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2025 League of Minnesota Cities Annual Conference

June 26, 2025

I’ve Got PFAS, What Now?

Confronting PFAS Contamination and a Brooklyn Center Success Story

Real People. Real Solutions.

Introduction

Meghan Brockman, PhD
Environmental Design Engineer
Bolton & Menk, Inc.

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Real People. Real Solutions.

Elizabeth Heyman
Director of Public Works
City of Brooklyn Center

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What is PFAS?

Man-made group of chemicals

15,000+ formulas exist

Unique physical, chemical, and toxicological properties

Fire resistant, non-stick properties

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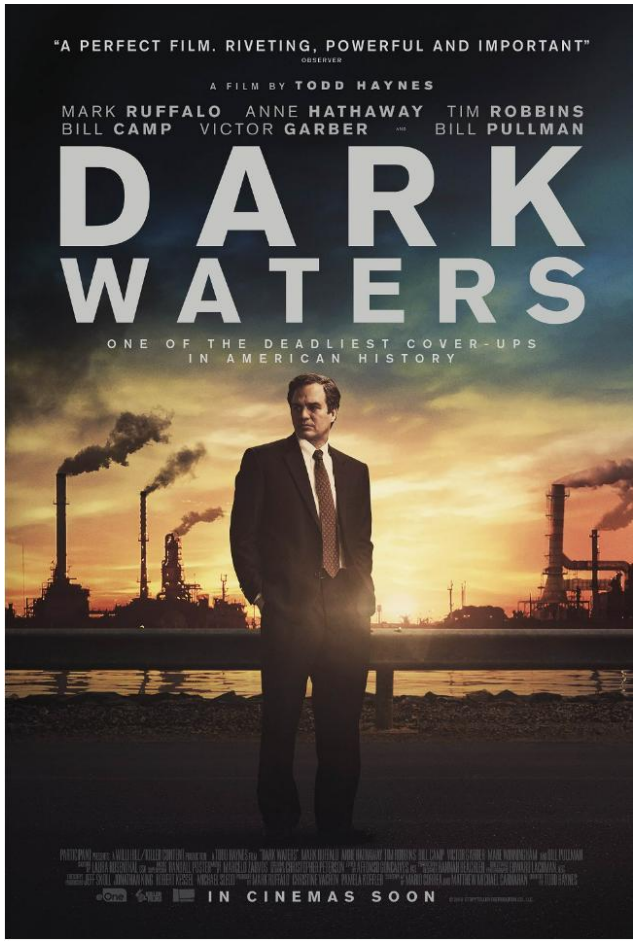
Public Awareness



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Public Awareness

MPRnews
Stay Curious. Stay Connected.

Kirsti Marohn · April 17, 2025 3:50 PM

Health department issues new warning about eating fish from some Minnesota lakes with 'forever chemicals'

Captured smelt from Lake Superior inside a cooler belonging to Johnny Thao of St. Paul. Derek Montgomery for MPR News | 2022

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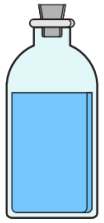
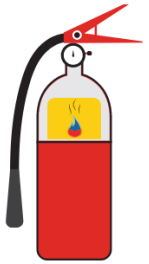
Where Can You Find It?



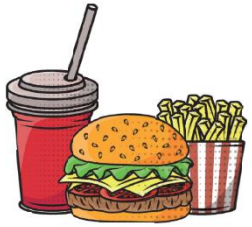
Stains and Water Resistent Treatments



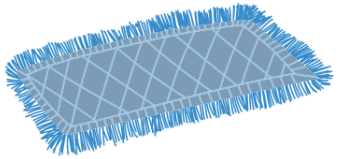
Firefighting Foam

Waterproof Apparel

Nonstick Cookware



Takeout Containers



Carpets & Textiles

Cleaning Products

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Where Can You Find It?

Water

Wastewater

Biosolids/
Waste Streams

Air

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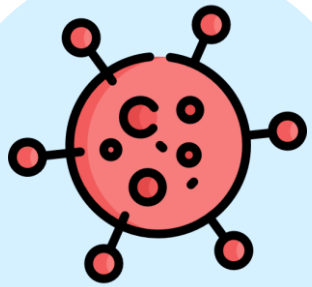
Is it Dangerous?



Cancer

Reproductive Issues

Liver Damage

Linked to:

High Cholesterol

Low Birth Weights

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How Do We Get Rid Of It?

Granular Activated Carbon (GAC)

Ion Exchange (IX)

Reverse Osmosis (RO)

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How Do We Get Rid Of It?

