ORANGE WATER AND SEWER AUTHORITY

A public, non-profit agency providing water, sewer and reclaimed water services to the Carrboro-Chapel Hill community.

PFAS Backgrounder as of June 3, 2019

Executive Summary

- OWASA's treated drinking water is safe and meets all Federal and State regulations and established health advisory levels.

- Per- and polyfluoroalkyl substances (PFAS) are considered an emerging contaminant – unregulated chemicals being detected in trace amounts. They are man-made chemicals that include PFOA, PFOS, and GenX. Total health and environmental impacts of PFAS are not yet understood because research is relatively recent and ongoing.

- PFAS increases resistance to water and stains and can be found in everyday products such as clothing and cookware. As these products are washed or degrade, PFAS can enter wastewater systems and travel onward to lakes and rivers.

- There are no NC State or Federal regulations with respect to PFAS in drinking water. In the absence of regulation, the Environmental Protection Agency (EPA) has established a lifetime Health Advisory Level of 70 parts per trillion for the combined amount of two PFAS in drinking water: PFOA and PFOS (one part per trillion corresponds to a single grain of sand in an Olympic sized swimming pool).

- OWASA implemented a PFAS monitoring plan to ensure we have localized data. OWASA's treated drinking water tests consistently below the EPA's Health Advisory Level.

- We support local and national monitoring and research for water quality.

- We invite our customers to contact us with any PFAS questions and comments by calling 919-968-4421 or emailing info@owasa.org. We are committed to providing accessible information and education on this emerging topic, to ensure people have the information they need to know.

1. PFAS overview

Per- and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that includes PFOA, PFOS, GenX, and other chemicals. Also referred to as perfluorinated chemicals[1], PFAS have been manufactured and used in a variety of industries around the globe, including in the United States since the 1940s.[2]

PFAS can be found in everyday products such as carpet, clothing, and cookware because they increase resistance to water, grease, and stains. As these products are treated, washed, or degrade, PFAS can enter wastewater systems and then travel onward to lakes and rivers. PFAS can also enter water through industrial releases or discharges from treatment plants.

There are a variety of ways people can be exposed to PFAS and at different levels. For example, at low levels through food packaging containing PFAS, or if such chemicals are released during normal use, biodegradation, or disposal of consumer products. Drinking water can also be a source of exposure where these chemicals have been detected in local water supplies; such detections are typically associated with a specific facility, for example, where PFAS are produced or used to manufacture other products.[3]

PFAS is considered an emerging contaminant. Emerging contaminants are unregulated chemicals being detected in trace amounts, mainly due to advances in water testing that allow measurements at the parts per trillion and lower. Total health and environmental impacts are not yet understood because research is relatively recent and ongoing.

What is understood is that certain PFAS can accumulate and stay in the human body for long periods of time. There is evidence that exposure to some PFAS can lead to adverse health outcomes in humans. The most-studied PFAS chemicals are PFOA and PFOS. Studies indicate that PFOA and PFOS can cause reproductive and developmental, liver and kidney, and immunological effects in laboratory animals. Both chemicals have caused tumors in animals. The most consistent findings are increased cholesterol levels among exposed populations, with more limited findings related to:

- Low infant birth weights
- Effects on the immune system
- Cancer (for PFOA)
- Thyroid hormone disruption (for PFOS)[4]

Certain PFAS chemicals are no longer manufactured in the United States as a result of phase outs including the PFOA Stewardship Program in which eight major chemical manufacturers agreed to eliminate the use of PFOA and PFOA-related chemicals in their products and as emissions from

[1] https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-management-and-polyfluoroalkyl-substances-pfass
[2] https://www.epa.gov/pfas/basic-information-pfas
[3] https://www.epa.gov/pfas/basic-information-pfas
[4] https://www.epa.gov/pfas/basic-information-pfas

their facilities. Although PFOA and PFOS are no longer manufactured in the United States, they are still produced internationally and can be imported into the United States in consumer goods such as carpet, leather and apparel, textiles, paper and packaging, coatings, rubber and plastics.[5]

2. PFAS timeline in North Carolina

1980 Fluorochemical production began at DuPont's Fayetteville Works plant, which merged with Chemours in 2015.[6]

2007 First documentation of a particular PFAS, known as PFOA, in the Cape Fear River, in part due to wastewater discharges from the plant.[7]

2009 In response to U.S. Environmental Protection Agency (EPA) PFOA Stewardship Program, Chemours began to replace PFOA with a shorter-chain chemical known as GenX.[8] Shorter chain PFAS were believed to be better for public health.

