NC Department of Health and Human Services

GenX and PFAS Updates

Zack Moore, MD, MPH
State Epidemiologist and Epidemiology Section Chief

July 26, 2022
What are PFAS?

PFAS, or per- and polyfluoroalkyl substances, are a group of human-made chemicals that includes PFOA, PFOS, GenX, and many other chemicals.

Used since the 1950s to make products to resist stains, grease, and water and in some firefighting foams.
How can I be exposed to PFAS?

PFAS exposure can occur through contaminated drinking water, food, and indoor dust, as well as some consumer products and workplaces.
How can PFAS affect my health?

- Increased cholesterol levels
- Decreased vaccine response in children
- Changes in liver enzymes
- Increased risk of high blood pressure or pre-eclampsia in pregnant women
- Small decreases in infant birth weights
- Increased risk of kidney or testicular cancer

In adults, children, and pregnant women

More research is needed to better understand the health effects associated with PFAS exposure.
PFAS and skin exposure

• Only a small amount of PFAS can get into your body through your skin, such as through bathing, showering and swimming.

• Limited data from animal studies show some PFAS may cause skin irritation at high levels.
Public health role

• Determine whether PFAS detected through environmental sampling could pose a risk to human health

• Provide health-based guidance on levels of exposure to such contaminants

• Conduct risk assessments and risk communication
# EPA Drinking Water Health Advisories

Released June 2022

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[https://www.epa.gov/sdwa/drinking-water-health-advisories-has](https://www.epa.gov/sdwa/drinking-water-health-advisories-has)
Ways to Reduce Exposure to PFAS

• If you live near known sources of PFAS contamination or your drinking water contains PFAS, you may want to use a different water source or filter your water before drinking, cooking, and preparing infant formula.

• Information about water testing and filtration resources is available on DHHS’ website.

https://epi.dph.ncdhhs.gov/oee/a_z/pfas.html
Ways to Reduce Exposure to PFAS

• Reduce your use of products containing PFAS (packaged foods, products with non-stick or stain resistant coatings, and some personal care products).

• If you have questions about the products you use in your home, contact the Consumer Product Safety Commission at (800) 638-2772.
Contact Information

NCDHHS Occupational and Environmental Epidemiology Branch

Phone: (919) 707-5900
E-mail: oeeb@dhhs.nc.gov
Chemours Drinking Water Plan and Sampling Updates
North Carolina Department of Environmental Quality
July 26, 2022
Discussion Topics

• PFAS and GenX
• Groundwater sampling and the Consent Order
• DEQ June 15th letter
• Alternate Water Options
• Additional information
Emerging Compounds: GenX and PFAS

- **GenX = HFPO-DA or C3 Dimer Acid = C₆HF₁₁O₃**
- **GenX** is a trade name for a manmade, unregulated chemical used in manufacturing nonstick coatings and for other purposes.
  - Is an *emerging compound* in a family of chemicals known as per- and polyfluoroalkyl substances (PFAS)
  - Produced and emitted by one company in NC – Chemours (formerly DuPont)
  - Has been discharged into the Cape Fear River for 30+ years.
  - Until the past couple of years, labs couldn’t measure it.

**Emerging compounds:**
- No (or limited) specific limits in environmental regulations.
- Little is known about how they behave in the environment.
- Little known about their effects on human health and environment.
- Presents significant challenge for regulatory agencies.
Emerging Compounds – GenX Case History in NC

- **Early-mid 2017:** Focus on surface water issues
- **Mid 2017:** Groundwater issues discovered
- **Mid-late 2017:** Air emission contributions
- **Through 2018:** Testing of emissions and drinking wells
- **Feb. 2019:** Consent Order signed
- **Dec. 2019:** Thermal Oxidizer
- **2019-Present:** Ongoing private well testing around the plant
- **Early 2022:** Lower Cape Fear Region well sampling
MAIN SOURCES OF PFAS FROM CHEMOURS TO THE ENVIRONMENT BEFORE 2017

Note: Image is conceptual and is not to scale
Groundwater Testing

• Found high levels of PFAS compounds in onsite monitoring wells at the Chemours plant in Bladen County in 2017

• In 2017, NCDHHS established a GenX drinking water health goal of 140 ng/L (ppt)

