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Association

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AWWA WEBINAR

JULY 22, 2020 | 11:00 A.M. - 12:30 P.M. MT

PFAS:
Messaging, Managing Risk, and Testing for Unregulated Compounds

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WEBINAR MODERATOR



Nathan Edman
Standard Methods Manager
American Water Works
Association

Nathan oversees and manages the content production of Standard Methods for the Examination of Water and Wastewater compendium and is in charge of a majority of the AWWA chemical standards committees.

Nathan received his Bachelor of Science Degree in Chemistry from the University of Arizona.

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PANEL OF EXPERTS



Erika Houtz, PhD, PE
Senior Engineer and
PFAS Analytical Lead
Arcadis



Michael J Pickel, PE
Director of Compliance
and Regulatory Affairs
Horsham Water and
Sewer Authority



**Carol T Walczyk, PE,
PMP**
Director, Water Quality
and Compliance
SUEZ in North America



Sarah Page, PhD
Drinking Water Quality
Manager
City of Ann Arbor

7



7

AGENDA

- | | |
|---|--------------------------|
| I. Characteristics and Analysis of PFAS | Erika Houtz, PhD, PE |
| II. Horsham Water and Sewer Authority Experience with PFAS Contamination | Michael J Pickel, PE |
| III. PFAS Case Studies | Carol T Walczyk, PE, PMP |
| IV. Development of a Holistic PFAS Management Strategy at the City of Ann Arbor | Sarah Page, PhD |

8



8

ASK THE EXPERTS



Erika Houtz, PhD, PE
Arcadis



Michael J Pickel, PE
Horsham Water and
Sewer Authority



**Carol T Walczyk, PE,
PMP**
SUEZ in North America



Sarah Page, PhD
City of Ann Arbor

Enter your **question** into the **question pane** on the right-hand side of the screen.

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9

CHARACTERISTICS AND ANALYSIS OF PFAS

Erika Houtz, PhD, PE
Senior Engineer and PFAS
Analytical Lead
Arcadis

10



10

SPECIFIC CHARACTERISTICS OF PFAS

- **Mobility**
High aqueous solubility, moderate sorption
- **Extreme Persistence**
Perfluoroalkyl compounds don't naturally degrade; polyfluorinated compounds form perfluoroalkyl compounds
- **Surfactant Nature**
Assemble at surfaces, especially air water interfaces
- **Bioaccumulation**
Long chain PFAS bioaccumulate in humans (protein rich compartments)
- **Toxicity**
Coupled with bioaccumulation, contributes to low regulations for some PFAS

PFASs

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11

11

Poly- and Perfluoroalkyl Substances (PFAS)

4,730 known compounds

More Commonly Regulated

Polyfluorinated "PFAA-Precursors"

1000's of individual parent compounds, but more daughters e.g. 6:2 FTS, 5:3 acid

Perfluorinated Compounds (PFCs) or Perfluoroalkyl Acids (PFAAs)

~25 common individual compounds, terminal daughters i.e. "forever chemicals" e.g. PFOS, PFOA, PFHxS, PFBA, PFHxA

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Environmental / Higher Organism Biotransformation

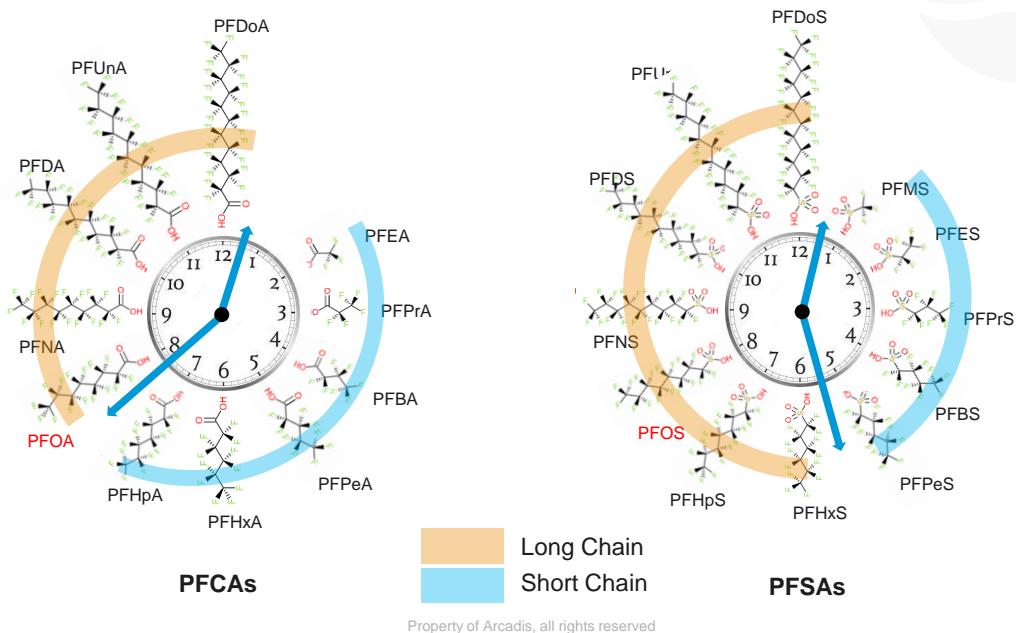
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12

LONG CHAIN VERSUS SHORT CHAIN



13

POTENTIAL LOCATIONS OF PFAS POINT SOURCE CONTAMINATION

- Primary Manufacturing
- Secondary manufacturing, e.g. application of PFAS to other products
- Fire Training Sites
 - Airports
 - Civil
 - Defense
 - Oil and Gas
 - Large Rail Yards
- Wastewater treatment plants
- Landfills



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PFAS ANALYSIS CONSIDERATIONS

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15



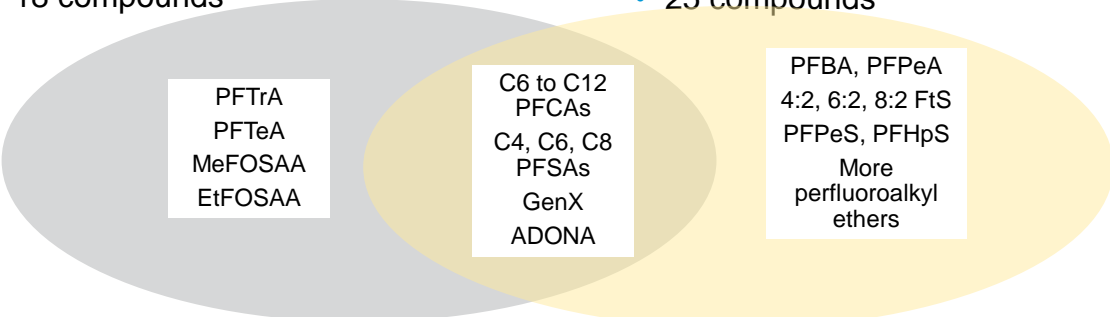
USEPA DRINKING WATER METHODS

USEPA Method 537.1 (late 2018)

- LC/MSMS
- External calibration
- 18 compounds

USEPA Method 533 (late 2019)

