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May 14, 2021

Via Email and www.regulations.gov

Ms. Samantha Lewis
Engineering and Analysis Division
Office of Science and Technology
Office of Water
United States Environmental Protection Agency
lewis.samantha@epa.gov

Re: Advanced Notice of Proposed Rulemaking: Clean Water Act Effluent Limitations Guidelines and Standards for the Organic Chemicals, Plastics and Synthetic Fibers Point Source Category, EPA–HQ–OW–2020–0582[1]

Dear Ms. Lewis:

The Southern Environmental Law Center offers the following comments on the United States Environmental Protection Agency's Advanced Notice of Proposed Rulemaking: *Clean Water Act Effluent Limitations Guidelines and Standards for the Organic Chemicals, Plastics and Synthetic Fibers Point Source Category*. These comments are submitted on behalf of:

Alabama Rivers Alliance
Black Warrior Riverkeeper
Cape Fear River Watch
Cahaba River Society
Center for Environmental Health
Charleston Waterkeeper
Choctawhatchee Riverkeeper
Clean Cape Fear
Clean Water Action
Congaree Riverkeeper
Coosa River Basin Initiative
Coosa Riverkeeper
Earthjustice
Environment America
Environmental Action
Environment Georgia
Environment North Carolina
Environmental Working Group
Haw River Assembly
League of Conservation Voters
Lumber Riverkeeper
Mobile Baykeeper
Natural Resources Defense Council
NC Child
North Carolina Conservation Network
North Carolina League of Conservation Voters
Ogeechee Riverkeeper
South Carolina Coastal Conservation League
Toxic Free North Carolina
Upstate Forever
U.S. PIRG
Virginia Conservation Network
Waccamaw Riverkeeper
Waterkeeper Alliance
Waterkeepers Chesapeake
Winyah Rivers Alliance

[1] The documents cited in this letter were submitted to the docket center by overnight mail sent on May 13, 2021.

I. Introduction

On June 8, 2017, communities in southeastern North Carolina woke up to a nightmare—their drinking water was contaminated with per- and polyfluoroalkyl substances ("PFAS").[2] These toxic chemicals had been dumped for years into the Cape Fear River by the E.I. du Pont de Nemours and Company ("DuPont") and former subsidiary Chemours Company FC, LLC ("Chemours") from their facility in Bladen County. The community responded with fear and outrage—but more importantly with action. Drinking water utilities downstream responded by designing multi-million-dollar improvements to their treatment plants. On behalf of Cape Fear River Watch, the Southern Environmental Law Center sued Chemours under the Clean Water Act to require the company to clean up its widespread contamination.[3] The North Carolina Department of Environmental Quality also sued the company under state law for its decades of pollution.[4]

That litigation resulted in a 2019 Consent Order between Cape Fear River Watch, the North Carolina Department of Environmental Quality, and Chemours.[5] The cleanup required under the Consent Order and its 2020 addendum[6] is making the river cleaner—and communities safer—by nearly eliminating PFAS from Chemours air emissions and discharges into surface waters. A granular activated carbon treatment system has been used at Chemours' facility to reduce PFAS as high as 345,000 parts per trillion ("ppt") from a creek contaminated by groundwater beneath the facility to nearly nondetectable concentrations.[7] Separately, a reverse osmosis treatment unit, coupled with granulated activated carbon and ion exchange, was also shown in pilot testing to reduce individual PFAS concentrations as high as 10,510,000 ppt and 5,886,000 ppt to at most 35 ppt, and mostly nondetectable levels.[8] Not only do these outcomes mean a cleaner Cape Fear River and safer drinking water for downstream communities, they also demonstrate that there is available and economically achievable technology that can remove PFAS so that it is not discharged into our rivers and streams.

We therefore urge the United States Environmental Protection Agency ("EPA") to set limitations for PFAS based on the use of granulated activated carbon and reverse osmosis water treatment—demonstrated by the Chemours' experience to be Best Available Technology.

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[2] Vaughn Hagerty, *Toxin Taints CFPUA drinking water*, WILMINGTON STAR NEWS (June 8, 2017) (Attachment 1).
[3] *See* Complaint, *Cape Fear River Watch v. Chemours*, No. 7:18-CV-159-D (E.D.N.C. Jan. 10, 2019) (hereinafter "Complaint") (Attachment 2).
[4] *See* Amended Complaint, *N.C. Dept. of Environmental Quality v. Chemours*, 17 CVS 580 (N.C. Super. Apr. 9, 2018) (hereinafter "NC DEQ Amended Complaint") (Attachment 3).
[5] Consent Order, *N.C. Dept. of Environmental Quality v. Chemours*, 17 CVS 580 (N.C. Super. Feb. 20, 2019) (hereinafter "Consent Order") (Attachment 4).
[6] Addendum to Consent Order Paragraph 12, *N.C. Dept. of Environmental Quality v. Chemours*, 17 CVS 580 (N.C. Super. Oct. 12, 2020) (Attachment 5).
[7] Ted Schoenberg, Parsons, *Old Outfall 002 GAC Pilot Study Interim Results Report, Chemours Fayetteville, North Carolina Facility*, 4-5 (Aug. 5, 2019) (hereinafter "GAC Pilot Study") (Attachment 6); *see also* Parsons, *Engineering Report – Old Outfall 002 GAC Pilot Study Results* (Sept. 2019) (hereinafter "GAC Pilot Study Results") (Attachment 7).
[8] Chemours Company, *Attachment J.2 to NPDES Permit No. NC0003573, Reverse Osmosis Engineering Report and Data Analysis*, 4-8 (Nov. 2020) (hereinafter "Chemours Reverse Osmosis Report") (Attachment 8).

We also urge EPA to act quickly and beyond this rulemaking to address other sources of these chemicals. This is essential because PFAS contamination is widespread, harming communities throughout our country;[9] companies responsible for releasing PFAS extend far beyond the "Organic Chemicals, Plastics and Synthetic Fibers Point Source Category;" and effluent limitations guidelines can take years to finalize. In particular, EPA must push state agencies to incorporate control technology-based limits into state-issued permits through case-by-case analyses, as required by the Clean Water Act,[10] and provide guidance to states for conducting these analyses. In addition, EPA should promptly initiate rulemaking(s) to adopt effluent limitations guidelines and pretreatment standards for other industrial categories that are responsible for contaminating our communities with PFAS—incorporating the technologies discussed in this comment letter.

II. <u>PFAS are toxic and bioaccumulative, and they persist in the environment and in our bodies.</u>

It is well established that PFAS are a threat to the health and safety of the public. Two of the most commonly studied PFAS—perfluorooctanoic acid ("PFOA") and perfluorooctane sulfonate ("PFOS")—have been found to cause developmental effects to fetuses and infants, kidney and testicular cancer, liver malfunction, hypothyroidism, high cholesterol, ulcerative colitis, lower birth weight and size, obesity, decreased immune response to vaccines, reduced hormone levels, and delayed puberty.[11] PFAS chemicals take years to leave the human body, and instead slowly accumulate over time.[12] Concerned about the extensive health effects of PFOA and PFOS, EPA in 2016 established a lifetime health advisory of 70 ppt for the combined concentrations of PFOA and PFOS in drinking water.[13]

Since then, in 2021, the United States Agency for Toxic Substances and Disease Registry released a Toxicological Profile for PFOA, PFOS, and other PFAS—suggesting that many of the chemicals are much more harmful than previously thought.[14] For instance, the minimal risk levels, or the amount of a chemical a person can eat, drink, or breathe each day without a detectable risk to health, was determined to be only 11 ppt for PFOA and 7 ppt for PFOS.[15]

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[9] Linda Gaines, EPA, *Presentation: Per and Polyfluoroalkyl Substances (PFASs) at Superfund Sites*, 4 (May 2017) (Attachment 9).

[10] In the absence of water quality standards or effluent limit guidelines, states are still required to use their best professional judgment to implement limits based on the available technologies. 40 C.F.R. § 125.3; *see also* 33 U.S.C. § 1342(a)(1)(B).

[11] Arlene Blum, et al., *The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs)*, ENVTL. HEALTH PERSPECTIVES, Vol. 123, No. 5, A 107 (2015) (hereinafter "Madrid Statement") (Attachment 10); EPA, *Fact Sheet: PFOA & PFOS Drinking Water Health Advisories*, 2 (Nov. 2016) (hereinafter "EPA Health Advisories Fact Sheet") (Attachment 11).

[12] Carol F. Kwiatkowski, et al., *Scientific Basis for Managing PFAS as a Chemical Class*, ENVIRON. SCI. & TECH. LETTERS 2020, 7(8), 534 (hereinafter "Kwiatkowski Article") (Attachment 22).

[13] EPA Health Advisories Fact Sheet at 2.

[14] ATSDR, *Toxicological Profile for Perfluoroalkyls* (May 2021) (hereinafter "2021 Toxicological Profile for Perfluoroalkyls") (Attachment 12).

[15] *Id.*; *see also* Cape Fear Public Utility Authority (CFPUA), *CFPUA Statement on Recently Released DHHS Report* (June 21, 2018) (Attachment 13). As the Natural Resources Defense Council (NRDC) has documented, ATSDR has posted different levels on a webpage entitled "ATSDR's Minimal Risk Levels (MRLs) and Environmental Media Evaluation Guides (EMEGs) for PFAS." The agency did not provide details on how it derived these values. NRDC determined, however, that, in calculating these levels, the agency assumed that 100 percent of a person's exposure

Epidemiological studies show that many of these same health outcomes result from exposure to other PFAS.[16] Given these harms, at least nine states have concluded that the EPA's 2016 health advisories are not adequately protective.[17] States like Michigan, New York, New Hampshire, New Jersey, and Vermont have acknowledged the dangers of these compounds and have either proposed or finalized drinking water standards for various PFAS at 20 ppt and lower.[18]

PFAS not only harm our bodies, they harm our environment. Once released, PFAS are extremely resistant to breaking down in the environment, or they transform into even more persistent PFAS.[19] Studies have estimated that PFAS will be in the environment "for centuries or longer, even if environmental releases cease immediately."[20] PFAS can also travel long distances, and have even been found in the Arctic and in the open ocean.[21] They have also been

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comes from drinking water, not 20 percent or 50 percent, as other agencies have projected. Anna Reade, et al., NRDC, *PFAS in Drinking Water 2019: Scientific and Policy Assessment for Addressing Per- and Polyfluoroalkyl Substances (PFAS) in Drinking Water*, 35 (Apr. 12, 2019) (Attachment 14).

