned the nickname "forever chemicals" due to their extremely long time frames to break down in the environment

PFAS is widespread throughout our environment

· Nearly all humans have detectable amounts of

Widespread prevalence

DELAW Division



PFAS in their blood

DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

Why Should We Remove PFAS?



Sources: US National Toxicology Program (2016); C8 Health Project Reports (2012); WHO IARC (2017); Barry et al. (2013); Fenton et al. (2009); and White et al. (2011) apud Emerging chemical risks in Europe — 'PFAS'¹.

Where are PFAS Found?

- PFAS is found globally in water, fish, soil, daily used products and in the blood of humans and animals
- The highest concentrations have been found near sites of current/past manufacturing processes and sites where PFAS containing firefighting foams were used like military bases
- The map shows currently known areas with elevated levels in drinking water





DELAWARE HEALTH AND SOCIAL SERVICES



What Delaware is doing:

- Multi-agency workgroup formed in 2018 (DNREC, DHSS, DelDOT, DDA)
- DNREC Remediation Section listed PFOA and PFOS as "Hazardous Substances" in 2016 - Updated 2023
- DNREC DWHS PFAS sampling policy 2018 (Update June 2023)
- Building staff capacity with dedicated and task force approach
- Statewide public water sampling







ELAWARE DEPARTMENT OF

Statewide Public Water Sampling

- Public water system sampling (545 samples from 134 unique water systems from 219 different wells)
 - Community Water Systems (municipalities, mobile home park, sub-divisions)
 - Non-Transient / Non-Community (schools, factories, office buildings, and hospitals)
 - Transient Non-Community (ex. gas stations, campgrounds)
- PFAS Data compiled in EQuIS database for analysis
- Analytical Method 537M DNREC REM to mimic and exceed UCMR5 -Unregulated Contaminant Monitoring Rule #5
- Data will help inform the implementation of an MCL



DELAWARE HEALTH AND SOCIAL SERVICES



USEPA PFAS Roadmap 10/2021

Research, Restrict, Remediate

- Consider the lifecycle of PFAS
- Get upstream of the problem
- Hold polluters accountable
- Ensure science-based decisions
- Prioritize protection of disadvantaged communities

State of Delaware -

- Collaborative group across multiple regulatory protection and resource programs.
- Track back studies through program authorities
- Identify and mitigate at points of opportunity
- Holistically collect and analyze multi-media data then take action based upon proven science
- Provide knowledge from PFAS effort to state entities working to identify, provide proof via collected data then develop regulation and policy to benefit environmental justice communities.



DELAWARE HEALTH AND SOCIAL SERVICES



EPA Proposed Drinking Water MCLs

EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan



PFOA – 4 parts per trillion (PPT)

PFOS – 4 parts per trillion (PPT)

EPA also proposed a hazard index to limit any mixture containing one or more of the PFAS compounds listed below

> PFOA PFOS PFNA

PFHxS PFBS GenX

DELAWARE HEALTH AND SOCIAL SERVICES







Options for Solutions

- Treatment add system to existing well
- Interconnection connect to known unimpacted water

Replacement Well

- Different location move location away from source
- Different Aquifer drill new well to unimpacted depth



DELAWARE HEALTH AND SOCIAL SERVICES





Granular Activated Carbon

- Highly porous carbon made from organic materials
- Least costly filtration system
- Highly effective at removing long-chain PFAS
- Does not absorb short-chain
 PFAS has well as other methods
- Generates large amounts of spent carbon that need disposed or regenerated





Ion Exchange

- Uses tiny beads of highly porous resin that are made from hydrocarbons
- Two main types of resins
 - Positively charged which are good at removing negatively charged contaminants
 - Negatively charged which are good at removing positively charged contaminants
- Highly effective at removing many PFAS with many specialized resins for particular compounds
- Similar to GAC it can be 100% effective for a time depending on resin type, bed depth, and which PFAS is being removed
- Resin media is more costly than GAC
- Spent resin normally needs to be incinerated



High-pressure Membranes

- Reverse osmosis and nanofiltration methods
- Forces water through semi-permeable membranes to filter
- Highly effective at removing long and short chain PFAS
- Most costly system
- About 20% of water stream becomes highly concentrated waste





DELAWARE HEALTH AND SOCIAL SERVICES



Replacement Wells - Public Well Permits

- Regulations Governing the Construction and Use of Wells
- Well Permit Required Issued to Driller
- Section 5.1
 - 150 ft from known sources of contamination
 - 75 ft from sewer force mains
- Well inspection required by Well Permitting Branch before issuance
- Source Water Hydrologist will review
- Follow Local Ordinances