Or…..
Find a new water source

EPA Rules

MCL (Maximum Contaminant Limits

- PFOS = 4 ng/L
- PFOA = 4 ng/L
- HI of 1.0

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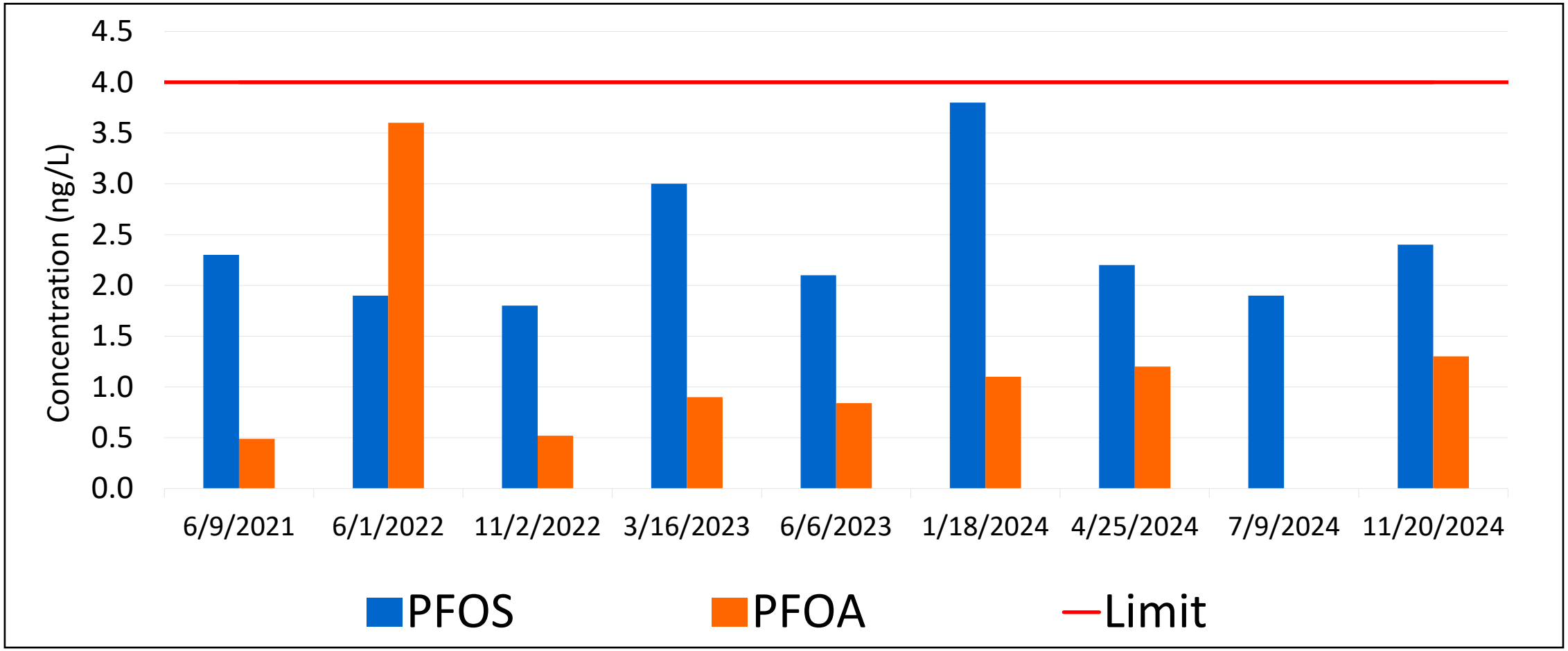
Water Treatment Plant #1



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System Status

Well	PFOS		PFOA	
	Detected	Above MCL	Detected	Above MCL
3	X	X	X	
4	X	X	X	
5	X	X	X	
6	X	X	X	
7	X		X	
8	X		X	
9	X		X	
10	X		X	

Brooklyn Center's Plan for PFAS

Educate the public about PFAS

Educate the City Council/staff on PFAS

Search for lower PFAS water source

Regular Testing

Continue to monitor for funding opportunities

Keep PFAS treatment as an option in future planning

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Public Education

- One-pager on PFAS
- Results webpage
- City newsletter article
- Social media and email campaign
- Educational mailer
- Educational video

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Public Education Must-dos

Work with experts

Only state facts

- Not “water is safe”, say “water meets all standards”

Unknown = fear = panic = angry residents

Be as open as possible*

- **Discuss all actions regarding PFAS, including communication, with your attorney*

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WHAT IS PFAS?

WHAT IS PFAS?

PFAS, or poly/perfluoroalkyl substances, are a group of compounds with similar chemical structures and properties. There are possibly over 10,000 PFAS formulas in existence. PFAS are sometimes called "forever chemicals", because they are almost impossible to degrade.

WHERE IS IT FOUND?

PFAS has been found everywhere from the artic ice to human blood. PFAS can be in the air, water, soil, or living organisms. The most common locations for PFAS in water are military sites, airports, landfills (where products have been thrown away) and manufacturing sites.

WHAT IS PFAS USED FOR?

The most popular use of PFAS is in fire fighting foams. PFAS has to be heated to over 1,000 ˚C before it degrades, making it a great fire suppressant.

PFAS can also be used to make water or stain resistant clothing and is a common additive to non-stick pans. PFAS can be used to make ski and board waxes, cleaning products, or carpets and other textiles.

IS PFAS HARMFUL?

The public health concern of all PFAS compounds is largely unknown. However, there is evidence that PFAS can lead to higher risks of cancer, liver damage, pregnancy complications, increased cholesterol, as well as other health concerns.

DOES MY WATER HAVE PFAS?

Brooklyn Center drinking water has tested the water using all available methods. 5 compounds were detected, including PFOA and PFOS. However, all compounds were detected at levels below the health based limit as set by the Minnesota Department of Health. The levels were also below proposed standards set by the US EPA. The city will conduct ongoing quarterly testing of the drinking water.

WHAT CAN I DO?

At this time, there is no cause for concern of PFAS in the Brooklyn Center drinking water. However, there are steps you can take in your home to reduce your exposure. Using a filter on any water source you use for drinking or cooking at your home can remove some PFAS compounds.

It is important to know that PFAS is not regulated yet by the EPA or FDA. This means bottled water may still contain PFAS compounds, though if this is the case and at what levels is unknown.

WHERE CAN I LEARN MORE?

To learn more about this issue visit: **brooklyncentermn.gov/government/departments/public-works/public-utilities/water-utility**

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PFAS

What are PFAS?