2012 GenX was first detected, along with other PFAS, in the Cape Fear River.[9]

2014 GenX was first detected in the city of Wilmington's drinking water.[10]

2015 Sampling was completed for the EPA's Unregulated Contaminant Monitoring Rule (UCMR3). PFAS were detected in 20 public water systems located in 11 NC counties.[11]

2018 NC State University publishes the results of its study involving 345 residential participants in the Lower Cape Fear River Basin. The study detects the presence of GenX in most tap water samples collected from homes serviced by Cape Fear Public Utility Authority's Sweeney Water Treatment Plant (which gets water from the Cape Fear River).[12]

2018 Policy Collaboratory (established by the NC General Assembly) launches new statewide study on PFAS with $5 million State appropriation. Managed by the UNC Gillings School of Global Public Health, research grants to be made available to 20 researchers at universities in NC.[13]

2018 Southern Environmental Law Center sued the chemical manufacturer Chemours on behalf of Cape Fear River Watch. The suit was filed in the U.S. District Court for the Eastern District of North Carolina and details the pollution of air and water with toxic perfluoroalkyl and polyfluoroalkyl substances (PFAS), including GenX, from the Chemours Fayetteville Works Facility in violation of the Clean Water Act and Toxic Substances Control Act.[14]

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[5] https://www.epa.gov/pfas/basic-information-pfas
[6] https://factor.niehs.nih.gov/2019/3/feature/2-feature-pfas/index.htm
[7] https://factor.niehs.nih.gov/2019/3/feature/2-feature-pfas/index.htm
[8] https://factor.niehs.nih.gov/2019/3/feature/2-feature-pfas/index.htm
[9] https://factor.niehs.nih.gov/2019/3/feature/2-feature-pfas/index.htm
[10] https://factor.niehs.nih.gov/2019/3/feature/2-feature-pfas/index.htm
[11] https://factor.niehs.nih.gov/2019/3/feature/2-feature-pfas/index.htm
[12] https://chhe.research.ncsu.edu/the-genx-exposure-study/
[13] https://collaboratory.unc.edu/news/2018/08/01/n-c-policy-collaboratory-launches-new-statewide-study-on-genx-with-5-million-state-appropriation/
[14] https://www.southernenvironment.org/news-and-press/news-feed/groups-sue-chemours-in-federal-court-to-stop-pfas-genx-pollution

2019 Legislation introduced for Congress' consideration (PFAS Action Act)[15] to designate PFAS chemicals as hazardous substances under the Superfund program, and to allow the EPA to clean up contaminated sites (with special reference to Michigan).[16]

3. Regulatory environment

PFAS is considered an emerging group of contaminants for which existing research is limited. Regulations with respect to drinking water have not yet been defined at the State or Federal level. Instead, State and Federal agencies have issued health screening goals or advisories, which are non-regulatory.

State of North Carolina

On June 14, 2017, the North Carolina Department of Health and Human Services (NC DHHS) issued a questions and answers document on its health assessment for GenX. In particular, it identified a health goal of 140 nanograms per liter for the most vulnerable population (bottle-fed infants, who drink the largest volume of water per body weight). A health goal is a non-regulatory, non-enforceable level of contamination below which no adverse health effects would be expected over the lifetime of exposure for the most sensitive sub-population. The NC DHHS document stated the following:

> The goal of the NC DHHS is to provide timely health information to residents and others who are concerned about potential health effects of GenX. When there is not a federal standard and sufficient scientific information available, the NC DHHS can develop and issue a health assessment. This assessment can include establishing a health goal, sometimes referred to as a health screening goal. A health goal is a non-regulatory, non-enforceable level of contamination below which no adverse health effects would be expected over a lifetime of exposure.
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> The NC DHHS shared a preliminary assessment for GenX with local partners on June 8, 2017, in an attempt to provide some context for understanding the health risks that could be associated with levels found in the Cape Fear River during 2013-2014. Since sharing the preliminary health assessment, NC DHHS has continued to review all available health information about GenX. Based on this review, continuing discussions, and consensus with EPA, NC DHHS has determined that sufficient data are available to make changes to the preliminary assessment. The updated health goal is 140 ng/L for the most vulnerable population- i.e. bottle-fed infants, the population that drinks the largest volume of water per body weight.[17]

On the question of drinking water, NC DHHS stated the following:

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[15] https://debbiedingell.house.gov/sites/debbiedingell.house.gov/files/documents/190114_PFASActionAct.pdf

[16] https://debbiedingell.house.gov/media-center/press-releases/dingell-upton-kildee-introduce-legislation-declare-pfas-hazardous-clean

[17] https://ncdenr.s3.amazonaws.com/s3fs-public/GenX/NC%20DHHS%20Risk%20Assessment%20FAQ%20Final%20Clean%20071417%20PM.pdf

