

Overview of Cape Fear Public Utility Authority PFAS Response and Request for Assistance from SSAB

Secretaries' Science Advisory Board

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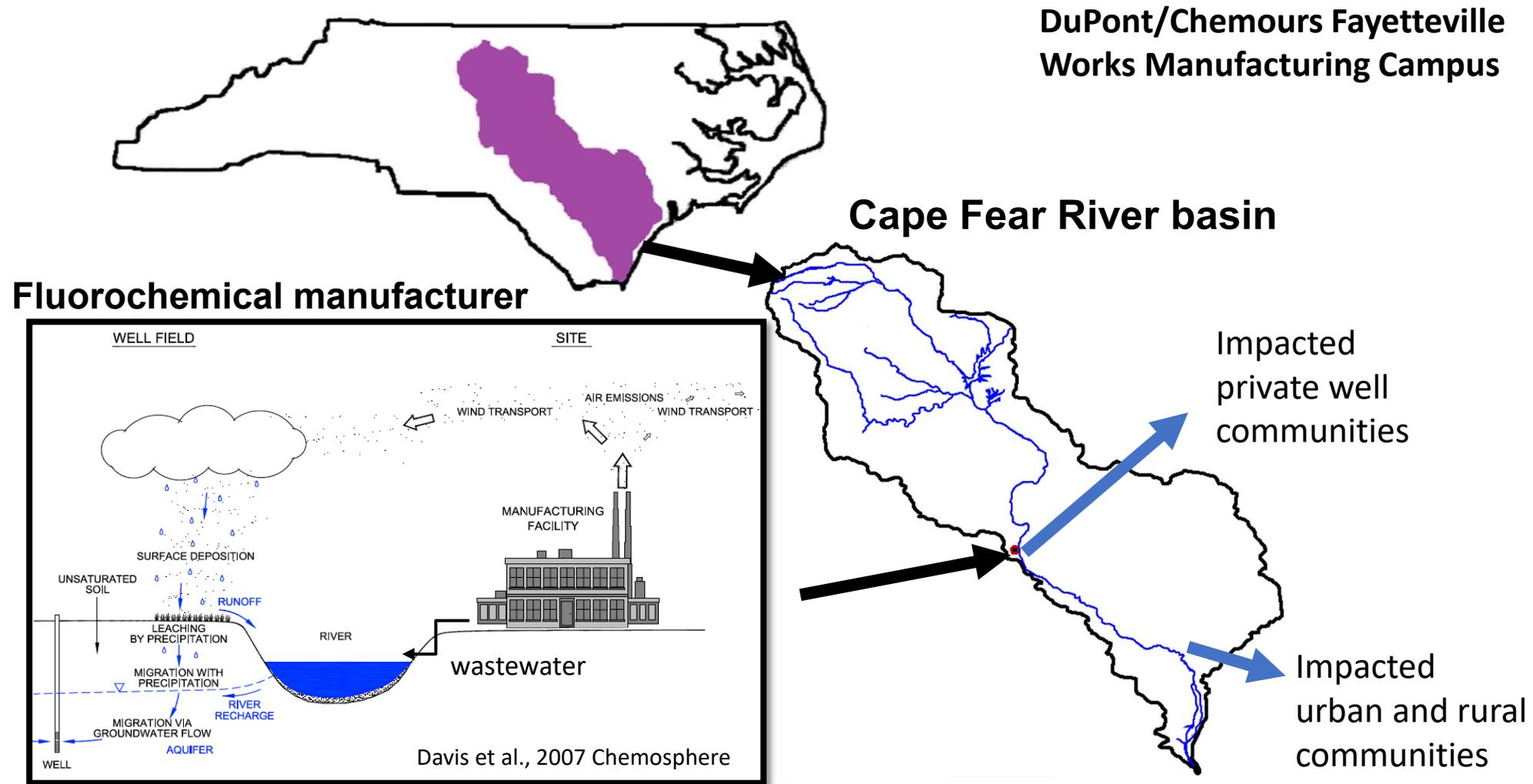


CFPUA Overview

- ▶ **July 1, 2008: CFPUA opened**
 - ▶ Merged New Hanover County and City of Wilmington water and sewer systems
- ▶ Serves 200,000 people; ~75,000 individual accounts
- ▶ Public authority, ratepayer-funded, not-for-profit
- ▶ 11-member Board
 - ▶ Appointed by Wilmington City Council and New Hanover County Commissioners
- ▶ FY24 Operating Budget: \$112.9 million
- ▶ 10-Year Capital Improvement Plan (CIP): \$648.4 million