- LC/MSMS
- Isotope dilution
- 25 compounds



PFTrA
PFTeA
MeFOSAA
EtFOSAA

C6 to C12
PFCAs
C4, C6, C8
PFSA
GenX
ADONA

PFBA, PFPeA
4:2, 6:2, 8:2 FtS
PFPeS, PFHpS
More
perfluoroalkyl
ethers

Standardized, Mature PFAS Drinking Water Methods are Available

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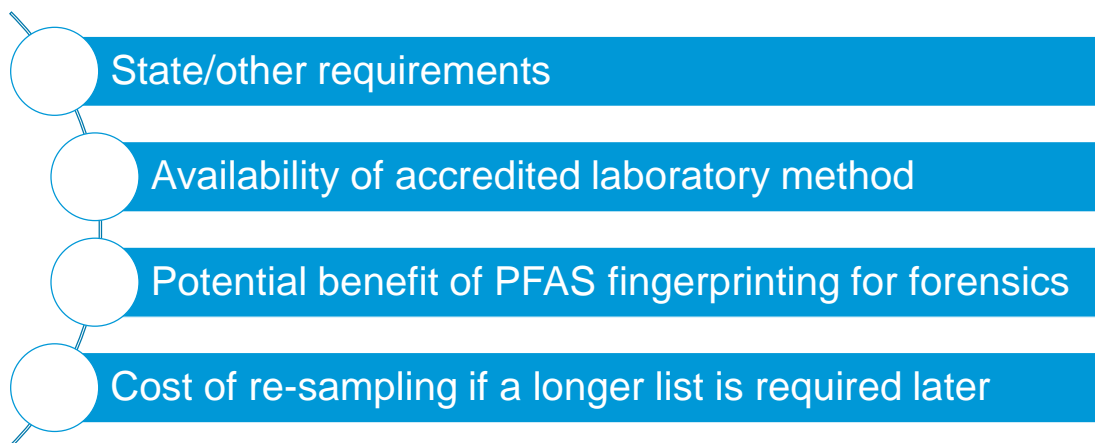
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CONSIDERATIONS IN SELECTING ANALYTES



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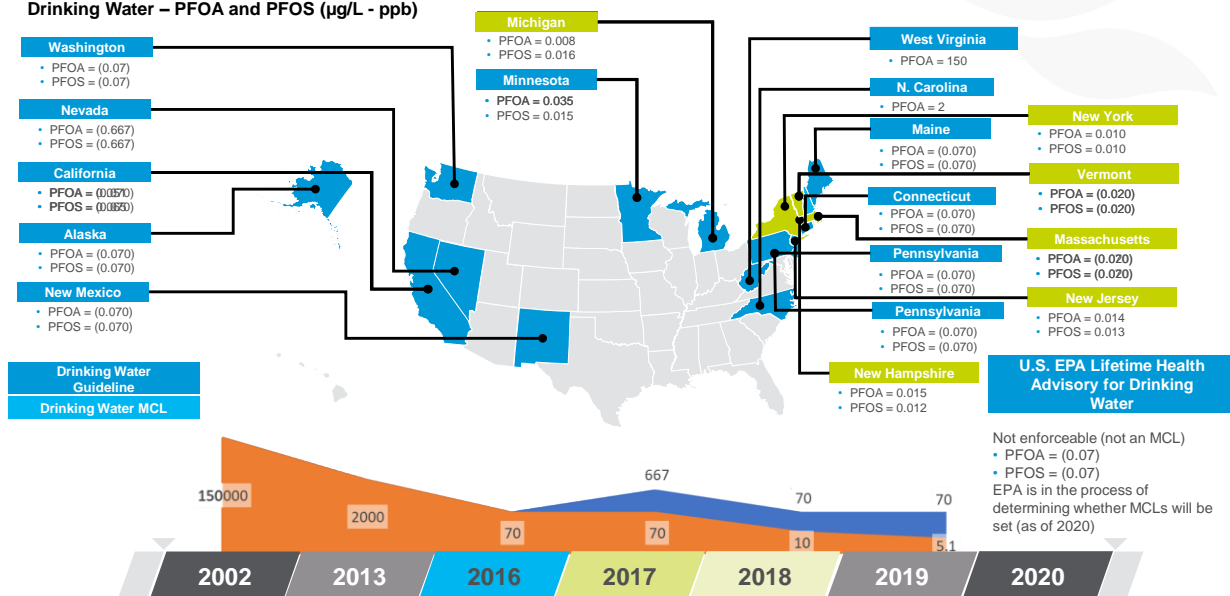
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CHANGING U.S. REGULATORY CLIMATE

Drinking Water – PFOA and PFOS (µg/L - ppb)



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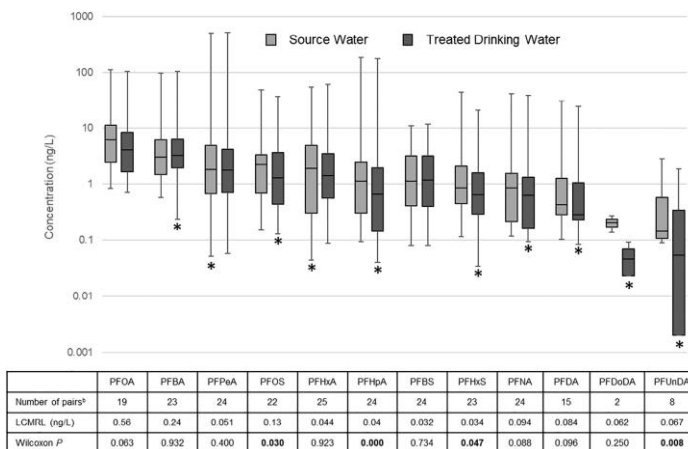
Updated January 30, 2020



18

BACKGROUND LEVELS OF PFAS IN U.S. DRINKING WATER

PFAS in Drinking Water – 25 U.S. Drinking Water Plants



Boone et al. 2019, *Sci Tot Env*, Volume 653

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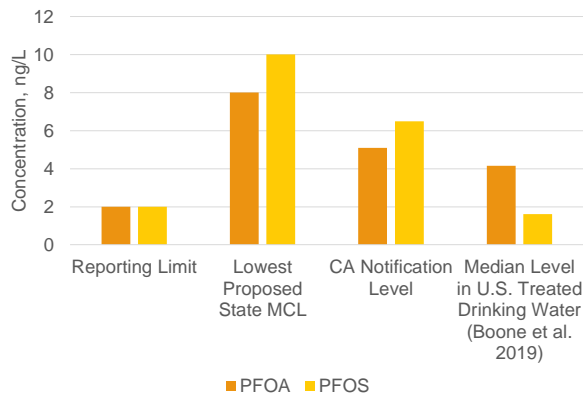
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19

REPORTING LIMITS AND/OR REGULATIONS ARE CONVERGING ON BACKGROUND

- Typical reporting limits for PFOS and PFOA in drinking water are 2 ng/L; lower limits are achievable
- State-proposed drinking water criteria and enforceable MCLs range between 5 and 20 ng/L
 - Recently issued draft CA Environmental Screening Levels are below 1 ng/L



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20



20

ADDITIONAL PFAS ANALYTICAL METHODS

Method	Demonstrated Matrices	PFAS Specific?
Total Oxidizable Precursor (TOP) Assay	Aqueous, Soil, Human Blood, Commercial products	Yes
Extractable Organofluorine and Ion Chromatography	Aqueous, Human Blood	No
Particle Induced Gamma Emission (PIGE) Spectroscopy	Commercial products	No
High Resolution Mass Spectrometry	Aqueous, likely other	Yes*

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WHEN SHOULD I USE AN “ADVANCED PFAS METHOD”?

- Evaluating treatment technologies for holistic treatment of PFAS
- Did we treat everything?
- Characterizing a fresh or modern release
- Is something unexpected going to happen, e.g. am I going to convert precursors to PFOA with AOP treatment?
- PFAS forensics
- Standard PFAS list may not capture any ingredients
- QTOF methods can help identify PFAS unique to a release

Advanced tools should be used judiciously – not for every circumstance.

