

# **NORTH CAROLINA PER- AND POLYFLUOROALKYL SUBSTANCES TESTING (PFAST) NETWORK**

Quarterly Progress Report (#8) submitted to the North Carolina General Assembly Environmental Review Commission, the NC Department of Environmental Quality, the NC Department of Health and Human Services, and the Environmental Protection Agency (Region 4)

*July 1, 2020*



## 1.0 INTRODUCTION

The North Carolina General Assembly (NCGA), in the passing of Session Law (SL) 2018-5, Sections 13.1.(g), directed the North Carolina Policy Collaboratory (Collaboratory) to *“identify faculty expertise, technology, and instrumentation, including mass spectrometers, located within institutions of higher education in the State, including the Universities of North Carolina at Chapel Hill and Wilmington, North Carolina State University, North Carolina A&T University, Duke University, and other public and private institutions, and coordinate these faculty and resources to conduct nontargeted analysis for PFAS, including GenX, at all public water supply surface water intakes and one public water supply well selected by each municipal water system that operates groundwater wells for public drinking water supplies as identified by the Department of Environmental Quality, to establish a water quality baseline for all sampling sites. The Collaboratory, in consultation with the participating institutions of higher education, shall establish a protocol for the baseline testing required by this subsection, as well as a protocol for periodic retesting of the municipal intakes and additional public water supply wells.”* The term ‘PFAS’, listed above, refers to Per- and Polyfluoroalkyl Substances and the study is referred to herein as the NC PFAS Testing Network or PFAST Network.

The PFAST Network was funded by an appropriation from the NCGA. Section 13.1.(i) of SL 2018-5 states, *“Five million thirteen thousand dollars (\$5,013,000) of the funds appropriated in this act for the 2018-2019 fiscal year to the Board of Governors of The University of North Carolina shall be allocated to the Collaboratory to manage and implement the requirements of this section, which shall include distribution to the Collaboratory and participating institutions of higher education (i) to cover costs incurred as a result of activities conducted pursuant to this section, (ii) for acquisition or modification of essential scientific instruments, or (iii) for payments of costs for sample collection and analysis, training or hiring of research staff and other personnel, method development activities, and data management, including dissemination of relevant data to stakeholders. No overhead shall be taken from these funds from the participating institutions that receive any portion of these funds. Funds appropriated by this section shall not revert but shall remain available for nonrecurring expenses.”*

In addition to the water sampling identified above, additional study parameters are mandated in Section 13.1.(l), which states, *“The Collaboratory shall identify faculty expertise within institutions of higher education in the State, including the Universities of North Carolina at Chapel Hill and Wilmington, North Carolina State University, North Carolina A&T State University, Duke University, and other public and private institutions, and use technology and instrumentation existing throughout the institutions to conduct the following research (i) develop quantitative models to predict which private wells are most at risk of contamination from the discharge of PFAS, including GenX; (ii) test the performance of relevant technologies in removing such compounds; and (iii) study the air emissions and atmospheric deposition of PFAS, including GenX. In addition, Collaboratory may, using relevant faculty expertise, technology, and instrumentation existing throughout institutions identified, evaluate other research opportunities and conduct such research for improved water quality sampling and analyses techniques, data interpretation, and potential mitigation measures that may be necessary, with respect to the discharge of PFAS, including GenX.”*

Research activities to carry out these legislative mandates and progress made to date are summarized in this this document which represents the eighth [quarterly] report. For reference, all provisions passed by the NCGA in Section 13 of Session Law 2018-5 [related to this project] are included in Appendix I of this report.

## **2.0 REPORTING REQUIREMENTS**

Section 13.1.(h) of SL 2018-5 states, *“Beginning October 1, 2018, the Collaboratory shall report no less than quarterly to the Environmental Review Commission, the Department of Environmental Quality, and the Department of Health and Human Services on all activities conducted pursuant to this section, including any findings and recommendations for any steps the Department of Environmental Quality, the Department of Health and Human Services, the General Assembly, or any other unit of government should take in order to address the impacts of PFAS, including GenX, on surface water and groundwater quality, as well as air quality in the State.”* In addition, Section 13.1(g) states, *“No later than December 1, 2019, Collaboratory shall report the results of such sampling by identifying chemical families detected at each intake to the Environmental Review Commission, the Department of Environmental Quality, the Department of Health and Human Services, and the United States Environmental Protection Agency.*