[16] *See* 2021 Toxicological Profile for Perfluoroalkyls.

[17] Gloria Post, *Recent US State and Federal Drinking Water Guidelines for Per- and Polyfluoroalkyl Substances*, 40 ENVIRON. TOXICOLOGY & CHEM. 550, 551 (2021) (Attachment 15).

[18] Press Release, Mich. Dep't of Env't, Great Lakes, and Energy, *Michigan Adopts Strict PFAS in Drinking Water Standards* (July 22, 2020) (Attachment 16); Keshia Clukey, *New York Moves on Some of the Strictest PFAS Drinking Water Limits*, BLOOMBERG (July 30, 2020) (Attachment 17); Annie Ropeik, *N.H. Approves Unprecedented Limits for PFAS Chemicals in Drinking Water*, NHPR (July 18, 2019) (Attachment 18); Vt. Dep't of Health, *PFAS in Drinking Water*, 2 (July 2019) (Attachment 19); N.J. Dep't of Health, *Drinking Water Facts: Per- and Polyfluorinated Substances (PFAS) in Drinking Water*, 2 (Sept. 2020) (Attachment 20); Press Release, N.J. Dep't of Env't Protection, *Affirming National Leadership Role, New Jersey Publishes Formal Stringent Drinking Water Standards for PFOA and PFOS* (June 1, 2020) (Attachment 21).

[19] Kwiatkowski Article.

[20] *Id*. at 535.

[21] *Id.*; *see also* EPA, *Technical Fact Sheet — Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA)* 3 (Nov. 2017) (Attachment 23); Madrid Statement at A 107.

shown to cause damaging effects in fish,[22] amphibians,[23] mollusks,[24] and other aquatic invertebrates[25]—resulting in developmental and reproductive impacts, behavioral changes, adverse effects to livers, disruption to endocrine systems, and weakened immune systems.[26] Despite these harms, companies have been polluting our bodies and our environment with PFAS for decades.

III. **<u>For decades, chemical companies have freely contaminated our environment with PFAS.</u>**

In North Carolina, for nearly four decades, DuPont knowingly contaminated the air, water, and groundwater at its Fayetteville Works Facility, as well as the Cape Fear River—the drinking water supply for more than 300,000 North Carolinians—with PFAS from its

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[22] Huang, et al., *Toxicity, Uptake Kinetics and Behavior Assessment in Zebrafish Embryos Following Exposure to Perfluorooctanesulphonicacid (PFOS)*, 98 AQUATIC TOXICOLOGY 139–147 (2010) (Attachment 24); Jantzen, et al., *PFOS, PFNA, and PFOA Sub-Lethal Exposure to Embryonic Zebrafish Have Different Toxicity Profiles in Terms of Morphometrics, Behavior and Gene Expression*, 175 AQUATIC TOXICOLOGY 160–170 (2016) (Attachment 25); Hagenaars, et al., *Structure–Activity Relationship Assessment of Four Perfluorinated Chemicals Using a Prolonged Zebrafish Early Life Stage Test*, 82 CHEMOSPHERE 764–772 (2011) (Attachment 26); Du, et al., *Chronic Effects of Water-Borne PFOS Exposure on Growth, Survival and Hepatotoxicity in Zebrafish: A Partial Life-Cycle Test*, 74 CHEMOSPHERE 723–729 (2009) (Attachment 27); Rotondo, et al., *Environmental Doses of Perfluorooctanoic Acid Change the Expression of Genes in Target Tissues of Common Carp*, 37 ENVIRON. TOXICOLOGY & CHEM. 942–948 (2018) (Attachment 28); Liu, et al., *The Thyroid-Disrupting Effects of Long-Term Perfluorononanoate Exposure on Zebrafish (Danio Rerio)*, 20 ECOTOXICOLOGY 47–55 (2011) (Attachment 29); Chen, et al., *Multigenerational Disruption of the Thyroid Endocrine System in Marine Medaka after a Life-Cycle Exposure to Perfluorobutanesulfonate*, 52 ENVIRON. SCI. & TECH. 4432–4439 (2018) (Attachment 30); Chen, et al., *Perfluorobutanesulfonate Exposure Causes Durable and Transgenerational Dysbiosis of Gut Microbiota in Marine Medaka*, 5 ENVIRON. SCI. & TECH. LETTERS 731–738 (2018) (Attachment 31); Chen, et al., *Accumulation of Perfluorobutane Sulfonate (PFBS) and Impairment of Visual Function in the Eyes of Marine Medaka After a Life-Cycle Exposure*, 201 AQUATIC TOXICOLOGY 1–10 (2018) (Attachment 32).

[23] Ankley, et al., *Partial Life-Cycle Toxicity and Bioconcentration Modeling of Perfluorooctanesulfonate in the Northern Leopard Frog (Rana Pipiens)*, 23 ENVIRON. TOXICOLOGY & CHEM. 2745–2755 (2004) (Attachment 33); Cheng, et al., *Thyroid Disruption Effects of Environmental Level Perfluorooctane Sulfonates (PFOS) in Xenopus Laevis*, 20 ECOTOXICOLOGY 2069–2078 (2011) (Attachment 34); Lou, et al., *Effects of Perfluorooctanesulfonate and Perfluorobutanesulfonate on the Growth and Sexual Development of Xenopus laevis*, 22 ECOTOXICOLOGY 1133–1144 (2013) (Attachment 35).

[24] Liu, et al., *Oxidative Toxicity of Perfluorinated Chemicals in Green Mussel and Bioaccumulation Factor Dependent Quantitative Structure-Activity Relationship*, 33 ENVIRON. TOXICOLOGY & CHEM. 2323–2332 (2014) (Attachment 36); Liu, et al., *Immunotoxicity in Green Mussels under Perfluoroalkyl Substance (PFAS) Exposure: Reversible Response and Response Model Development*, 37 ENVIRON. TOXICOLOGY & CHEM. 1138–1145 (2018) (Attachment 37).

[25] Ji, et al., *Toxicity of Perfluorooctane Sulfonic Acid and Perfluorooctanoic Acid on Freshwater Macroinvertebrates (Daphnia Magna and Moina Macrocopa) and Fish (Oryzias Latipes)*, 27 ENVIRON. TOXICOLOGY & CHEM. 2159 (2008) (Attachment 38); Houde, et al, *Endocrine-Disruption Potential of Perfluoroethylcyclohexane Sulfonate (PFECHS) in Chronically Exposed Daphnia Magna*, 218 ENVIRON. POLLUTION 950–956 (2016) (Attachment 39); Liang, et al., *Effects of Perfluorooctane Sulfonate on Immobilization, Heartbeat, Reproductive and Biochemical Performance of Daphnia Magna*, 168 CHEMOSPHERE 1613–1618 (2017) (Attachment 40); MacDonald, et al., *Toxicity of Perfluorooctane Sulfonic Acid and Perfluorooctanoic Acid to Chironomus Tentans*, 23 ENVIRON. TOXICOLOGY & CHEM. 2116 (2004) (Attachment 41).

[26] *See supra* notes 21-25.

manufacturing processes. After DuPont created Chemours,[27] and passed responsibility for its pollution to its then-subsidiary, the Fayetteville Works Facility continued to quietly poison the public with hundreds of thousands of pounds of toxic PFAS.

This was not the first time DuPont contaminated a community and its drinking water. Before DuPont polluted the air and water in southeastern North Carolina, the company devastated communities in West Virginia with its pollution containing PFOA.[28] DuPont knew about the dangers of PFOA beginning in the early 1960s, after the company conducted studies that showed the chemical caused liver damage, was resistant to degradation, and could cause birth defects.[29] By 1981, DuPont found PFOA in the umbilical cord of a pregnant employee, demonstrating that the chemical's toxic effects could reach fetuses.[30] By 1982, DuPont knew that PFOA emissions from its facility's stacks in West Virginia traveled beyond the boundaries of its West Virginia facility and was warned by its own medical director that surrounding communities were likely being exposed to the company's poisonous dust.[31] By 1987, DuPont found the chemical in drinking water around its West Virginia facility, yet told no one outside the company.[32]

Nevertheless, when DuPont lost its supply of PFOA from the 3M Company in 2000, it decided to begin making PFOA at its Fayetteville Works Facility in North Carolina, starting a new legacy of pervasive environmental pollution for another unsuspecting state.[33] Years later, plagued by thousands of civil lawsuits from its PFOA pollution in West Virginia; scientific evidence showing that PFOA causes birth defects, cancer, and other severe health effects; and pressure from the public and EPA, DuPont was pressured to stop making PFOA.[34] And, it replaced it with the equally harmful GenX.

DuPont had studied GenX, its new toxic PFAS substitute, beginning as early as 1963, discovering over time that GenX produced toxic effects in laboratory animals similar to that of PFOA, including cancers in the liver, pancreas, and testicles.[35] Still, in the 1980s the company began quietly pouring the chemical into the Cape Fear River, an important North Carolina drinking water supply, as a byproduct of its many manufacturing processes.[36]

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[27] E.I. du Pont de Nemours and Company owned and operated the Fayetteville Works facility from the 1970s until the company formed Chemours Company FC, LLC, and transferred ownership to Chemours in 2015. Complaint at 1, n.1.

[28] *See* Nathaniel Rich, *The Lawyer Who Became DuPont's Worst Nightmare*, N.Y. TIMES (Jan. 6, 2016) (hereinafter "Rich Article") (Attachment 42).

[29] *Id*.

[30] *Id*.