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22



22

VIEWING PFAS AS A SINGLE CLASS

- Measurement of “total PFAS” has limitations
 - Total organofluorine methods can capture non-PFAS that contain fluorines
 - Most methods are limited in measuring ultra short PFAS
- Individual PFAS have important differences with respect to:
 - Mobility and modes of transport
 - Toxicity
 - Bioaccumulation
- Regulation based on subgroups is more feasible:
 - Bioassays that target specific modes of toxicity
 - Long and short chain



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23



23

COMMERCIAL LAB PFAS METHODS: WHAT'S AHEAD?

- More widespread use of US EPA Method 533
 - Will the perfluoroalkyl ether compounds be widely detected?
- Forthcoming US EPA Methods:
 - Non-potable water and soils with isotope dilution (US EPA Method 8328)
- TOP Standardization?
- Expanded commercial availability of High Res MS/MS

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24



24

THANKS!



ERIKA HOUTZ, PhD, PE

Senior Engineer and PFAS Analytical Lead
Chemical and Environmental Engineer (10 yrs experience)

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25



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26



26



HORSHAM WATER & SEWER AUTHORITY EXPERIENCE WITH PFAS CONTAMINATION

Michael J. Pickel, PE
Director of Compliance and
Regulatory Affairs
Horsham Water & Sewer
Authority

27



27

HORSHAM WATER & SEWER AUTHORITY (HWSA)

Water System:

- 8,025 service connections
- ~2 MGD average daily flow
- 2 Pressure zones
- 5 elevated storage tanks
- Prior to 2014, Horsham's public water supply utilized:
 - 14 active groundwater wells (~90%)
 - interconnections with 2 neighboring suppliers (~10%)



28



28

HORSHAM TOWNSHIP



- Founded in 1717
- ~ 18 miles north of center city Philadelphia
- 17.32 Square Miles (11,090 acres)
- 26,147 residents
- 32,000 + jobs
- In 2011, Horsham Township was named one of the top 100 places to live in America by CNN Money Magazine, and climbed into the top 50 in 2013

29



29

THEN IN 2014, THE 1ST SHOE DROPS . . .

- UCMR3 monitoring identified a number of wells in Horsham, and the neighboring townships of Warminster and Warrington, as among the most PFAS contaminated sites found in the nation, with two wells having levels above the then short-term provisional health standards (PHAs) for PFOA (400 ppt) and PFOS (200 ppt).
- The 2 HWSA wells (#26 and #40) were shut down immediately and per PADEP/USEPA “guidance”, Tier 1 (24 hour) public notice was given to the community.
- Thus, starting in 2014, Horsham became endlessly spot-lighted by the media as a community with PFAS problems



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WHERE DOES THE PFAS IN HORSHAM COME FROM?

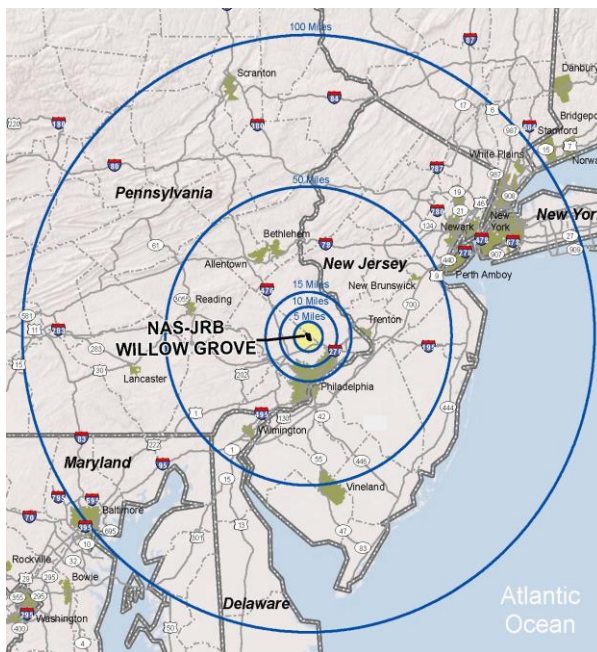
- The source of the PFAS contamination has been linked to historical activities, particularly to use of AFFF fire-fighting foam, at the former Willow Grove Naval Air Station Joint Reserve Base (NASJRB) and existing Horsham Air Guard Station (HAGS). The former Naval Air Warfare Center in Warminster (~ 4 miles east) has also been linked to PFAS contamination



31

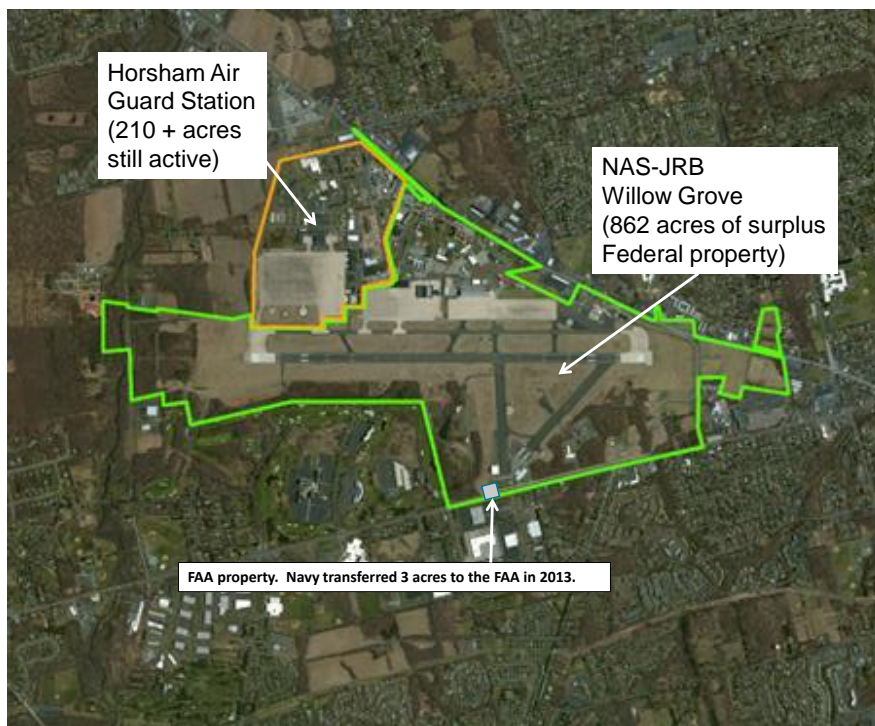


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33

NAVY & HWSA ENTER INTO AN ENVIRONMENTAL SERVICES COOPERATIVE AGREEMENT (ESCA)

- Executed in July 2015
- Navy to provide funding for HWSA to provide PFAS remediation at any HWSA wells containing PFOS/PFOA at or above the existing or any future drinking water standard (Health Advisories are considered a standard under the ESCA)
- ESCA also covers costs for the extension of water mains to areas served by private wells that have been found the drinking water standard and public water supply does not currently exist
- Design of GAC treatment for HWSA's Wells #26 and #40 begin

34

34



THEN IN 2016, THE 2ND SHOE DROPS ...

- In 2016 EPA issued a new combined PFOA/PFOS Lifetime Health Advisory (HA) at 70 ppt
 - 3 more HWSA wells (#10, #17 & #21) impacted and were abruptly shut down, and again immediate public notice was given
 - Given the lower detection levels of the newer methods now available, PFAS was detected at some level in all 14 of HWSA active wells.
 - Public concern and outcry was much more pronounced in 2016 than 2014, as the public was now more concerned over past exposures as well as now distrustful of the adequacy of the health advisory levels.