Subsequently, Senate Bill 433 was ratified by the NC General Assembly and adopted November 6, 2019 as Session Law 2019-241. Section 7.(d) includes revision of the original language from Section 13.1(g) of S.L. 2018-5, extending the deadline for submission of the Collaboratory’s final PFAST Network report to October 15, 2020. The legislative language in Section 7 of SL 2019-241 is provided for reference in Appendix II of this progress report. The extension was granted (without additional appropriations) to ensure sufficient time for completing comprehensive analysis and interpretation of non-targeted data and to enable additional sampling of drinking water supplies during different seasons.

This report fulfills the initial NCGA requirement for the submission of quarterly progress reports and summarizes the work carried out since the April 1, 2020 report. Per Section 7.(d) of SL 2019-241, a final report summarizing findings and recommendations will be submitted by the Collaboratory to the Environmental Review Commission, the Department of Environmental Quality, the Department of Health and Human Services, and the United States Environmental Protection Agency (Region 4) no later than October 15, 2020.

## **3.0 QUARTERLY PROGRESS UPDATE**

NC PFAST Network researchers are in the final stages of their projects, completing their assessments of baseline levels of targeted PFAS throughout North Carolina in all public drinking water supplies, some private wells, wastewater (influent and effluent), landfill leachates, rainwater and ambient air (gas and particles). Network scientists have also been conducting experiments to investigate: the presence and impacts of PFAS in ecologically relevant animal species such as alligators and different species of fish; effects of soil composition on uptake and distribution of PFAS in crop plants; and effects of PFAS exposure on the immune response, pregnancy, and development.

Due to the 2020 COVID-19 pandemic response in North Carolina, all sample collections, laboratory experiments, and in-person meetings have been suspended since March. Public and private universities across the state are now implementing their plans for returning to campus and resuming research and instructional activities. Brief updates of the progress made by our teams during this past quarter from April 1, through June 30, 2020 are provided below. Copies of prior reports can be accessed in the [Resources](#) section of the NC PFAST Network [website](#).

### **PFAS Water Sampling and Analysis**

- As stated previously in the April 1, 2020 progress report, the first round of water sampling and targeted PFAS analysis has been completed, and the second round of sampling was in progress when the universities had to shut down operations. Concentrations for up to 50 individual PFAS were reported to each of the water systems tested, and copies of those reports are now available to view on the PFAST Network [website](#) under [Data and Tools](#).
- Non-target and suspect screening using high resolution mass spectrometry and spectral libraries to identify novel PFAS, PFAS precursors, and PFAS transformation products was underway at both Duke University and NC State University prior to the temporary shutdown of research laboratories. These analyses are expected to resume soon, as the campus labs have begun phased re-opening under strict guidelines and protocols for personal safety and community protection.
- Total fluorine analysis of water samples via Adsorbable Organic Fluorine (AOF) measurements was also suspended during this time. Current work is focused on writing a research paper describing the development and application of the AOF analytical method. The detailed procedures and the robustness of the new method will be presented in the paper. When campus activities resume, the remaining water samples will be processed by the AOF method, and the data will be compared with the targeted analysis results to estimate the percentage of fluorinated substances accounted for (mass balance) in the targeted analysis. Access to new analytical standards as well as results from nontargeted and suspect screening should improve the mass balance and will contribute to a more comprehensive understanding of PFAS exposures from North Carolina's public drinking water sources.

### **Private Well Risk Modeling**

- At the end of May, Drs. Genereux, Pétré, and Knappe from NC State University submitted a grant proposal to the Environmental Enhancement Grant (EEG) Program of the North Carolina Attorney General in the "Research, Planning, and Education" category. The proposed project "GenX and other PFAS in groundwater of the Cape Fear River watershed: How fast is the groundwater flushing, how long will drinking water be impaired?" builds on their previous work done within the PFAST Network and will focus on the timescale for PFAS flushing from the groundwater system to the streams as well as from the zone supplying private water wells around Chemours.
- Drs. Genereux and Pétré started exchanging with the Cape Fear Public Utility Authority about their PFAS data from the Cape Fear River at the Sweeney Water Treatment plant. They will try to offer an interpretation of this dataset in the light of their recent findings in streams in the Chemours' area.

