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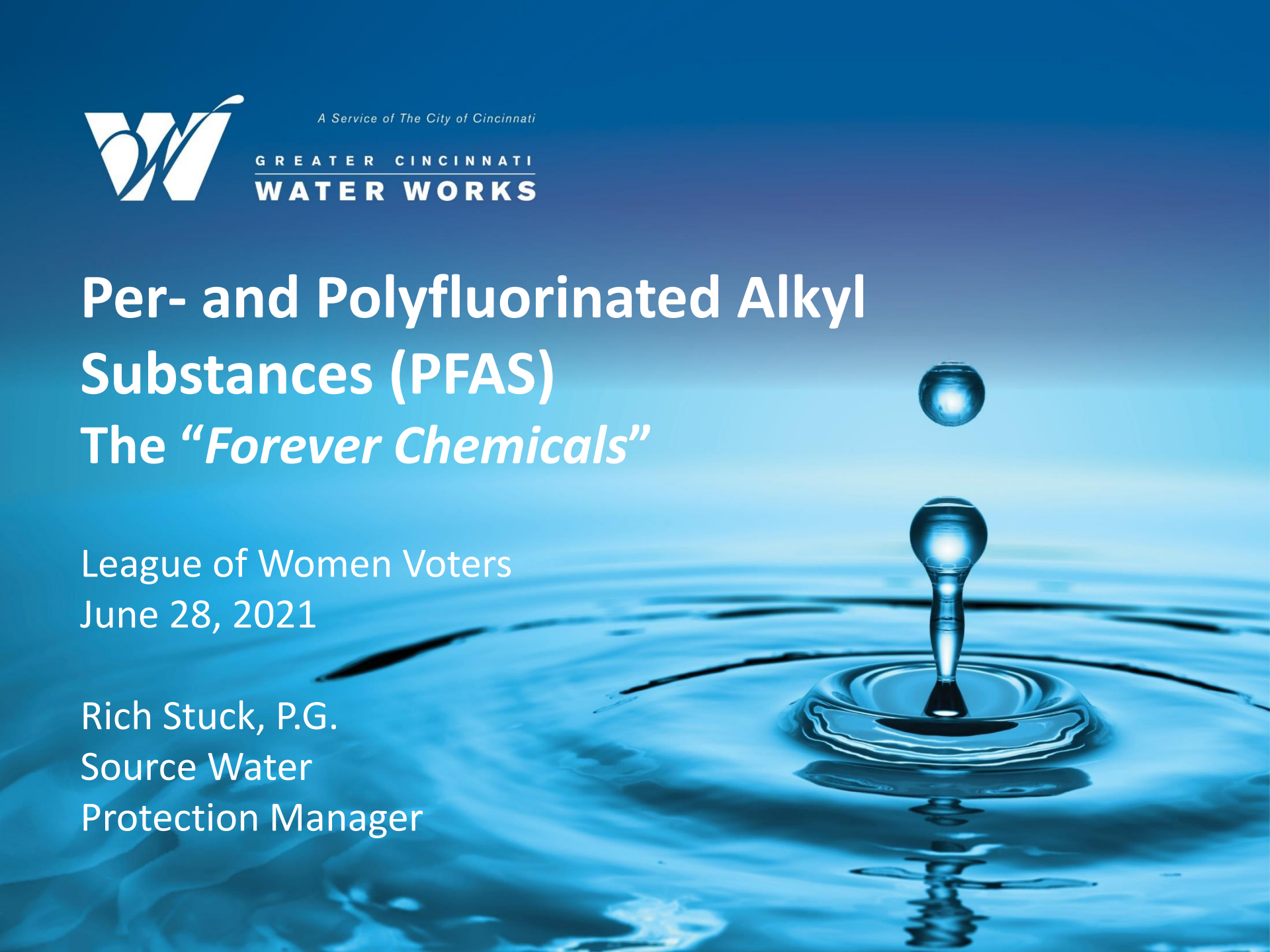
GREATER CINCINNATI WATER WORKS

Per- and Polyfluorinated Alkyl Substances (PFAS)

The "*Forever Chemicals*"

