

City of Portsmouth

Department of Public Works

MEMORANDUM

TO: John P. Bohenko, City Manager

FROM: Brian Goetz, Deputy Director of Public Works
Al Pratt, Water Resource Manager

DATE: August 27, 2019

SUBJECT: Report Back to City Council regarding PFAS
- updated from March 5, 2018 "Report Back to City Council"

COMPLIANCE WITH REGULATORY REQUIREMENTS FOR PFAS

We are currently in compliance with the 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 on the City's website at:

<https://www.cityofportsmouth.com/publicworks/water/drinking-water-quality>

The State of New Hampshire recently became the first state to promulgate 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 the 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 entire rule can be accessed at this link;

<https://www.des.nh.gov/organization/commissioner/legal/rulemaking/documents/env-dw7-800amd-adpt-pstd.pdf>

According to information provided to New Hampshire public drinking water systems by the New Hampshire Department of Environmental Services:

1. The rules apply to all community and non-transient/non-community public water systems (NOT transient water systems)
2. Initial PFAS monitoring will start in the 4th quarter of 2019 and continue for four ***consecutive*** quarters.
3. Systems should check with their laboratory in advance to make sure that the lab is accredited for all four PFAS compounds or is sub-contracting with a laboratory that is.
4. Initial compliance will be based on the running annual average of all samples taken in a year’s timeframe.

For systems with elevated results, compliance may be calculated and determined prior the completion of the initial monitoring round.

5. After the initial monitoring period is complete, the future sampling frequency will be based off the results.
 - If results are greater than an MCL or your system is treating for a PFAS, you will be required to sample quarterly.
 - For all other results, the future sampling frequency will be as follows;

Average Monitoring Result	Sample Frequency
Greater than 50% of MCL to 100% of MCL	Annually
50% of MCL or less	Once every 3 years

6. Those systems where the future sampling frequency is annually or once every three years, future PFAS monitoring will be scheduled for the quarter that the highest level PFAS was detected.

The regulatory requirements and health advisories for PFAS compounds have evolved considerably since May 2014. When the 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.

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 is providing 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. That summary technical report can be found here:

www.des.nh.gov/organization/commissioner/legal/rulemaking/index.htm#pdrinking

The following table summarizes the advisories and timeline of MCLs for the four New Hampshire regulated compounds:

Regulation/Advisory	Date	PFHxS	PFNA	PFOA	PFOS
EPA Preliminary Health Advisory (2009)	2009			400	200
EPA Lifetime Health Advisory	2015			70*	70*
NH Maximum Contaminant Levels (MCLs)	2019	18	11	12	15

Notes:

- All levels are in ppt
- * EPA’s 2016 Advisory was for 70 ppt combined for PFOA and PFOS
- No advisories or MCLs were previously set for PFHxS or PFNA

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. Maxxam laboratories was chosen to perform this work by the technical response team and we continue to utilize this laboratory for PFAS analysis to provide consistency. 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.

The City of Portsmouth’s water supply staff have also been monitoring all of our public water supply sources for PFAS every six months since 2014. Sampling is performed at the source of supply, as required by the regulations, and not at individual customer taps to ensure that all sources comply with regulatory requirements.

The following is a summary of the number of sample events performed for each drinking water source since 2014:

- Bellamy Reservoir – 10 sample events
- Madbury Water Treatment Facility – 8 sample events
- Madbury Wells – 8 sample events
- Greenland Well – 12 sample events
- Portsmouth Well – 64 months of sampling (since May 2014)
- Collins Well – 64 months of sampling (since May 2014)

With the new limits in effect we are now sampling quarterly to obtain the average necessary to prepare for compliance with New Hampshire’s standards. The water samples for the April and July 2019 rounds of sampling were analyzed using the laboratory detection limits required by the NHDES rules.

