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## PORTSMOUTH WATER SYSTEM PFAS UPDATE

### June 15, 2022

#### COMPLIANCE WITH NEW HAMPSHIRE REGULATORY REQUIREMENTS FOR PFAS

We are currently in compliance with the New Hampshire Drinking Water standards for per- and polyfluoroalkyl substances (PFAS) in both the Portsmouth Regional and Pease International Tradeport Drinking Water Systems. The two systems service the following areas on the Seacoast:

##### Portsmouth Regional Drinking Water System:

- Portsmouth
- Newington
- Greenland
- New Castle (and wholesale water to the New Castle Water District)
- Some of Rye (and wholesale water to the Rye Water District), Durham, Madbury and Dover

##### Pease International Tradeport Drinking Water System:

- Pease International Tradeport
- The village area of Newington

Annual Water Quality Reports for all these systems are sent to all water customers and posted [here](#).

The City of Portsmouth's water system tests for Poly- and Per- Fluoro Alkyl Substances (PFAS) in all of our sources of supply quarterly. Four PFAS chemicals are regulated by the NH Code of Administrative Rules, Chapter Env-Dw 700. These rules establish Maximum Contaminant Levels (MCLs), and compliance requirements for: PFOA, PFOS, PFHxS and PFNA. **Currently all of Portsmouth Water's sources are in compliance with the New Hampshire MCLs.**

The following table provides a summary of the four quarter rolling average results for Portsmouth water system testing results through March 2022. Additional results from samples collected are accessible on the City's Water website:

<https://www.cityofportsmouth.com/publicworks/water>

**PFAS Four Quarter Running Averages through March 2022 (EPA Approved Method 533)**

Sample Point	PFHxS	PFNA	PFOS	PFOA	% of Water Supply (last 12 months)
<b>NH MCL in Parts per Trillion (PPT)</b>	<b>18</b>	<b>11</b>	<b>15</b>	<b>12</b>	---
<b>Madbury Treatment</b>	ND	ND	ND	ND	<b>66.0%</b>
<b>Madbury Well 2</b>	ND	ND	ND	<b>3</b>	<b>2.1%</b>
<b>Madbury Well 3</b>	ND	ND	ND	<b>3</b>	<b>4.3%</b>
<b>Madbury Well 4</b>	ND	ND	ND	ND	<b>6.2%</b>
<b>Collins Well</b>	<b>2</b>	NA	<b>3</b>	<b>3</b>	<b>2.6%</b>
<b>Greenland Well</b>	<b>2</b>	ND	<b>4</b>	<b>4</b>	<b>11.4%</b>
<b>Portsmouth Well</b>	<b>7</b>	ND	<b>5</b>	<b>7</b>	<b>7.4%</b>
<b>PEASE International Tradeport Treated Water</b>	ND	ND	ND	ND	<b>Pease Only</b>

Notes: ND = Not Detected above reporting limit

The State of New Hampshire has adopted enforceable drinking water Maximum Contaminant Level (MCL) standards for four per- and polyfluoroalkyl substances (PFAS); Perfluorohexane sulfonic acid (PFHxS), Perfluorononanoic acid (PFNA), Perfluorooctane sulfonic acid (PFOS), and Perfluorooctanoic acid (PFOA). Prior to the adoption of these standards, the State had been following the EPA’s Health Advisory standard of 70 parts-per-trillion (ppt) for two compounds, PFOS and PFOA.

The New Hampshire standards set a drinking water maximum contaminant level (MCL) for each contaminant as follows:

PFAS Contaminant	MCL parts per trillion (ppt)
PFHxS	18
PFNA	11
PFOS	15
PFOA	12

The regulatory requirements and health advisories for PFAS compounds have evolved considerably since May 2014. When the Pease Haven Well test results were reported to us back then, the only guidance for PFAS compounds were the EPA’s Preliminary Health Advisories for PFOA at 0.400 parts-per-billion (400 ppt) and for PFOS at 0.200 parts-per-billion (200 ppt). According to the EPA’s information at the time these, “health advisories describe non-regulatory concentrations of drinking

water contaminants at or below which adverse health effects are not anticipated to occur over specific exposure durations. They serve as informal technical guidance to assist federal, state and local officials, and water system managers by providing information on the health effects of and methods to sample and treat PFOA and PFOS in drinking water.”

