

BEFORE THE  
NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY

CAPE FEAR RIVER WATCH	)	
	)	
Petitioner.	)	REQUEST FOR
	)	DECLARATORY RULING
	)	
	)	

Pursuant to N.C. Gen. Stat. § 150B-4 and § 143-215.3(a)(12), the Cape Fear River Watch (“Petitioner”), submits this Request for Declaratory Ruling to the North Carolina Department of Environmental Quality (“DEQ”) for a ruling ordering Chemours Company FC, LLC (“Chemours”) to immediately discontinue all emissions and discharges of perfluoroalkyl and polyfluoroalkyl substances (collectively, “PFAS compounds”), also known as perfluorinated compounds, from the Fayetteville Works Facility. The relief requested in this declaratory ruling is similar to that requested by the Department in its recent amended complaint in its Bladen County Superior Court enforcement action—relief that DEQ can grant without court intervention. Specifically, the Petitioner requests the following rulings:

- a) Previous and ongoing activities of Chemours Company FC, LLC and E.I. du Pont de Nemours and Company at the Fayetteville Works Facility have caused, and continue to cause, a generalized condition of water and air pollution which is causing imminent danger to the health and safety of the public.
- b) In order to protect public health and safety, Chemours Company FC, LLC must immediately discontinue all air emissions as well as all surface water, groundwater, and/or stormwater discharges of perfluoroalkyl and polyfluoroalkyl substances from the Fayetteville Works Facility.

## **I. Nature of the Request**

Chemours and E.I. du Pont de Nemours and Company (“DuPont”)<sup>1</sup> (collectively, “the companies”) have knowingly polluted North Carolina’s public water sources with GenX and other toxic PFAS compounds for nearly four decades, causing widespread and dangerous contamination to the state’s surface and groundwaters.<sup>2</sup> Despite nearly a year of DEQ investigation and enforcement actions, GenX and other PFAS compounds continue to be released into our water, air, and soil through Chemours’ stack emissions, stormwater and wastewater conveyance ditches, unlined sedimentation basins, contaminated equipment, and numerous leaks and spills,<sup>3</sup> in violation of state law as well as the Clean Water Act and the Toxic Substances Control Act.<sup>4</sup>

DEQ has stated that Chemours has “caused significant and widespread groundwater contamination,” and that Chemours “continues to contaminate North Carolina’s air, surface water and groundwater through the release of “GenX” or “C3 Dimer Acid,” which the U.S. Environmental Protection Agency [] and the North Carolina Department of Health and Human

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<sup>1</sup> E.I. du Pont de Nemours and Company owned and operated the Fayetteville Works facility from the 1970s until the company formed Chemours, and transferred ownership to Chemours in 2015. Amended Complaint, N.C. Dept. of Environmental Quality v. Chemours, 17 CVS 580, 14 (N.C. Super. 2018) (hereinafter “NC DEQ Amended Complaint”), included as Attachment 1.

<sup>2</sup> Complaint, N.C. Dept. of Environmental Quality v. Chemours, 17 CVS 580, 11-22 (N.C. Super. 2017) (hereinafter “NC DEQ Complaint”), included as Attachment 2.

<sup>3</sup> NC DEQ Press Release, “DEQ will take additional enforcement action against Chemours for unreported spill,” Nov. 9, 2017, included as Attachment 3. Chemours has also admitted to at least six leaks and spills since then, on December 9, 2017, and January 14, January 25, February 1, February 8, and March 3, 2018. Screenshot of NC DEQ’s Investigations and Enforcement Actions taken on Apr. 5, 2018, NC DEQ GenX website, included as Attachment 4; NC DEQ Letter to Chemours, “Notice of Violation – Immediate Action Required,” Feb. 12, 2018, included as Attachment 5; Chemours’ Letter to NC DEQ, “Notice of Violation - Immediate Action Required,” Feb. 26, 2018 (hereinafter “Chemours Feb. 2018 Response”), included as Attachment 6.

<sup>4</sup> Southern Environmental Law Center Notice of Intent to sue Chemours under the Clean Water Act, included as Attachment 7; Southern Environmental Law Center Notice of Intent to sue Chemours under the Toxic Substances Control Act, included as Attachment 8.