League of Women Voters
June 28, 2021

Rich Stuck, P.G.
Source Water
Protection Manager



Per- and Polyufluoroalkyl Substances (PFAS)

- Do not occur naturally
- Uses include – Non-stick/stain repellent coatings, water repellents, fire retardant coatings, fire fighting foam, electroplating…..
- Used Since the 1940's
- Resistant to normal degradation
- PFOA and PFOS most well known/studied

Common Sources of PFAS In the Environment

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- PFAS manufacturing & processing facilities (Discharges)
  - Textiles and Leather
  - Paper Products
  - Metal Plating
  - Wire Manufacture
  - Plastics/Resins/Molds
  - Semi-conductor
- Airports, military bases, and fire fighting training facilities (or actual fires).
  - Aqueous film forming foam (AFFF)
- Wastewater Treatment Plants
- Air Deposition (from factory air emissions)

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Federal Regulations/Guidance

- Drinking Water
  - No current regulations (PFOA/PFOS LHA 70 ppt)
  - Announced intent to regulate PFOA/PFOS
- Toxics Release Inventory –
  - 175 PFAS compounds added for reporting year 2020
  - Reports due by July 31, 2021.
  - These data will potentially reveal previously unknown sources
- Groundwater Cleanup
  - Interim recommendation – 40 ppt (PFOA/PFOS) screening level 70 ppt preliminary remediation goal for groundwater which is current or potential source of drinking water
- Legislative efforts to require establishment of MCLs
- Legislative efforts to declare PFAS Hazardous Substances

Summary of State Levels

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State	Drinking Water Action	Compound	Level (ppt)
California	Response Level	PFOA PFOS	10 40
Connecticut	Action Level	Sum of PFOA, PFOS, PFNA, PFHxS, PFHpA	70
Massachusetts	Drinking Water MCL process initiation	Sum of PFOA, PFOS, PFNA, PFHxS, PFHpA, PFDA	20
Michigan	Proposed MCLs	PFOA PFOS PFNA PFHxS PFBS PFHxA GenX	8 16 6 51 420 400,000 370
Minnesota	Health Based Guidance	PFOA PFOS PFHxS	35 15 47
New Hampshire	Adopted Regulation	PFOA PFOS PFHxS PFNA	12 15 18 11
New Jersey	Adopted Regulation Regulation in Development Guidance Value	PFNA PFOA PFOS	13 14 13
New York	Rulemaking initiated 7/8/19	PFOA PFOS	10 10
North Carolina	Health Advisory	GenX	140
Vermont	Drinking Water Health Advisory	Sum of PFOA, PFOS, PFNA, PFHxS, PFHpA,	20

From www.asdwa.org/pfas/ on 2/24/2020

Range of State Levels
PFOA 8-70 ppt
PFOS 10-70 ppt
GenX 140-370 ppt

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Ohio Regulations / Guidance

- Currently no drinking water regulations
- Established action levels for 6 compounds