[31] *Id.*; *see also* Motion for Partial Summary Judgment, Exhibit 7, *Little Hocking Water Ass'n, Inc. v. E.I. du Pont Nemours & Co.*, 91 F. Supp. 3d 940, 962 (S.D. Ohio 2015) (Attachment 43).

[32] Motion for Partial Summary Judgment, Exhibit 12, *Little Hocking Water Ass'n, Inc. v. E.I. du Pont Nemours & Co.*, 91 F. Supp. 3d 940, 962 (S.D. Ohio 2015) (Attachment 44).

[33] Rich Article.

[34] *Id*.

[35] DuPont and Chemours, TSCA filing to EPA, 8EHQ-06- 1643 6_8EHQ-06- 16478 (Jan. 8, 2013) (hereinafter "DuPont and Chemours TSCA Filing") (Attachment 45).

[36] NC DEQ Amended Complaint at 16; *Notes from Chemours Meeting with Local, State Officials*, STARNEWS (June 15, 2017) (hereinafter "StarNews Notes") (Attachment 46).

Three decades later, when DuPont began making GenX in 2009 as a replacement for PFOA at the Fayetteville Works Facility,[37] the company did not disclose to the North Carolina Department of Environmental Quality or to the public that GenX has harmful health effects similar to those of PFOA. DuPont also failed to disclose that it had already been dumping the chemical along with other harmful PFAS into the Cape Fear River since the 1980s.[38]

After incurring hundreds of million dollars' worth of legal liabilities from its earlier PFAS contamination, DuPont created a spinoff company, Chemours, to take on DuPont's liabilities and to continue to manufacture GenX. When Chemours took ownership of the Fayetteville Works Facility in 2015, it simply continued DuPont's tradition of surreptitiously pouring toxic pollution into the Cape Fear River.[39]

Not only did the companies dump their PFAS-laden wastewater directly into the Cape Fear River,[40] they also released PFAS into the air from their stack emissions.[41] When those emissions settled to the ground, PFAS contaminated the soil and then seeped into groundwater.[42] The companies also allowed their wastewater to leak from the facility's ditches, storage pits, and pipes.[43] Every time it rained, stormwater picked up PFAS from the facility's contaminated soil and equipment, and flushed the chemicals into the Cape Fear River.[44] In addition to the soil, groundwater, and rivers and streams in and around the facility, DuPont and Chemours contaminated over 70 square miles of groundwater,[45] including over 4,000 drinking water wells.[46] From the Cape Fear River and its tributaries, the facility's polluted groundwater also taints the drinking water supplies downstream for more than 300,000 North Carolinians.[47] Hundreds of thousands of people in North Carolina have been devastated by DuPont's and Chemours' decades of PFAS contamination.

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[37] NC DEQ Amended Complaint at 18.
[38] *Id*. at 16, 20-21.
[39] *See* NC DEQ Amended Complaint at 14-16.
[40] NC DEQ Amended Complaint at 16; StarNews Notes; Mei Sun et al., *Legacy and Emerging Perfluoroalkyl Substances Are Important Drinking Water Contaminants in the Cape Fear River Watershed of North Carolina*, 3 ENVIRON. SCI. & TECH. LETTERS 415 (2016) (Attachment 47); EPA, *Laboratory PFAS Results for NC DEQ Cape Fear Watershed Sampling* (Aug. 21, 2017) (Attachment 48); Mark Strynar, et al., *Identification of Novel Perfluoroalkyl Ether Carboxylic Acids (PFECAs) and Sulfonic Acids (PFESAs) in Natural Waters Using Accurate Mass Time-of-Flight Mass Spectrometry (TOFMS)*, 49 ENVIRON. SCI. & TECH. LETTERS 11622 (2015) (Attachment 49).
[41] Geosyntec Consultants, *On and Offsite Assessment, Chemours Fayetteville Works* (Oct. 31, 2019) at 13, 15, 43, 52, 55-56, 10-7 (hereinafter "Chemours On and Offsite Assessment") (Attachment 50); Chemours Company, *2012-2016 Fayetteville Works Facility Air Emission Summary for Other Emerging Compounds* (Attachment 51).
[42] Chemours On and Offsite Assessment at 13, 15, 52, Figure 9-8, 9-9, 9-10, Figure 10-7.
[43] *Id.* at 13-14, 44, Figure 9-8, 9-9, 9-10, 10-7; GeoSynetc Consultants, *Characterization of PFAS in Process and Non-Process Wastewater and Stormwater: Initial Characterization – Final Quarterly Report* at Figure 3B (Dec. 18, 2020) (hereinafter "Characterization of PFAS Report") (Attachment 52).
[44] Characterization of PFAS Report at 18-19, Figure 3B.
[45] Chemours, *Corrective Action Plan – Chemours Fayetteville Works*, xvi (Dec. 2019) (hereinafter "CAP") (Attachment 53); Pioneer Technologies, *Residential Sample Results Collected the Week of May 11th, 2020* (hereinafter "Residential Sample Results") (Attachment 54); Chemours On and Offsite Assessment at 13-14, 44, Figure 9-8, 9-9, 9-12.
[46] *NCDEQ and Chemours PFAS Residential Well Sampling Results: 08/2017 – 12/2020* (hereinafter "Chemours PFAS Well Results") (Attachment 55).
[47] Chemours On and Offsite Assessment at 52-53, 55, Figure 10-7.

Recent retesting of samples taken in 2014 and 2015 downstream of Chemours' facility revealed alarmingly high levels of PFAS that the people of southeastern North Carolina had been drinking for nearly forty years. A 2014 sample below Chemours' wastewater outfall documented PFAS concentrations of about 990,000 ppt.[48] Another sample taken near the drinking water intake for people in Wilmington and Brunswick County measured PFAS concentrations of 130,000 ppt—many thousand times higher than the health levels for the chemicals.[49]

Chemours and DuPont are not the only companies dumping PFAS into our waterways. Residents in southeastern North Carolina and elsewhere continue to be exposed to PFAS from other sources. The chemical maker Solvay Specialty Polymers USA, LLC released PFOA into the air, soil, sediment, groundwater, and surface water near the company's PFAS manufacturing facility in Delaware.[50] Solvay's New Jersey PFAS manufacturing facility caused perfluorononanoic acid ("PFNA") pollution that reached "the highest reported concentration in surface water in the world at that time."[51] The company 3M similarly discharged PFAS from its manufacture of Scotchgard into the drinking water sources relied on by Minnesotans.[52] In Alabama, 3M contaminated the drinking water supply for about 100,000 people with PFOA and PFOS manufactured at its Decatur plant.[53] Michigan is similarly facing widespread PFAS contamination from facilities operated by 3M, DuPont, Chemours, Arkema Inc., Daikin Industries, Solvay, and other companies.[54] As EPA surely knows, this list could go on.

Until PFAS are strictly controlled, companies throughout the country will continue to dump toxic PFAS into our waterways, and millions more people throughout the country will be harmed.

IV. **EPA and state agencies must address PFAS as a class to stop PFAS pollution at the source.**

History has shown that PFAS must be addressed as a class and at the source. EPA and state permitting agencies should therefore require companies to install proven control technologies to remove the class of PFAS before they can send the toxic chemicals into our air and water.

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[48] Adam Wagner, *NC State-Led Study Shows Cape Fear River Had 'Incredibly High' Levels of Chemicals*, THE NEWS & OBSERVER (Oct. 10, 2019) (Attachment 56).
[49] *Id.*
[50] Julia Rentsch, *Delaware Settles with Solvay Specialty Polymers Over PFAS Contamination Claims in Prices Corner*, SALISBURY DAILY TIMES (Feb. 17, 2021) (Attachment 57).
[51] Jacob Adelman, *N.J. Sues Chemical Maker Solvay for Evading Responsibility for Toxic Pollution from West Deptford Plant*, PHILADELPHIA INQUIRER (Nov. 10, 2020) (Attachment 58).
[52] John Gardella, *PFAS Water Utility Lawsuit Shows an Increasing Trend*, NATIONAL LAW REVIEW (Feb. 17, 2021) (Attachment 59).
[53] *3M pays $35 Million to North Alabama Water Authority Ink Drinking Water Contamination Settlement*, WHNT NEWS 19 (Apr. 28, 2019) (Attachment 60).
[54] Press Release, Mich. Dep't of Env't, Great Lakes, and Energy, Mich. PFAS Action Response Team, *Michigan Files Lawsuit Against 3M, DuPont and Others for PFAS Contamination* (Jan. 14, 2020) (Attachment 61).

A. PFAS must be addressed as a class.

There are over 3,000 PFAS in circulation on the global market,[55] and possibly 5,000 to 10,000 in total.[56] PFAS must be addressed as a class, not as one chemical at a time. As scientists have stated:

> managing the risk of PFAS has focused primarily on one chemical at a time, or a small group of PFAS. This approach has not been effective at controlling widespread exposure to this large group of chemicals with known and potential hazards.[57]

This is true for a number of reasons.

First, managing one chemical or a few at a time incentivizes chemical companies to develop alternatives that are just as harmful, but outside of public and regulatory scrutiny, creating a so-called "whack-a-mole" problem. History has proven this.

In 2006, EPA asked companies, including DuPont, to voluntarily phase out their use of PFOA, and gave the companies nearly a decade to do so.[58] DuPont then took advantage of the lack of express regulation on PFAS and simply shifted from using PFOA to using GenX, a structurally similar compound. At the time, DuPont's own studies of GenX showed that the chemical had health effects in laboratory animals consistent with those of PFOA.[59] Even so, DuPont, and later Chemours, knowingly pumped GenX and numerous other harmful PFAS into the drinking water for over 300,000 people in southeastern North Carolina.

Over the past several years, many studies have shown that—although "replacement PFAS" (like GenX) "were marketed […] as safer alternatives" by companies like DuPont and Chemours—these replacement chemicals "are not safer."[60] Instead, a "growing body of evidence suggests that they are associated with similar adverse toxicological effects;" they "can be equally environmentally persistent and are even more mobile in the environment and more difficult to remove from drinking water"; and bioaccumulation can still occur in both humans and animals.[61] If regulators continue to scrutinize one, or a few, PFAS at a time, nothing will stop chemical manufacturers from continuing to switch to equally harmful alternatives—as they have done before.