35



35

- Since then, the township has hosted numerous community education events, congressional roundtables, workgroups, a national EPA PFAS Listening Session, the PA PFAS Action Team, and numerous state and national health study meetings



- The end result is that Horsham Township became an epi-center to the growing PFAS issue



36



36

TOWNSHIP ADOPTS ITS OWN PFAS DRINKING WATER STANDARD



- By this time, the Horsham Council and the residents had lost faith in following the EPA “standard”
 - Council directed HWSA to develop plans to reduce the PFAS levels in the drinking water
 - In six-weeks, alternatives were presented to Council at public meetings and in 2016 the Short and Long Term PFAS Plans were adopted to enact the “Horsham Standard” which reads:

“In light of concerns as to the evolving nature of the science regarding PFAS and the historic, chronic exposure in this community, Horsham Township has chosen to set a local water quality standard with a goal of “non-detect”

37



37

SHORT-TERM PFAS ACTION PLAN



- The Short-Term Plan goal was to minimize levels of PFAS in the public supply through optimization of sources with the lowest PFAS concentrations while performing the phased installation of treatment systems
 - 5 wells with Navy-funded PFAS treatment systems restored to service
 - permanent GAC treatment (26 and 40)
 - temporary GAC treatment (17 and 21)
 - temporary Anion Exchange Resin (10)
 - 8 wells suspended from service (5 for construction of GAC)
 - Temporary increase in purchased water from neighboring supplier while wells are out of service for treatment system installation
- The system-wide average in the HWSA public water system is currently ~ 4 ppt for PFOA/PFOS combined
- Annual cost of Short-Term Plan was ~ \$1.0 Million and was funded by Horsham ratepayers in the form of a surcharge (originally ~ \$24/quarter for typical residential customer)

38



38

TEMPORARY TREATMENT SITES



← GAC trailer at Well 17

Anion exchange resin vessels at Well 10 →



39



39

LONG-TERM PFAS ACTION PLAN

- \$10M Long-Term Plan infrastructure is grant funded through PennVest
- Construct permanent treatment systems on 5 wells < 70 ppt (Completed)
 - All 5 wells (#2, #4, #19, #20 & #22) were placed back in service in 2019.
- Install an additional interconnection with a separate neighboring supplier (Completed)
- Construct permanent treatment system on existing interconnection with neighboring supplier (construction completed in 2020)
- Result in 11 PFAS treatment systems (10 wells and an IC)
- Currently ~60/40 % HWSA wells/purchased water
- Convert temporary treatment systems at 3 Navy-funded wells (10, 17 and 21) to permanent systems (Still in progress)
- In 2019, PA passed legislation creating the Military Installation Remediation and Infrastructure Authority (MIRIA) which allows a portion of state tax revenue generated on and around the base to be used locally to eliminate past and future local surcharges

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GAC CASE STUDY - WELL 26

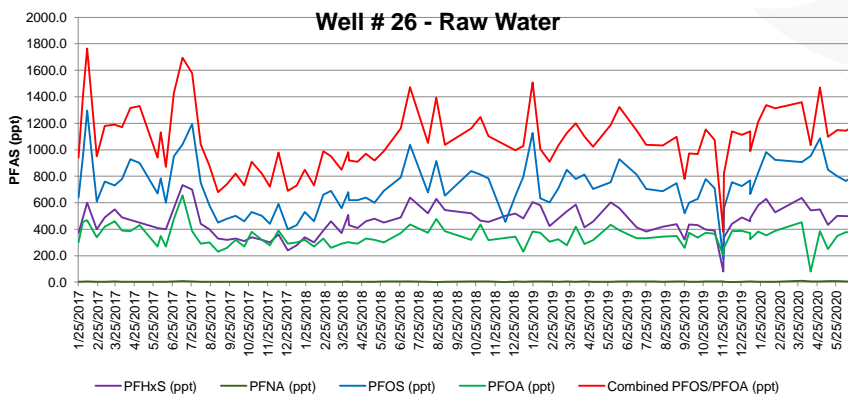
- Placed in service 3/20/2017
- Intermittent operation
 - 8-12 hours per day
 - Flow Rate = 200-250 gpm
 - Influent PFOA+PFOS = 1,000 ng/L
- Model 10 Adsorption System
 - 2 x 10' diameter vessels
 - 20,000 lb GAC per vessel
 - Bituminous coal based
 - Lead-Lag Operation
 - Performed GAC change outs on 6/12/2018; 6/13/2019; and 7/9/2020
 - Using customer regenerated GAC for last 2



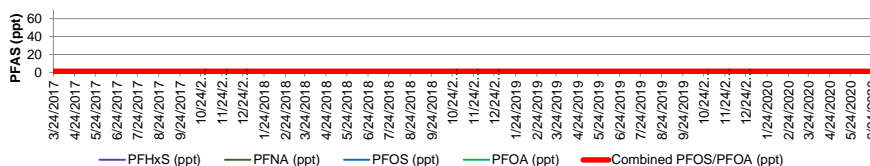
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41



Well #26 Treated Water - Currently Active



42



42

SINGLE-PASS ANION EXCHANGE PILOT STUDY TIMELINE

- On April 11, 2017, HWSA placed Well 10 in service with a temporary pilot permit for anion exchange to remove PFAS.
- The well was equipped with 2 GAC vessels and 1 anion exchange vessel in series and went to the distribution system
- From January to September, 2018, the GAC filters were by-passed and the well was pumped to waste 24/7 using only the single anion exchange vessel
- On October 10, 2018, the well now retrofitted with 2 vessels of IX resin in series was placed in service to the distribution system. The first full scale use of anion exchange for PFAS removal in PA
- The pilot is still in operation as of July 2020 with only breakthrough of PFHxA in the 1st vessel. PFHxA broke through the 2nd vessel in late 2019 prompting the installation of a 3rd IX vessel to ensure no PFAS in the distribution system per the “Horsham Standard”

43



43

GAC VS. IX

Capacity to Break from ND
Avg. Inlet **140 ppt** total PFAS (Horsham #10)

	Bituminous GAC 5.6 mins EBCT BV Capacity at ND	Purofine PFA694E PFAS-Selective Resin 1.8 mins EBCT BV Capacity at ND	Ratio IX/ GAC
PFHxA short chain	< 15,000	102,000	~7
PFHpA short chain	15,000	354,000	24
PFOA long chain	22,000	375,000	17
PFBS short chain	15,000	>522,000	35
PFHxS long chain	22,000	>522,000	24
PFOS long chain	22,000	>522,000	24

522,000 BV = 3.9 millions gallons/cubic foot of resin

22

44



44

ESTIMATED GAC VS. IX COSTS (100 GPM)



- Capital Costs:
 - Although IX resin is more expensive than GAC (~\$400/ft³ vs. \$65/ft³), because the EBCT in minutes per vessel is less (3 vs. 10.5), less media is needed.
 - Capital Costs are expected to be ~55% less for IX than GAC
- Operating Costs:
 - IX is achieving higher BVs before breakthrough occurs (350,000 vs. 35,000)
 - Annual operating costs are expected to be 75% less for IX than GAC (\$8,000 vs. \$78,000)
- Other considerations
 - IX does not have the PADEP arsenic SOP issue
 - IX does not require backwashing which produces a waste stream
 - IX is incinerated and the ash disposed of
 - IX does potentially raise "simultaneous compliance" concerns, but only during start up which can be handled similarly to arsenic in GAC
 - IX resins are proprietary