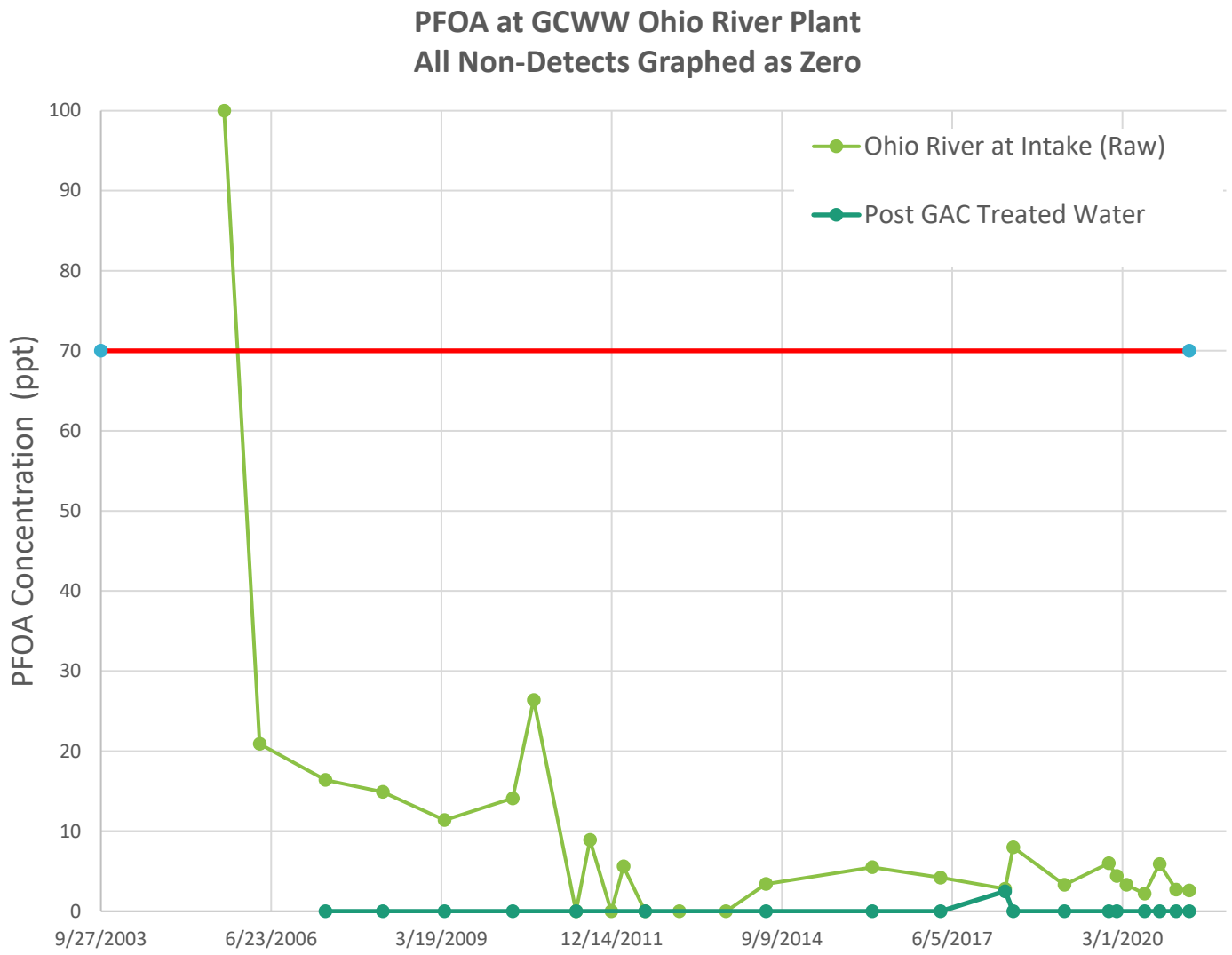
PFOA	PFOS	GenX	PFBS	PFHxS	PFNA
>70 w/PFOS	>70 w/PFOA	>700 ppt	>140,000	>140	>21

- Extensive statewide sampling of raw and finished water recently completed.
- Legislative efforts to require establishment of MCLs (H.B. 497)
- Legislation to limit fluorinated firefighting foam (H.B. 328)

GCWW's PFAS Mitigation Strategies

- Became aware of DuPont/Chemours Site in WV around 2005 and started collecting baseline data (PFOA, PFOS, recently added GenX).
- Modified carbon regeneration schedule in part, to optimize removal of PFOA.
- Provide input on upstream NPDES permits and proposed regulations at known PFAS locations.
- Review data and water monitoring information to identify sources of PFAS.
- Participate in various research projects and workgroups.