Second, people are not exposed to one PFAS at a time—they are exposed to complex mixtures of many at once, and newer analytical methods reveal that people are exposed to far

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[55] KEMI, Swedish Chemicals Agency, *Occurrence and Use of Highly Fluorinated Substances and Alternatives*, 6 (2015) (Attachment 62).
[56] EPA, *Combined Presentations from EPA PFAS Community Engagement in Fayetteville, NC*, Slide 18 (Aug. 14, 2018) (hereinafter "Fayetteville Presentations") (Attachment 63).
[57] Kwiatkowski Article at 534.
[58] EPA, *Fact Sheet: 2010/2015 PFOA Stewardship Program* (Attachment 64).
[59] DuPont and Chemours TSCA Filing.
[60] Kwiatkowski Article at 534.
[61] *Id*.

more of the chemicals than previously estimated.[62] Failure to set standards for PFAS as a class ignores this reality.

Third, it is extremely time and resource intensive to conduct health studies on individual PFAS. Because it takes so long and there are so many different PFAS, only a small fraction of them have been tested for their health effects.[63] Even after there is a wealth of data showing a chemical is dangerous, it takes decades longer for regulators to set a level that is safe for the public. For example, scientists outside of DuPont began studying the health effects of PFOA since at least the 1970s.[64] But the EPA did not set a health advisory for the chemical until 2009,[65] which was later revised in 2016.[66] Not only did it take the agency decades to act on the chemical, it set the health advisories at a level dozens of times higher than what is now considered safe.[67] States have acknowledged that EPA's health advisories are not adequately protective, but only a handful of them have finalized regulations on the chemical at a level that is more protective.[68] As researchers have acknowledged, "[p]roceeding with the approach of testing one chemical at a time will cause substantial delays in the effort to protect health and the environment from this large class of potentially hazardous chemicals."[69] To effectively protect our communities and environment, PFAS must be controlled as a class.

B. PFAS must be stopped at the source.

Not only must standards be set for PFAS as a class, PFAS must be stopped at the source. Once the chemicals have been released into drinking water supplies, treatment at drinking water treatment plants is extremely costly and difficult. For instance, in North Carolina, public drinking water utilities are spending hundreds of millions of dollars to clean up the water that Chemours has polluted. Brunswick County is planning to spend over $156 million for a reverse osmosis treatment system.[70] Cape Fear Public Utility Authority in Wilmington, North Carolina is spending $43 million on a granular activated carbon treatment system.[71] In January 2020, the Cumberland County Board of Commissioners allocated $10.5 million to pipe clean water to schools and residences whose wells were contaminated.[72] Unfairly, these costs will be borne by

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[62] *Id.* at 533.
[63] *Id*. at 535.
[64] *See* EPA Office of Water Health and Ecological Criteria Division, *Health Effects Support Document for Perfluorooctanoic Acid (PFOA)*, EPA Doc. No. 822-R-16-003, 3-61 (May 2016) (discussing a 1978 study) (Attachment 65).
[65] EPA, *Provisional Health Advisories for Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS)* (Jan 8. 2009) (Attachment 66).
[66] EPA Health Advisories Fact Sheet at 2.
[67] *See generally* 2021 Toxicological Profile for Perfluoroalkyls.
[68] *See* Environmental Council of the States (ECOS), *Processes and Considerations for Setting State PFAS Standards*, 7 (Updated Mar. 2, 2021) (hereinafter "ECOS Report") (Attachment 67); *id*. at 8 (noting that only "[s]everal states have developed drinking water guidelines for PFOA and PFOS that are lower than the EPA's" lifetime health advisory).
[69] Kwiatkowski Article at 533.
[70] Randell Woodruff, Brunswick County Manager, *Recommended Budget to Brunswick County Board of Commissioners*, 13 (May 18, 2020) (hereinafter "Recommended Budget") (Attachment 68).
[71] *CFPUA Files Motion to Intervene in North Carolina's Complaint Against Chemours*, WECT NEWS 6 (Sept. 10, 2020) (Attachment 69).
[72] Paul Woolverton, *Cumberland County to Spend $10.5M to Send Water to GenX Contaminated Gray's Creek*, THE FAYETTEVILLE OBSERVER (Jan. 6, 2020) (hereinafter "Woolverton Article") (Attachment 70).

communities that bear no responsibility for creating the problem and are already at risk from decades of drinking the polluted water. Rather than taxpayers, it is the polluters that should bear the burden of protecting communities against the harms from their toxic chemicals. The most effective way to accomplish this is to require the polluters themselves to install control technologies at their facilities to prevent PFAS from entering our air and water.

Indeed, once PFAS enter the environment, the chemicals move aggressively and are extremely resistant to breaking down. PFAS "end up virtually everywhere, including air, dust, wastewater treatment plant (WWTP) effluent, biosolids, soil, inland and ocean waters, drinking water, and food, […] in the deep ocean, and in underground aquifers, in rainwater and snow, and in pristine Arctic lakes, far from any point source."[73] We saw this in North Carolina when Chemours' decades of contamination caused PFAS to migrate over 70 square miles in groundwater,[74] including into over 4,000 drinking water wells.[75] The chemicals have also been found in the soil, stormwater runoff, nearby rivers and streams, local honey and produce, fish and alligators, and in the rainwater nearly 80 miles from facility.[76] To prevent this widespread contamination, EPA must requires polluters to stop sending PFAS into the environment.

C. When relying heavily on available health data for individual PFAS, states have struggled to manage the chemicals as a class and at the source.

In the absence of express action at the federal level, individual states have been attempting to address PFAS pollution. At least 20 states have developed draft, proposed, or final health-based regulatory and/or guidance values for certain PFAS in drinking water, groundwater, and/or surface water.[77] Although better than nothing, these state actions will not adequately protect communities from PFAS.

Most importantly, the states that have taken action on PFAS have addressed only a few of the chemicals. For instance, in developing drinking water limits, New York and Wisconsin have only acted on PFOA and PFOS. New Jersey is acting on three compounds; New Hampshire is acting on four; Vermont is acting on five; Massachusetts is acting on six; and Michigan—the state that has enacted drinking water limits for the *most* PFAS in the country—is only acting on seven.[78] None of these states have acted on the PFAS released by Chemours and therefore, none of these drinking water limits would have protected those in southeastern North Carolina. Given there are up to 10,000 existing PFAS being released at facilities in our communities,[79] the public cannot wait for regulators to act on an individual, or a few, PFAS at a time—particularly when

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[73] Cal. EPA, et al., *Product – Chemical Profile for Treatments Containing Perfluoroalkyl or Polyfluoroalkyl Substances for Use on Converted Textiles or Leathers*, 19 (Nov. 2019) (Attachment 71).
[74] CAP at xvi; Residential Sample Results; Chemours On and Offsite Assessment at 13-14, 44, Figure 9-8, 9-9, 9-12.
[75] Chemours PFAS Well Results.
[76] *See supra* notes 39-46; Ralph Mead, UNCW, *Presentation to House Select Committee on North Carolina River Quality, Report from the University of North Carolina at Wilmington Regarding the Implementation of § 20.(a)(2) of House Bill 56 (S.L. 2017-209)*; Lisa Sorg, *FDA: GenX, 14 Types of Perfluorinated Compounds Found in Produce Grown Within 10 miles of Chemours*, N.C. POLICY WATCH (June 3, 2019) (Attachment 72); Lisa Sorg, *It's Even Been Found in Honey: Mysteries Deepen About Extent, Risks of GenX Contamination*, N.C. POLICY WATCH (Dec. 5, 2017) (Attachment 73).
[77] ECOS Report at 7.
[78] *Id.* at 10.
[79] Fayetteville Presentations at 18.

chemical companies can substitute PFAS that are under scrutiny with those that regulators will not even know to look for.

In addition, only Michigan has statewide surface water standards—standards that can be used to prevent *sources* of highly contaminated wastewater—for some PFAS.[80] Of the other few states that have adopted standards, most have focused on drinking water, groundwater, and soil regulations and guidelines.[81] While important, drinking water regulations and guidelines often put the heavy burden of cleaning up the pollution on communities that are already suffering from the health impacts of the pollution caused by industry.[82] Groundwater and soil regulations and guidelines often focus on cleaning up contamination that has already been released—rather than on preventing the harm to people and the environment.[83]

States claim that they lack toxicity data, or the expertise or resources to assess available data, to address PFAS as a class.[84] Although not an adequate excuse for failing to protect the public,[85] these barriers demonstrate that it is not feasible to rely on health data for individual PFAS to manage these chemicals. The only feasible way to address these chemicals is to stop the class of them at the source using what the Clean Water Act requires: the best available controls technologies paid for by the polluters.

V. **The Clean Water Act requires the use of best available technology and technology-based effluent limitations to control PFAS at the source.**

Technology-based effluent limitations are the only way to protect the public from PFAS; they are also what the Clean Water Act requires.

The Clean Water Act directs EPA to promulgate technology-based effluent limitations guidelines that reflect pollutant reductions achievable in categories or subcategories of industrial point sources through the implementation of available treatment technologies.[86] Effluent limitations guidelines apply to pollutants discharged from industrial facilities to surface water and to publicly owned treatment works. The use of technology-based standards ensures that "industrial facilities with similar characteristics will, at a minimum, meet similar effluent guidelines representing the performance of the 'best' pollution control technologies, regardless of their location or the nature of their receiving water or publicly owned treatment work into which they discharge."[87]

[80] ECOS Report at 9. Although Minnesota and New Mexico are listed in the report, neither state has promulgated statewide water quality standards for the chemicals that are applicable for every discharge permit issued by the state.
[81] *Id*. at 9-10.
[82] Recommended Budget at 13; Jim Ware, *CFPUA Moving Forward with $46M GenX Filtration System*, STARNEWS ONLINE (June 11, 2019) (Attachment 74); Woolverton Article.
[83] *See* ECOS Report at 13, 15, Appendix B, Appendix D (showing many states' standards for soil and groundwater as being tied to contaminated sites).
[84] *Id*. at 9.
[85] In the absence of water quality standards or effluent limit guidelines, states are still required to use their best professional judgment to implement limits based on the available technologies. 40 C.F.R. § 125.3; *see also* 33 U.S.C. § 1342(a)(1)(B).
[86] 33 U.S.C. §§ 1311(b), 1314(b).
[87] EPA, *Effluent Guidelines Program Plan 14*, 2-1 (Jan. 2021) (Attachment 75).