The following table summarizes the average of these two monitoring results, in Parts-per-Trillion (ppt) for the City of Portsmouth water sources utilizing this laboratory method and reporting limits. The table also includes the Maximum Contaminant Levels (MCLs) as set by New Hampshire on July 18, 2019. **According to this data, all City of Portsmouth’s water supply sources are below these levels and are in compliance with the new rules.**

Average of Two Sampling Events (April and July 2019)

PFAS	NH – MCL	Madbury Treatment	Madbury Well 2	Madbury Well 3	Madbury Well 4	Portsmouth Well	Collins Well	Greenland Well
Date	06/28/2019	07/31/19	07/31/19	07/31/19	07/31/19	07/31/19	07/31/19	07/31/19
PFOA	12 ppt	3	2	2	<2	5	3	4
PFOS	15 ppt	<2	<2	<2	<2	3	3	3
PFHxS	18 ppt	<2	<2	<2	<2	5	2	1
PFNA	11 ppt	<2	<2	<2	<2	<2	<2	<2

Notes:

ppt = parts-per-trillion

<2 = less than 2 ppt, the reporting limit set by the NHDES rules

The following is the approximate percentage of Portsmouth Water Sources that supply water to the Portsmouth system:

- Bellamy Reservoir/Madbury Treatment – 65%
- Madbury Wells – 10%
- Portsmouth Well – 9%
- Collins Well – 5%
- Greenland Well – 11%

PEASE INTERNATIONAL TRADEPORT PFAS RESPONSE

The two wells that are currently serving the Pease International Tradeport Water System, the Smith and Harrison Wells, have also been monitored for PFAS monthly since 2014. These wells have historically had higher levels of PFAS in them due to their proximity to the Haven Well, which has been offline since May 2014. Due to these levels, and also in anticipation of lower regulatory limits, the City proposed to the Air Force that activated carbon treatment be installed to treat these two wells. The Air Force agreed and a treatment system was installed in September 2016 and has been in service since that time. Sampling of the filters takes place periodically to confirm the treatment performance of this system. Data from those sample events and updates on the Pease water system response are posted on the City's website:

<https://www.cityofportsmouth.com/publicworks/water/pease-tradeport-water-system>

Additionally, we have been working on a study being performed by the Colorado School of Mines and Northeastern University under a grant obtained by Testing for Pease. This study is analyzing additional non-target compounds that may not be detected by current laboratory methods. We do not have any results yet from this ongoing work but will report on the findings when they are made public.

ONGOING MONITORING AND WATER TREATMENT UPGRADES

The United States Air Force has taken responsibility for the contamination at Pease due to the extended use of firefighting foam at the base and at their fire-fighting training center. Beginning in May 2014 they have employed the services of Wood, plc (formerly AMEC) to monitor and track PFAS compounds around the wells. The City water operations staff have been part of a large technical response team that includes the Air Force, the EPA, NHDES and the Pease Development Authority. The City has also employed the services of Weston & Sampson to provide technical support regarding water quality data and treatment options.

The Air Force, through various agreements, has reimbursed the City for the costs we have incurred to address this issue. They funded the installation of the two carbon filter units for the Harrison and Smith wells. They are currently funding the cost of the final treatment system at Pease which will include both resin and carbon filtering technologies to treat the PFAS. Additionally, the Air Force has constructed a separate treatment system at Pease that treats the water in the aquifer through a pump, treat, and reinjection well system. That system has been in service since April 2019.

REGIONAL AND NATIONAL RESPONSE TO PFAS

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. We were 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. Other research has revealed PFAS to be present:

- 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, carpet and other flooring products;
- 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;
- 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.

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.

National attention on this issue has prompted the EPA to address the regulation of these compounds by implementing new health advisories in 2016 for PFOA and PFOS, developing draft toxicity assessments for GenX and PFBS, and holding national and regional summits on PFAS throughout the country (including one held last year in Exeter for the New England Region, which the City of Portsmouth and Testing for Pease representatives gave presentations). States, including Vermont, New Jersey, New York, and California have also responded to this issue by developing their own health advisories, differing from the EPA's levels. Many other states are considering their own limits. Some advocates are proposing that all PFAS compounds be assessed together with one regulatory standard. This is a very complex and evolving issue that the American Water Works Association has commented that, "more research is needed to understand the health impacts of other PFAS compounds and whether regulation of PFAS as a group or class would be an effective approach to public health protection."

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. The fact that 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. As we have done for over five years now, 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 Pease Restoration Advisory Board meetings and 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 Haven Well aquifer.
- Work with regulators and 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. Information for both the City of Portsmouth and Pease water systems can be accessed on the City's website at: <https://www.cityofportsmouth.com/publicworks/water>