PFAS, or poly/perfluoroalkyl substances, commonly referred to as forever chemicals, are a group of compounds with similar chemical structures and properties. There are possibly over 10,000 PFAS formulas in existence. PFAS are commonly referred to as "forever chemicals" because they are almost impossible to degrade.

What are PFAS used for?

PFAS are used to make water or stain resistant clothing, and is a common additive in non-stick pans. PFAS are also popularly used in fire fighting foams, as they make great fire suppressants due to their high heat resistance; needing to be heated to over 1,000 degrees Celsius before degrading.

Where are PFAS found?

PFAS have been found everywhere from the Arctic ice to human blood. PFAS can be found in the air, water, soil or within living organisms. The most common locations for PFAS in water are military sites, airports, landfills and manufacturing sites.

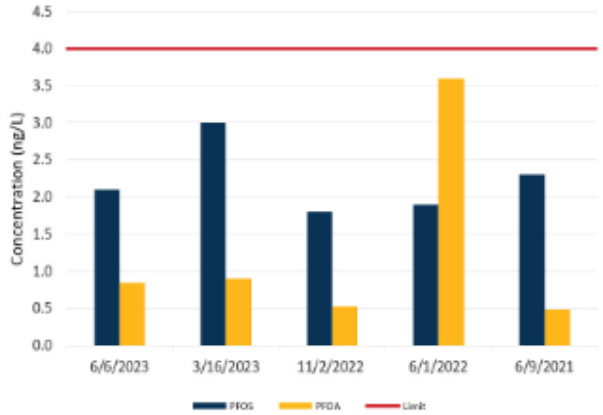
Are PFAS harmful?

The public health risks of all PFAS compounds are largely unknown. However, there is evidence that PFAS can lead to higher risks of cancer, liver damage, pregnancy complications, increased cholesterol, as well as other health concerns.

PFAS and Brooklyn Center water

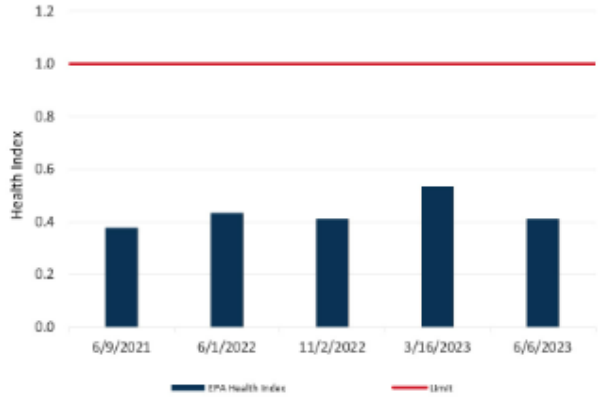
As part of regular drinking water monitoring. Brooklyn Center has tested water leaving the city water treatment plant. As shown in the graphs below, the testing results show Brooklyn Center drinking water meets all current federal standards for PFAS in drinking water. The City will continue to conduct quarterly testing of the drinking water and update these results as testing is completed.

Water treatment plant PFOS & PFOA testing results: Comparison to EPA limit



When multiple PFAS compounds are present, the EPA has advised that an additive effect can happen. This means if two PFAS compounds are present, both can be below the health based guidance, but still potentially be harmful. To account for this, the EPA has created a measure called a Health Based Index. To learn about this health based index, see the EPA guidance here.

Water treatment plant testing results: Comparison to EPA Health Index limit



The City will continue to conduct quarterly testing of the drinking water and update these results as testing is completed. You can see the full results below.

BC PFAS full results (PDF)

For more information on what these results mean or PFAS in general, visit the Minnesota Department of Health website here.

City Council Education

1 on 1 time

Avoid surprises at public meetings

Focus:

What is PFAS?

What are the health concerns?

What actions are available?

What actions are recommended?

Vet your experts!

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Search for Other Water Sources

- Where is PFAS found?
  - Both in city and nearby cities
- How does the local groundwater move?
- Is surface water an option?
- Certainty is hard, can only reduce uncertainty