Services [] have recognized may present an unreasonable risk of injury to human health and the environment.”<sup>5</sup>

Over the past year, GenX has now been found in at least 690 private wells up to 5.5 miles away from the facility’s border, in levels as high as 4,000 ppt—28 *times* the state’s health goal.<sup>6</sup> Yet DEQ and Chemours have not stopped the company’s leaching of PFAS contaminants through its unlined basins and ditches,<sup>7</sup> or the PFAS air emissions coming from the facility at a rate of nearly *100,000 pounds per year*.<sup>8</sup> Chemours’ ongoing contamination of air and water from Fayetteville to Wilmington is causing imminent danger to the health and safety of the public and constitutes “a generalized condition of water or air pollution.” Therefore, DEQ has the authority and obligation to order Chemours to “discontinue immediately” its emissions and discharges of PFAS compounds, including GenX.<sup>9</sup>

## **II. Cape Fear River Watch**

The Cape Fear River Watch is a § 501(c)(3) nonprofit public interest organization headquartered in Wilmington, North Carolina that engages residents of the Cape Fear watershed through programs to preserve and safeguard the river. The organization has 1,100 members, including members who live near, fish, swim, and boat on, and who drink water from, the Cape Fear River downstream of Chemours’ facility. As demonstrated in the affidavits included in Attachment 14 to this request, members of Cape Fear River Watch who live near and

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<sup>5</sup> NC DEQ Amended Complaint at 1-2.

<sup>6</sup> NC DEQ Presentation to the House Select Committee on North Carolina River Quality, slides 9-10, Apr. 26, 2018 (hereinafter “NC DEQ Apr. 26 Presentation”), included as Attachment 87; *see also* NC DEQ Presentation to the House Select Committee on North Carolina River Quality, slide 13, Mar. 22, 2018 (hereinafter “NC DEQ March 22 Presentation”), included as Attachment 9; Chemours and DEQ Collected Combined Phase I and Phase II Private Well Water Data for GenX, included as Attachment 10; Phase III Private Well Water GenX Data, included as Attachment 11.

<sup>7</sup> *See* NC DEQ Amended Complaint at 23.

<sup>8</sup> *See* Chemours’ 2012-2016 Fayetteville Works Facility Air Emission Summary for GenX Compounds (hereinafter “Chemours’ GenX Air Emission Summary”), included as Attachment 12; Chemours’ 2012-2016 Fayetteville Works Facility Air Emission Summary for other Emerging Compounds (hereinafter “Chemours’ other Emerging Compounds Air Emissions Summary”), included as Attachment 13.

<sup>9</sup> N.C. Gen. Stat. § 143-215.3(a)(12).

downstream of the Fayetteville Works Facility have been devastated by Chemours' PFAS contamination. For decades, they and their families have been exposed to air and water that has been contaminated by Chemours. They now live in fear of how much the pollution has affected the health of their families and communities, and frustration that the company continues to release it into their environments. Cape Fear River Watch's mission is "to protect and improve the water quality of the Lower Cape Fear River Basin through education, advocacy and action." In order to fulfill that mission, the organization works to protect the entire Cape Fear River from pollution, including toxic chemicals, such as the PFAS compounds that have been released from the Fayetteville Works Facility for decades, and continue to be pumped into the environment at alarming rates. A declaratory ruling in favor of Cape Fear River Watch would address the substantial interests of the organizations and their members in the health of the Cape Fear River and its tributaries.

### **III. Statutory and Regulatory Background**

#### **A. The North Carolina Administrative Procedure Act**

The North Carolina Administrative Procedure Act states that "an agency shall issue a declaratory ruling [...] as to the applicability to a given state of facts of a statute administered by the agency or of a rule or order of the agency" when requested by a person aggrieved.<sup>10</sup> "Person aggrieved" includes groups with a common interest, like Petitioner, whose interests are impacted by the requested decision.<sup>11</sup> Cape Fear River Watch is a person aggrieved and is entitled to request a declaratory ruling from DEQ under the North Carolina Administrative Procedures Act.

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<sup>10</sup> N.C. Gen. Stat. § 150B-4(a).

<sup>11</sup> *Id.* at 150B-2(6), (7).