45



45

PRIVATE DRINKING WATER WELLS

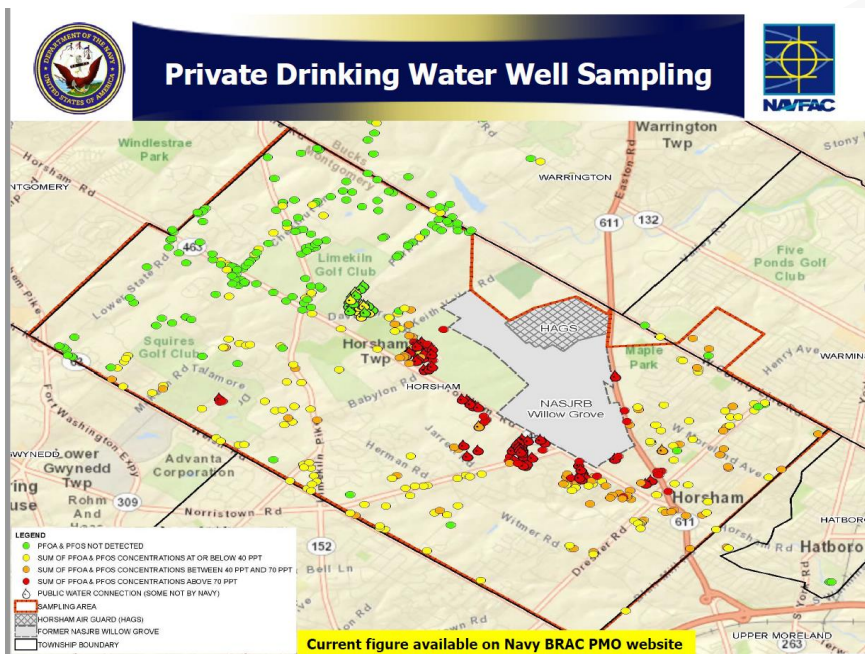


- The PFAS contamination is not limited to the public water supply wells:
 - Navy/HAG have funded PFAS testing of private wells
 - Currently over 500 private wells have been sampled
 - 93 have been connected to the public water system due to PFOA/PFOS levels > 70 ppt (Navy/HAG funded)
 - 3 are in the process of being connected at this time
 - 1.8 miles of new HWSA water mains in areas where public water was not previously available have been constructed – (Navy funded)
 - 60 wells detected in the 40–70 ppt range are sampled quarterly

46



46



47



47

PFAS MONITORING DATA REVIEW

- HWSA typically uses EPA Method 537. Split samples were done using Method 537.1 (will do same with Method 533)
- Over 2,350 PFAS samples to date
- Typically only see detectable results for 7 PFAS analytes in the raw waters: PFOS, PFOA, PFHxS, PFNA, PFBS, PFHxA, and PFHpA
- PFOS is greater than PFOA in 7 wells; ~ the same in 2; and less than PFOA in 5
- PFOS/PFOA ratios range from 50 to 60% of the detected PFAS
- The 4 long chain PFAS compounds (PFOS, PFOA, PFHxS, and PFNA) are typically 70 – 90% of the detected PFAS

48



48

SO WHAT DOES THIS ALL MEAN TO THE HEALTH OF OUR CUSTOMERS?

- Now that the drinking water issue has been “fixed”, the toughest issue to address, is what are the long term health impacts to the residents from years/decades of the past exposure?
- In 2018, the PFAS Exposure Assessment Technical Toolkit (PEATT) Pilot Project was conducted
 - The PA Department of Health conducted 235 (out of 600 contacted) randomly selected community members as part of a pilot project in May to September 2018 to evaluate the PEATT developed by the CDC and the ATSDR
 - The project was funded by the Association of State and Territorial Health Officials (ASTHO)
 - Serum samples were analyzed for 11 PFAS compounds

49



49

▶ Results Overall—4 main compounds

- Average serum PFAS levels (level of PFAS in the blood) were higher compared to NHANES’s averages
 - 94% had higher levels of PFHxS
 - 81% had higher levels of PFOS
 - 75% had higher levels of PFOA
 - 59% had higher levels of PFNA
- Results are consistent with other studies on PFAS exposure through drinking water

PFAS Compound	Community Results				NHANES Results (2013-2014)	
	Average	95% Confidence Interval	Median	Range	Average	95% Confidence Interval
PFOA	3.13	2.81-3.50	3.06	0.55-24.8	1.94	1.76-2.14
PFOS	10.24	8.86-11.83	9.86	1.02-105.00	4.99	4.50-5.52
PFHxS	6.64	5.51-7.99	6.61	0.54-116.00	1.35	1.20-1.52
PFNA	0.74	0.67-0.80	0.76	0.50-2.56	0.68	0.61-0.74

• Results shown in ug/L. Range excludes <LOD

50



50

CDC MULTI-SITE STUDY



- The SEPA PEATT pilot (as well as other pilots conducted nationally) did not include health outcomes
- A larger multi-site national health study is to be conducted by sampling 8,000 (6,000 adults and 2,000 children) in 7 PFAS-impacted communities throughout the country
 - SEPA selected as one of the national sites due to the levels of exposure and that the community is “highly engaged”
 - 1,000 adults and 300 children will be recruited locally
 - Testing to begin later this year
 - Full public analysis won't be complete until spring 2024
 - Will not include cancer as a health outcome to the “limited” sample size but the researchers hope to find funds to include in the testing

51



51

LESSONS LEARNED



- GAC is labor intensive, expensive and obtrusive
 - Carbon change outs (and associated sampling now being required by PADEP) can result in wells being out of service (with the associated loss of production) for days to weeks at a time
- Installing large GAC buildings on small footprints and in residential areas is not popular with neighbors
- Alternately, permitting of IX treatment is proving to be difficult, which is frustrating considering both GAC and IX are not new technologies for drinking water and PFAS is not even “regulated” at this point
- Whether GAC or IX, installing treatment on wells is a substantial change in operational complexity and knowledge for a medium sized groundwater system
- Although HWSA eliminated exposure to PFAS from the drinking water in less than 3 years, remediation at the source (military installations) is going to be a long, process laden endeavor
- Similarly, our understanding of the health impacts from the past exposure are years away at best

52



52



THANK YOU

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HORSHAM WATER & SEWER AUTHORITY
617 HORSHAM ROAD
HORSHAM, PA 19044

OUR PFAS MONITORING DATA, HISTORY AND TIMELINE ARE AVAILABLE
AT WWW.HORSHAMWATER-SEWER.COM

53



53

ASK THE EXPERTS



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54



54



PFAS CASE STUDIES

Carol T. Walczyk, PE, PMP
Director, Water Quality and
Compliance
SUEZ in North America

55



55

PURPOSE & LEARNING OBJECTIVES

- Share SUEZ's PFAS experiences, lessons learned and future plans
- Water treatment to address contamination without final regulations

56



56

ABOUT SUEZ NORTH AMERICA



57



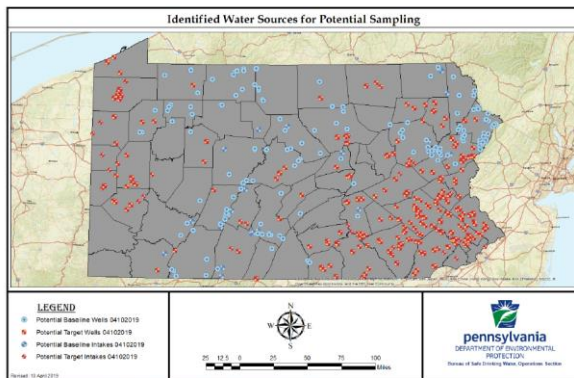
CASE STUDY: NEWBERRY TOWNSHIP PA

58

PFAS IN PENNSYLVANIA : EARLY 2019

- No PFAS MCLs existing or proposed
- No PFAS testing required except UCMR3
- Some public awareness of PFAS
- PA determining PFAS Action Plan

11 April 2019



Map 1. Identified wells and intakes to be sampled. Both Target and Baseline selections are shown.