ELAWARE HEALTH AND SOCIAL SERVICES



Wells Pumping over 50,000 GPD

- Need Allocation permit \$375
- Required to Advertised \$100
- Requirements in the permit
 - Pump tests
 - Geophysical logging
 - Access tube for water levels
 - Flow meter
- Allocation may require additional monitoring (saltwater intrusion, water level, water quality sampling)



DELAWARE HEALTH AND SOCIAL SERVICES Division of Public Health



Interconnections

- Typically for Allocated User to Allocated User
- Interconnection Information
 - Location of Interconnection
 - Specifics of Interconnection (size, valving)
 - Transfer capacity
- File Transfer with Allocations Program



DELAWARE HEALTH AND SOCIAL SERVICE	s
Division of Public Health	



	on Permit Number	٦	
Facility Name: < Nam Water System Facility	e> / ID: <facility id=""></facility>		n permit #
Installation Date (Opt	ional)		
	+		
Agreement between	allocated facilities	ou and the allocate	d facility. This agreement should
indicatewhat?			
Choose File		_	
How many interconne	Values 1 - 30	If Yes	
·			
Interconnection 1 Coordinates of Interco	onnection Location	ור	
		i	
		i	
Location Description		n il	
il			
i		- I	
Valve Material			
		_ !}	Repeat 1-30 times based on above
Pipe Diameter (inche	5}		
1			
Maximum Transfer C	apacity (MGD)		
I			
Flow Direction			
Both directions			
I.			

I can't meet the distance....

- Alternative Method of Compliance (Section 12 of the Regulations)
 - Maximize all distances to known sources of contamination
 - Requires Justification
 - Required Confined
 - Treatment processes
 - Requires Advertisement in local newspaper
 - Scale drawings
 - Needs Secretary of DNREC's approval
 - Adds 8 to 12 weeks to the permit issuance





How do we tackle this?

- Start planning by engaging engineers and consulting firms
- Start exploring opportunities using your base line emerging contaminant test results

Where's the money?

- The US EPA is offering a non-competitive grant to the State of Delaware in the amount of \$19M for emerging contaminants in small or disadvantaged community water systems
- For Delaware to be eligible for the funding we need **YOU** to submit a Notice of Intent application by July 8th



DELAWARE HEALTH AND SOCIAL SERVICES

Emerging Contaminants – Small or Disadvantaged Communities

Who's Eligible?

- Community Water Systems that are:

 - Disadvantaged

Grant Application • Small; or What's Eligible*?* not exhaustive ant Applicati

- Feasibility studies
- Emerging contaminant non-routine sampling
- Treatment systems
- Permit fees
- Legal fees

Emerging Contaminants – Small or Disadvantaged Communities



ELAWARE HEALTH AND SOCIAL SERVICES Division of Public Health

Who's NOT Eligible?

Non-Community water systems

 Community water systems serving over 10,000 persons, that are not disadvantaged

10,000 perso What's NOT Eligible?

- Operation and Maintenance
- Projects that are not primarily* for addressing emerging contaminants
 - Including projects for growth
 - Including projects for fire protection

*Addressing secondary issues under this funding may be allowable

Emerging Contaminants – Small or Disadvantaged Communities



DELAWARE HEALTH AND SOCIAL SERVICES Division of Public Health





DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL



DELAWARE HEALTH AND SOCIAL SERVICES

Division of Public Health





Contact Us!



DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

Amber Bataille, Hydrologist <u>Amber.Battaille@delaware.gov</u> 302-739-9945 Sam Tracy, Hydrologist <u>Samantha.Tracy@delaware.gov</u> 302-739-9945 Brenda Haire, Environmental Scientist <u>Brenda.Haire@delaware.gov</u> 302-395-2600 Todd Keyser, Hydrologist <u>Todd.Keyser@delaware.gov</u> 302-395-2600



DELAWARE HEALTH AND SOCIAL SERVICES

James Hanes, Environmental Scientist <u>James.hanes@delaware.gov</u> 302-744-4824 Steve Mann, Administrator Office of Drinking Water <u>Stephen.Mann@delaware.gov</u> Sandi Spiegel, Deputy Chief – Health Systems Protection <u>Sandi.Spiegel@delaware.gov</u>

DHSS DPH EC SDC@Delaware.gov