- The predictive Bayesian Network machine learning model for GenX has been finalized and verified using data from well water samples collected from 18 houses in the area of study. Results from the water analysis for GenX were sent to the participating homeowners.
- Time has been spent on manuscript writing and webpage development. Homeowners will be able to use the tool to receive a predicted probability score for GenX contamination above (or below) the NC provisional health goal of 140 ng/L in their area. The webpage is not yet ready for public use, however the team is currently collecting feedback from a few stakeholders to make it more user friendly and expects to have it available soon.
- Drs. MacDonald Gibson and Roostaei have also been working with the Division of Waste Management, NC DEQ who requested access to the data they collected on well depth, age, and construction records. After finalizing the IRB (Institutional Review Board for research ethics) and Data Use Agreement, they shared related maps and well depth information with the group, and are now working with NC DEQ to obtain data from recent measurements to update the Bayesian Network model for some other PFAS that have been measured in the region.

### **PFAS Removal Performance Testing**

- Prior to the shutdown at UNC Charlotte, the Boron Doped Diamond (BDD) electrode reactor used for electrochemical degradation was modified to further enhance PFAS degradation efficiency by increasing the anode area to volume ratio. The new reactor model will be tested once the lab reopens.
- The team has been analyzing data for PFAS removal by ion exchange (IX) and preparing a manuscript for a peer-reviewed journal publication. They found that the polymer matrix of the IX resin plays an important role in removing PFAS, and that IX resins with polystyrene-divinylbenzene (PS-DVB) outperformed other acrylic matrix types. PFAS with sulfonate functional groups were removed more effectively by IX resins than PFAS carrying carboxyl groups, and longer chain PFAS were removed faster than short-chain ones. Adsorption kinetics and removal of perfluoroalkyl ether acids (PFEA) depended on the number of ether groups and the properties (pore structure and functional groups) of the IX PS-DVB resin.

### **Air Emissions and Atmospheric Deposition**

- UNC Chapel Hill researchers completed a one-year field campaign at five sites (Fayetteville, Charlotte, Research Triangle Park, Wilmington and Greenville) to determine PFAS levels in seasonally composited samples of particles (PM<sub>2.5</sub>) and gases. Filters have been extracted and analyzed for PFAS concentrations in particles, and results are being summarized in a manuscript for submission to ES&T Letters. Analysis of volatile PFAS in gaseous samples is starting soon.
- An intensive, 6-month fence line monitoring campaign using high volume (HiVol) air samplers was conducted weekly at two locations close to the Chemours facility and in line with the main wind directions (SSW and NNE). Sample processing and mass spec analysis will begin soon.
- Analysis of wet deposition samples collected at UNC Wilmington showed no correlation of targeted PFAS with seasonality, air-mass back trajectories, rain duration, rain volume, duration of drought, and other rainwater indicators (such as DOC, H<sup>+</sup>, Cl<sup>-</sup>, NO<sub>3</sub><sup>-</sup>, SO<sub>4</sub><sup>2-</sup>,

and non-sea salt sulfate). The lack of correlation typically observed for rainwater constituents for these PFAS compounds suggests that the controls on their occurrence and concentrations are different than those of other anthropogenic compounds. However, it should be noted that the data set is relatively small and future studies may reveal correlations not observed in the current study.

- PFAS compounds were also measured in two unique events during the course of this study. Rainwater collected during Hurricane Doran provided the first data for PFAS in hurricane rain. Concentrations in the hurricane rain were the highest concentrations observed during the study suggesting potential marine sources for these compounds or incorporation of soil particles and plant debris generated by high winds. The branched isomer composition of PFOA was similar in Hurricane Dorian events and a marine rain event collected at another time, suggesting a strong marine source of this compound. This has important ramifications suggesting that while the ocean may be considered a main sink for PFAS it may also be a primary source of contamination via ocean currents and atmospheric deposition.
- Wet and dry deposition results were presented at the Carolinas Society of Toxicology and Chemistry (CSETAC) 29th Annual Meeting (virtual) on May 22, 2020. The title of the presentation was: “Per- and Polyfluoroalkyl Substances in Wet and Dry Deposition in North Carolina”. Additionally, UNC-W graduate student Rachel Mott successfully defended her Master in Chemistry on wet deposition of PFAS across NC. The title of the thesis is “PER- AND POLYFLUORINATED COMPOUNDS (PFAS) AND EMERGING CONTAMINANTS IN WET DEPOSITION ACROSS NORTH CAROLINA”.