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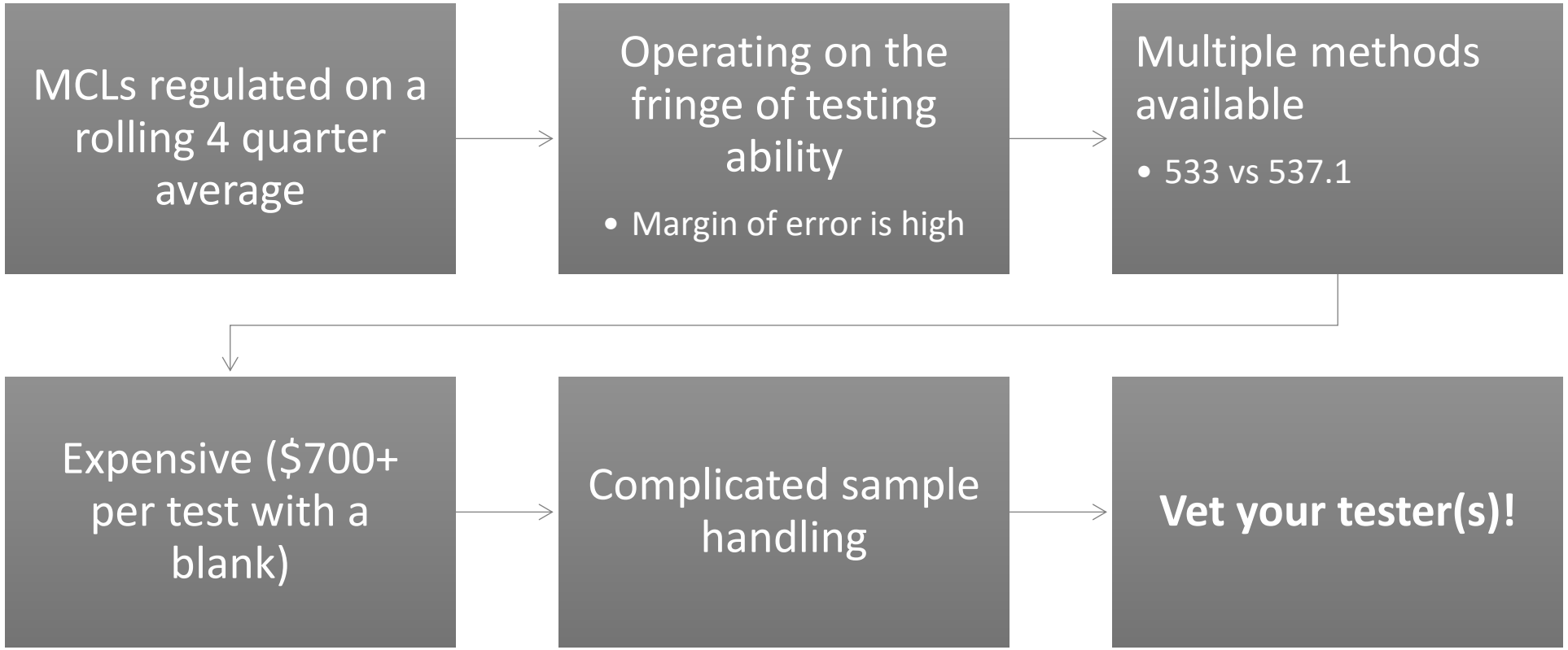
Regular Testing



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What if I Don't Find PFAS?

- **Celebrate!**
- Retest if new method is announced, or customer base changes

HELP!

I found PFAS!

Check
results against EPA Limits

Contact
experts for help (outside of regulators)

Determine
if treatment is feasible and/or necessary

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How Do We Get Rid Of It?

Granular Activated Carbon (GAC)

Ion Exchange (IX)

Reverse Osmosis (RO)

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Granular Activated Carbon (GAC)

- Organic material (wood, peat, coal) heated to activate carbon
- Stored in large vessels through which contaminated water flows
- PFAS bonds to the GAC where it remains as water passes over
- Used until it reaches PFAS breakthrough, at which time the GAC is replaced

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GAC

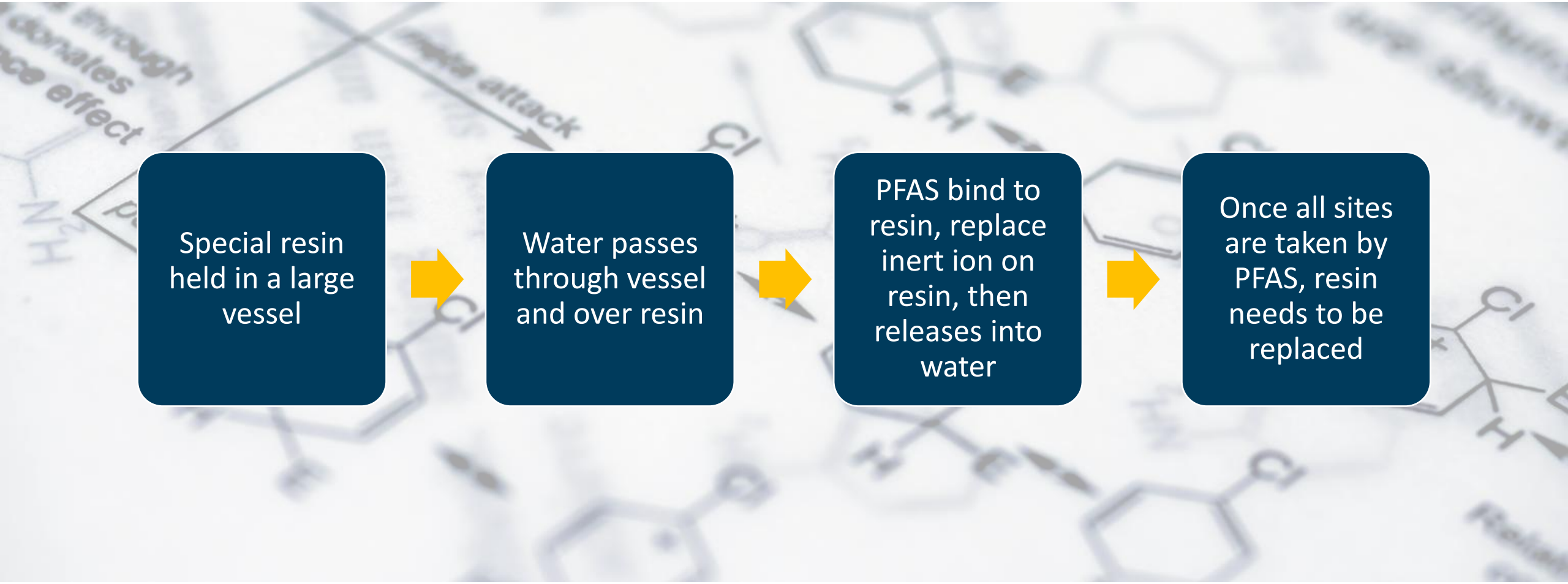
Pros:

- Lowest cost
- Common method for many contaminants
- GAC manufacturer will often pick up the waste GAC and dispose of it for you
- Approved by the MDH