Under the Clean Water Act, polluters must use the *best available technology* that is economically achievable to control and ideally eliminate their discharge of pollutants.[88] Congress made the Clean Water Act "technology-forcing": technology-based effluent limitations spur innovation in wastewater treatment and control and ensure progress toward the Act's goal of eliminating the discharge of pollutants into navigable waters.[89] "The Best Available Technology standard reflects the intention of Congress to use the latest scientific research and technology in setting effluent limits, pushing industries toward the goal of zero discharge as quickly as possible. In setting the Best Available Technology standard, EPA uses not the average plant, but the optimally operating plant, the pilot plant which acts as a beacon to show what is possible."[90]

VI. <u>Granular activated carbon and reverse osmosis are the Best Available Technology for PFAS.</u>

The Chemours experience described above has one silver lining: the cleanup serves as a "beacon to show what is possible." [91] It demonstrates that there are available and economically achievable technologies that can remove PFAS before it is discharged into our rivers and streams: granulated activated carbon and reverse osmosis.

A. A granulated activated carbon treatment system has been used to nearly eliminate PFAS at the Chemours facility in North Carolina.

Granular activated carbon has been used at Chemours' facility to nearly eliminate PFAS concentrations as high as 345,000 ppt in a creek previously known as Old Outfall 002.[92] The creek, which flowed straight into the Cape Fear River, is fed with the contaminated groundwater beneath the site. Under the 2019 Consent Order, Chemours was required to implement a system to capture and treat the flow from Old Outfall 002, and to reduce the indicator PFAS—GenX and perfluoro-2-methoxyacetic acid ("PFMOAA")—flowing from it by at least 99 percent.[93]

Prior to treatment, Old Outfall 002 comprised about a quarter of Chemours' PFAS pollution into the Cape Fear River.[94] Sampling results for PFAS in Old Outfall 002 prior to treatment were extremely high: on May 15, 2019, for example, the total PFAS concentration was measured at over 345,000 ppt.[95] Individual PFAS concentrations were thousands of times above any health levels for PFAS: PFMOAA was measured at 241,000 ppt, perfluoro (3,5-dioxahexanoic) acid ("PFO_2HxA") at 47,000 ppt, GenX at 20,000 ppt, and perfluoro (3,5,7-

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[88] 33 U.S.C. § 1311(b)(2)(A).
[89] *Kennecott v. EPA*, 780 F.2d 445, 448 (4th Cir. 1985); *see also EPA v. Nat'l Crushed Stone Ass'n*, 449 U.S. 64, 74 (1980).
[90] *Kennecott*, 780 F.2d at 448 (citing *A Legislative History of the Water Pollution Control Act Amendments of 1972,* 93d Cong., 1st Sess. (Comm. Print 1973) at 798 ("The distinction between 'best practicable' and 'best available' is intended to reflect the need to press toward increasingly higher levels of control . . . .")).
[91] *Id.*
[92] Old Outfall 002 is referred to as Outfall 003 in current NPDES permitting documents. *See, e.g.*, *Fact Sheet NPDES Permit No. NC0089915* at 2 (hereinafter "NPDES Permit Fact Sheet") (Attachment 76).
[93] Consent Order at 17.
[94] GeoSyntec Consultants, *Cape Fear River PFAS Mass Loading Assessment – Fourth Quarter 2020 Report* (Mar. 2021) at 20 (Attachment 77); GeoSyntec Consultants, *Cape Fear River PFAS Loading Reduction Plan – Supplemental Information Report* (Nov. 2019) at 14 (Attachment 78).
[95] Parsons, *Old Outfall 002 Surface Water Sampling Results* at Table 1 (Sept. 30, 2019) (Attachment 79).

trioxaoctanoic) acid ("PFO_3OA") at 12,000 ppt.[96] Other sampling conducted in the creek had similarly high levels, from 130,000 to 290,000 ppt of total PFAS.[97]

In order to meet the requirements of the Consent Order, Chemours proposed to build a dam to capture the flow from the creek and install a granular activated carbon treatment system to remove PFAS prior to discharging treated water into the Cape Fear River. Chemours first tested the treatment technology through a pilot study. The results showed that granular activated carbon is capable of removing more than 99 percent of 20 PFAS.[98] Almost all of the compounds were reduced to levels so low they were not detectable in the discharge.[99]

Based on the success of the pilot study, the North Carolina Department of Environmental Quality, Division of Water Resources ("the Division") approved Chemours' use of the granular activated carbon treatment system technology to treat the water from Old Outfall 002. Designed to treat a maximum flow of 750 gallons per minute,[100] Chemours' full-scale treatment system consists of a number of components. First, the system includes an influent oxidation/coagulation/pH adjustment tank for pretreatment.[101] Second, there is ultrafiltration pretreatment, removing solids prior to treatment through the granular activated carbon units.[102] The water is then treated using granular activated carbon adsorption.[103] The system includes six vessels that can hold up to 20,000 pounds of granular activated carbon each.[104] Chemours changes out the lead carbon unit when there is break-through in the carbon unit, *i.e.*, when the level of PFMOAA in the lead carbon unit equals that leaving the lead unit.[105] The treatment system also includes a solids handling and treatment system.[106]

Incorporating the requirements of the 2019 Consent Order, the Division issued a National Pollutant Discharge Elimination System ("NPDES") permit requiring technology-based limits on PFAS.[107] The permit imposes limits on discharges from Old Outfall 002 for three indicator parameters: HFPO-DA (GenX), PFMOAA, and perfluoromethoxypropyl carboxylic acid ("PMPA").[108] Based on a single 24-hour composite influent sample, and assuming that Chemours' treatment system would remove 99 percent of the PFAS, the agency issued a limit of 60 ppt for GenX, 850 ppt for PFMOAA, and 54 ppt for PMPA.[109] In addition to these numeric limits, the treatment has to demonstrate 99 percent removal for the three compounds based on monthly average concentration data.[110] Under the permit, Chemours is also required to sample the influent and effluent of its treatment system for GenX, PFMOAA, and PMPA twice each

[96] *Id*.
[97] *E.g.*, Chemours On and Offsite Assessment at Figure 9-8.
[98] *See* GAC Pilot Study Results.
[99] *Id.* at Appendix D Table 20.
[100] NPDES Permit Fact Sheet at 2.
[101] *Id*. at 3.
[102] *Id*.
[103] *Id*. at 3-4.
[104] *Id*. at 3.
[105] *Id.* at 4.
[106] *Id*.
[107] *See* Old Outfall 002 Final Permit (Attachment 80).
[108] *Id* at 3.
[109] NPDES Permit Fact Sheet at 9-10.
[110] Old Outfall 002 Final Permit at 4; NPDES Permit Fact Sheet at 10.

month.[111] Chemours must also sample for other PFAS in waters upstream and downstream of Old Outfall 002, and in the influent and effluent of its treatment system, on a monthly basis.[112]

The Division stated in its fact sheet for the permit that "[t]he 99% removal is also consistent with the NPDES permitting procedure for establishing [best available technology] for waste streams that don't have promulgated Effluent Guidelines,"[113] and that "when indicator compounds PFMOAA, PMPA, and GenX are removed at the rate of 99%," other PFAS compounds "were also removed at the rate of 99% based on current analytical detection levels."[114]

On behalf of Cape Fear River Watch, Southern Environmental Law Center advocated for lower permit limits for the three indicator compounds because Chemours' pilot study for granular activated carbon demonstrated that the company could attain much lower PFAS concentrations.[115] But the agency did not lower the draft permit limits because it was concerned that Chemours would not necessarily be able to replicate the results of the pilot study and that it may be more difficult to achieve non-detect levels or similar levels through a full-scale treatment system. In response to comments, the agency stated, "[t]he study performed by the consultants was conducted under predictable and controlled laboratory conditions on a small scale during a short time period. When this technology is implemented in the field, there will be additional complications that could have a negative impact on the performance…."[116] Elsewhere, the Division stated that "since these are technology based effluent limits,"[117] it would reevaluate limits after three years, and "reduce the limits if the facility demonstrates ability to consistently achieve levels that are lower than the proposed limits." [118] According to the agency, it needed to give the system "time to optimize [its] performance."[119]

Over the past several months, sampling data has shown that Chemours' granular activated carbon treatment system is achieving levels far below its permit limits of 60 ppt for GenX, 850 ppt for PFMOAA, and 54 ppt for PMPA:[120]

[111] Old Outfall 002 Final Permit at 3.
[112] *Id*. at 10.
[113] NPDES Permit Fact Sheet at 9.
[114] *Id*.
[115] *See* SELC Outfall 003 Comments (Attachment 81).
[116] NPDES Permit Fact Sheet at 15.
[117] *Id*. at 10.
[118] *Id*. at 10, 16.
[119] *Id*. at 16.
[120] These discharges have been detected in the facility's discharge monitoring reports. In October, there were violations of the permit and the consent order because the treatment system failed to properly manage sediment loading. NC DEQ, *Notice of Violation & Intent to Assess Civil Penalty and Stipulated Penalty* (Jan. 26, 2021) (Attachment 82). The agency issued a notice for violation and penalties. *Id.*; NC DEQ, *DEQ Assesses Penalties of Nearly $200,000 for Chemours Violations* (Mar. 31, 2021) (Attachment 83). And Chemours implemented a series of changes to its treatment system. *See* Chemours, *Response to Notice of Violation & Intent to Assess Civil Penalty and Stipulated Penalty* (Feb. 25, 2021) (Attachment 84). The treatment system is now working as intended.