In May 2016, the EPA issued Lifetime Health Advisories for PFOA and PFOS and set them at 70 ppt, stating, “when both PFOA and PFOS are found in drinking water, the combined concentrations of PFOA and PFOS should be compared with the 70 parts per trillion health advisory level. This health advisory level offers a margin of protection for all Americans throughout their life from adverse health effects resulting from exposure to PFOA and PFOS in drinking water.” Subsequently, New Hampshire adopted EPA's health advisory for PFOA and PFOS as an Ambient Groundwater Quality Standard at 70 parts per trillion (ppt) individually or combined.

On June 15, 2022 the EPA issued updated Lifetime Drinking Water Health Advisories for Four Perfluoroalkyl Substances (PFAS) from the US Environmental Protection Agency (EPA). According to their release, “EPA’s health advisories, which identify the concentration of chemicals in drinking water at or below which adverse health effects are not anticipated to occur, are: 0.004 parts per trillion (ppt) for PFOA, 0.02 ppt for PFOS, 10 ppt for GenX chemicals, and 2,000 ppt for PFBS. Health advisories are non-regulatory and reflect EPA’s assessment of the best available peer-reviewed science.”

**The development of New Hampshire’s 2019 MCLs were described by the NHDES on their website with the following information:**

To establish MCLs for PFOA, PFOS, PFHxS and PFNA, NHDES had to consider the extent to which the contaminants are found in New Hampshire, the ability to detect them in public water systems, the ability to remove the contaminant from drinking water, and the costs and benefits to affected parties that will result from establishing the standard, and then develop a MCL for each compound that is protective of the most sensitive population at all life stages.