• In 2022, EPA established a nationwide health advisory for GenX at 10ppt that has been incorporated into the Chemours Consent Order

• DEQ tested wells on properties adjacent to Chemours first and found high levels

• Asked Chemours to test additional wells in the area to determine extent of contamination

• November 3, 2021: DEQ letter stating that Chemours is responsible for contamination of groundwater monitoring wells and water supply wells in New Hanover County and potentially other counties
• NC DEQ signed a Consent Order with Chemours Feb. 26, 2019: 

• Consent Order included:
  • Requirements to reduce air emissions and to achieve maximum reductions of 
    all remaining PFAS contributions to the Cape Fear River on an accelerated 
    basis, including groundwater.

  • Notify and coordinate with downstream public water utilities when potential 
    discharge of GenX compounds into the Cape Fear River.

  • Sample wells and provide drinking water

• Additional penalties will apply if Chemours fails to meet 
  the conditions and deadlines established in the order.
Implementing the Chemours Consent Order

Addressing contamination

Per the 2019 Consent Order and 2020 Addendum, Chemours must also:

• Achieve control technology improvements and meet emissions reduction milestones;

• Determine which PFAS at what amounts are in wastewater and stormwater at the facility;

• Determine which PFAS at what amounts are in river sediment and downstream raw water intakes for drinking water plants;

• Take specific actions to address more than 90 percent of the PFAS entering the Cape Fear River through groundwater from the residual contamination on the site.

• As of 2022, the interim measures required by the Addendum are operational. The design of the barrier wall and treatment system is underway, and DEQ has held a public process for the related NPDES permit.
MAIN SOURCES OF PFAS FROM CHEMOURS TO THE ENVIRONMENT 2017 - PRESENT

Note: Image is conceptual and is not to scale
Sample Wells and Provide Drinking Water for impacted private drinking water wells

- Sample drinking water wells
  - ¼ mile beyond the closest well that had PFAS levels above 10 parts per trillion
  - Annually retest wells that were previously sampled
  - Bottled water in 3 days if exceed a Consent Order limit

- For those with GenX above 10 parts per trillion (New EPA Health Advisory):
  - Provide permanent drinking water supply
    - Options: Public waterline connection where feasible, whole-building GAC filtration system, reverse osmosis (RO) units installed on every bathroom and kitchen sink

- For those with combined PFAS levels above 70 parts per trillion or any individual PFAS compound above 10 parts per trillion:
  - Provide, install and maintain up to three under-sink RO systems per residence
DEQ’s June 15, 2022 letter to Chemours

- Required Chemours to submit a report by July 13th identifying affected parties entitled to public water or whole-building filtration as a result of the new EPA health advisory for GenX at 10 ppt.

- Required Chemours to submit for review and approval a draft letter to affected parties (well owners with GenX above 10ppt) notifying them of their eligibility options.

- Requirement to submit a plan within 90 days for revising and supplementing Chemours’ assessment of public water feasibility for all affected parties (including re-evaluation of areas where municipal water was determined to be infeasible).

- Requirement to submit a plan for transitioning affected parties who have previously received RO systems to public water or whole-house filtration systems where required.
  
  - Residents who have GenX levels above 10 ppt and declined filters / bottled water will be contacted.
Chemours has reported that **1,697 residences** in Cumberland, Bladen and Robeson Counties with GenX between 10 ppt and 140 ppt. All have been offered alternate water.

- About **1,487** in Cumberland
- Appx. **139** in Bladen
- About **71** residences in Robeson

Chemours proposes to send a letter within 30 days of DEQ approval outlining the options based on the new health goal for GenX: public water (if feasible), RO units in every bathroom and kitchen sink (where currently not installed), or installation of a whole-house GAC system.

Chemours will cover the installation and maintenance costs for the filters for 20 years or the connection to municipal water and the water bill (for 20 years up to $75) if public water is feasible.

Information on a revised public water feasibility will be forthcoming to all residents.

Residents can request whole-house GAC filtration or additional RO units in the near term even if municipal water may be available.