Date of sampling	GenX in effluent (ppt)	PFMOAA in effluent (ppt)	PMPA in effluent (ppt)
	Permit limit for GenX: 60 ppt	Permit limit for PFMOAA: 850 ppt	Permit limit for PMPA: 54 ppt
	Reporting level of 2 ppt	Reporting level of 2 ppt	Reporting level of 10 ppt
11/5/2020	<2	<2	<10
11/20/2020	<2	<2	<10
12/8/2020	<2	**16**	<10
12/18/2020	<2	<2	<10
12/22/2020	<2	<2	<10
12/30/2020	<2	<2	<10
1/4/2021	<2	<2	<10
1/11/2021	<2	<2	<10
1/19/2021	<2	**3.9**	<10
1/26/2021	<2	<2	<10
2/2/2021	<2	<2	<10
2/9/2021	<2	<2	<10
2/19/2021	<2	**2.2**	<10
2/23/2021	<2	<2	<10
3/4/2021	**2.1**	**4**	<10
3/9/2021	<2	**4.7**	<10
3/16/2021	<2	**2.4**	<10
3/23/2021	<2	**2.9**	<10
3/30/-3/31/2021	<2	<2	<10

In fact, the system has reduced total PFAS concentrations from as high as 94,460 ppt to mostly undetectable levels:[121]

Date of sampling	Total Table 3+ PFAS Influent Data (ppt)	Total Table 3+ PFAS Effluent Data (ppt)
11/5/2020	94,460	*Less than reporting level for all compounds*
11/20/2020	64,500	*Less than reporting level for all compounds*
12/8/2020	84,794.9	16
12/18/2020	55,900	*Less than reporting level for all compounds*
12/22/2020	60,600	*Less than reporting level for all compounds*
12/30/2020	76,700	*Less than reporting level for all compounds*
1/4/2021	67,049.2	*Less than reporting level for all compounds*
1/11/2021	58,200	*Less than reporting level for all compounds*
1/19/2021	91,900	3.9
1/26/2021	74,900	*Less than reporting level for all compounds*
2/2/2021	70,415.20	*Less than reporting level for all compounds*
2/9/2021	54,100	*Less than reporting level for all compounds*
2/19/2021	19,400	2.2
2/23/2021	44,200	*Less than reporting level for all compounds*
3/4/2021	66,616.6	6.1
3/9/2021	47,400	4.7

This data demonstrates that the granular activated carbon treatment system at Chemours' facility is extremely effective. It can remove over 99.9 percent of all PFAS being monitored for at the facility.

Chemours' facility is not the only place where this technology has been proven to effectively remove PFAS. A 2018 report found that granular activated carbon systems were used to treat PFAS-contaminated water at "more than 45 military installations, as well as several industrial sites and publicly owned treatment works involving private and municipal drinking water supplies."[122] In Michigan, as part of a statewide initiative to address PFAS pollution, 24 industrial facilities installed granular activated carbon to pretreat wastewater for PFAS prior to discharge into publicly owned treatment works ("POTWs") (also known as wastewater treatment

[121] Chemours Company, NPDES Permit No. 0089915, *Discharge Monitoring Report* (Nov. 2020) (Attachment 85). On November 5, 2020, Chemours' Table 3+ PFAS totaled 94,460 in the influent, and were below reported levels in the effluent.

[122] Interstate Technology Regulatory Council, *PFAS – Per- and Polyfluoroalkyl Substances*, 182 (Updated Sept. 2020) (citing E. Forrester & J. Matthis, *Treatment Solutions for PFAS Removal: Evaluating Total Cost* (2018)) (Attachment 86).

plants), drastically reducing the PFOS measured in POTWs' effluent.[123] Utilities are also using granular activated carbon to reduce PFAS contamination in drinking water.[124] For example, in 2018, the city of Newburgh, New York constructed a granular activated carbon absorption system to remove PFAS from Washington Lake, the City's primary water source.[125]

Chemours' treatment system demonstrates that granular activated carbon treatment technology is available and economically achievable. Granular activated carbon treatment technologies are therefore Best Available Technology for PFAS.

B. Chemours will also use a reverse osmosis system to eliminate PFAS from its process wastewater.

In addition to using a granular activated carbon treatment system at its facility, Chemours plans to use a reverse osmosis treatment system, coupled with granulated activated carbon and ion exchange, to treat the wastewater from its manufacturing processes. The pilot testing for the system demonstrates that this technology can nearly eliminate PFAS in the *millions* of parts per trillion.

Before the news broke out about Chemours' PFAS contamination, the company was releasing wastewater from its manufacturing processes, or its process wastewater, directly into the Cape Fear River. The state required Chemours to stop its release of process wastewater into the river in 2017, after which the company began shipping its polluted wastewater off-site.[126]

Chemours' process wastewater has *extremely* high levels of PFAS. The company collected samples of its process wastewater to assess available treatment technologies.[127] GenX alone was measured at 10,510 parts per billion, or *over 10,510,000 ppt*.[128] PFMOAA and PFO2HxA were both measured at over 5,800,000 ppt.[129] Several other compounds were measured over one million, or several hundred thousand, parts per trillion.[130] These concentrations are summarized below:

[123] Michigan PFAS Action Response Team, *Wastewater Treatment Plants/Industrial Pretreatment Program* (hereinafter "Michigan PFAS Pretreatment Program") (Attachment 87).
[124] *See, e.g.*, Hazen & Sawyer, *Post-Filter GAC Contactor Facility for PFAS Control* (Attachment 88).
[125] City of Newburgh, New York State Dept. of Env't Conservation, *Information for Communities Impacted by Per- and Polyfluoroalkyl Substances (PFAS)* (Attachment 89).
[126] *See* NC DEQ, *DEQ Verifies Chemours Has Stopped Discharging GenX Wastewater* (June 27, 2017) (Attachment 90).
[127] Chemours Reverse Osmosis Report at 4.
[128] *Id*.
[129] *Id*.
[130] *Id*.

Table 3: Influent Data for the Reverse Osmosis Pilot Study, April 30 to June 19, 2019

Compound	Number of Samples	Average (ppb)	Maximum (ppb)	Minimum (ppb)	Table 3+ Detection Limits (ppb)
HFPO-DA	20	3,503.6	10,510.6	72.335	0.002
PFMOAA	20	852.1	5,886.6	0.399	0.002
PMPA	20	69.4	749.0	0.390	0.02
PFO2HxA	20	808.8	5,809.8	42.954	0.002
PFO3OA	20	223.0	1,523.6	12.272	0.002
PF04DA	20	45.9	221.5	1.799	0.002
PF05DA	20	9.8	22.1	0.210	0.002
Byproduct1	20	1,083.7	2,055.7	13.391	0.002
Byproduct2	20	223.8	524.0	3.254	0.002
NVHOS	20	138.9	291.2	2.443	0.002
PEPA	20	133.0	854.7	4.096	0.01
EVE Acid	20	85.3	198.2	0.900	0.002
Hyrdo Eve	20	36.0	66.4	0.448	0.002
Byproduct6	20	20.6	75.4	0.440	0.002
PES	20	0.887	3.000	0.002	0.002
PFECA_G	20	0.090	0.263	0.007	0.002

Chemours plans to treat this process wastewater for reuse in its manufacturing operations. The company's planned treatment system includes a two-pass reverse osmosis, granular activated carbon, and mixed bed ion exchange system.[131] The system will receive and treat approximately 28,000 gallons per day of wastewater.[132] Concentrated reject water from the treatment system will be collected for off-site disposal.[133]

The data from Chemours' pilot testing shows that this treatment technology can effectively remove the extremely high levels of PFAS found in the company's process wastewater. Effluent data collected from July 1 to September 28, 2020 shows that 11 of 16 PFAS compounds were *undetected* after treatment.[134] GenX was the compound that was detected most often and still, it was only detected in 12 out of 74 samples. Whereas influent concentrations for GenX reached over 10,510,000 ppt,[135] the highest effluent concentration was only 35 ppt.[136] Similarly, PFMOAA was measured in the influent at over 5,886,000 ppt,[137] but the highest

[131] *Id*. at 1.
[132] Chemours Reverse Osmosis Report at 2.
[133] *Id*. at 2-3.
[134] *Id*. at 5.
[135] *Id*. at 4.
[136] *Id*. at 5.
[137] Chemours Reverse Osmosis Report at 4.

effluent concentration was only 13 ppt.[138] PFO2HxA was measured at over 5,809,000 ppt in the influent,[139] but was not even detected in any of the 74 samples in the effluent.[140] These effluent data from Chemours' pilot testing are shown below:

Table 4: Effluent Data for the Reverse Osmosis Unit, July 1 to September 28, 2020

Compound	Number of Samples	Detectable Samples	Percent Detectable Samples (%)	Average (ppb)	Maximum (ppb)	Minimum (ppb)	Table 3+ Detection Limits (ppb)
HFPO-DA	74	12	16.22%	0.0032	0.0350	0.0020	0.002
PFMOAA	74	3	4.05%	0.0022	0.0130	0.0020	0.002
PMPA	74	0	0%	0.02	0.02	0.02	0.02
PFO2HxA	74	0	0%	0.002	0.002	0.002	0.002
PFO3OA	74	0	0%	0.002	0.002	0.002	0.002
PF04DA	74	0	0%	0.002	0.002	0.002	0.002
PF05DA	74	0	0%	0.002	0.002	0.002	0.002
Byproduct1	74	9	12.16%	0.0024	0.013	0.002	0.002
Byproduct2	74	1	1.35%	0.002	0.002	0.002	0.002
NVHOS	74	0	0%	0.002	0.002	0.002	0.002
PEPA	74	0	0%	0.01	0.01	0.01	0.01
EVE Acid	74	1	1.35%	0.002	0.0022	0.002	0.002
Hyrdo Eve	74	0	0%	0.002	0.002	0.002	0.002
Byproduct6	74	0	0%	0.002	0.002	0.002	0.002
PES	74	0	0%	0.002	0.002	0.002	0.002
PFECA_G	74	0	0%	0.002	0.002	0.002	0.002

Reverse osmosis systems are being used across the country and in our region to remove PFAS, particularly at drinking water utilities. For example, in Decatur, Alabama, the West Morgan-East Lawrence Water Authority, is installing a reverse osmosis system to remove PFAS from water contaminated by 3M.[141] In Brunswick County, North Carolina, the Northwest Water Treatment Plant is also installing a reverse osmosis system to remove PFAS downstream of Chemours' facility.[142]

As Chemours' data shows, reverse osmosis treatment systems—particularly when combined with granular activated carbon and ion exchange technologies—can nearly eliminate PFAS in exceedingly high levels. Chemours' pilot testing and plan to use the technology at its facility demonstrates that it is Best Available Technology. EPA should therefore develop effluent limitation guidelines and standards in this rulemaking that reflect the use of this technology.