GCWW PFOA Data



Ohio PFAS Action Levels

	PFAS Chemicals[1]					
	PFOA	PFOS	GenX	PFBS	PFHxS	PFNA
Action Level (ppt)	>70 single or combined with PFOS	>70 single or combined with PFOS	>700	>140,000	>140	>21

[1] PFOA (perfluorooctanoic acid), PFOS (perfluorooctane sulfonate), GenX (HFPO dimer acid), PFBS (perfluorobutanesolfonic acid), PFHxS (perfluorohexane sulfonic acid), and PFNA (perfluorononanoic acid)

Monitoring

Utilities in Ohio are not required to regularly monitor for PFAS. However, in 2005, GCWW became aware of PFOA contamination at a facility in Parkersburg, WV that was owned and operated by DuPont. GCWW was concerned this compound could be getting into the Ohio River, which is the source of water for most of the region. At this time, GCWW began a monitoring program to assess the levels in the river and to ensure that the GAC treatment process was effective at removing this compound. Initially, monitoring results of the Ohio River found PFOA levels at 100 ppt, but the GAC successfully removed the PFOA to non-detectable levels.

Beginning in 2006, DuPont entered into an agreement with the USEPA to begin phasing out PFOA production, and the Ohio River monitoring shows decreasing levels in the river starting in 2006. DuPont reported that in 2015 the discharge and manufacture of PFOA at the facility had stopped. Subsequent PFOA levels found in the Ohio River are likely from other sources including leaching from some landfills in the Parkersburg area.

GCWW has been monitoring GenX in the river since 2017 to ensure there are not high levels of that compound in the water from the DuPont plant. To date, most samples collected are not detectable or far below the Ohio EPA's action levels of 700 ppt. GCWW will continue to monitor PFAS compounds to evaluate the levels and to ensure that these compounds are removed effectively through the treatment processes at the Richard Miller Treatment Plant.

GCWW has also been monitoring for PFOS and PFOS at the Charles M. Bolton Treatment Plant (CMBP) since 2007 and for GenX since 2019. The CMBP provides treated groundwater to a smaller portion of the region. Contamination of groundwater can come from sources such as firefighting foams used at military installations and fire training facilities or manufacturing facilities. Trace levels of PFOA and PFOS have been detected in the groundwater and in the treated water at CMBP. All the levels are well below the USEPA health advisory of 70 ppt. GenX has not been detected at the CMBP. To ensure the safety of our water we will continue to monitor these compounds in our groundwater system.

Track our Results –

https://www.cincinnati-oh.gov/water/water-quality-and-treatment/water-your-health/pfas-and-genx/

Perfluorooctanoic Acid (PFOA)

Ohio PFOA Action Level: > 70 ppt single or combined with PFOS

SAMPLE DATE	Richard Miller Treatment Plant		Charles M. Bolton Treatment Plant	
	OHIO RIVER WATER	TREATED WATER	WELL WATER	TREATED WATER
	CONCENTRATION* (parts per trillion)		CONCENTRATION* (parts per trillion)	
9/20/2005	100	< 25	No Sample	No Sample
4/17/2006	20.9	No Sample	No Sample	No Sample
4/17/2006	22.3	No Sample	No Sample	No Sample
5/7/2007	No Sample	No Sample	No Sample	< 10
5/8/2007	16.1	< 10	No Sample	No Sample
5/8/2007	16.7	No Sample	No Sample	No Sample
4/9/2008	14.9	< 10	No Sample	< 10
4/7/2009	11.4	<10	No Sample	< 10
5/12/2010	14.1	< 10	< 10	< 10
9/12/2010	26.4	No Sample	No Sample	No Sample
9/16/2010	No Sample	1.06	No Sample	No Sample
5/19/2011	< 10	< 10	No Sample	< 10
8/9/2011	8.9	No Sample	No Sample	No Sample
12/12/2011	< 5	< 5	No Sample	No Sample
12/12/2011	No Sample	< 5	No Sample	No Sample
2/22/2012	5.6	< 5	No Sample	No Sample
2/22/2012	No Sample	< 5	No Sample	No Sample
6/28/2012	< 50	< 50	< 50	No Sample

Regional PFAS Studies

Ohio River (ORSANCO):

- Started First of 2 river-wide sampling events in June 2021
- Goal to characterize present *ambient* concentrations in the Ohio River at multiple locations
- 20 sample sites, 2 sampling events
- Very technical, highly evolved sampling approach