PFAS Manufacturing Above Water Source



PFAS in the Cape Fear

- ▶ 2017: Community made aware of PFAS contamination in Cape Fear River
 - ▶ Numerous PFAS compounds, among them GenX
- ▶ Contamination caused by decades of releases from Fayetteville facility operated by DuPont and later Chemours, upriver from Kings Bluff
- ▶ Customer demand for CFPUA to respond to PFAS in drinking water

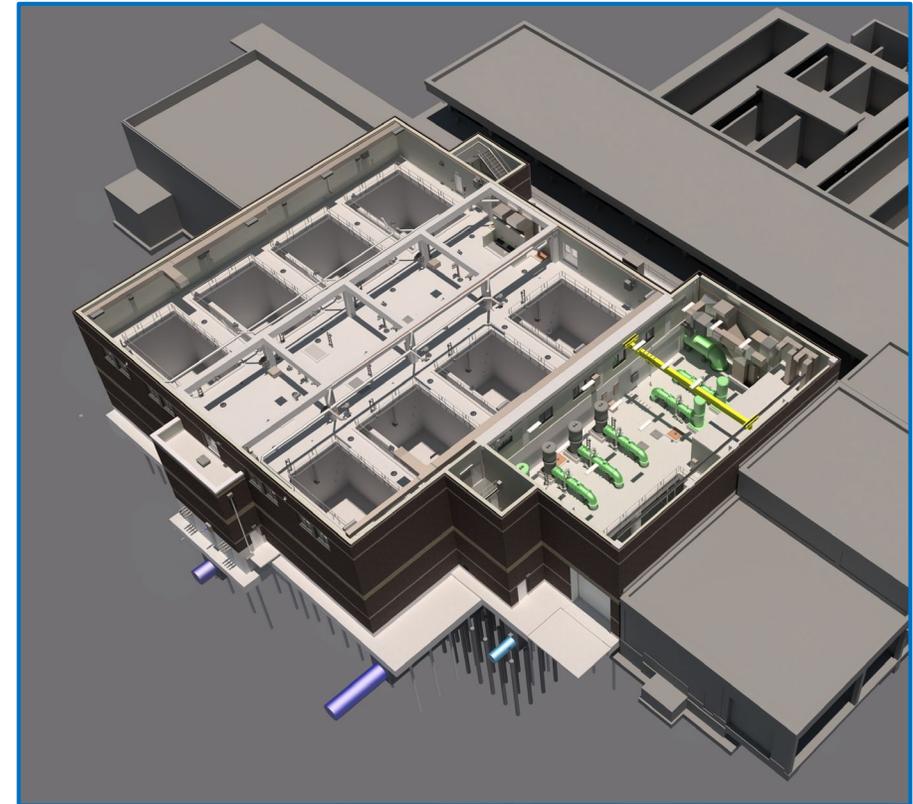


Lock & Dam 1 at Kings Bluff, Cape Fear River

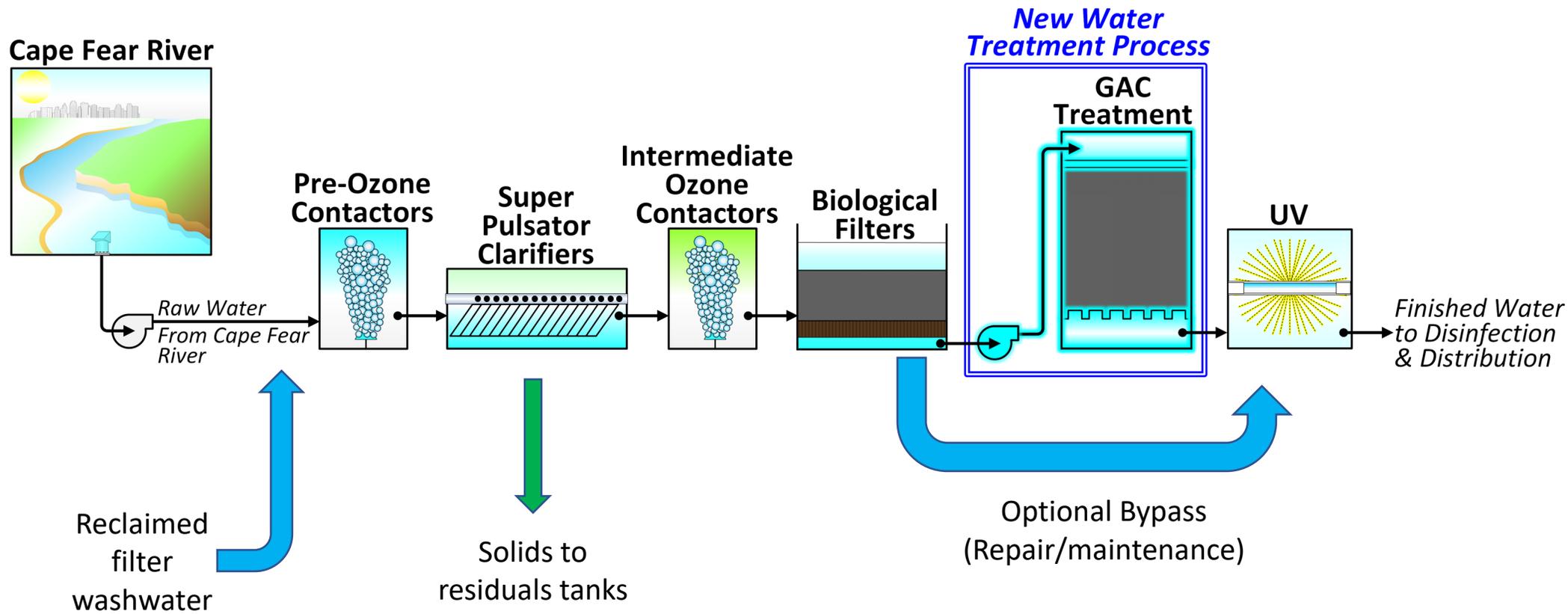
Design Summary

Granular Activated Carbon Contactor Design Summary

Number of GAC Contactors	8
Design Flow Rate (each)	3,823 GPM
Type	Concrete Basin
Size (each)	22 x 38 feet
GAC Media Depth	12.5 feet
Contact Time at Design Flow	20 minutes



GAC Treatment Location



GAC Contactor Overview

- ▶ 44 MGD treatment capacity
- ▶ At peak capacity, takes 20 minutes for the water to flow through
- ▶ Almost 3,000,000 pounds of GAC media
- ▶ 14 inches of graded gravel