[138] *Id.* at 5.
[139] *Id.* at 4.
[140] *Id.* at 5.
[141] *3M Agrees to Settle Lawsuit with Alabama Water Authority*, U.S. CLAIMS (Aug. 16, 2019) (Attachment 91).
[142] Recommended Budget at 13.

VII. The Clean Water Act requires that pretreatment standards be developed expeditiously to prevent toxic chemicals from passing through publicly owned treatment works into our surface waters.

For facilities that discharge their effluent to a POTW, effluent limitations take the form of pretreatment standards.[143] POTWs are systems owned by a state or municipality that treat municipal sewage, and/or liquid industrial waste before discharging the effluent into rivers and streams.[144] The Clean Water Act requires EPA to establish pretreatment standards for pollutants "which are determined not to be susceptible to treatment" by POTWs or "which interfere[] with, pass[] through, or [are] otherwise incompatible with such works."[145] The discharger then must "pretreat" its polluted effluent before sending it to a POTW, meaning it must reduce, alter, or eliminate the pollutants at issue in accordance with the pretreatment standards.[146] For some industries, categorical pretreatment standards apply, which specify the quantities and concentrations of pollutants that users in that particular industry may discharge to a POTW.[147]

As EPA noted in its Preliminary Plan 14, PFAS "are known to pass through" POTWs, "discharging to surface waters in their effluent and accumulating in the biosolids."[148] Indeed, the treatment process itself can cause certain compounds to transform into PFAS that then pass through the POTWs.[149] We have seen this directly in North Carolina, where high levels of PFAS from the City of Burlington's treatment plant have been found in the Haw River and in the drinking water of downstream Pittsboro and other communities.[150]

Similarly, the state of Michigan has found that industrial discharges to POTWs are a significant source of PFAS in surface waters. Industries, such as metal finishers, paper manufacturers, and fabric/leather treaters, were sending PFAS-contaminated wastewater to POTWs.[151] Municipalities within the state have been effectively reducing their PFAS discharges by requiring industries to install treatment technology, including granular activated carbon treatment systems. After 24 industrial users in seven POTWs installed granular activated carbon to pretreat wastewater for PFAS,[152] PFOS levels in the discharges of treatment plants were reduced by up to 99 percent.[153]

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[143] *See* 33 U.S.C. § 1317(b); 40 C.F.R. § 403 *et. seq*.
[144] 33 U.S.C. § 1292(2)(A); 40 C.F.R. § 125.58(u).
[145] 33 U.S.C. § 1314(g); *see also id.* § 1317(b)(1).
[146] 40 C.F.R. § 403.3(s).
[147] 40 C.F.R. § 403.6.
[148] EPA, *Preliminary Effluent Guidelines Program Plan 14*, 3-20 (Oct. 2019) (Attachment 92); *see also id.* at 3-19 ("The high water solubility of some PFAS allows them to pass through most POTW treatment processes.").
[149] *See, e.g.*, Ulrika Eriksson, et al., *Contribution of Precursor Compounds to the Release of Per-and Polyfluoroalkyl Substances (PFASs) from Waste Water Treatment Plants (WWTPs)*, 61 J. ENVTL. SCI. 80, 80 (Nov. 2017) (Attachment 93).
[150] Southern Environmental Law Center, *Notice of Intent to Sue the City of Burlington for Violations of the Clean Water Act and the Resource Conservation and Recovery Act* (Nov. 7, 2019) (Attachment 94); G. Barnes, *New DEQ Data Show 'Staggering' Levels of PFAS in Cape Fear River Basin,* NORTH CAROLINA HEALTH NEWS (Feb. 3, 2020) (Attachment 95).
[151] Michigan PFAS Pretreatment Program.
[152] *Id*.
[153] *Id.*

Accordingly, EPA must not delay in developing and imposing pretreatment standards incorporating the same technology-forcing requirements as in its effluent limitations guidelines.

VIII. Conclusion

Far too many communities like those in North Carolina have been and continue to be harmed by the lasting effects of PFAS contamination. To prevent more widespread contamination, EPA must control PFAS as a class, and at the pollution source, by requiring polluters to install the best available technology to remove PFAS before they can be dumped into treatment plants and into our rivers, streams, and drinking water supplies. We urge EPA to develop stringent effluent limitations guidelines and pretreatment standards based on granulated activated carbon and reverse osmosis treatment technologies—technologies that have been proven to be effective and economically achievable in removing PFAS at Chemours' facility and elsewhere.

To assist EPA to better protect communities by setting protective standards required by the Clean Water Act, we have provided numerous data and documents in response to the agency's requests for further information. Those documents, described in the attached Appendix and the documents cited in this letter, were sent by overnight mail to the docket center. As additional information becomes known, we reserve the right to supplement our comments and/or document submittal.

Thank you for considering these comments. Please contact us at 919-967-1450 if you have any questions regarding this letter.

Sincerely,

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Appendix - Responses to EPA's Requests for Further Information

The documents referenced below are provided in response to EPA's requests for further information made in its Advanced Notice of Proposed Rulemaking: Clean Water Act Effluent Limitations Guidelines and Standards for the Organic Chemicals, Plastics and Synthetic Fibers Point Source Category, EPA–HQ–OW–2020–0582.

PFAS Manufacturers

1. **Descriptions of the manufacturing processes being employed at PFAS manufacturing facilities, including process flow diagrams:**

    - *Descriptions of the manufacturing processes being employed at Chemours Fayetteville Works Facility*: Chemours Fayetteville Works NPDES Permit Application Update, Attachment A-2, "Current Facility Operating Conditions" (July 2019)

    - *Process flow diagram at Chemours Fayetteville Works Facility*: Chemours Fayetteville Works NPDES Permit Application Update, Attachment B.1, "Line Drawing Water Balance" (Dec. 2020)

    - *Future wastewater flows starting 2021 at Chemours Fayetteville Works Facility*: Chemours Fayetteville Works NPDES Permit Application Update, Attachment A of Attachment B.11, "Wastewater Management & Treatment System: Engineering Report & Basis of Design for Phase I Modifications Report 'NEW'" – "Chemours Fayetteville Future Wastewater Flows Starting 2021" (Nov. 2020)

2. **Information and data on the specific PFAS compounds that are currently being produced (including as byproducts) at these facilities (including the product name, CAS number and class of each compound):**

    - *Information on PFAS compounds that are currently being produced at Chemours Fayetteville Works Facility:* Chemours Fayetteville Works NPDES Permit Application Update, Attachment A-2, "Current Facility Operating Conditions" (July 2019)

    - *Known PFAS compounds that could be present at Chemours Fayetteville Works Facility and therefore potentially detected in the effluent from the facility*: Chemours Fayetteville Works NPDES Permit Application Update, Attachment F-4, "List of PFAS Compounds" (July 2019)

3. **Identification of the wastewater streams at manufacturing facilities that contain PFAS (e.g., process wastewater, cooling water, contaminated stormwater, wastewater from aqueous scrubbers or air pollution control equipment, off-specification products, equipment cleaning wastewater, spills and leaks), their volumes, characteristics, the identity (including CAS Number), and concentrations of PFAS compounds in those individual waste streams:**

As described below, there are numerous wastewater streams at Chemours Fayetteville Works Facility that contain PFAS, including the process wastewater, cooling water, contaminated stormwater, wastewater from air pollution control equipment, equipment cleaning wastewater, and spills and leaks.

- *Under the 2019 Consent Order, Chemours is required to identify PFAS compounds in its process wastewater, non-process wastewater, and stormwater at its Fayetteville Works Facility, and to provide quarterly reports of this investigation. These quarterly reports have information on PFAS and their concentrations in the various waste streams, and are listed below:*

    - The Chemours Company FC, LLC, "Characterization of PFAS in Process and Non-Process Wastewater and Stormwater" (July 2019)
    - The Chemours Company FC, LLC, "Characterization of PFAS in Process and Non-Process Wastewater and Stormwater" (Oct. 2019)
    - The Chemours Company FC, LLC, "Characterization of PFAS in Process and Non-Process Wastewater and Stormwater" (Jan. 2020)
    - The Chemours Company FC, LLC, "Characterization of PFAS in Process and Non-Process Wastewater and Stormwater" (Apr. 2020)
    - The Chemours Company FC, LLC, "Characterization of PFAS in Process and Non-Process Wastewater and Stormwater" (July 2020)
    - The Chemours Company FC, LLC, "Characterization of PFAS in Process and Non-Process Wastewater and Stormwater" (Dec. 2020)

- *Current Outfall 002 is the current discharge outfall at Chemours Fayetteville Works Facility. It used to release process wastewater, cooling water, stormwater, as well as equipment cleaning wastewater and spills and leaks. From June 2017 until May 2021, Chemours is prohibited from discharging process wastewater from the outfall due to its high levels of PFAS. In the future, the company plans to treat its process wastewater to remove PFAS before discharge into the Cape Fear River. More information about this wastewater stream is available in the following documents.*