Cons:

- Bonds with other chemicals as well
- Contaminated water can lead to early exhaustion of GAC and frequent change out
- Removal efficiency varies by PFAS compounds; may not be as effective for your PFAS problem

Ion Exchange (IX)



IX

Pros:

- Many resins available to fit your specific need
- Manufacturer often disposes of waste vessel
- MDH approval possible if pilot project is run before install

Cons:

- Resins expensive; specs often proprietary and difficult to learn what they contain
- Resins only specific to size and charge of contaminant you're trying to remove
- Contaminated water can lead to early exhaustion and frequent change out
- Removal efficiency varies by PFAS compounds
- Rapid small-scale column test needed to confirm appropriate IX resin

Reverse Osmosis (RO)

- Operates via rolls of thin membranes
- Water pumped through membranes; reject water sent for disposal or treatment
- PFAS compounds stopped by membranes and removed from water

RO

Pros:

- Remove other contaminants, like chlorides or hardness
- Membranes can be backwashed and reused multiple times
- Effective against many PFAS compounds at once

Cons:

- High cost to push water through membranes
- Membranes are expensive and delicate;cannot be tailored to only remove PFAS
- Reject stream needs to be disposed of
- High concentration of nutrients, organics, and TSS in wastewater makes RO a tertiary treatment option

Process for Design PFAS DW Treatment

Test raw water chemistry

Do you have a lot of other contaminants (iron, manganese, TOC?)

Determine if pretreatment ahead of PFAS treatment is needed

99% of the time, yes

Determine which treatment is right for you

Complete pilot testing

Construction/Installation

Ongoing maintenance

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Wastewater

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PFAS and Wastewater

Wastewater plants are passive receivers of PFAS through the influent

1. WWTPs do not create PFAS
2. WWTPs are not designed to remove PFAS
3. PFAS enter the WWTP influent through industrial, residential, commercial sources, and landfill leachate.

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MPCA and Wastewater PFAS

In 2022, MPCA requested participation from cities in sampling for PFAS in the influent

Four influent samples were taken and communities were classified into high, medium, low priority

Participating cities were requested to develop a PFAS Management plan based on sample results

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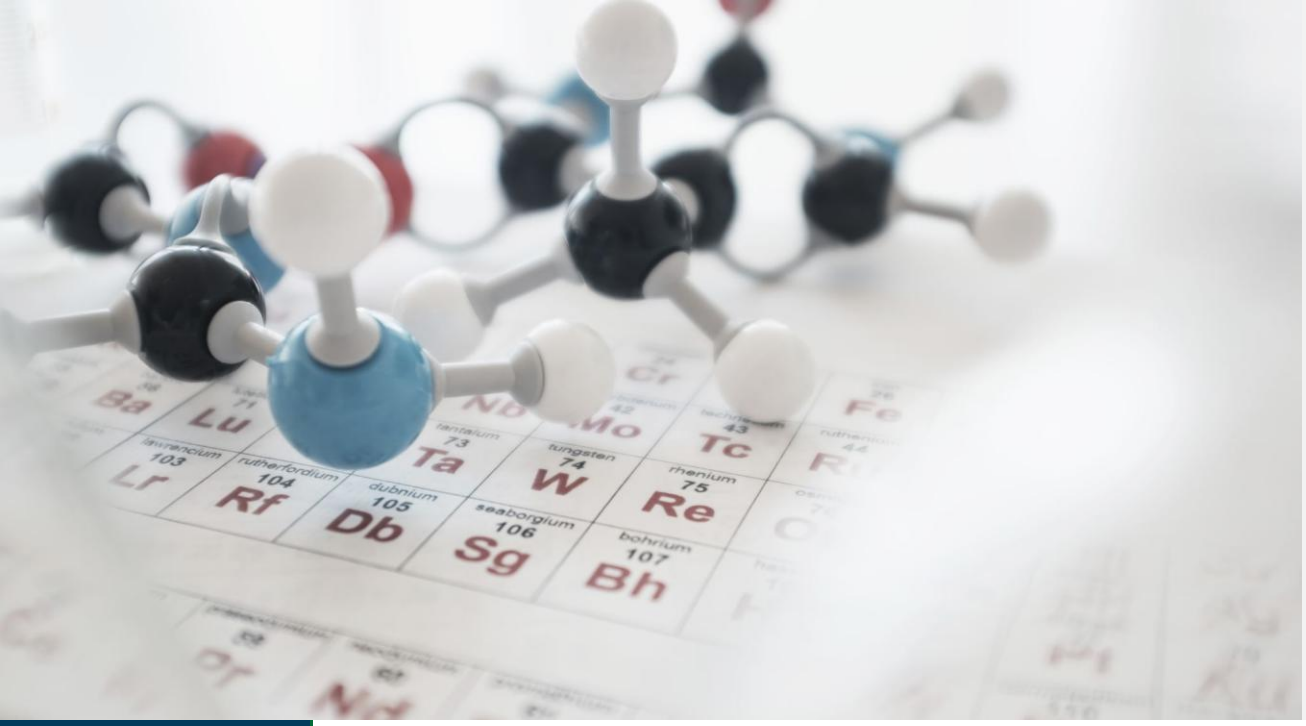

MPCA Regulations

- MPCA is in the early stages of implementing regulations for both biosolids and effluent
- MPCA has announced a new biosolids strategy for land applied biosolids
- MPCA has not set WWTP effluent limits, **yet!**

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Biosolids Land Application Regulations