- ▶ 12.5 feet of GAC media (Calgon F400)
- ▶ Up to 375,000 pounds of GAC per contactor
- ▶ GAC media cost per contactor is about \$670,000



GAC Filters Optimization: Year One

- ▶ October 2022: Deep-bed GAC filters come online at the Sweeney Plant.
- ▶ PFAS initially removed to at or near non-detectable levels in the finished water, but shortly afterwards we saw some breakthrough, especially from short-chain compounds.
- ▶ Using PFMOAA as the indicator compound for filter changeout.
- ▶ March 2023: EPA Proposes first time National Primary Drinking Water Regulations (NPDWR) for PFAS.
- ▶ Year One is focused on optimization and learning to use and manage the facility.

EPA's Proposed Action for the PFAS NPDWR

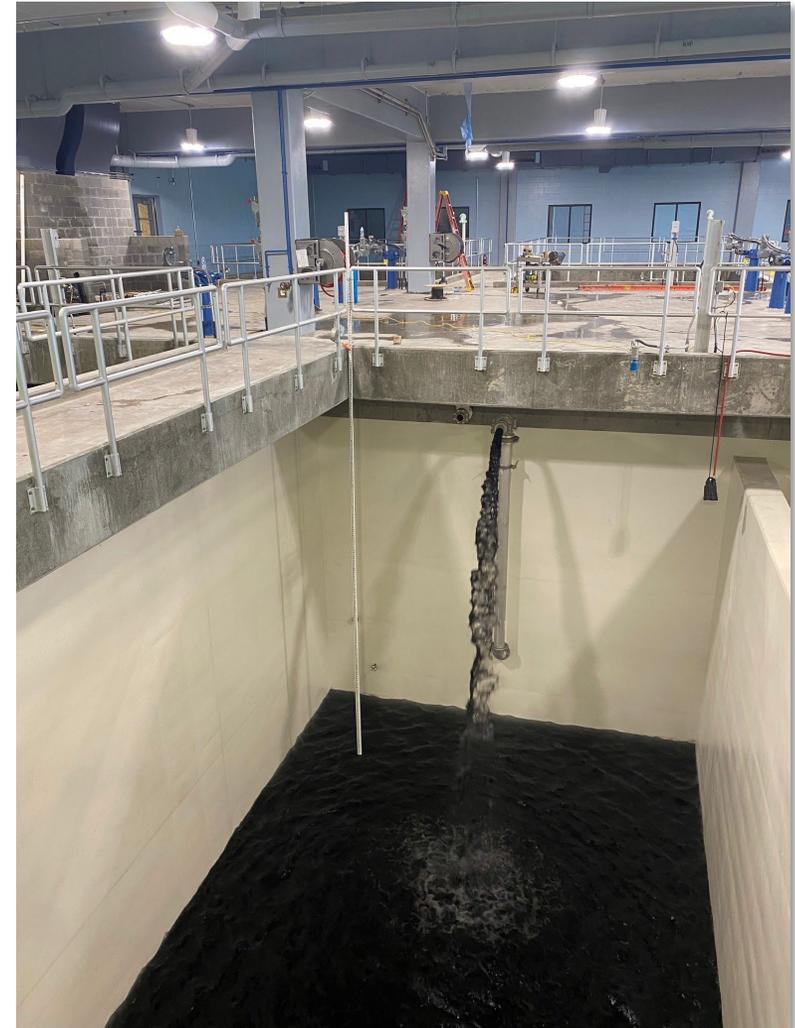
Compound	Proposed MCLG	Proposed MCL (enforceable levels)
PFOA	0 ppt*	4.0 ppt*
PFOS	0 ppt*	4.0 ppt*
PFNA		
PFHxS	1.0 (unitless)	1.0 (unitless)
PFBS	Hazard Index	Hazard Index
HFPO-DA (commonly referred to as GenX Chemicals)		