#### **Other Applied Research Opportunities:**

##### ***Novel PFAS Inputs into the environment: landfill leachates and wastewater treatment:***

- The Barlaz group at NC State University hopes to return to the lab very soon. During this reporting period, they delivered the following three presentations:
  - Barlaz, M. A. Thelusmond, J. R., Levis, J. W., and N. DeStefano, “Per- and Polyfluoroalkyl Substances (PFAS) in Landfill Leachate and Municipal Wastewater,” Global Waste Management Symposium, Feb. 24 – 26, 2020, Indian Wells, CA.
  - Barlaz, M. A., DeSilva, V. and B. Staley, “PFAS 101: Impacts on Solid Waste Management, Solid waste Association of North America” Webinar, Apr. 29, 2020.
  - Barlaz, M. A., DeSilva, V. and B. Staley, “PFAS Research and Solid Waste Management,” Solid Waste Association of North America, Swanapalooza Virtual Conference, June 22-25, 2020.

##### ***PFAS bioaccumulation in aquatic environments: alligator and fish studies:***

- Non-targeted analysis at NC State University was put on hold during the COVID-19 shutdown. The Belcher group has recently restarted sampling and have been collecting fish that are consumed by anglers across the Cape Fear River basin (both upper and lower, the Haw River and Jordan Lake) to be coupled with weekly water sampling. Those samples are being archived for future analysis. Currently they are collecting regulatory relevant fillet samples as well as 9 different organs including otoliths (age the fish), liver, brain, spleen etc. They have sampled 6-7 different species regularly targeted by anglers.

- Six alligator sampling trips have been made and samples were prepared for analysis. The team captured their 100th different alligator on June 29<sup>th</sup> and have totaled around 140 different captures. They are working on a manuscript comparing health effects observed at a site on the Cape Fear River that has relatively higher PFAS exposure and a site with low PFAS exposure outside the Cape Fear River basin.

***PFAS bioaccumulation and distribution in crop plants: greenhouse studies:***

- The Duckworth group at NC State University has been conducting greenhouse experiments with compost-amended and PFAS-spiked soils. In a first study, they determined concentrations of eight PFAS in soil, porewater, roots, and shoots of lettuce. The results clearly demonstrate a reduction in PFAS uptake with increasing organic matter content. They also completed a second greenhouse trial to look at uptake by other crops and started working on extraction methods for those samples. A proposal to the Canadian Light Source for imaging time by STXM (scanning X-ray transmission spectroscopy) to determine the distribution and molecular associations of PFAS in plant tissues was scored at should receive beamtime in the spring. A virtual presentation “Effects of Compost on PFAS Uptake by Lettuce” was given by Dr. Duckworth at the Goldschmidt 2020 international geochemistry meeting, June 21-26, 2020.

**Communications:**

- With respect to stakeholder engagement, the team has been rethinking communications activity in light of the pandemic shutdown. They responded to questions from the City of Charlotte PIO (public information office) about their water reports and inclusion in updates to customers.
- Ariana Eily completed her post-doc at Duke University in May. With help from team leaders Jory Weintraub and Kathleen Gray, she prepared a draft final report from the Fall 2019 PFAS symposium for publication on the Research Triangle Environmental Health Collaborative (RTEHC) website (a link will be included on the NC PFAST website). A meeting was held with RTEHC organizers to finalize this document and discuss whether some portion of it could be considered for peer-reviewed publication.
- Increasing awareness among lay publics has been an important aim of the Communications team. They met to discuss options for a virtual seminar series to present PFAST Network results in the fall and are considering a series of four zoom webinars that include scientists, community members, and policy makers starting in September 2020. A draft plan will be shared with the PFAST Network Program Management team in July for input. The team is also preparing a summary of questions and answers from the February Fayetteville community meeting for sharing on the PFAST Network website.
- The team held a focus group at NC State University on June 15, 2020 for Dr. Mitsova of the Data Science and Management team to get feedback on proposed maps and their visual display. The Communications team will continue to provide input on visualizations and to work with researchers to enhance their ability to communicate research findings to the public.