B. The North Carolina Department of Environmental Quality’s emergency power to protect public health and safety.

DEQ is required by law to take immediate protective action if it determines that there is (1) a “generalized condition of water or air pollution which is causing imminent danger to the health or safety of the public,” and that (2) “it creates an emergency requiring immediate action to protect the public health and safety or to protect fish and wildlife.”<sup>12</sup> In particular, DEQ is required to “order persons causing or contributing to the water or air pollution in question to reduce or discontinue immediately the emission of air contaminants or the discharge of wastes.”<sup>13</sup>

**IV. Argument**

DEQ’s public statements and documents filed in its Bladen County enforcement action make clear that substances discharged and emitted by Chemours are toxic, have caused widespread air and water pollution, and have created an emergency that requires DEQ to immediately order the company to cease all emissions and discharges.

A. Chemours’ toxic PFAS pollution threatens public health and safety.

It is well established that PFAS compounds are a threat to public health. Of the commonly studied PFAS compounds, perfluorooctanoic acid (“PFOA”) and perfluorooctyl 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, and reduced hormone levels and delayed puberty.<sup>14</sup> PFOA and PFOS have been found in the air and

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<sup>12</sup> N.C. Gen. Stat. § 143-215.3(a)(12).

<sup>13</sup> *Id.*

<sup>14</sup> The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs), A 107 (May 2015) (hereinafter “The Madrid Statement”), included as Attachment 15; U.S. Environmental Protection Agency (“EPA”), Fact Sheet on PFOA & PFOS Drinking Water Health Advisories, 2, included as Attachment 16; *see also* EPA, Health Effects

dust, surface water and groundwater, and soil and sediment.<sup>15</sup> They are extremely resistant to breaking down in the environment, can travel long distances, and have even been found in the Arctic and in the open ocean.<sup>16</sup> They take years to leave the human body, and instead slowly accumulate over time.<sup>17</sup>

Before GenX, DuPont manufactured PFOA.<sup>18</sup> DuPont had known about the dangers of PFOA since the early 1960s, secretly conducting studies that showed the chemical caused liver damage, was resistant to degradation, and could cause birth defects.<sup>19</sup> Nearly four decades later, information about PFOA's toxicity began to rise to the surface, and in 1999, the first of over 3,500 personal injury lawsuits were filed against DuPont for knowingly poisoning thousands of people.<sup>20</sup> Concerned about the extensive health effects of PFOA and PFOS, in 2016, the U.S. Environmental Protection Agency ("EPA") established a lifetime health advisory of 70 parts per trillion ("ppt"), or nanograms per liter ("ng/L"), for the *combined* concentrations of PFOA and PFOS in drinking water.<sup>21</sup>

DuPont manufactured PFOA at the Fayetteville Works Facility until 2013.<sup>22</sup> In 2009, DuPont also began manufacturing GenX,<sup>23</sup> a structurally similar compound, to eventually

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Support Document for Perfluorooctane Sulfonate (PFOS) (2016), included as Attachment 17; EPA, Health Effects Support Document for Perfluorooctanoic Acid (PFOA) (2016), included as Attachment 18; EPA, Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS) (2016), included as Attachment 19; EPA, Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA) (2016), included as Attachment 20.

<sup>15</sup> U.S. Dep't of Health and Human Services, Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for Perfluoroalkyls, 2 (Aug. 2015) (hereinafter "ATSDR Report"), included as Attachment 21.

<sup>16</sup> *Id.*; see also EPA, Technical Fact Sheet - Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA) (Nov. 2017), included as Attachment 22; The Madrid Statement at A 107.

<sup>17</sup> ATSDR Report at 3.

<sup>18</sup> See Nathaniel Rich, "The Lawyer Who Became DuPont's Worst Nightmare," *N.Y. Times*, Jan. 6, 2016, included as Attachment 23.

<sup>19</sup> *Id.* at \*9-10.

<sup>20</sup> *Id.*; Kris Maher et al., "DuPont Settlement of Chemical Exposure Case Seen as 'Shot in Arm for Other Suits,'" *Wall Street Journal*, Feb. 13, 2017, included as Attachment 24.

<sup>21</sup> EPA, Fact Sheet on PFOA & PFOS Drinking Water Health Advisories at 2.

<sup>22</sup> Final Phase III RCRA Facility Investigation Report for DuPont Fayetteville Works, 36-37 (2014) (hereinafter "2014 RCRA Investigation"), included as Attachment 25.