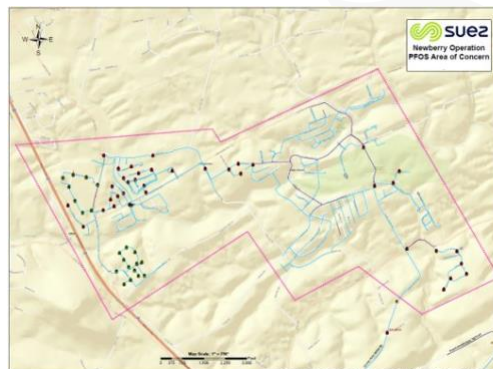
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NEWBERRY TOWNSHIP, PA

- Small groundwater system, not subject to UCMR3
- Customer concerned about reported contamination nearby collected own sample

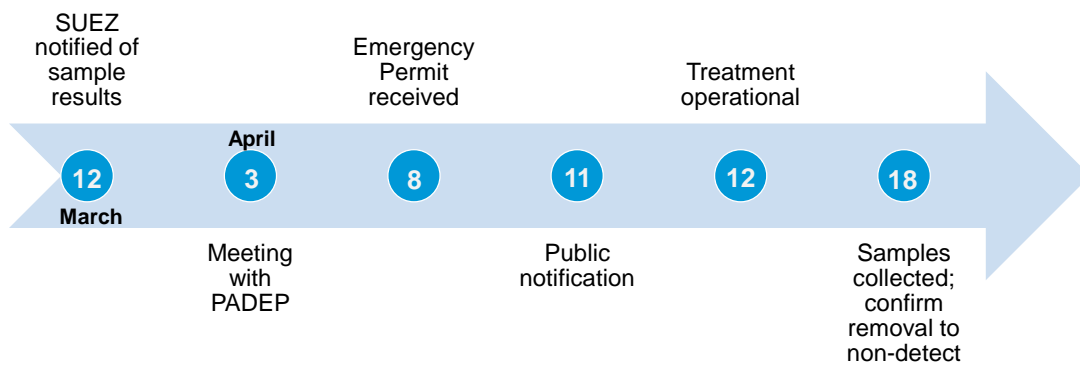


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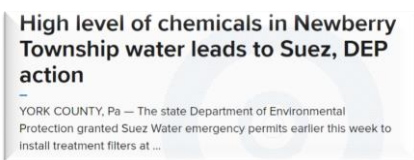


SEQUENCE OF EVENTS



CUSTOMER COMMUNICATION

- Public notification of health advisory exceedance to 1500 affected customers
- Press release
- Local news coverage
- Public meetings held, attended by regulatory agency



SYSTEM SPECIFICS



- Two facilities, four wells
- 8-foot diameter vessels, 10,000 lb each
- Enhanced coconut-based activated carbon
- Lead-lag arrangement
- Tanker trucks for initial soaking and rinsing of media
- Media life estimated 8-12 months
- Temporary systems now being converted to permanent enclosed systems

63



63

SUEZ PFAS STRATEGY 2020



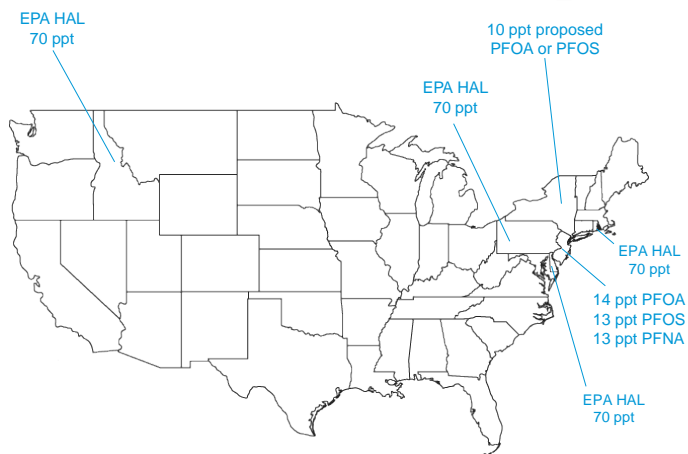
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64

PFAS RISK ASSESSMENT

- Local regulatory status
- Known contamination risk
- UCMR3 results
- Voluntary monitoring
- Existing treatment efficacy for PFAS
- Planned treatment upgrades
- Withdrawal alternatives
- Communication planning



65



65

SUEZ PFAS COLLABORATION

- Participating in research, technology and policy development
 - AWWA Government Affairs
 - Water Research Foundation/Department of Defense
 - State regulatory authority stakeholder meetings and task forces
 - SUEZ global research and water production facilities
 - SUEZ Water Technologies & Solutions equipment manufacturing



66



66

CHALLENGES

- Customer concerns
- State regulations
 - Timeframes
 - COVID-19 impact
 - Regional considerations
 - Approval of alternate technologies
- Planning while regulations are still being developed
 - Treatment capacity
 - Simultaneous compliance
 - Funding
 - Communication
- Analysis of trends
- Sampling costs
- Resource availability
- Waste disposal



EWG, 2019

67



67

CONCLUSIONS & LESSONS LEARNED

- Current regulatory environment requires a different approach
 - Proactive risk assessment
 - Collaboration
 - Transparent communication

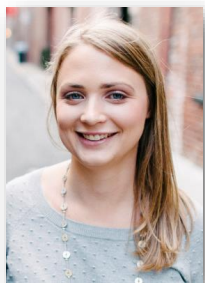


68



68

ASK THE EXPERTS



Erika Houtz, PhD, PE
Arcadis



Michael J Pickel, PE
Horsham Water and
Sewer Authority



**Carol T Walczyk, PE,
PMP**
SUEZ in North America



Sarah Page, PhD
City of Ann Arbor

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Please specify to whom you are addressing the question.