> NC DHHS will not be making a blanket recommendation about water use, but will work with local partners about health risks and messaging regarding sampling results. Individuals are encouraged to consider information in the health risk assessment when making decisions about water use. The potential health effects from these chemicals should be balanced against the health benefits of municipal water, including routine monitoring for a variety of microbial and known chemical contaminants that could be present in private wells or other unregulated sources…Studies to determine if any filtration systems could remove GenX and other perfluorinated chemicals are underway and DHHS will share new information as it becomes available.[18]

Another State agency, the Department of Environmental Quality (DEQ), has taken regulatory action with respect to the GenX – Chemours – Cape Fear issue throughout 2017 and 2018.[19] This included a consent order in November 2018 requiring Chemours to pay DEQ a $12 million civil penalty plus $1 million for investigative costs, and other conditions such as providing permanent drinking water supplies (in the form of either a public waterline connection or whole building filtration system) for those with drinking water wells with GenX above 140 parts per trillion or applicable health advisory.[20]

Jointly, DEQ and DHHS convened a Science Advisory Board. Their task is to examine new and emerging chemicals and their potential impacts to human health and the environment. The board is comprised of 16 experts in toxicology, public health, ecology, engineering and related fields. Their mandate is to study ways to better protect North Carolina's people and environment from new and emerging chemicals of concern, including GenX.[21]

Federal Environmental Protection Agency

No Federal regulations exist with respect to PFAS. However, in 2016, the Environmental Protection Agency (EPA) established a lifetime Health Advisory Level of 70 parts per trillion (ppt) for the combined amount of two PFAS in drinking water: PFOA (perfluorooctanoic acid) and PFOS (perfluorooctane sulfonate).[22] Note that one part per trillion corresponds to a single grain of sand in an Olympic sized swimming pool.

The EPA's Health Advisory Level (HAL) describes non-regulatory concentrations of drinking water contaminants at or below which adverse health effects are not anticipated to occur over specific exposure durations. The HAL serves as informal technical guidance to assist federal, state and local officials, and water system managers by providing information on the health effects of, and

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[18] https://ncdenr.s3.amazonaws.com/s3fs-public/GenX/NC%20DHHS%20Risk%20Assessment%20FAQ%20Final%20Clean%20071417%20PM.pdf
[19] https://deq.nc.gov/news/hot-topics/genx-investigation/genx-timeline
[20] https://deq.nc.gov/news/press-releases/2018/11/21/release-state-officials-require-chemours-provide-permanent-drinking
[21] https://deq.nc.gov/news/press-releases/2017/10/19/members-named-state-science-advisory-board-advise-emerging-chemicals
[22] https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos

methods to sample and treat, PFOA and PFOS in drinking water.[23] HALs are not formal regulations and do not indicate safe or unsafe levels.

Under the Safe Water Drinking Act, the EPA has the authority to set enforceable Maximum Contaminant Levels (MCLs) for specific chemicals. There are currently no MCLs established for PFAS chemicals. However, the EPA has initiated the steps to evaluate the need for an MCL for PFOA and PFOS under the federal regulatory determination process.[24]

A regulatory determination is a formal decision on whether EPA should initiate a process to develop a national primary drinking water regulation for a specific contaminant.[25] When making a "determination", the law requires that EPA determine whether the determination meets three criteria: 1) the contaminant may have an adverse effect on the health of persons, 2) the contaminant is known to occur or substantial likelihood it will occur in public water systems with a frequency and at levels of public health concern, and 3) in the sole judgment of the Administrator, regulation of the contaminant presents a meaningful opportunity for health risk reductions for persons served by public water systems.[26]

The EPA has stated that by the end of 2019, it will propose a regulatory determination which is the next step in the Safe Drinking Water Act process for establishing an MCL.[27] It's important to note that a regulatory determination is not the adoption of a formal regulation. Rather, a regulatory determination is a decision as to whether or not to proceed with developing a formal regulation.

The EPA's intention to make a regulatory determination was announced in February 2019 as part of the publication of its national PFAS Action Plan. The plan outlines the EPA's intention to reduce PFAS releases into sources of drinking water, propose national drinking water monitoring, and enhance PFAS research, among other items.[28]

A review of the EPA's actions to address PFAS[29] shows that the agency has been monitoring this emerging contaminant since at least 2006 when it invited major corporations to join in a global stewardship program to work toward eliminating PFAS chemicals from emissions.[30]

4. PFAS monitoring at OWASA

In the absence of formal regulatory guidance OWASA has developed and is implementing a PFAS monitoring plan, to ensure we have localized data.