<sup>23</sup> GenX is the trade name for a chemical known as C3 Dimer Acid (also known as HFPO Dimer Acid), which has a "Chemical Abstracts Registry" or "CAS" number of 13252-13-6. NC DEQ Amended Complaint at 15.

replace its production of PFOA.<sup>24</sup> Long before it began manufacturing GenX for commercial purposes, since 1980, DuPont knowingly discharged GenX as a byproduct into the Cape Fear River—a public drinking water supply.<sup>25</sup> At some point in time, the companies also began releasing numerous other PFAS compounds, including Nafion Byproduct 1 and 2, into the river.<sup>26</sup>

Instead of being a long unbroken chain of several carbon atoms, GenX and many other new PFAS alternatives have shorter chains of carbon atoms and ether (oxygen) linkages.<sup>27</sup> Therefore, they are often referred to as “short-chain” PFAS compounds.<sup>28</sup> GenX is also known as HFPO Dimer Acid. HFPO Dimer Acid Fluoride<sup>29</sup> and HFPO Dimer Acid Ammonium Salt,<sup>30</sup> two other PFAS compounds that have been emitted by Chemours, convert to GenX in the presence of water.<sup>31</sup>

DEQ has stated that “GenX and related compounds” from Chemours’ facility meet the state’s definition of toxic substances.<sup>32</sup> North Carolina defines toxic substances as:

any substance or combination of substances (including disease-causing agents), which after discharge and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, has the potential to cause death, disease, behavioral

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<sup>24</sup> Brooks Pierce Letter to NC DEQ, “GenX in the Cape Fear River,” June 23, 2017, included as Attachment 26; *see also* DuPont, DWM, and DWQ Meeting Summary, Aug. 26, 2010, included as Attachment 32.

<sup>25</sup> “Notes from Chemours meeting with local, state officials,” *StarNews*, Jun. 15, 2017, included as Attachment 27; *see also* NC DEQ Amended Complaint at 16.

<sup>26</sup> 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. Technol. Let.* 415 (2016) (hereinafter “Sun 2016 Study”), included as Attachment 28; EPA, “Laboratory PFAS Results for NC DEQ Cape Fear Watershed Sampling,” Aug. 21, 2017, included as Attachment 29; 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. Technol. Let.* 11622 (2015) (hereinafter “Strynar 2015 Study”), included as Attachment 30.

<sup>27</sup> *See* Melisa Gomis et al., “Comparing the toxic potency in vivo of long-chain perfluoroalkyl acids and fluorinated alternatives,” 113 *Environ. International* 1 (2018) (hereinafter “Gomis 2018 study”), included as Attachment 31.

<sup>28</sup> *Id.*

<sup>29</sup> HFPO Dimer Acid Fluoride has a CAS number of 2062-98-8. NC DEQ Amended Complaint at 15.

<sup>30</sup> HFPO Dimer Acid Ammonium Salt has a CAS number of 62037-80-3. *Id.*

<sup>31</sup> *Id.*

<sup>32</sup> NC DEQ Amended Complaint at 32-33.

abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions or suppression in reproduction or growth) or physical deformities in such organisms or their offspring.<sup>33</sup>

DuPont’s own studies of GenX, which it began as early as 1963, showed that GenX had health effects in laboratory animals consistent with the effects of other PFAS compounds, including cancers in multiple organs, including the liver, pancreas, and testicles.<sup>34</sup> As DEQ has stated, “DuPont was aware that [GenX and related compounds] had potential toxic effects prior to submitting its 2012 Permit Application to DWR,” and “when it was spun off as an independent business from DuPont.”<sup>35</sup>

In DuPont’s 2009 Toxic Substances Control Act Consent Order for GenX, which the company entered into with the Environmental Protection Agency, the EPA warned DuPont that the agency had human health concerns about GenX because the chemical is “structurally similar” to other heavily studied PFAS compounds, such as PFOA, that are known to persist in the environment and bioaccumulate in humans.<sup>36</sup> Finding that DuPont was missing key toxicological studies, such as information on chronic and carcinogenic effects,<sup>37</sup> the EPA stated that “more information is needed on the toxicity and pharmacokinetics” of GenX—particularly given that GenX would likely “be used as a major substitute for a major use of PFOA.”<sup>38</sup> The EPA further voiced concerns that GenX “could bioaccumulate and be toxic ... to people, wild mammals, and birds,” that they “are expected to be absorbed by all routes of exposure,” that they

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<sup>33</sup> 15A N.C. Admin. Code 2B .0202(64).