The Hazard Index is a tool used to evaluate potential health risks from exposure to chemical mixtures.

*ppt = parts per trillion (also expressed as ng/L)

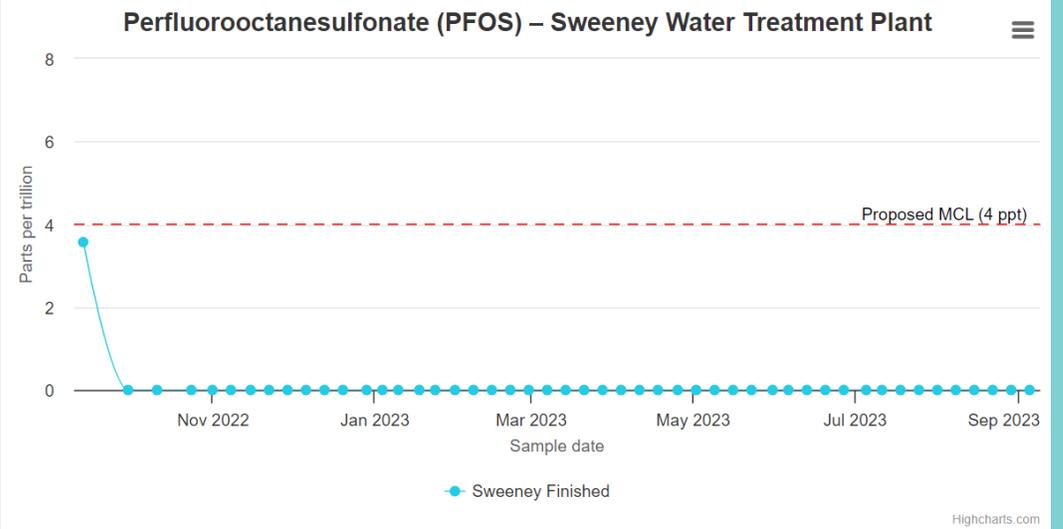
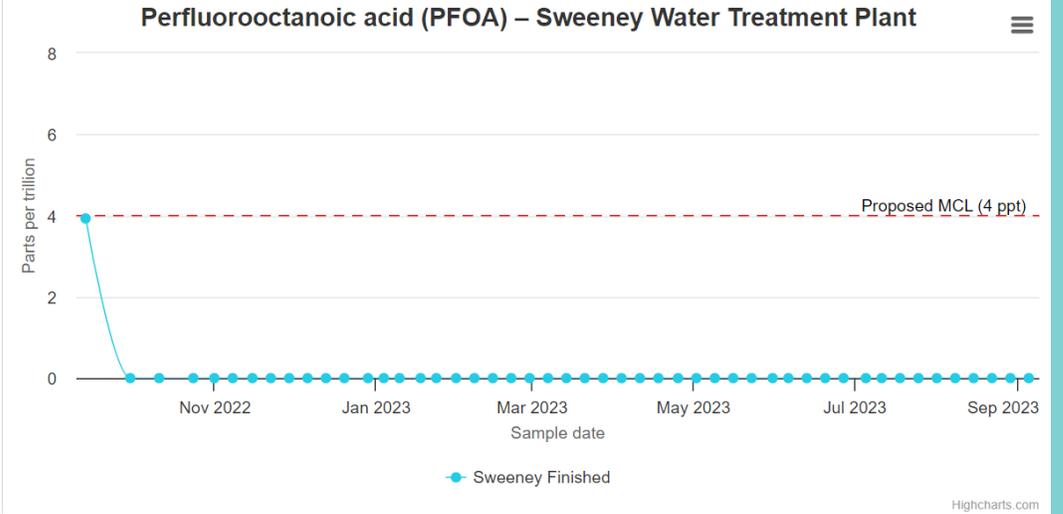
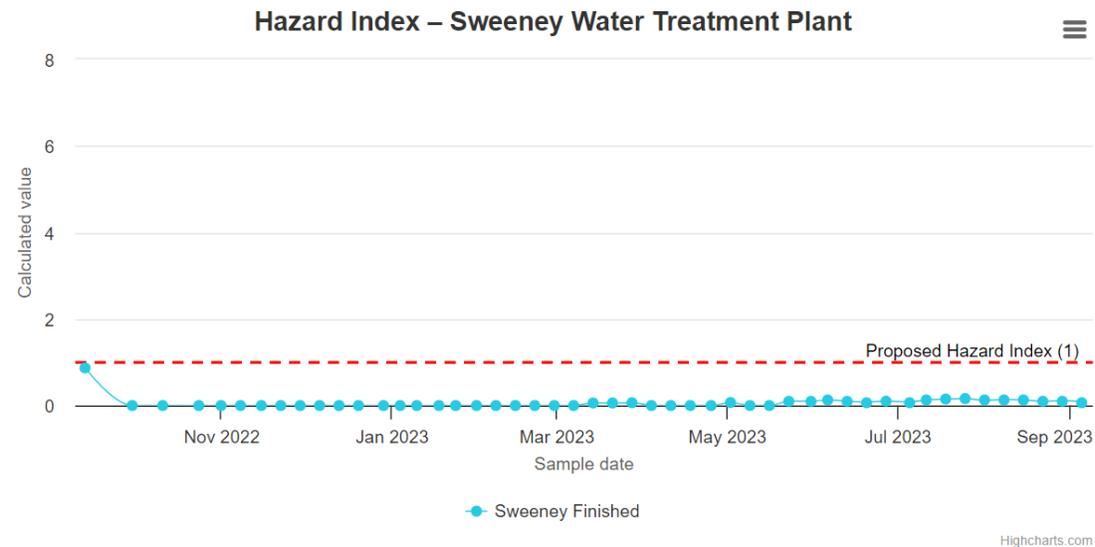
GAC Media Exchange