    - *Information on flow for Outfall 002*: Chemours Fayetteville Works NPDES Permit Application Update, Attachment B.3, "Outfall 002 Average Flows and Treatment" (Dec. 2020)
    - *Information on PFAS in Chemours' process wastewater, which prior to June 2017, was being released through the companies Outfall 002*: Chemours Fayetteville Works NPDES Permit Application Update, Attachment J.2, "RO Permeate Engineering Report and Data Analysis," 4 (Nov. 2020)
    - *PFAS compounds that have been detected in Outfall 002 while Chemours was capturing its process wastewater*: Chemours Fayetteville Works NPDES Permit Application Update, Attachment F.3, "List of PFAS Compounds Detected in Outfall 002" (July 2019)
    - *Known PFAS compounds that could be present at Chemours Fayetteville Works Facility and therefore potentially in the effluent discharged from the facility*:

Chemours Fayetteville Works NPDES Permit Application Update, Attachment F-4, "List of PFAS Compounds" (July 2019)
  - *PFAS compounds that have been detected in the Chemours' facility water intake, and therefore, may be detected in the effluent*: Chemours Fayetteville Works NPDES Permit Application Update, Attachment F.9.1, "List of PFAS Compounds Detected in the Intake" (July 2019)
  - *PFAS compounds that have been detected upstream of Chemours' facility, and therefore, may be in the intake and in the facility's effluent*: Chemours Fayetteville Works NPDES Permit Application Update, Attachment F.9.2, "List of Upstream PFAS Compounds" (July 2019)

- *Old Outfall 002, also currently known as Outfall 003, is an old discharge channel/creek at Chemours' Fayetteville Works Facility that is fed by PFAS-contaminated groundwater beneath the facility and previously discharged straight into the Cape Fear River. Information on PFAS in Old Outfall 002 prior to installation of a treatment system is included below:*

  - Chemours Fayetteville Works NPDES Permit Application Update, Attachment 1 of Attachment D-1, "Old Outfall 002 Engineering Report," – "24-Hour Influent Characterization Results Old Outfall 002 Option B Location (Proposed Dam)" (July 2019)
  - The Chemours Company FC, LLC, Old Outfall 002 Surface Water Sampling Results, Table 1, "Surface Water Sampling Results," (Sept. 2019)

- *In September 2018, Chemours conducted some initial sampling in and around its facility as described in the following document:* The Chemours Company, "Assessment of the Chemical and Spatial Distribution of PFAS in the Cape Fear River" (Sept. 2018)

- *In 2017 and 2018, the N.C. Department of Environmental Quality posted on its website Chemours' reports of PFAS spills and leaks at its Fayetteville Works Facility. There have likely been other spills that have not been publicly reported. The publicly available reports follow:*

  - Letter from Jay Zimmerman to Ellis H. McGaughy, "Notice of Partial Suspension and 60-Day Notice of Intent to Partially Revoke NPDES Permit NC0003573; The Chemours Company, Fayetteville Works," Nov. 16, 2017
  - N.C. DEQ Press Release, "DEQ investigating air emissions leak at Chemours, Nov. 17, 2017
  - Letter from Christel Compton to Trent Allen, "Notice of Potential Leak of HFPO Dimer Acid," Dec. 11, 2017
  - Letter from Christel Compton to Trent Allen, "Notice of Potential Leak of HFPO Dimer Acid," Jan. 15, 2018
  - Letter from Christel Compton to Trent Allen, "Notice of Potential Leak of HFPO Dimer Acid," Jan. 29, 2018
  - ERM, "Third-Party LDAR Program Review" (Jan. 2018)

- Letter from Christel Compton to Trent Allen, "Notice of Potential Leak of HFPO Dimer Acid," Feb. 2, 2018
- Email from Christel E. Compton to Trent Allen, "Chemours – DAF Spill," Feb. 14, 2018
- Email from Christel E. Compton to Trent Allen, "Chemours – Potential HFPO Dimer Acid Spill," Mar. 9, 2018
- Email from Michael E. Johnson to Trent Allen, "Chemours – Potential HFPO Dimer Acid Spill," June 13, 2018
- Email from Dianne L. Fields to Trent Allen, "Chemours – Potential HFPO Dimer Acid Spill," July 16, 2018
- Email from Christel E. Compton to Trent Allen, "Chemours – Leak of Wastewater," Dec. 4, 2018

- *In addition to the discharges of contaminated water from Old Outfall 002, current Outfall 002, and groundwater, Chemours has numerous on-site seeps that leak PFAS-contaminated groundwater into the Cape Fear River and its tributaries, as described in:* The Chemours Company FC, LLC, "Seeps and Creeks Investigation Report" (Aug. 26, 2019)

4. **Information and data on the current wastewater treatment and management practices (including pollution prevention and product recovery practices) being utilized at existing PFAS manufacturers. Specific information requested includes descriptions of the treatment technologies, their size and flow rate, process flow diagrams, capital and operation and maintenance costs, treatment chemical utilization, and residuals generation and management. If wastewater storage ponds are used to hold PFAS wastewater, EPA also requests a description of the ponds, including purpose, age, capacity, design, wastewater characteristics, whether they are lined or unlined, and whether they have discharge outfalls.**

In the past, Chemours has used unlined storage ponds and basins, as well as unlined or leaking ditches and channels, for liquid and solid waste at its Fayetteville Works Facility, resulting in significant legacy contamination at the site. Due to the litigation, 2019 Consent Order, and 2020 Addendum described more fully in our comment letter, the company is required to handle its waste more responsibly. The documents below describe current and future management of waste at the facility.

- *Process flow diagram at Chemours Fayetteville Works Facility with PFAS reverse osmosis unit and stormwater treatment system installed*: Chemours Fayetteville Works NPDES Permit Application Update, Attachment B.1, "Line Drawing Water Balance" (Dec. 2020)

- *Narrative description of wastewater management at the Chemours facility*: Chemours Fayetteville Works NPDES Permit Application Update, Attachment B.5.1, "Future Biological Wastewater Treatment Facility Management" (Nov. 2020)

- *Information on IXM/Monomers Reverse Osmosis treatment system for Chemours' process wastewater:* Chemours Fayetteville Works NPDES Permit Application Update, Attachment J, "Reverse Osmosis System Wastewater 'New'" (Nov. 2020)

- *Information on Granular Activated Carbon treatment system for Chemours' Old Outfall 002, currently known as Outfall 003:*

    - N.C. Division of Water Resources, Fact Sheet, NPDES Permit No. NC0089915
    - The Chemours Company FC, LLC, "Engineering Report – Old Outfall 002 GAC Pilot Study Results Addendum" (Jan. 2020)
    - Chemours Fayetteville Works NPDES Permit Application Update, Attachment D "Preliminary Conceptual Process Flow Diagram," (PDF page 232), (July 2019)

- *Information on flow-through treatment cells installed to treat on-site seeps that leak PFAS-contaminated groundwater from Chemours' Fayetteville Works Facility into the Cape Fear River and its tributaries*:

    - The Chemours Company FC, LLC, "Interim Seep Remediation System Plan" (Aug. 2020)
    - The Chemours Company FC, LLC, "Interim Seep Remediation Operation and Maintenance Report #1" (Mar. 2021)
    - The Chemours Company FC, LLC, "Interim See Remediation – Seep C Effectiveness Demonstration Report" (Apr. 2021)

- *Information on treatment system for PFAS-contaminated stormwater at Chemours Fayetteville Works Facility:*

    - Memorandum from the Geosyntec Consultants of NC, P.C., to The Chemours Company, FC LLC, "Fayetteville Works Monomers/IXM Stormwater Treatment System, Runoff Volume Calculations for Design Storm," Dec. 10, 2020
    - Chemours Fayetteville Works NPDES Permit Application Update, Attachment B.3, "Average Flows and Treatment – Stormwater Treatment System" (Dec. 2020)
    - Chemours Fayetteville Works NPDES Permit Application Update, Attachment K.2, "Stormwater Capture and Treatment System – Engineering Report and Data Analysis" (Dec. 2020)
    - Chemours Fayetteville Works NPDES Permit Application Update, Attachment K.3, "Stormwater Treatment System Potential Location" (Dec. 2020)

5. **EPA requests additional monitoring data (see DCN OCPSF00115 for suggested data format and fields) on PFAS compounds in wastewater discharges from PFAS manufacturing facilities.**

    The following discharge monitoring reports for the Chemours Fayetteville Works Facility are provided:

- The Chemours Company FC, LLC, Discharge Monitoring Report for October 2020
- The Chemours Company FC, LLC, Discharge Monitoring Report for November 2020
- The Chemours Company FC, LLC, Discharge Monitoring Report for December 2020
- The Chemours Company FC, LLC, Discharge Monitoring Report for January 2021
- The Chemours Company FC, LLC, Discharge Monitoring Report for February 2021
- The Chemours Company FC, LLC, Discharge Monitoring Report for March 2021

Additional PFAS monitoring and sampling data is located in the documents provided in response to Information Request number 3 above.

PFAS Formulators

The SIC or NAICS codes of formulating facilities.

NAICS codes of facilities that are potential PFAS formulators include:

- 3133: Textile and Fabric Finishing and Fabric Coating Mills
  - 313310: Textile and Fabric Finishing Mills
  - 313320: Fabric Coating Mills

- 3132: Fabric Mills
  - 313210: Broadwoven Fabric Mills
  - 313220: Narrow Fabric Mills
  - 313230: Nonwoven Fabric Mills
  - 313240: Knit Fabric Mills

- 3161: Leather and Hide Tanning and Finishing

- 3221: Pulp, Paper, and Paperboard Mills

  - 322110: Pulp Mills
  - 322121: Paper Mills
  - 322122: Newsprint Mills
  - 322130: Paperboard Mills

- 314110: Carpet and Rug Mills

- 325211: Plastics and Resin Manufacturing

- 325613: Surface Active Agent Manufacturing

- 332813: Electroplating, Polishing, Anodizing, and Coloring