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[23] https://www.epa.gov/pfas/pfas-laws-and-regulations
[24] https://www.epa.gov/pfas/pfas-laws-and-regulations
[25] https://www.epa.gov/ccl/basic-information-ccl-and-regulatory-determination#what-is-reg-det
[26] https://www.epa.gov/ccl/basic-information-ccl-and-regulatory-determination#what-is-reg-det
[27] https://www.epa.gov/newsreleases/epa-acting-administrator-announces-first-ever-comprehensive-nationwide-pfas-action-plan
[28] https://www.epa.gov/pfas/epas-pfas-action-plan
[29] https://www.epa.gov/pfas/epa-actions-address-pfas
[30] https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-management-and-polyfluoroalkyl-substances-pfass#tab-3

2013

OWASA first detected PFAS in its water in 2013 during our testing as part of the EPA's Unregulated Contaminant Monitoring Rule. The testing collects local data about compounds in water that aren't regulated by the Safe Drinking Water Act. OWASA tested 4 times for 6 different PFAS. We detected one PFAS (PFOA) in one sample in our drinking water testing, at 30 ppt, far below the EPA's Health Advisory Level.

2018

In 2018, OWASA tested local water samples for PFAS levels in our treated drinking water, raw water sources (reservoirs), and wastewater effluents. Results showed that GenX was not present in any samples.

OWASA tested for 39 different PFAS compounds, seven of which were detected in our treated drinking water. Low levels of PFOS and PFOA were detected in two of OWASA's treated water samples (13.7 ppt in one sample and 18 ppt in the other), far below the EPA's Health Advisory Level. Studies indicate that the use of powder activated carbon (PAC) is successful in the reduction of some PFAS but not all. Consistent with these studies, OWASA's use of PAC in its water treatment process has also resulted in the reduction of some PFAS but not all.

With respect to our raw water testing (at point of source, not yet treated), two PFAS were detected in the University Lake and Quarry Reservoir samples. 11 PFAS were detected in the sample from Cane Creek Reservoir. The sum of detected PFOS and PFOA in University Lake, Quarry Reservoir, and Cane Creek Reservoir were 4.7, 4.9, and 120 ppt, respectively. The upstream sources of PFOS and PFOA at Cane Creek Reservoir are not certain at this time. There are no facilities typically associated with elevated levels of PFAS in the watershed (although we do not have historical information on past land use). We do know that other utilities have applied biosolids in the watershed; OWASA does not. Note that there is no Health Advisory Level established by State or Federal agencies for raw water sources.

In our wastewater treatment plant effluent sample, nine PFAS were detected. The list of nine compounds detected in the effluent includes all seven PFAS detected in the drinking water samples and two additional compounds. Five of these compounds were present at similar levels to that in the drinking water samples.

Our wastewater treatment plant is located near Morgan Creek. It's here that the community's wastewater is collected, after which it undergoes a comprehensive treatment process. Some of the treated wastewater is reclaimed for non-drinking uses. The remainder undergoes additional treatment processes to ensure high quality effluent is released into Morgan Creek to be used by communities and utilities downstream. To understand if PFAS is already present in Morgan Creek, before OWASA's wastewater effluent is released into the local waterway, we tested the water upstream from where our plant is located. 8 PFAS were detected in the sample taken upstream from our wastewater treatment plant. These were the same 8 compounds detected in our effluent sample. Four of these compounds were present at similar levels in the creek and effluent samples. One additional compound was detected in our effluent but not in the creek sample.

2019

OWASA is implementing quarterly PFAS testing throughout 2019 to ensure we have localized data for analysis – to enable us to make informed decisions with respect to PFAS monitoring and removal. We want to understand: do factors such as time of year, season, temperature, rainfall, etc., affect the level of local PFAS detection and treatment?

Every quarter, we will test our treated drinking water and raw water source at Cane Creek Reservoir. The results of our first and second quarter sampling for 2019 are similar to our 2018 results. We detected low levels of PFOS and PFOA in our treated water samples, far below the EPA's Health Advisory Level of 70 ppt for PFOS and PFOA combined.

We will continue to share results and action plans with the community, and will post updated information as it becomes available on our website (https://www.owasa.org/testing-for-perfluorinated-compounds). Together with community partners, we also plan to host a public education series on water quality this year, which will include information and community conversations on PFAS.

Continued monitoring and information sharing

OWASA's treated drinking water and wastewater are safe, and meet all Federal and State regulations and established health advisory levels. On PFAS detection, our treated drinking water tests below the EPA's Health Advisory Level.

OWASA is an active member of regional groups that support monitoring and research for water quality, including on unregulated compounds. We also participate in the EPA program for monitoring unregulated compounds.

PFAS is a topic that affects all water providers, so we dialogue and share information with sister utilities in the region to learn from each other.

We invite our customers to contact us with any questions and comments by calling 919-968-4421 or emailing info@owasa.org. We are committed to providing accessible information and education on this emerging topic, to ensure people have the information they need to know.