### **Data Science and Management**

- The Data team met with representatives of the Program Management and Water Sampling and Analysis teams to discuss outstanding questions regarding format and layout of static and dynamic maps. This meeting resulted in a decision to focus on developing a set of static maps and general agreements which included:
  - standard measurement (parts-per-trillion) for PFAS concentration maps
  - inclusion of groundwater vs. surface water icons on future maps
  - displaying total measurements and PFAS classes (as opposed to individual chemicals)
- The team added watershed hydrologic unit codes (HUC6) and counties context layers to the NC PFAST map server as vector tiles (packets of geographic data) and implemented the data abstraction layer API (application programming interface) that powers the user interface.

# APPENDIX I

## LEGISLATIVE LANGUAGE PASSED BY THE NORTH CAROLINA GENERAL ASSEMBLY

*(Session Law 2018-5, Section 13.1 (f) through (l), effective June 12, 2018)*

### FUNDING TO ADDRESS PER- AND POLY-FLUOROALKYL SUBSTANCES, INCLUDING GENX/USE OF EXPERTISE AND TECHNOLOGY AVAILABLE IN INSTITUTIONS OF HIGHER EDUCATION LOCATED WITHIN THE STATE

**SECTION 13.1.(f)** The General Assembly finds that (i) per- and poly-fluoroalkyl substances (PFAS), including the chemical known as "GenX" (CAS registry number 62037-80-3 or 13252-13-6), are present in multiple watersheds in the State, and impair drinking water and (ii) these contaminants have been discovered largely through academic research not through systematic water quality monitoring programs operated by the Department of Environmental Quality or other State or federal agencies. The General Assembly finds that the profound, extensive, and nationally recognized faculty expertise, technology, and instrumentation existing within the Universities of North Carolina at Chapel Hill and Wilmington, North Carolina State University, North Carolina A&T State University, Duke University, and other public and private institutions of higher education located throughout the State should be maximally utilized to address the occurrence of PFAS, including GenX, in drinking waterresources.

**SECTION 13.1.(g)** The North Carolina Policy Collaboratory at the University of North Carolina at Chapel Hill (Collaboratory) shall identify faculty expertise, technology, and instrumentation, including mass spectrometers, located within institutions of higher education in the State, including the Universities of North Carolina at Chapel Hill and Wilmington, North Carolina State University, North Carolina A&T State University, Duke University, and other public and private institutions, and coordinate these faculty and resources to conduct nontargeted analysis for PFAS, including GenX, at all public water supply surface water intakes and one public water supply well selected by each municipal water system that operates groundwater wells for public drinking water supplies as identified by the Department of Environmental Quality, to establish a water quality baseline for all sampling sites. The Collaboratory, in consultation with the participating institutions of higher education, shall establish a protocol for the baseline testing required by this subsection, as well as a protocol for periodic retesting of the municipal intakes and additional public water supply wells. No later than December 1, 2019, Collaboratory shall report the results of such sampling by identifying chemical families detected at each intake to the Environmental Review Commission, the Department of Environmental Quality, the Department of Health and Human Services, and the United States Environmental Protection Agency.

**SECTION 13.1.(h)** Beginning October 1, 2018, the Collaboratory shall report no less than quarterly to the Environmental Review Commission, the Department of Environmental Quality, and the Department of Health and Human Services on all activities conducted pursuant to this section, including any findings and recommendations for any steps the Department of Environmental Quality, the Department of Health and Human Services, the General Assembly, or any other unit of government should take in order to address the impacts of PFAS, including GenX, on surface water and groundwater quality, as well as air quality in the State.