- ▶ GAC removes PFAS from water through a process called adsorption (with a “d”)
 - ▶ Water flows over the GAC and PFAS compounds cling to the surface area of GAC particles
- ▶ Over time as GAC adsorbs PFAS, there is less surface area to treat water
- ▶ GAC media must be periodically replaced to achieve high level of PFAS removal
- ▶ Four replacements completed so far (2023)
 - ▶ Filters are drained one by one, and GAC removed
 - ▶ Carbon will be taken offsite by vendor for “regeneration” (PFAS destroyed by exposing GAC to extreme temperatures) and returned to Sweeney for reuse
 - ▶ 60-day turn-round per filter



GAC Filters Optimization Successes

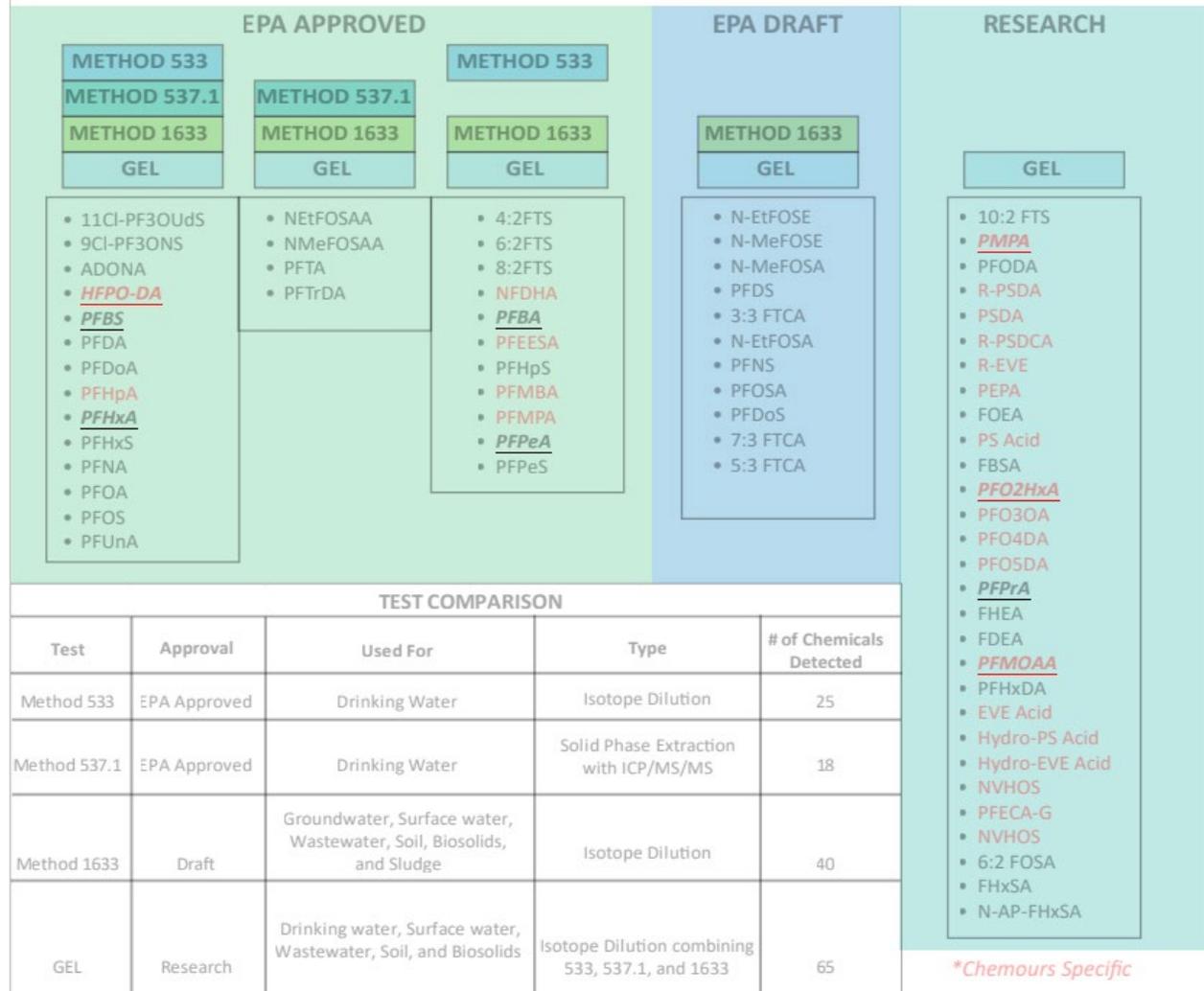
- ▶ GAC facility easily meeting the proposed NPDWR standard for PFOA, PFOS, and the Hazard Index for PFHxS, PFNA, PFBS, and HFPO-DA (GenX).
- ▶ Optimization continues for non-regulated compounds