Tiers	PFOS or PFOA Concentrations	WWTF Requirement
Tier 4	PFOS or PFOA ≥ 125 µg/kg	• Biosolids are considered industrially impacted • Notify MPCA • **Land application is not allowed** • WWTF must sample effluent for PFAS • Create, implement, or expedite a PMP
Tier 3	51 – 124 µg/kg	• Notify MPCA, farmer, and landowner of PFAS results • Create and implement a PMP • WWTF must sample effluent for PFAS • Reduce application to 1.5 dry tons/acre • Track cumulative application rates and report to MPCA
Tier 2	21 – 50 µg/kg	• Notify farmer and landowner of PFAS results • Track cumulative application rates and report to MPCA
Tier 1	≤ 20 µg/kg	• Notify farmer and landowner PFAS sampling was conducted

Effluent and PFAS

- MPCA has not set regulations for effluent PFAS
- MPCA is expected in the next NPDES permit cycle or two to begin adding PFAS monitoring for major facilities (>1MGD)
- If the WWTF discharges into a Class 1 water, expect PFAS limits in NPDES permit

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Stop the Source

Best Reduction Method

- MPCA's primary PFAS goal is to find and reduce the amount of PFAS in the community
- Source Identification and Reduction is most economical way to remove PFAS
- Work primarily has been left up to the city employees for community and industrial outreach to locate the PFAS

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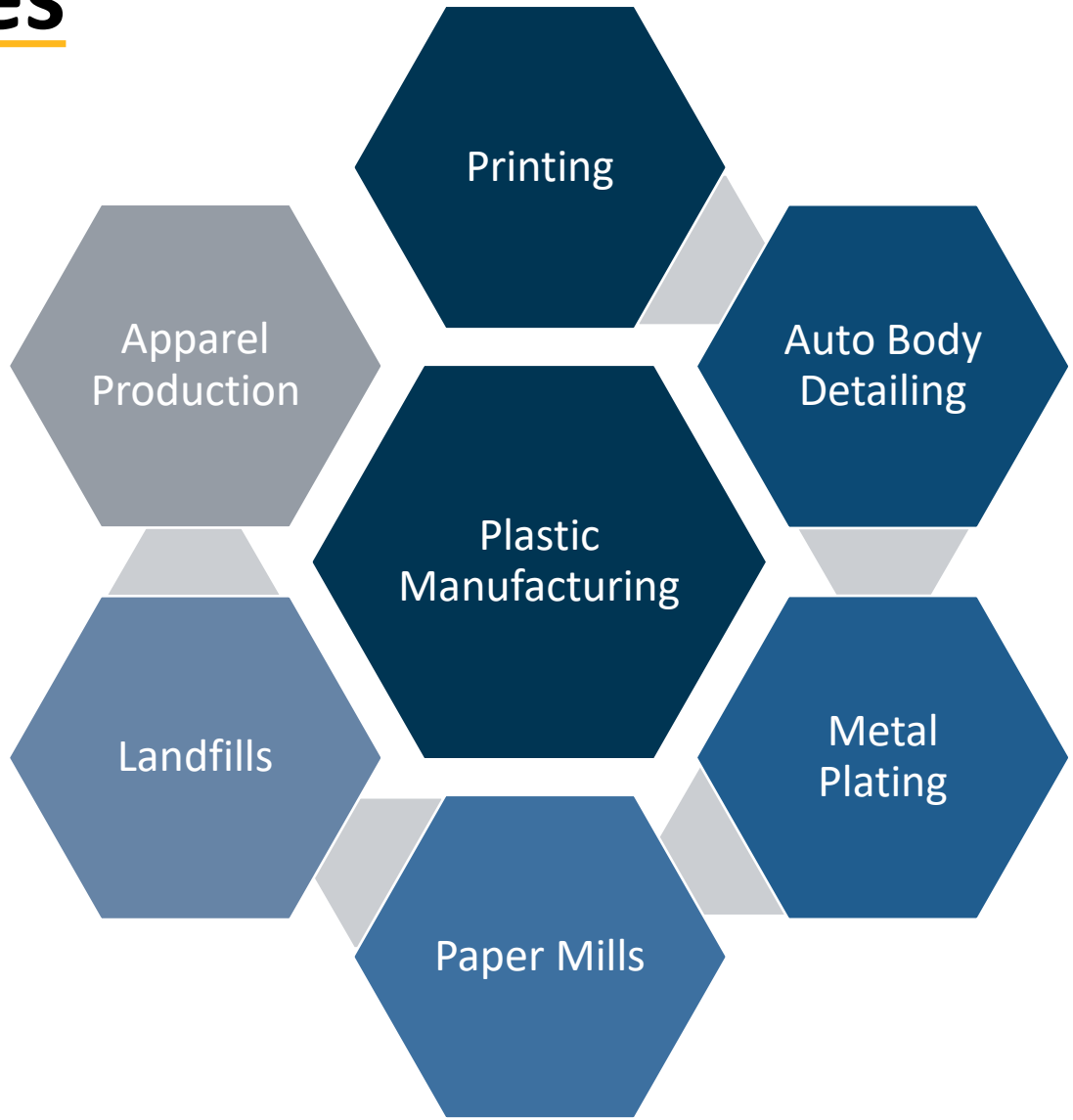
PFAS Sources