**NOTE:** These selections would forego the future municipal water connection.
NCDEQ’s Map of Land Parcels that Exceed EPA Health Advisory for GenX
Results: 08/2017 - 06/2022

1,795 Parcels Qualify for GAC Water Treatment

- 1,550 Parcels above NEW EPA Health Advisory (GenX ≥10ppt)
- 245 Parcels above Previous Health Advisory (GenX ≥140ppt)

Map Creation Date: 7/25/2022
Map Author: Jared Wilson
Data Sources: North Carolina Department of Environmental Quality, Chemours, ESRI
Next Steps if Chemours PFAS are detected

Installation of water treatment systems if Chemours PFAS are detected above 10ppt including GenX

- Two types of well water treatment systems are used
- Whole-house treatment (GAC) and under-the-sink (RO) versions
- DEQ has tested both systems for their effectiveness
Next Steps

• Once DEQ approves, Chemours will send letters to residents in Bladen, Cumberland, Robeson and Sampson Counties offering the different options under the EPA health goal of 10ppt for GenX.
  • Options are: connection to municipal water, ROs at every kitchen and bathroom sink, whole-house GAC

• Continued DEQ and local government input / coordination on the Chemours public water feasibility reevaluation to be submitted in September of 2022. This will include Cumberland, Bladen and Robeson Counties. DEQ and the counties met on July 20 to discuss next steps in this process.

• Continued private well sampling in four Lower Cape Fear counties: New Hanover, Columbus, Pender and Brunswick.
  • There are currently 43 wells in this area that are eligible for alternate water based on detections of Chemours PFAS in well water.

• Continued work on the current and proposed remediation systems at the Chemours plant to include the barrier wall and groundwater extraction system.
NCDEQ and Chemours PFAS Residential Well Sampling Lower Cape Fear Counties Results: 08/2017 - 06/2022

Legend
- No Detections or No PFAS <= 10ppt
- Any PFAS (Except GenX) <= 10ppt or Total Sum PFAS <= 70ppt
- GenX <= 10ppt

Additional Information
- Total Residences Sampled: 214
- Total Residences that do not qualify for water treatment: 177
- Total Residences that qualify for RO system: 31
- Total Residences that qualify for GAC system: 6

Map Creation Date: 7/19/2022
Map Author: Jared Wilson
Data Sources: North Carolina Department of Environmental Quality, Chemours, ESRU

Unlabeled Miles
0 2.5 5 10 15
Bottled Water
Information

• If a private well is tested by Chemours / Parsons and found to have Chemours PFAS above 10ppt bottle water will be provided to the resident within 3 days.

• Chemours is using a new bottled water voucher system that may help some residents with their requests for different water volume sizes.

• The voucher card would allow residents to purchase the type of water and size of container they prefer with pre-paid money voucher cards provided by Chemours.
Additional Information

If you live near Chemours' Fayetteville Works facility:
Call Chemours at (910) 678-1101 to have your drinking water well sampled or for more information.

- DEQ website includes latest actions, PFAS health-related information and air/water information:
  https://deq.nc.gov/news/key-issues/genx-investigation

- Fayetteville-area well sampling information:
  https://deq.nc.gov/news/key-issues/genx-investigation/genx-information-residents

- Community Update – sent to residents who live near the Chemours facility with information and updates about DEQ’s actions
Waste Management

Michael E. Scott, Director
217 W. Jones Street
1464 Mail Service Center
Raleigh, NC 27699-1646

919-707-8246

https://deq.nc.gov/wastemanagement
Water Resources Update

Richard Rogers and Julie Gryzb
North Carolina Department of Environmental Quality
July 26, 2022
DWR Emerging Compounds Strategy

- **Groundwater** – DWR is expanding groundwater PFAS assessment using the DWR ambient groundwater monitoring network to better understand the nature and extent of PFAS contamination in North Carolina’s aquifers.

- **Public Water Supply Systems** – DWR has prioritized additional sampling at 50 of the systems, which showed elevated levels of PFOA, PFOS and GenX.

- **Surface Water** – DWR is currently collecting PFAS data from several wastewater and industrial dischargers that are known to discharge PFAS compounds. DWR is working with the NC Water Quality Association and pretreatment operators to have them voluntarily submit to DWR PFAS sampling data.
Emerging Compounds Strategy: Groundwater

Lower Cape Fear River Basin

The statewide groundwater monitoring well network consists of 703 wells in 68 counties. To date, samples have been collected from 217 wells at 86 monitoring station locations between July 2020 and June 2022.