**SECTION 13.1.(i)** Five million thirteen thousand dollars (\$5,013,000) of the funds appropriated in this act for the 2018-2019 fiscal year to the Board of Governors of The University of North Carolina shall be allocated to the Collaboratory to manage and implement the requirements of this section, which shall include distribution to the Collaboratory and participating institutions of higher education (i) to cover costs incurred as a result of activities conducted pursuant to this section, (ii) for acquisition or modification of essential scientific instruments, or (iii) for payments of costs for sample collection and analysis, training or hiring of research staff and other personnel, method development activities, and data management, including dissemination of relevant data to stakeholders. No overhead shall be taken from these funds from the participating institutions that receive any portion of these funds. Funds appropriated by this section shall not revert but shall remain available for nonrecurring expenses.

**SECTION 13.1.(j)** The Collaboratory should pursue relevant public and private funding opportunities that may be available to address the impacts of PFAS, including GenX, on surface water and groundwater quality, as well as air quality, in order to leverage funds appropriated by this section, or any other funds provided to the Collaboratory, including the Challenge Grant authorized in Section 27.5 of S.L. 2016-94, as amended by Section 10.4(a) of S.L. 2017-57.

**SECTION 13.1.(k)** In the event that the United States Environmental Protection Agency no longer provides access to its analytical instrumentation at no cost to the State for water quality sampling analysis related to per- and poly-fluoroalkyl substances (PFAS), including the chemical known as "GenX" (CAS registry number 62037-80-3 or 13252-13-6), or if the Department of Environmental Quality determines that such analysis is not being performed in a sufficiently timely manner, the Collaboratory shall coordinate such analysis in the most cost-effective manner using relevant faculty expertise, technology, and instrumentation, including mass spectrometers, existing throughout institutions of higher education located throughout the State, until such time as the Department of Environmental Quality is able to perform such analysis with instrumentation acquired pursuant to subsection (q) of this section. The Collaboratory, in consultation with the Department and relevant experts across institutions of higher education in the State, including the Universities of North Carolina at Chapel Hill and Wilmington, North Carolina State University, North Carolina A&T State University, Duke University, and other public and private institutions, shall establish a protocol for delivery of such samples taken by the Department to the entity designated to perform analysis of the samples, chain of custody protocols, and other matters to ensure proper handling and processing of the samples, which protocols shall be subject to approval by the United States Environmental Protection Agency, if such approval is required pursuant to authority delegated from the United States Environmental Protection Agency to the Department to administer federal environmental law.

**SECTION 13.1.(l)** The Collaboratory shall identify faculty expertise within institutions of higher education in the State, including the Universities of North Carolina at Chapel Hill and Wilmington, North Carolina State University, North Carolina A&T State University, Duke University, and other public and private institutions, and use technology and instrumentation existing throughout the institutions to conduct the following research (i) develop quantitative models to predict which private wells are most at risk of contamination from the discharge of PFAS, including GenX; (ii) test the performance of relevant technologies in removing such compounds; and (iii) study the air emissions and atmospheric deposition of PFAS, including GenX. In addition, Collaboratory may, using relevant faculty expertise, technology, and instrumentation existing throughout institutions identified, evaluate other research opportunities and conduct such research for improved water quality sampling and analyses techniques, data interpretation, and potential mitigation measures that may be necessary, with respect to the discharge of PFAS, including GenX.

# APPENDIX II

## LEGISLATIVE LANGUAGE PASSED BY THE NORTH CAROLINA GENERAL ASSEMBLY

*(Session Law 2019-241, Section 7.(a) through 7.(d), effective Nov. 6, 2019)*

### GENERAL ASSEMBLY OF NORTH CAROLINA SESSION 2019

#### SESSION LAW 2019-241 SENATE BILL 433

AN ACT TO MAKE VARIOUS CHANGES TO THE STATUTES GOVERNING THE DEPARTMENT OF NATURAL AND CULTURAL RESOURCES AND TO REMOVE CERTAIN LANDS FROM THE STATE NATURE AND HISTORIC PRESERVE, AS RECOMMENDED BY THE DEPARTMENT; **TO AMEND CERTAIN REPORTS OF THE NORTH CAROLINA POLICY COLLABORATORY TO THE GENERAL ASSEMBLY**; TO CLARIFY CERTAIN APPROPRIATIONS IN THE 2018 HURRICANE FLORENCE DISASTER RECOVERY ACT; TO CORRECT AN EFFECTIVE DATE; TO REPEAL AND REPLACE AN ACT PROVIDING FOR EMERGENCY OPERATING FUNDS FOR UTILITIES; TO ADJUST FOR INFLATION THE THRESHOLD FOR DEPARTMENT OF ADMINISTRATION APPROVAL OF STATE LEASES; AND TO CLARIFY AND AMEND THE SEPTIC TANK SITE SUITABILITY DETERMINATION PROCESS.