Evolving Understanding of PFAS

- ▶ EPA Approved Standard Methods for 29 PFAS compounds (M533, M537.1; M1633)
- ▶ Experimental methods now are identifying approximately 70 compounds (MM533 and MM537.1)
- ▶ The National Resource Defense Council (NRDC) conducted a pilot study across 16 states. This study used experimental methods from contract laboratory Eurofins.
- ▶ This study found that ultra-short-chain PFPrA was the most frequently occurring compound in drinking water systems, detected in 24 of 30 samples.
- ▶ PFPrA was also the PFAS compound reported at the highest concentrations in 15 of 30 samples.

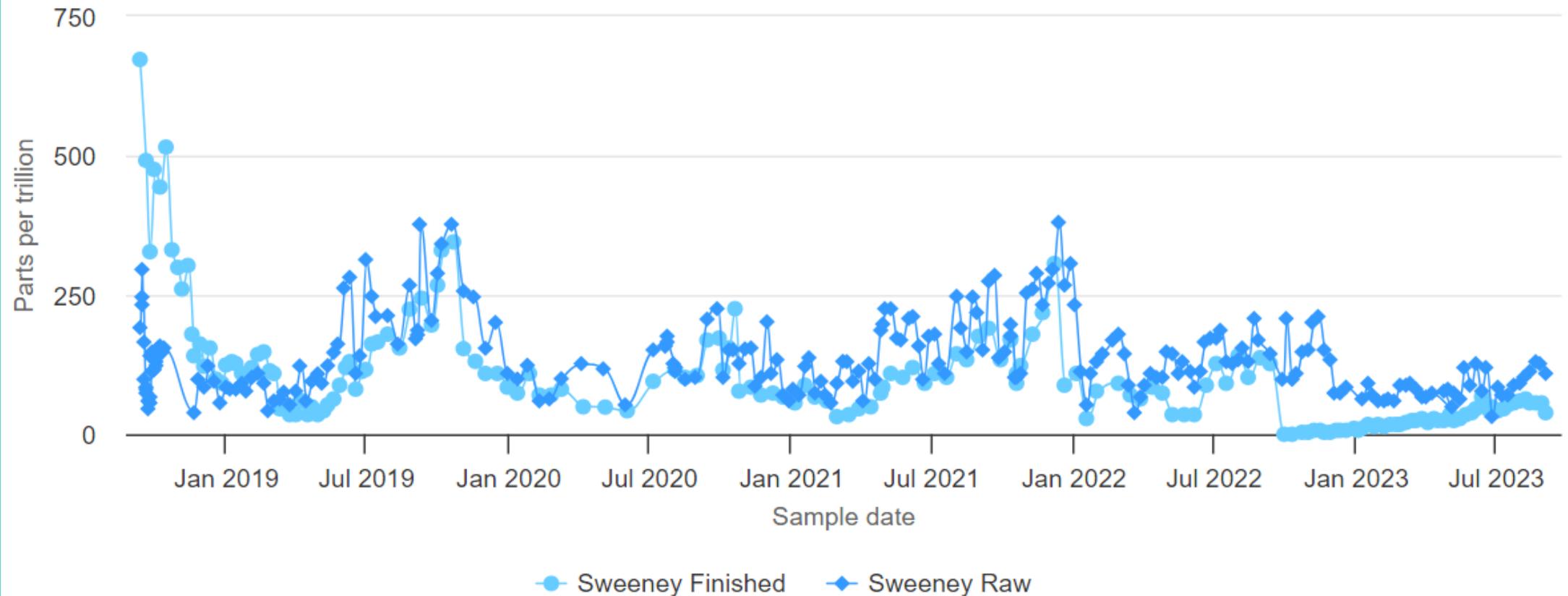
Comparison of PFAS Analytes by Method 8-8-23