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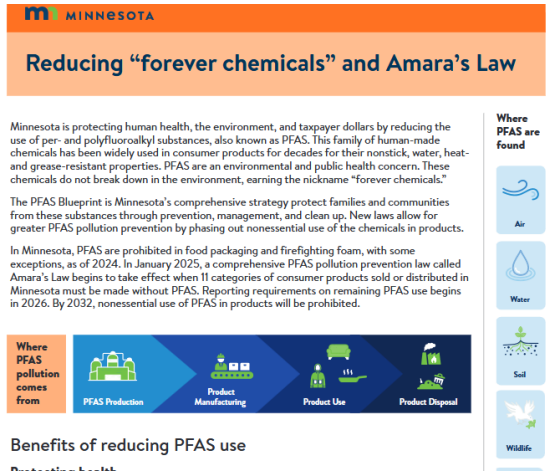
Talking to the Community

MPCA has communication tools available to assist city leaders

- Sample social media text
- One minute elevator talk
- Sample press release
- Factsheets
- Slide decks
- Graphics
- FAQs


MINNESOTA

Reducing "forever chemicals" and Amara's Law

Minnesota is protecting human health, the environment, and taxpayer dollars by reducing the use of per- and polyfluoroalkyl substances, also known as PFAS. This family of human-made chemicals has been widely used in consumer products for decades for their nonstick, water, heat- and grease-resistant properties. PFAS are an environmental and public health concern. These chemicals do not break down in the environment, earning the nickname "forever chemicals."

The PFAS Blueprint is Minnesota's comprehensive strategy protect families and communities from these substances through prevention, management, and clean up. New laws allow for greater PFAS pollution prevention by phasing out nonessential use of the chemicals in products.

In Minnesota, PFAS are prohibited in food packaging and firefighting foam, with some exceptions, as of 2024. In January 2025, a comprehensive PFAS pollution prevention law called Amara's Law begins to take effect when 11 categories of consumer products sold or distributed in Minnesota must be made without PFAS. Reporting requirements on remaining PFAS use begins in 2026. By 2032, nonessential use of PFAS in products will be prohibited.

Where PFAS are found

Air

Water

Soil

Wildlife

Where PFAS pollution comes from

PFAS Production

Product Manufacturing

Product Use

Product Disposal

Benefits of reducing PFAS use

https://www.pca.state.mn.us/air-water-land-climate/communications-toolkit-pfas-reduction-and-amaras-law

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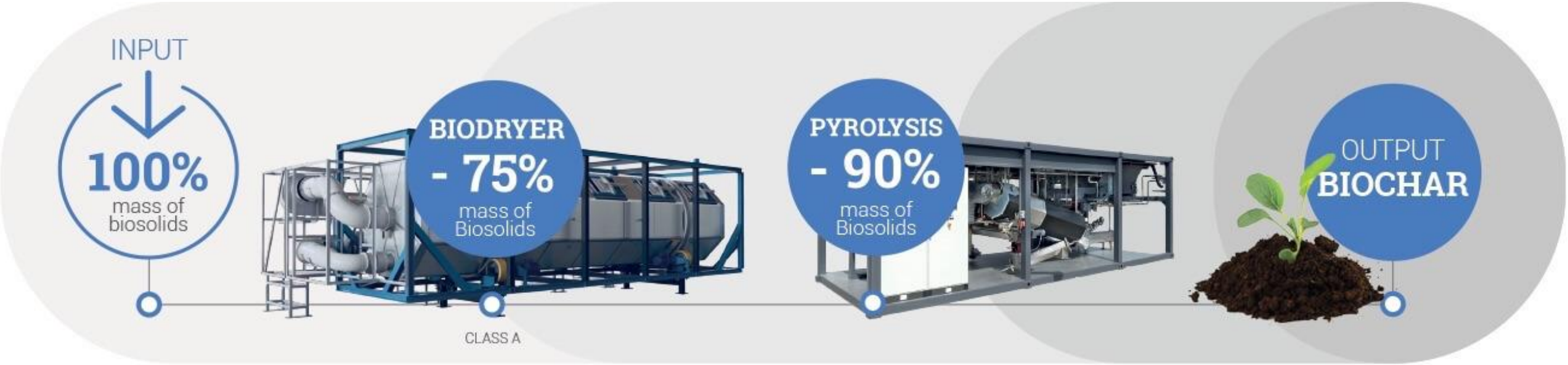
PFAS Treatment of Biosolids

- Most common sludge treatment process do not reduce PFAS in sludge
- Incineration
- Gasification – High temperature with limited oxygen present
- Pyrolysis – High temperature and pressure and no oxygen



What about Biosolids?

Treatment Methods

Incineration

- Costly
- Still have a waste product to dispose of
- Strict air release regulations

Pyrolysis

- Also costly
- Still undergoing study
- Potential PFAS byproducts

Supercritical Water Oxidation

- Difficult to implement
- Not yet deployed at full scale, only laboratory settings

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What about Biosolids?

Best Method – Source Reduction

Table 1. Substantial PFOS Reduction at WWTPs with Exceedances (EGLE, 2020)

Municipal WWTP	Recent PFOS, Effluent* (ng/L)	PFOS Reduction (highest to most recent)	Actions Taken to Reduce PFOS
Ionia	<7.6	99%	Treatment (GAC) at source (1)
Lapeer	11	99%	Treatment (GAC) at source (1)
Port Huron	13	99%	Eliminated source PFOS (2)
Wixom	18	99%	Treatment (GAC) at source (1)
Howell	3.7	95%	Treatment (GAC/resin) at source (1)
Bronson	13	96%	Treatment (GAC) at source (1)
Kalamazoo	3.1	92%	Treatment (GAC) at source (2), change water supply
K.I. Sawyer	27	89%	Eliminated leak PFOS-containing firefighting foam
GLWA (Detroit)	30	No Value	Treatment (GAC) at sources (8)
Belding	7.2	49%	Restricted landfill leachate quantity accepted

*Data received as of March 26, 2020

https://www.michigan.gov

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How Can I Pay for It?