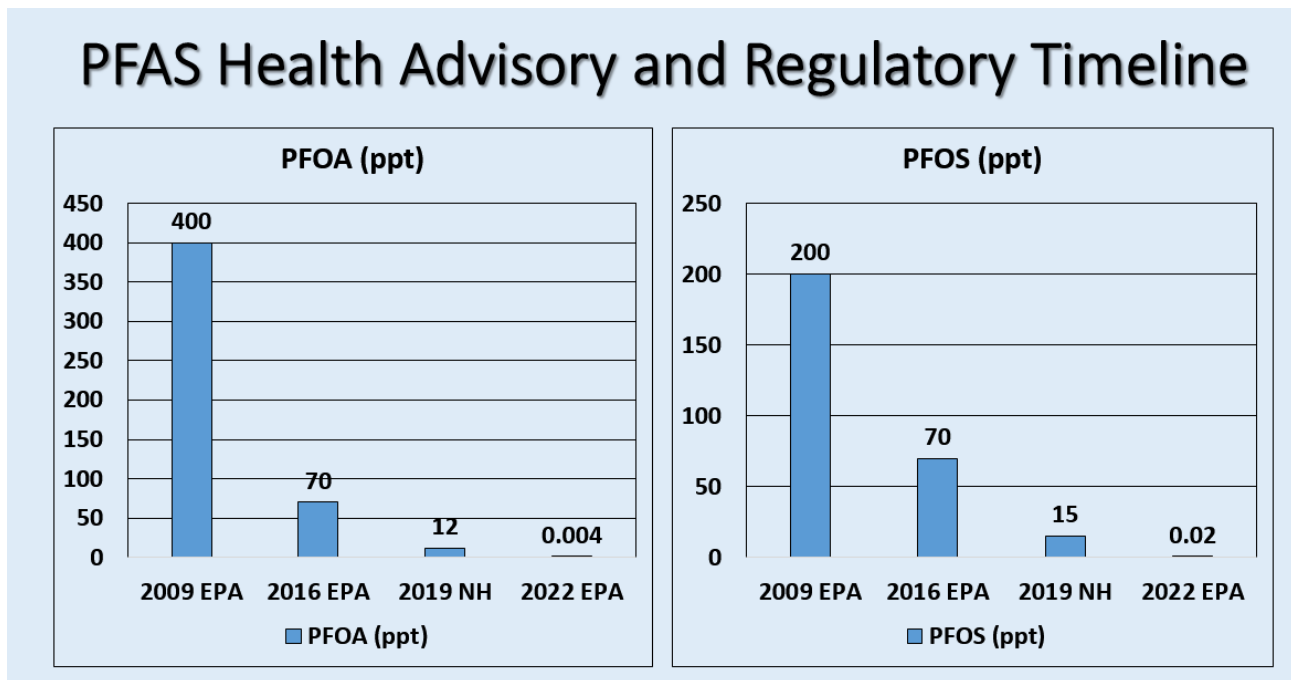
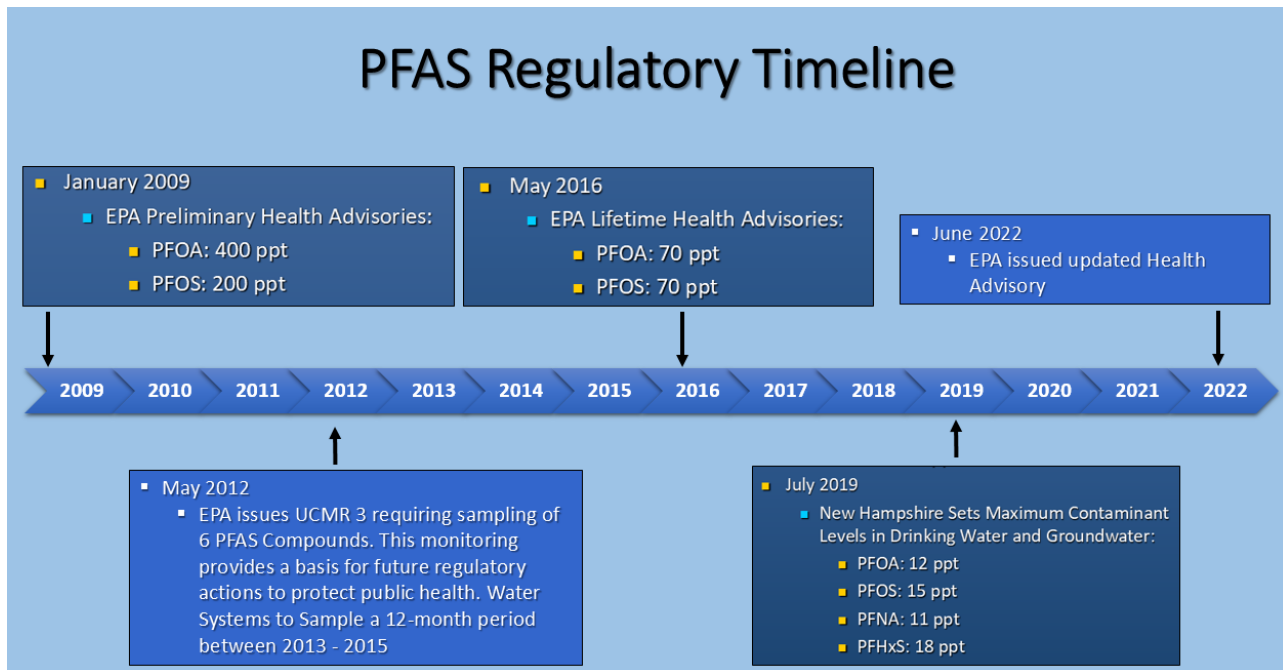
Included with the final proposal, NHDES provided a summary technical report on the development of the drinking water standards (MCLs) including an explanation of the health risk assessment for each compound and information on cost, benefit, occurrence, and ability to detect and treat these chemicals.

The following table summarizes the EAP advisories and timeline of MCLs for the four New Hampshire regulated compounds, together with PFBS:

<b>Regulation/Advisory</b>	<b>Date</b>	<b>PFHxS</b>	<b>PFNA</b>	<b>PFOA</b>	<b>PFOS</b>	<b>PFBS</b>
EPA Preliminary Health Advisory	2009			400	200	
EPA Lifetime Health Advisory	2016			70*	70*	
NH Maximum Contaminant Levels (MCLs)	2019	18	11	12	15	
EPA Lifetime Health Advisory	2022			0.004	0.02	2,000

**Notes:**

- All levels are in Parts-per-Trillion (ppt)
- \* EPA’s 2016 Advisory was for 70 ppt combined for PFOA and PFOS
- No advisories or MCLs were previously set for PFHxS, PFNA or PFBS



**What is the difference between a Maximum Contaminant Level (MCL) Regulatory Requirement and a Health Advisory?**

According to the EPA’s website regarding how health advisories and regulatory standards are set for drinking water contaminants:

Under the SDWA, EPA has the authority to set enforceable National Primary Drinking Water Regulations (NPDWRs) for drinking water contaminants and require monitoring of public water supplies. To date, EPA has regulated more than 90 drinking water contaminants but has not established national drinking water regulations for any PFAS. The proposed timeline for water regulation of PFOA and PFOS is expected in the Fall of 2022, with the final rule expected in the Fall of 2023.