All Compounds using Experimental Testing Methods

Total of all Compounds - Raw and Finished Water at Sweeney Water Treatment Plant

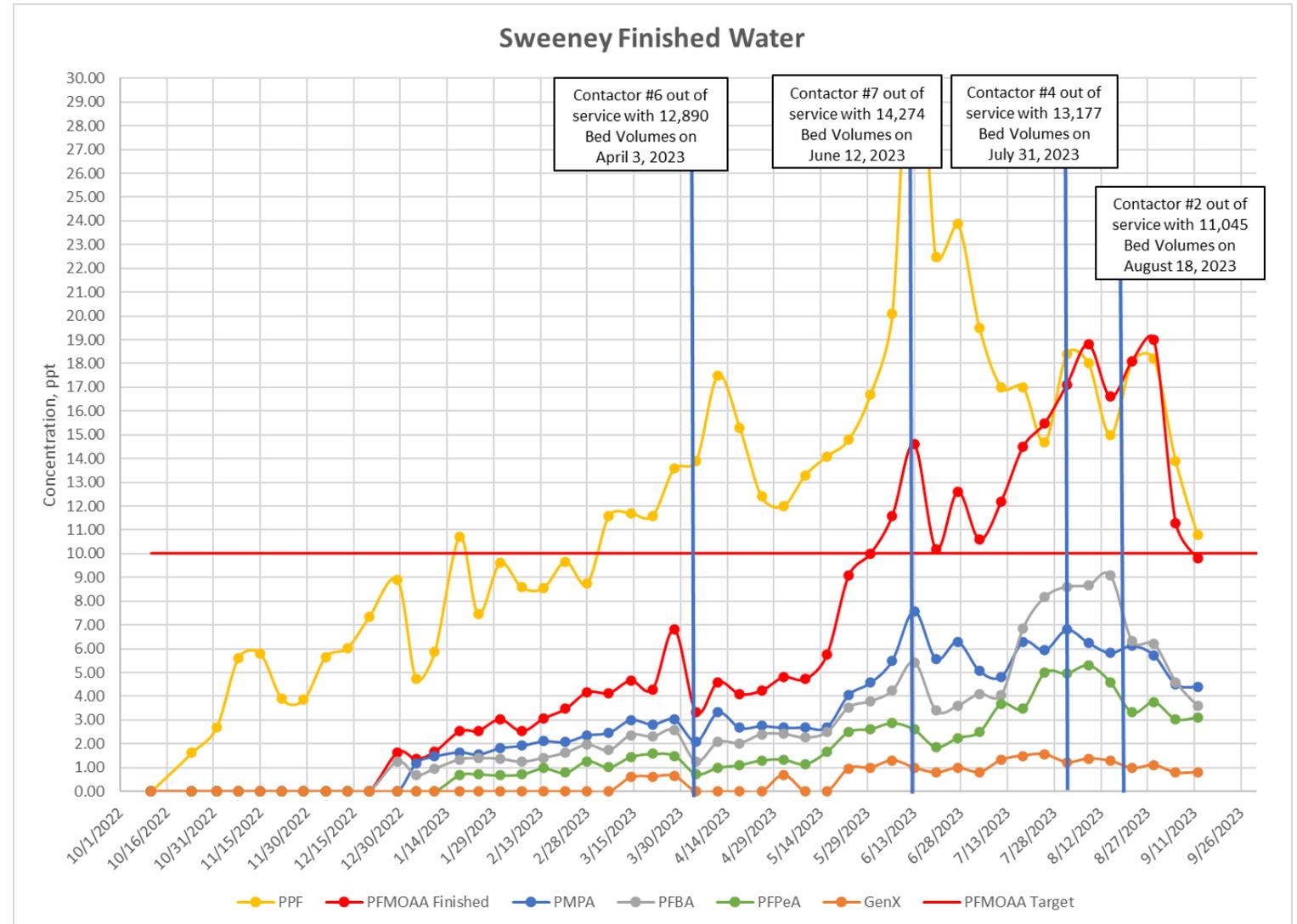
Results in Parts Per Trillion



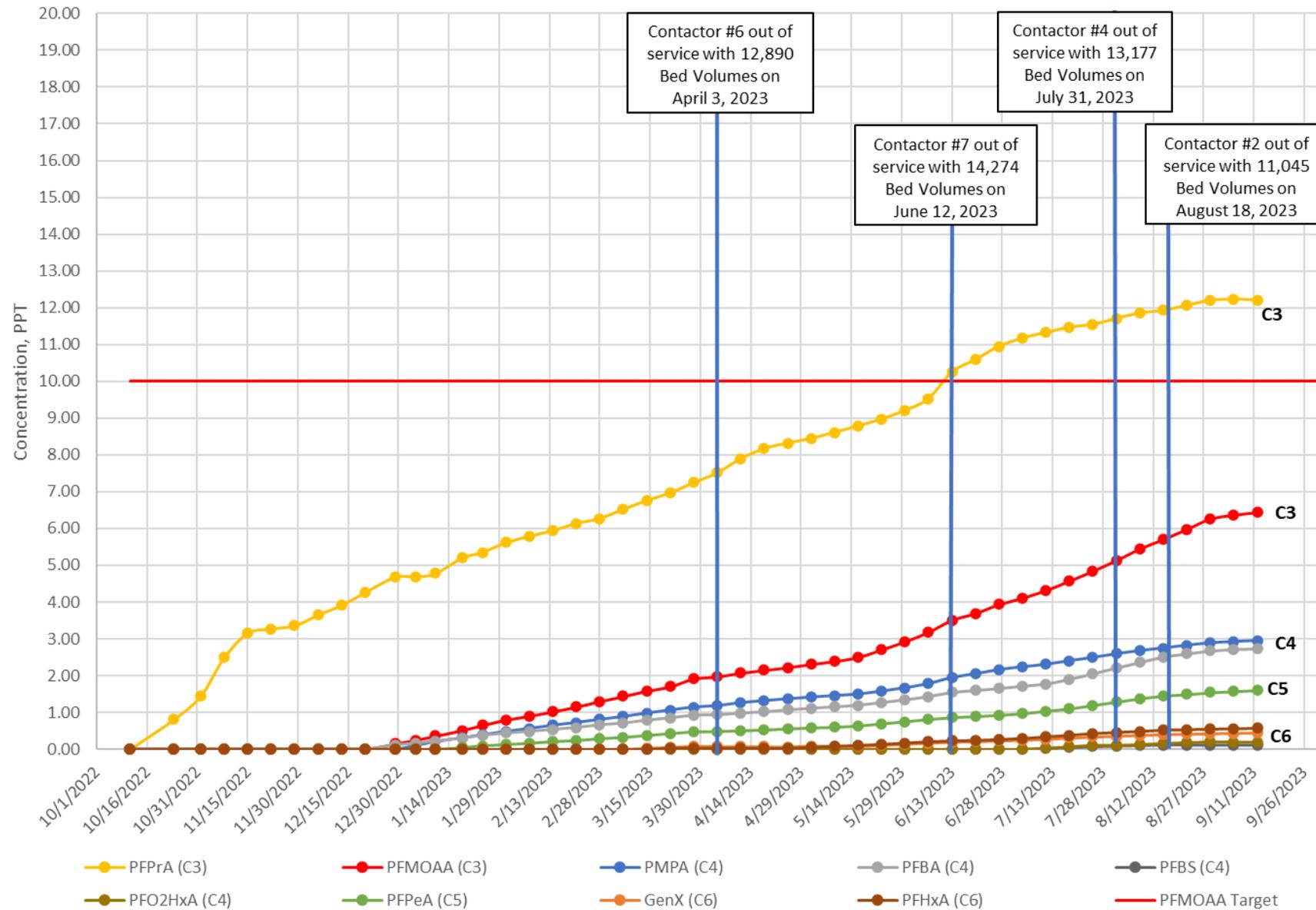
Highcharts.com

Next Steps

- ▶ Moving to a dual trigger for media exchange (10,000 bed-volumes or 10 ppt for PFMOAA).
- ▶ Near future: testing of new combinations of GAC and new novel sorbents with our in-house pilot plant.
- ▶ CFPUA has asked North Carolina's Secretary's Scientific Advisory Board to add PFPrA and other ultra-short chain PFAS to their PFAS Action Plan.



Sweeney Finished Water PFAS 12-month Rolling Average



Questions?



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