- IIJA has $11.6 million for “emerging contaminants”, including PFAS
- PFAS treatment $$ available once bonding bill is passed
- Will go through PFA, like other DW and WW projects
- **No specific “pool” of money**

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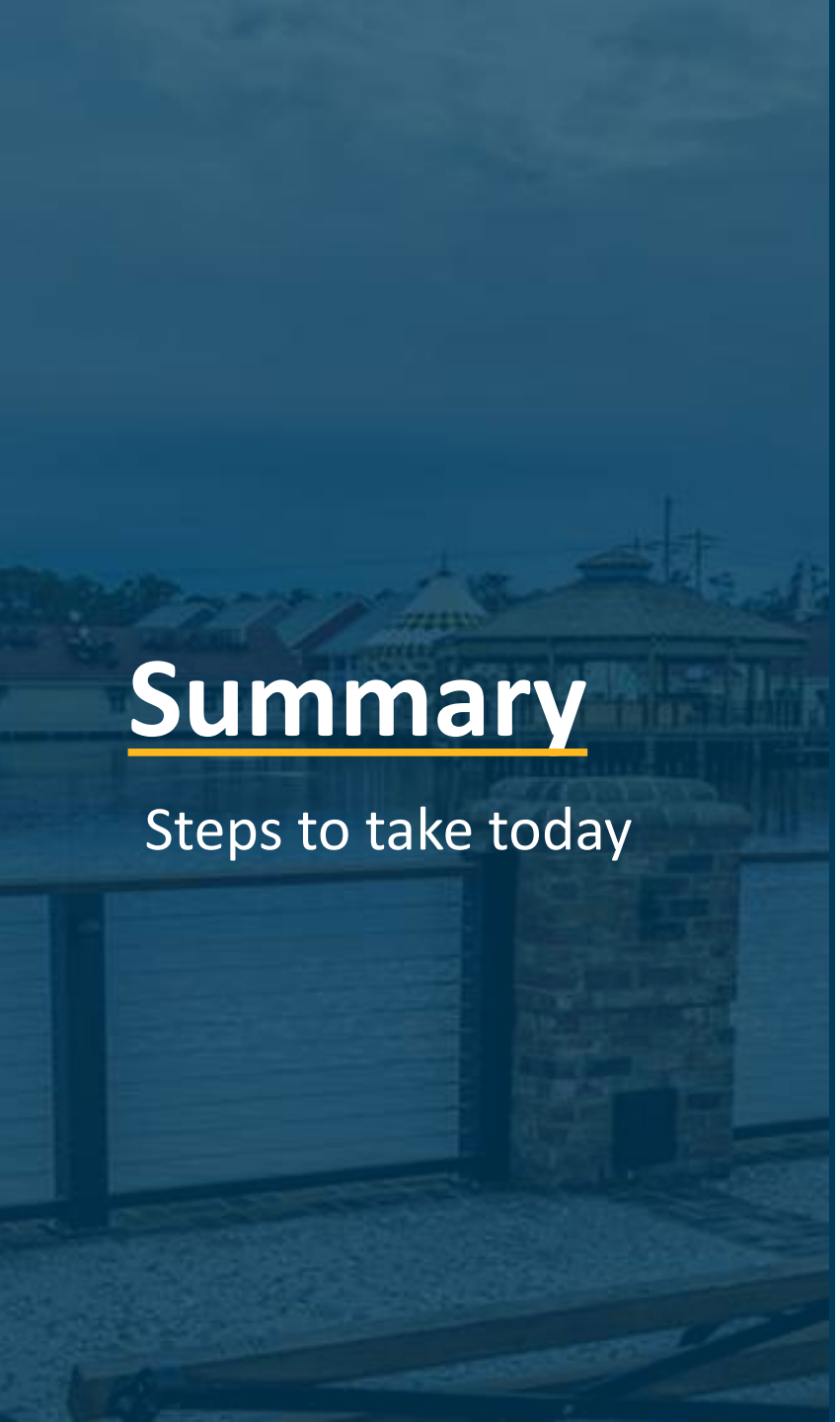

Summary

Steps to take today

Know your risks

Landfills
Chrome Plating
Manufacturing
Airports/Military

Know your testing status

Have you tested/been tested before? Results?

Decide how to test

Do you test every quarter? Every year? What method?

Have a PR plan

If you have PFAS, know how you are going to speak/explain to the public

Look out for funding

PFAS funding should be coming….soon?

Check the laws, often

MCLs are coming by 2031

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Thank You!

Questions?

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EPA Health Advisories

	PFOA	PFOS	PFHxS	PFHxA	PFBA	PFBS
HA (ppb)	0.035	0.015	0.047	0.2	7	0.1

$$\mathrm{HI} = \frac{\mathrm{PFOA\ (ppb)}}{0.035} + \frac{\mathrm{PFOS\ (ppb)}}{0.015} + \frac{\mathrm{PFHxS\ (ppb)}}{0.047} + \frac{\mathrm{PFHxA\ (ppb)}}{0.2} + \frac{\mathrm{PFBA\ (ppb)}}{7} + \frac{\mathrm{PFBS\ (ppb)}}{0.1}$$

$$\mathrm{HI} \leq 1: \textit{Below or at allowable risk level, action not needed}$$

$$\mathrm{HI} > 1: \textit{Above allowable risk level, action needed}$$

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https://www.health.state.mn.us/communities/environment/hazardous/topics/pfashealth.html

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