Health advisories offer a margin of protection by defining a level of drinking water concentration at or below which lifetime exposure is not anticipated to lead to adverse health effects.

After reviewing health effects data, EPA sets a maximum contaminant level goal (MCLG). The MCLG is the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, allowing an adequate margin of safety.

MCLGs are non-enforceable public health goals. MCLGs consider only public health and not the limits of detection and treatment technology effectiveness. Therefore, they sometimes are set at levels which water systems cannot meet because of technological limitations.

Once the MCLG is determined, EPA sets an enforceable standard. In most cases, the standard is a maximum contaminant level (MCL). The MCL is the maximum level allowed of a contaminant in water which is delivered to any user of a public water system.

Currently there are a number of contaminants that have been regulated by the EPA that have MCLs that are higher than the MCLGs. These include Arsenic, Lead, Uranium, Benzene, Carbon Tetrachloride and others.

## **CITY OF PORTSMOUTH REGIONAL WATER SYSTEM RESPONSE**

The City of Portsmouth has proactively been sampling for PFAS compounds ever since the discovery of PFOS above the EPA's provisional health advisory in the Pease Tradeport Water System's Haven Well in May 2014. The well was contaminated by the use of fire-fighting foam at the former Pease Air Force Base. That well was shut down and a comprehensive investigation into the source and extent of the contamination was undertaken. A monthly monitoring program of the Pease supply wells was also implemented. This program included monitoring of the City of Portsmouth's Collins and Portsmouth wells. Sampling at that time included not only the six compounds that the EPA was soon to require large systems to sample, but a total of 23 compounds to provide a better understanding of the extent of the contamination.

Similar to regulatory standards, laboratory methods and detection levels have evolved over time to enable ever lower detection capability. This is why some sources of supply that previously were "non detect" for some PFAS compounds early in the sample process now have low levels of PFAS detections.

Due to the levels of PFAS in the Portsmouth, Collins and Greenland Wells, the City has engaged the services of our consulting engineer to prepare preliminary design of treatment systems for those sources of supply. It is most likely that granular activated carbon will be the most viable option for these sources since it has proven to be most effective for water with low levels of PFAS.

## PEASE INTERNATIONAL TRADEPORT PFAS RESPONSE



Construction of a new Pease Drinking Water Treatment Facility was substantially complete in April 2021. The treatment process at this facility includes both ion-exchange resin and activated carbon filtration systems for the removal of PFAS. Water from the Harrison and Smith wells have been continuously treated through granular activated carbon (GAC) since 2016. The ion-exchange resin filters were added to the treatment system on April 20, 2021, and have since been removing PFAS from the Harrison and Smith well water.

The Haven Well, which had been out of service since the discovery of PFAS contamination in 2014, was reactivated and approved as a source of water for the Pease Water Treatment Facility in July 2021. Since August 3, 2021, water from Haven Well has been treated along with Smith Well and Harrison Well water through the Pease Water Treatment Facility. Over a four week startup testing period, samples were collected weekly and analyzed for PFAS from each ion-exchange resin filter and from the granular activated carbon filters. Samples are now being collected monthly throughout the treatment process and analyzed for PFAS. Samples are analyzed with EPA Method 533 which provides results for 25 PFAS compounds, of which four are regulated by the NHDES for drinking water. There have been no detections of these compounds in the water entering the distribution system from the treatment plant since it has been in operation.



Granular Activated Carbon (GAC) Filters



Ion-Exchange Resin Filters

## **SAFE WATER ADVISORY GROUP**

The Safe Water Advisory Group (SWAG) was founded by Council action on October 5, 2020, the group's stated mission is to:

- To review and communicate the latest science on the health and environmental effects of PFAS, to monitor federal and state level legislative changes, and to anticipate policy changes that could impact the city of Portsmouth.