69



69

DEVELOPMENT OF A HOLISTIC PFAS MANAGEMENT STRATEGY AT THE CITY OF ANN ARBOR

Sarah Page, PhD
Drinking Water Quality
Manager
City of Ann Arbor

70



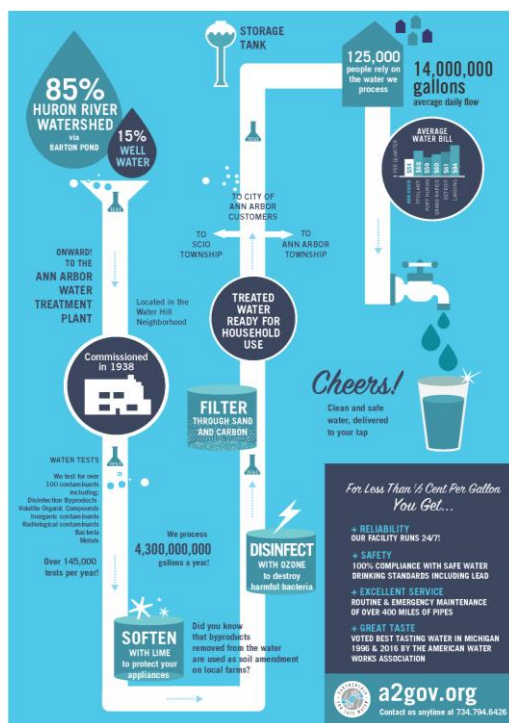
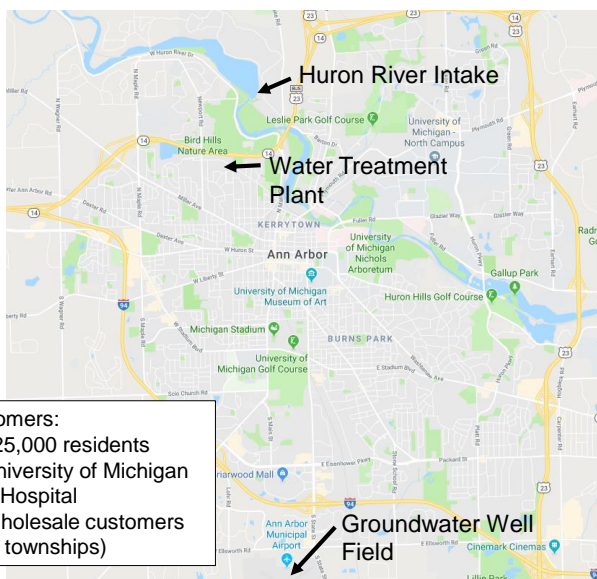
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DEVELOPMENT OF A HOLISTIC PFAS MANAGEMENT STRATEGY AT THE CITY OF ANN ARBOR



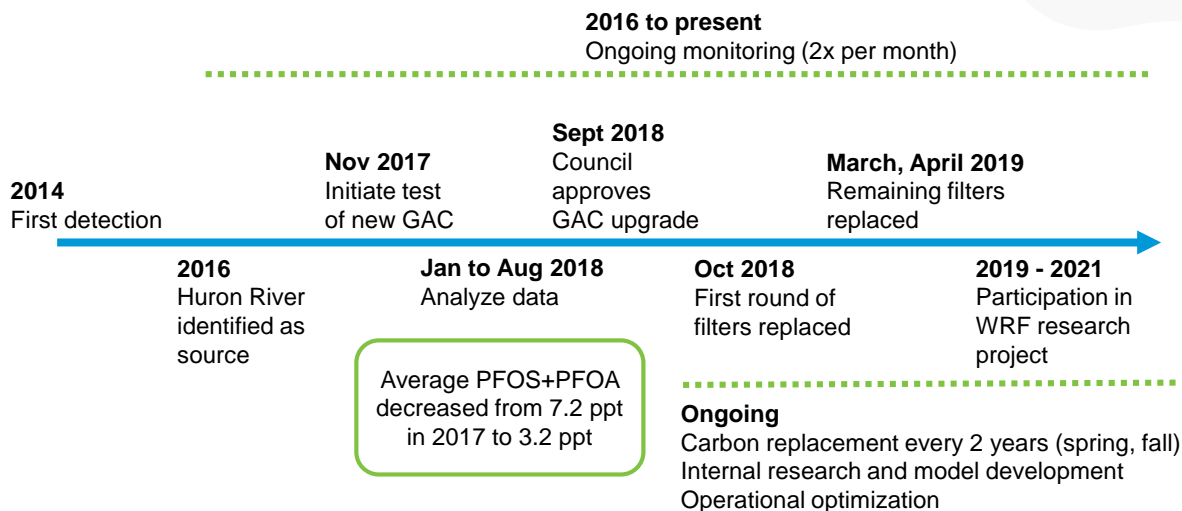
71

ANN ARBOR DRINKING WATER



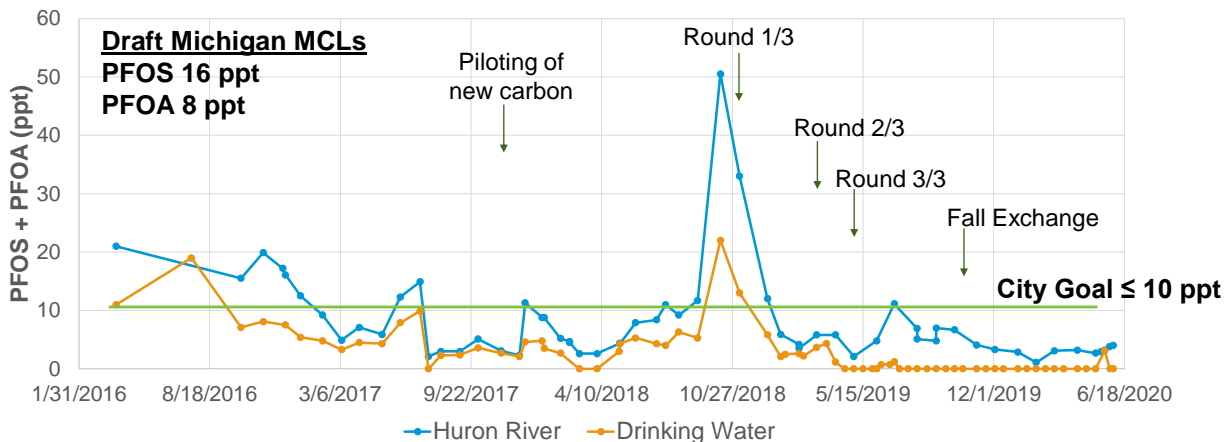
72

ANN ARBOR PFAS TIMELINE



73

ANN ARBOR PFOS + PFOA DATA



74

HOW DO ANN ARBOR CONCENTRATIONS COMPARE TO MI DRAFT PFAS MCLS?



PFAS	Draft MCL (ppt)	Current Ann Arbor Concentration (ppt)	Maximum Ann Arbor Concentration Post-GAC Change (ppt)
HFPA-DA	370	Not detected	Not detected
PFBS	420	1.4	9.2
PFHxS	51	Not detected	Not detected
PFHxA	400,000	2.6	14
PFNA	6	Not detected	Not detected
PFOS	16	Not detected	3.1*
PFOA	8	Not detected	Not detected



75

DRAFT MCL IMPACTS – PUBLIC ENGAGEMENT



PFAS	Draft MCL (ppt)	Current Ann Arbor Concentration (ppt)	Maximum Ann Arbor Concentration Post-GAC Change (ppt)
HFPA-DA	370	Not detected	Not detected
PFBS	420	1.4	9.2
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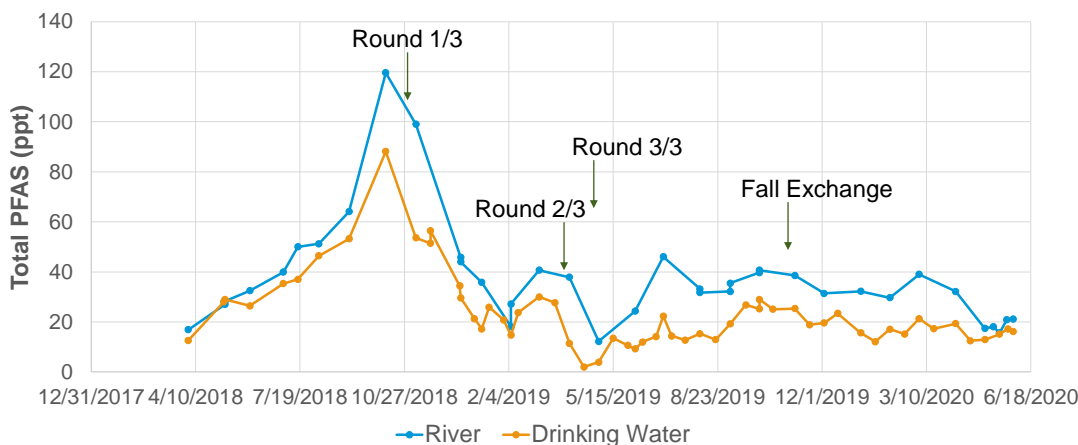
What about PFBA, PFPeA, PFHpA, 6:2 FTS, 8:2 FTS, total PFAS...?