The General Assembly of North Carolina enacts:

#### **COLLABORATORY/FIREFIGHTING FOAM**

**SECTION 7.(a)** The North Carolina Policy Collaboratory at the University of North Carolina at Chapel Hill (Collaboratory) shall create an inventory of aqueous film-forming foam (AFFF) used or stored by fire departments in North Carolina operated, managed, or overseen by units of local government, including those located at or serving airports. This inventory shall include, at a minimum, the following:

- (1) The name and address of each fire department that owns or otherwise has on the premises of a fire station a firefighting vehicle that carries AFFF or a storage tank or other vessel for AFFF.
- (2) The volume, trade name, and CAS number of AFFF used by each department in 2018 for fighting fires or firefighter training.
- (3) The number of firefighting vehicles carrying AFFF and the volume of AFFF carried by each vehicle.
- (4) Each fire department's annual cost of acquiring AFFF and last known purchases of AFFF.

- (5) The volume, trade name, and CAS number of AFFF stored by each fire department or unit of local government for firefighting use and the portion of these AFFFs that are no longer utilized and could be removed from inventory for disposal.
- (6) Other data deemed relevant by the Collaboratory to establish a statewide inventory of AFFF used for fighting fires or firefighter training.

The Office of the State Fire Marshal of the Department of Insurance and all units of local government shall provide any assistance requested by the Collaboratory to acquire and compile the data required by this section.

**SECTION 7.(b)** The North Carolina Policy Collaboratory at the University of North Carolina at Chapel Hill (Collaboratory) shall develop a proposal for identifying and collecting AFFF that is expired or no longer needed or wanted by each fire department in North Carolina operated, managed, or overseen by units of local government, including those located at or serving airports. This proposal should include recommendations on which State agency or agencies could oversee such a collection effort and cost estimates on this collection, stockpiling, and disposal. The Department of Insurance Office of the State Fire Marshal, the Department of Environmental Quality, the Department of Health and Human Services, and the Department of Public Safety shall provide any assistance requested by the Collaboratory to acquire and compile the data required by this section.

**SECTION 7.(c)** The Collaboratory shall submit an interim report with the results of the studies required by subsections (a) and (b) of this section no later than April 1, 2020, and a final report no later than October 15, 2020, to the Joint Legislative Oversight Committee on Agriculture and Natural and Economic Resources and the Environmental Review Commission.

**SECTION 7.(d)** Section 13.1(g) of S.L. 2018-5 reads as rewritten:

**"SECTION 13.1.(g)** The North Carolina Policy Collaboratory at the University of North Carolina at Chapel Hill (Collaboratory) shall identify faculty expertise, technology, and instrumentation, including mass spectrometers, located within institutions of higher education in the State, including the Universities of North Carolina at Chapel Hill and Wilmington, North Carolina State University, North Carolina A&T State University, Duke University, and other public and private institutions, and coordinate these faculty and resources to conduct nontargeted analysis for PFAS, including GenX, at all public water supply surface water intakes and one public water supply well selected by each municipal water system that operates groundwater wells for public drinking water supplies as identified by the Department of Environmental Quality, to establish a water quality baseline for all sampling sites. The Collaboratory, in consultation with the participating institutions of higher education, shall establish a protocol for the baseline testing required by this subsection, as well as a protocol for periodic retesting of the municipal intakes and additional public water supply wells. No later than ~~December 1, 2019~~, October 15, 2020, the Collaboratory shall report the results of such sampling by identifying chemical families detected at each intake to the Joint Legislative Oversight Committee on Agriculture and Natural and Economic Resources, the Environmental Review Commission, the Department of Environmental Quality, the Department of Health and Human Services, and the United States Environmental Protection Agency.