<sup>34</sup> See Data reported in Lisa Craig, “H-28548: Combined Chronic Toxicity/Oncogenicity Study 2-Year Oral Gavage Study in Rats”—Laboratory Project ID: DuPont-18405-1238” (MPI Research, Inc., Mattawan, Michigan 2013) (sponsored By E.I. du Pont de Nemours and Company), *available at* <https://edocs.deq.nc.gov/WaterResources/Browse.aspx?dbid=0&startid=624254&row=1&cr=1>; see also North Carolina Department of Health and Human Services (“NC DHHS”) Presentation to Secretaries’ Science Advisory Board, “GenX Health Studies and Health Advisories,” Jan. 29, 2018, included as Attachment 33.

<sup>35</sup> NC DEQ Amended Complaint at 32-33.

<sup>36</sup> EPA, Consent Order and Determinations Supporting Consent Order for PMN Substances P-08-508 and P-08-509, vii (2009), included as Attachment 34.

<sup>37</sup> *Id.* at ix.

<sup>38</sup> *Id.* at x-xi.

are expected “to be highly persistent in the environment,” and that “there is high concern for possible environmental effects over the long-term.”<sup>39</sup>

The EPA ultimately concluded that “[t]he Company should make every effort to minimize or prevent any release to the environment of these substances,” and “that uncontrolled manufacture [...] and disposal of [GenX] may present an unreasonable risk of injury to human health and the environment.”<sup>40</sup> Due to these concerns, the EPA ordered DuPont to “recover and capture (destroy) or recycle [GenX] at an overall efficiency of 99% from all the effluent process streams and the air emissions (point source and fugitive).”<sup>41</sup>

After the EPA found that more research needed to be conducted on the chronic and carcinogenic effects of GenX, in particular, a 2-year Chronic Toxicity/Carcinogenicity study,<sup>42</sup> DuPont conducted such a study and found the following effects in rats:

- Livers exhibited severe liver damage via degeneration and necrosis (cell death),
- Kidneys exhibited papillary necrosis (acute cell death) and chronic progressive nephropathy (chronic progressive degradation of kidney functions),
- Uteri exhibited stromal polyps (cell tumors),
- Stomachs exhibited non-glandular mucosal hyperplasia (increased cellular growth),
- Pancreases exhibited acinar cell tumors and equivocal acinar cell hyperplasia (increased cellular growth),
- Testes exhibited interstitial cell tumors and hyperplasia (increased cellular growth),
- Lungs exhibited histiocytosis (chronic scarring of lung tissue),
- Tongues exhibited mucosal hyperplasia/inflammation (increased cellular growth).<sup>43</sup>

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<sup>39</sup> *Id.* at vii, xi, xii.

<sup>40</sup> *Id.* at xiv-xv.

<sup>41</sup> *Id.* at 36.

<sup>42</sup> *Id.* at ix.

<sup>43</sup> DuPont and Chemours’ TSCA filing to EPA, “8EHQ-06- 1643 6/8EHQ-06- 16478,” Jan. 8, 2013, included as Attachment 35.

The hyperplasia, or increased cellular growth, that Chemours found in many of the organs is a known precursor to cancer.<sup>44</sup> Necrosis, which was found in both livers and kidneys, is the irreversible death of cells that happens when there is severe damage to cell membranes so that the contents of the cells leak out and the cell itself is ultimately dissolved.<sup>45</sup>

In May of 2015, two hundred researchers and scientists warned government officials, manufacturers, and the public not to underestimate the danger of short-chain PFAS alternatives, including GenX. They wrote that these alternatives

are still as environmentally persistent as long-chain substances or have persistent degradation products. Thus, a switch to short-chain and other fluorinated alternatives may not reduce the amounts of PFASs in the environment. In addition, because some of the shorter-chain PFASs are less effective, larger quantities may be needed to provide the same performance.<sup>46</sup>

Numerous studies have been conducted since then—all of which indicate that short-chain PFAS alternatives, such as GenX, possess the same dangerous qualities as PFOA and PFOS.<sup>47</sup> The California Department of Toxic Substances Control reviewed recent scientific literature on PFAS compounds, including short-chain PFAS alternatives and, in February 2018, released a draft report that discussed the human health risks of short-chain PFAS compounds, such as

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<sup>44</sup> “[I]n many cases pathologic hyperplasia constitutes a fertile soil in which cancers may eventually arise. For example, patients with hyperplasia of the endometrium are at increased risk of developing endometrial cancer.” Excerpt explaining “hyperplasia” from Vinay Kumar et al., *Robbins basic pathology* (9th ed. 2013), included as Attachment 36.