76



ADDING COMPLEXITY – TOTAL PFAS AND PUBLIC ENGAGEMENT



77



CUSTOMER OUTREACH



- Branding
- Action Plan
- Monthly Newsletter
- Water Pop-up Events
- Website, social media



QUALITY WATER MATTERS: KEEPING OUR CUSTOMERS INFORMED ABOUT PFAS

The number one focus of the city's drinking water quality team is to provide safe drinking water, and we take this responsibility very seriously. That is why we have produced this handout and continue to revise it as needed.

REMOVING PFAS ACTION PLAN: As you may have heard, we continue to face water quality challenges such as with gear- and petroleum-based substances (commonly referred to as PFAS). So, we created an action plan to help residents informed about what we are doing to eliminate PFAS contamination in our source and drinking waters. As part of our action plan, we recently installed a new type of granular activated carbon in our filters which improved the water.

Updated 8/1/2019

Page 1 of 4

Sample Date	PFBA (ppt)	PFPA (ppt)	PFES (ppt)	PFNA (ppt)	PFHpA (ppt)	PFHxS (ppt)	PFDA (ppt)	PFNA (ppt)	PFOS (ppt)	6:2 FTS (ppt)	Sum of PFOS and PFOA (ppt)	Sum of All PFAS (ppt)
7/20/2019	5.4	6.1	Not detected	2.9	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	0	14.4
7/2/2019	3.0	9.7	1.6	4.4	2.4	Not detected	Not detected	Not detected	1.2	Not detected	1.2	22.3



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Volume 1, Issue 4 | August 2019



I hope everyone is enjoying their summer. It has been a very busy time for water treatment services staff who hosted a group of 20 journalists in late June and participated in a panel discussion in mid-July for a group of Northern Michigan stakeholders to share the city's strategy for holistic PFAS management.

The city continues to get recognized for its proactive approach to addressing PFAS, and the water treatment plant's filters with the new Granular Activated Carbon (GAC) are performing extremely well, exceeding our expectations. As illustrated in our Monthly Water Quality Dashboard, PFOS and PFOA levels remain below their detection limits. On June 27, the Michigan Science Advisory Workgroup released its report on Health-Based Drinking Water Value Recommendations for PFAS in Michigan. This is the report that the state will use to eventually develop regulated levels for PFAS in drinking water. This report proposes health-based screening levels for seven PFAS chemicals. In all seven cases, the city's drinking water is below the proposed health-based screening levels.

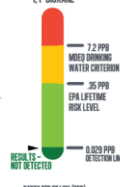
MONTHLY WATER QUALITY DASHBOARD



PFOS/PFOA



1,4-DIOXANE



What's in your water?

78



ADVOCACY AND OUTREACH



- City
 - Customers
 - Fire department
 - Employees
- Watershed
 - PFAS sources
 - Fire departments
- State
- National
- Media

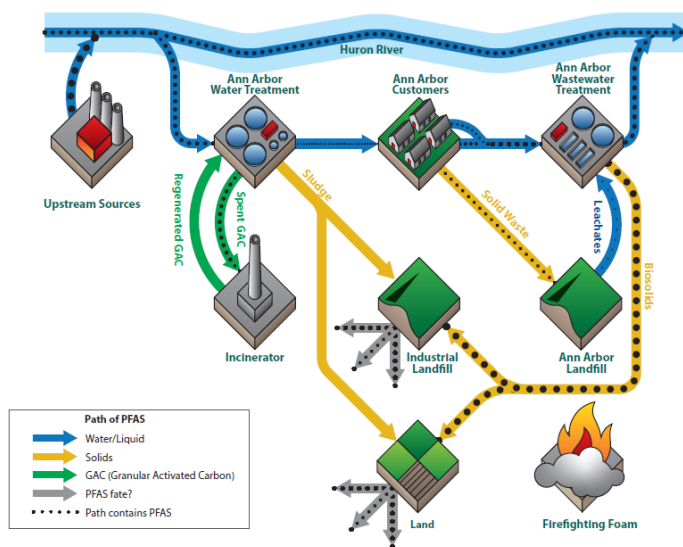


79

IMPORTANCE OF RESEARCH FOR HOLISTIC PFAS MANAGEMENT STRATEGY



- Leadership
- Demonstrates expertise
- Solution development
- Protection of public health
- Foundation for trust



80

ACKNOWLEDGEMENTS

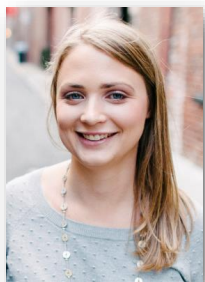


- Ann Arbor WTP Staff
- Calgon Carbon Corporation
- NC State



81

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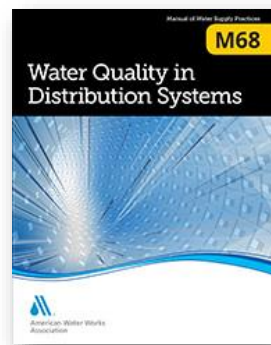
82

82



ADDITIONAL RESOURCES

- [AWWA's PFAS Resource Community](#)
- [PFAS Cycle Infographic](#)
 - This infographic provides a visual representation of how PFAS cycle through the environment.
- [PFAS Treatment](#)
 - Learn about treatment technologies recognized for providing demonstrated PFAS removal and the requirements for selecting among these technologies.
- [M68 Water Quality in Distribution Systems](#)
 - AWWA catalog no: 30068



83



83

UPCOMING WEBINARS

July 23 - Succession Planning: Lessons Learned from a Global Pandemic

July 28 - Free Webinar from Pall Water: Process Optimization For Your Water Treatment Plant

July 29 - Cross Connection Control

[Register for a 2020 Webinar Bundle](#)

View the full 2020 schedule at awwa.org/webinars

84



84

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THANK YOU FOR JOINING TODAY'S WEBINAR

- As part of your registration, you are entitled to an additional 30-day archive access of today's program.
- Until next time, keep the water safe and secure.

86

86



PRESENTER BIOGRAPHY INFORMATION



Dr. Houtz is a senior engineer at Arcadis. She has ten years of academic and professional experience investigating the environmental impacts of PFASs and has significant experience in developing analytical and experimental methods for the measurement of PFASs in environmental and human samples. At Arcadis, she is the PFAS analytical lead and a technical resource for PFAS site investigation and treatment technology evaluation.



Mr. Pickel has over 40 years' experience in water and wastewater utility operations and management. He joined the Horsham Water & Sewer Authority (HWSA) in 2018. Previous to that, Mr. Pickel served as Vice President & Chief Environmental Officer of Aqua America (Aqua) and has been involved in the PFAS issue in Horsham since it was initially detected in 2014 while Aqua then operated the HWSA water system under a management contract.



Carol Walczyk is the Director of Water Quality and Compliance for SUEZ in North America. She has 30 years of experience in drinking water, wastewater, and stormwater planning, infrastructure design, and risk management. She has a BE in Civil Engineering from Cooper Union and is a licensed Professional Engineer and certified Project Management Professional.



Sarah Page is the Drinking Water Quality Manager for the City of Ann Arbor and has been a leader in the city's PFAS research, response, and outreach. She has a PhD in Chemistry from the University of Minnesota and served as the Drinking Water Emerging Contaminant and Regulatory Issues Discipline Lead for an international consulting firm prior to her move to Ann Arbor.

87



87

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