Of the 69 monitoring wells sampled in Brunswick, Pender, Sampson, Columbus, New Hanover and southern Bladen Counties: 13 locations showed levels greater then 4 ppt for PFOS/PFOA, and/or 10 ppt GenX.

DWR is currently identifying additional monitoring wells to sample to fill data gaps throughout New Hanover, Brunswick, Pender, Sampson, Columbus, and Bladen Counties.
Orange symbol color indicates well locations where samples showed PFAS concentrations exceeded any one of the new EPA health advisories:
- PFOA – 4 ng/L
- PFOS – 4 ng/L
- GenX – 10 ng/L
Orange Symbol color indicates well locations where samples showed PFAS concentrations exceeded any one of the new EPA health advisories:
- PFOA – 4 ng/L
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Emerging Compounds Strategy: Groundwater

Statewide monitoring network for PFAS

DWR continues to collect additional monitoring data from all available sources.

DWR’s sampling will focus on sampling 50 public water supply sources around the state that showed PFOS/PFOA at or above 4ppt and/or GenX above 10ppt in the 2019 NC PFAS Round 1 Network data.

In addition, groundwater network monitoring will be expanded to available wells that are near these 50 sites.

DWR will focus on investigative data that helps educate and protect public health.
Orange Symbol color indicates well locations where samples showed PFAS concentrations exceeded any one of the new EPA health advisories:
- PFOA – 4 ng/L
- PFOS – 4 ng/L
- GenX – 10 ng/L
Public Water Supply Systems Sampling

Of the 380 sites in 97 counties tested by the NC PFAS Testing Network, 50 sources were found to have PFOS/PFOA at or above 4ppt & /or GenX above 10ppt.

DWR will sample these facilities 3 times over the next 3 months.

Identify where PFOA and/or PFOS are above the minimum reporting limit to establish areas of focus for education and protection of public health.
Public Water Systems Tested by the PFAST Network

Data Collected 2019

PFAST Network Systems

Miles
PFOS, PFOA and GenX Detections at NC PFAST Network Sites

Legend
- PFOA >= 4ppt
- PFOS >= 4ppt
- GenX >= 10 ppt

Data Collected 2019
Emerging Compounds Strategy: Public Water Systems

Public Water Supply Systems Sampling

EPA’s Safe Drinking Water Unregulated Contaminant Monitoring Rule #5 (UCMR5) is a 5-year cycle that spans 2022 – 2026, with preparations in 2022, sample collection from 2023 – 2025, and completion of data reporting in 2026.

Public water systems serving 3,300 people or more will be required to sample for 29 PFAS compounds.

Eighteen public water supplies in Bladen, Cumberland, Robeson and Sampson Counties will be required to sample the UCMR5 parameters during a 12-month period.
UCMR5 Systems in Bladen, Cumberland, Robeson, and Sampson Counties

UCMR5 Information
Size Group and Year
- Large Groundwater (Over 10,000 population) 2023
- Large Groundwater (Over 10,000 population) 2024
- Large Groundwater (Over 10,000 population) 2025
- Large Surface Water (Over 10,000 population) 2023
- Large Surface Water (Over 10,000 population) 2024
- Large Surface Water (Over 10,000 population) 2025
- Medium Groundwater (3,300 to 10,000 population) 2023
- Medium Surface Water (3,300 to 10,000 population) 2024
- Medium Surface Water (3,300 to 10,000 population) 2025
- Small Groundwater (501 to 3,300 population) 2025
- 4 County Area

DEQ - Department of Environmental Quality

0 5 10 15 20 25 30 35 40 45 50 Miles

North Carolina
Emerging Compounds Strategy: Surface Water

Industry and Wastewater System Sampling

April 2022: EPA issued a Memorandum outlining its approach to use federally-issued permits to reduce PFAS discharges.

- Federally-issued permits will include requirements to monitor for PFAS, to use best management practices like product substitution and good housekeeping practices and establish practices to address PFAS-containing firefighting foams in stormwater.

- These conditions and PFAS monitoring requirements will also apply to Industrial Direct Dischargers and Publicly Owned Wastewater Treatment systems receiving wastewaters from industries known or suspected of discharging wastewaters containing PFAS compounds.