Great Miami Buried Valley Aquifer

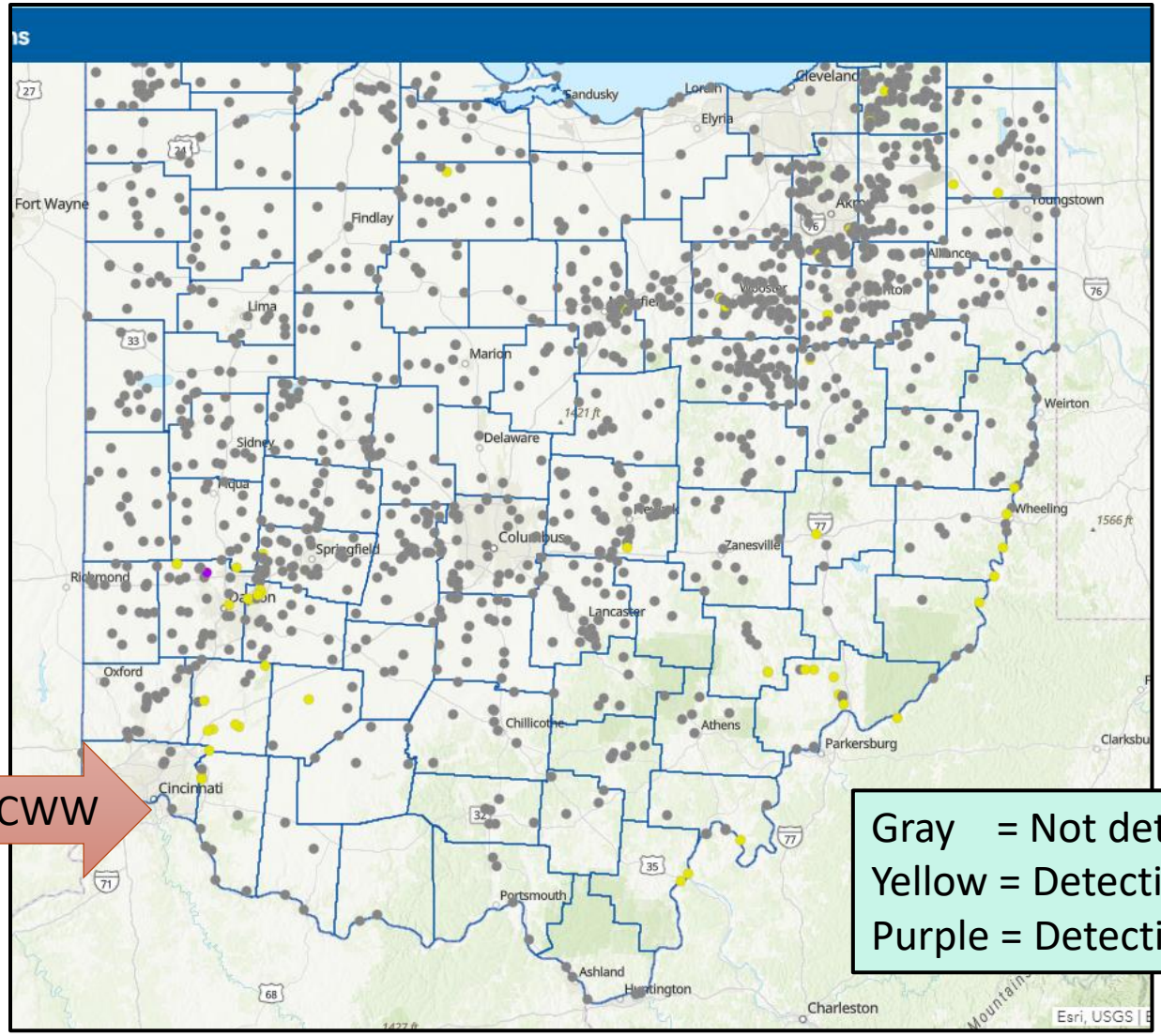
(USGS, GW Consortium, MCD, and Others)

- Ambient GW sampling occurring throughout the GMBVA aquifer

Ohio EPA

- On Sept. 27, 2019, Ohio Governor Mike DeWine directed Ohio EPA and Ohio Department of Health (ODH) to analyze the prevalence of PFAS in Ohio's drinking water.
- Sampling Completed in 2020 (1,532 PWS Tested)

Ohio EPA PFAS Sampling Results



https://epa.ohio.gov/pfas

GCWW

Gray = Not detected
Yellow = Detection below action level
Purple = Detection above action level

Finding Sources of PFAS

- National Defense Authorization Act Section 7321
- 175 PFAS compounds added to the ***Toxics Release Inventory*** reporting requirements
  - Provisions for additional compounds in the future
  - First PFAS data due by July 31, 2021
  - Will be critical to identifying previously unknown potential sources

What Can Utilities Do Now?