For the latest information on SWAG please [click here](#).

## **PFAS in Our Day-to-Day Lives**

The attention to PFAS in drinking water, and other products, has grown considerably since it was first discovered at the Haven Well in May 2014. Pease was one of the first sites in the nation to have to respond to PFAS contamination caused by fire-fighting foam. Since then, many other prominent sites in New Hampshire and across the nation have discovered the presence of these compounds in their groundwater and drinking water. However, other research has revealed PFAS to be present:

- In certain products utilizing PFAS produced by 3M, Chemours, Dupont, Tyco and others.
- In products from foreign manufacturers that do not have PFAS regulations.
- In food, including milk, meat and fish;
- In products, including non-stick cookware, pans and utensils, dental floss, floor and car polishes/waxes, cleaning, rinse and waterproofing agents:
- In stain resistant coatings used on carpets, upholstery, and other fabrics.
- In water resistant clothing, sporting goods and camping gear.
- Used as ingredients in certain cosmetics, such as lotions, cleansers, nail polish, shaving cream, and some types of makeup, such as lipstick, eyeliner, eyeshadow, and mascara. According to greenmatters.com “a study found PFAS in more than half of cosmetics tested.”
- In children’s car seats
- In certain ski waxes
- In byproducts such as air dust and biosolids;
- In forested areas of Vermont where 68 soil samples, collected from 66 locations, revealed PFOS in all soil samples, some with high frequency;
- In some bottled water, NHDES having performed sampling and finding detectable levels in three brands, one which exceeded the EPA’s health advisory limits. A study published in the journal Water Research by Johns Hopkins University researchers detected PFAS in 39 out of more than 100 bottled waters tested.
- In private wells on Cape Cod with no known sources of contamination other than septic systems according to a study by the Silent Spring Institute; and
- In other New Hampshire municipal landfills, fire training centers and fire department facilities.
- In rainwater

- On Mount Everest: The journal Science of The Total Environment published a study that found perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), and perfluorohexanoic acid (PFHxA) in Mt. Everest snow and meltwater. The highest concentrations found were 26.14 and 10.34 ppt of PFOS at Base Camp and Camp 2, respectively

With regard to drinking water in particular:

- An analysis of one-third of the nationwide water systems found that 28 percent of them contained PFAS chemicals at concentrations at or above 5 ppt (Environmental Working Group Article, May 2018, reporting on work of Eurofins Eaton Analytical); and
- Many water systems that originally had samples with “non detections” are now detecting low levels of these compounds with improved/lowered laboratory detection capabilities. Seacoast communities with detections include Hampton and North Hampton (served by Aquarion), Dover, Rochester, Rye, Seabrook and Stratham.

## **SUMMARY**

The City of Portsmouth’s water operations staff will continue to monitor and address this evolving issue through our ongoing efforts, research, monitoring and system upgrades as necessary. Because we were one of the first to address this issue has allowed us the opportunity to explore, pilot and implement treatment technologies and continually allow drinking water to be delivered to our customers that meets the regulatory requirements. We are also fortunate that we have great support from our local and congressional delegations and that the Air Force has been a willing partner in responding to the contamination.

Technologies and regulatory requirements are likely to continue to evolve. We will continue to do our best to implement necessary and feasible actions to respond and comply with regulatory standards. We will also continue to update the City Council and public through our water system’s website updates and other information presented during the quarterly Safe Water Advisory Group and Pease Restoration Advisory Board meetings and at various water conferences.

The following is a summary of our continued focus on PFAS response:

- Sampling of all Portsmouth drinking water sources quarterly for PFAS compounds to assess the 12-month rolling averages for the four New Hampshire regulated compounds.
- Evaluate the need for and type of treatment that may be necessary at any other drinking water sources of supply serving the City’s drinking water system.
- Work with the Air Force to monitor PFAS compounds in the water sources in the Pease southern wellfield aquifer.
- Work with regulators and other waterworks professionals to track and respond to the evolving water quality information, regulations and treatment technologies related to PFAS compounds.
- Provide public information on this and all other water quality parameters in our water systems. For information for both the City of Portsmouth and Pease water systems: <https://www.cityofportsmouth.com/publicworks/water>