DWR is adding permitting conditions and monitoring requirements to municipal and industrial facilities who are suspected or known to discharge PFAS compounds.
Groundwater from decades of contamination from the Chemours Fayetteville Works site continues to flow into the Cape Fear River.

This is the largest reoccurring source of PFAS from the Chemours site impacting the Cape Fear River.

The barrier wall is designed to intercept the flow of contaminated groundwater to the Cape Fear River.

The subsurface barrier wall will be approx. 6,050 feet long, 70-80 feet deep, and about 2 feet thick. It will consist of bentonite and cement mixed with soil.

Extraction wells will be installed to collect the contaminated groundwater behind the wall. This contaminated groundwater will be pumped to a treatment system for the removal of PFAS compounds.

The NPDES Permit for Outfall 004 applies to this treatment system.
**Proposed Groundwater Treatment System**

**Current Groundwater Contaminating Cape Fear River**

**Proposed Groundwater Treatment:**

- Intercept contaminated groundwater
- Remove at least 99% of PFAS
- Treated water enters river

Diagram showing the flow of PFAS in groundwater and the proposed barrier wall & wells to treat the water before it enters the river.
Barrier Wall And Draft Discharge Permit

• Public hearings on the permit were held on June 21\textsuperscript{st} and 23\textsuperscript{rd}.

• The Hearing Officer is reviewing and addressing comments and considering appropriate recommendations.

• The Hearing Officer’s recommendations will be presented to the Director within the next month for review and approval.
Cumberland County Information Session
## PFAST Network Sampled Systems in Four-County Area

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## UCMR5 Systems in Four-County Area

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Air Quality Update
Mike Abraczinskas, Division of Air Quality
July 26, 2022

NC Department of Environmental Quality
Division of Air Quality - Outline

- Control technology updates – Thermal Oxidizer/Scrubber control system
- Facility-wide GenX emissions cap
- Compliance status
- Atmospheric deposition data
Air Quality – Control Technology Improvements

- **Control Technology Improvements:** Thermal Oxidizer/Scrubber system

- By December 31, 2019, control all PFAS in process streams routed to the control system at an efficiency of 99.99%.
  - Thermal Oxidizer/Scrubber system - installed & operational on December 27, 2019
Air Quality – Facility-Wide GenX Emission Reductions

GenX Emissions Reduction Milestones

99% facility-wide reduction of GenX compounds relative to 2017 total reported emissions by December 31, 2019 and for each consecutive 12-month period following that date

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<th>Air Quality Permit</th>
<th>2020 reported emissions</th>
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<td>12 month rolling sum GenX emissions cap</td>
<td>DAQ reviewed data and confirmed results</td>
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Air Quality – Facility-Wide GenX Emission Reductions
Enforcement Actions

• DAQ Issued Civil Penalty Assessment on October 1, 2021
  • 7 violations for failure to reduce the 12-month rolling sum facility-wide emissions of GenX Compounds to less than 23.027 pounds
  • 26 violations for failure to properly operate and maintain the control device.

• Total assessment: $305,611.00

• Chemours appealed the assessment
Air Quality – Facility-Wide GenX Emission Reductions
Enforcement Actions

• Settlement signed on April 5, 2022

• Chemours agreed to:
  • pay the $305K civil penalty in full
  • a new emissions limit of no more than an average of 1.0 pound of GenX emissions per month between May and September 2022
  • implement a list of 12 additional emission reduction actions by the end of October 2022
  • follow a rigorous schedule of stack testing that will allow DAQ to better assess how well the Carbon Adsorber control unit at their Vinyl Ethers North process is controlling emissions

• If that new emissions limit is not met, Chemours waived the right to contest an additional civil penalty assessment of up to $125,000.
Air Quality – Facility-Wide GenX Emission Reductions
Leak Investigation

• July 2, 2022

• Chemours reported a leak that resulted in an estimated 1.07 pounds of GenX emissions from the Vinyl Ethers North carbon adsorber
  • Resulted from an O-ring not sealing properly

• DAQ is continuing to collect information and investigate

• Evaluate compliance with the new limit
  • Average of 1.0 pound of GenX emissions per month

• Reviewing permit language
Contact information

Mike Abraczinskas, EIT, CPM
Director
NC Division of Air Quality
Michael.Abraczinskas@ncdenr.gov
919-707-8447