- Evaluate/update source water protection inventory to look for potential contaminant sources.
- Track/Comment on NPDES and Air Permit limits.
- Open a dialogue with the upstream sources.
- Conduct upstream source water sampling.
- Work with regulatory agencies.

Specific Questions

- *"GenX is smaller particles. Do they still cling onto carbon as well?"*

  Treatment information for GenX is evolving. The size of the molecule is not the determining factor. Activated carbon does remove GenX, no as effectively as it removes PFOA, PFOS and other PFAS, but enough to keep the concentrations in finished water well below the HAL.

- *"Is GCWW still keeping vigilance over cleanup at Beckjord? What about ash ponds?" also, "They are moving forever chemicals from a leaking pond to another less leaking pond"?*

  Yes, Decommissioning activities at Beckjord remain a high priority for us and the potential for releases from the ash ponds are our biggest legacy concern for that site. We have increased the frequency of certain sampling in response to the demolition debris in the river.

  They are in fact moving coal ash from on unlined pond to a second unlined pond, however, this is NOT a PFAS-related situation. So far we have not seen any data to suggest Beckjord coal ash is a source for PFAS.

- *"What does the final step of Ultra Violet Light for drinking water? Why after carbon treatment is this needed?"*

  The final UV step is a disinfection step designed to protect the water supply from microorganisms such as giardia and cryptosporidium that are resistant to chlorine. The carbon removes dissolved organic compounds (chemical). The two treatment systems are complimentary, not redundant. UV is after the carbon to maximize the disinfection and reduce the amount of electricity needed to achieve the target inactivation. We continue to use chlorine for disinfection as well.

Specific Questions

- *"Some fracking in OH produces no fuel, only plastic. What waste comes from these fracking sites, and how does GCWW test for these chemicals.?"*

  I believe this question is getting at the NGL (natural gas liquids) products from some portions of the fracking area (Utica shale wells?) vs. crude oil and natural gas wells. The NGLs are the feedstock for ethane crackers and plastics raw material. GCWW and ORSANCO monitor VOCs, which includes a number of petroleum compounds, through the ODS. We will provide comments whenever possible on permits related to the ethane cracker plants and Appalachian Petroleum Hub to ensure drinking water is adequately considered.

- *"Radioactive brine on roadways is sometimes used during winter. Does GCWW test for radioactivity?"*

  GCWW is aware of the potential use of fracking brines as deicing materials. We increased our radiologic sampling 2 years ago due to the resumption of activities at the Portsmouth Gaseous Diffusion plant. This sampling will pick up any changes due to road deicing as well.

- With the coronavirus variants tested in the wastewater, does that help water works deal with viruses in water? Does the carbon and ultra violet light clean any viruses up?
  - All public water systems must treat the water to stop the spread of microbial contaminants including viruses. The corona virus is killed by the chlorine disinfection; GCWW maintains a residual of chlorine throughout our distribution system providing disinfection all the way to the tap. We also disinfect the water with ultraviolet light as an additional barrier. There have been no cases of coronavirus spread through the drinking water supply.

Rich Stuck, P.G.
Source Water Protection Manager
Greater Cincinnati Water Works
513-624-5659
richard.stuck@gcww.cincinnati-oh.gov

Greater Cincinnati Source Water Protection page:
https://www.cincinnati-oh.gov/water/water-quality-and-treatment/water-sources-resource-protection/

Ohio River Source Water Alliance page:
https://orswa.org/

Hamilton to New Baltimore Groundwater Consortium page:
https://gwconsortium.org/