<sup>45</sup> “Necrosis is the type of cell death that is associated with loss of membrane integrity and leakage of cellular contents culminating in dissolution of cells, largely resulting from the degradative action of enzymes on lethally injured cells.” Excerpt explaining “necrosis” from Vinay Kumar et al., *Robbins basic pathology* (9th ed. 2013), included as Attachment 37.

<sup>46</sup> The Madrid Statement at A 107, included as Attachment 15; *see also* Scheringer et al., *Helsingor Statement on poly- and perfluorinated alkyl substances (PFASs)* (2014), included as Attachment 38.

<sup>47</sup> *See* Gomis 2018 study; Gloria Post et al., “Key scientific issues in developing drinking water guidelines for perfluoroalkyl acids: Contaminants of emerging concern,” 15 *PLoS Biol* e2002855 (2017), included as Attachment 39; Melissa Gomis, “From emission sources to human tissues: modelling the exposure to per- and polyfluoroalkyl substances,” (2017), included as Attachment 40; Nan Sheng et al., “Cytotoxicity of novel fluorinated alternatives to long chain,” 92 *Archives of Toxicol.* 359 (2017), included as Attachment 41; Melisa Gomis et al., “A modeling assessment of the physicochemical properties and environmental fate of emerging and novel per- and polyfluoroalkyl substances,” 505 *Sci. of the Total Environ.* 981 (2014), included as Attachment 42; J.M. Rae et al., “Evaluation of chronic toxicity and carcinogenicity of ammonium 2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)propanoate in SpragueDawley rats,” 2 *Toxicol. Rep.* 939 (2015), included as Attachment 43.

GenX.<sup>48</sup> The report concluded that that short-chain PFAS compounds take just as long to break down in the environment, and can even travel more readily than long-chain PFAS compounds such as PFOA, which have been found as far as the Arctic:

[f]luorinated ethers were thought to degrade easily, but recent studies found they also persist indefinitely in the environment. Shorter-chain PFASs are marketed as less toxic compared to the longer chains, [but instead] are equally persistent and more mobile in the environment than the chemicals they are replacing...<sup>49</sup>

GenX's ability to travel far in our atmosphere has been recently confirmed by scientists at the University of North Carolina in Wilmington.<sup>50</sup> The California Department of Toxic Substances Control also found that short-chain PFAS compounds "showed the highest potential to translocate to and bioaccumulate in edible plants, thus entering the terrestrial food chain."<sup>51</sup>

Citing a 2018 study which compared short and long-chain PFAS compounds, the report ultimately found that the short-chain alternatives, in particular GenX, could be more toxic than the compounds they are replacing:

PFECAs and shorter-chain PFAAs may have *similar or higher toxic potency* than the longer-chain PFAAs they are replacing. Using a toxicokinetic model and existing toxicity data sets, a recent study found that PFBA, PFHxA, and PFOA have the same potency to induce increased liver weight, *whereas GenX is more potent*. The authors concluded that previous findings of lower toxicity of fluorinated alternatives in rats were primarily due to the faster elimination rates and lower distribution to the liver compared to PFOA and other longer-chain PFAAs.<sup>52</sup>

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<sup>48</sup> California Department of Toxic Substances Control, "Product – Chemical Profile for Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs) in Carpets and Rugs" (2018) (hereinafter "CDTSC 2018 Report"), included as Attachment 44.

<sup>49</sup> *Id.* at 6.

<sup>50</sup> UNCW Presentation to House Select Committee on North Carolina River Quality, "Report from The University of North Carolina at Wilmington Regarding the Implementation of Section 20.(a)(2) of House Bill 56 (S.L. 2017-209)," Apr. 26, 2018, slide 15, included as Attachment 88.

<sup>51</sup> CDTSC 2018 Report at 42.

<sup>52</sup> *Id.* at 29 (citation omitted).

Therefore, GenX only *appeared* to be less toxic than long-chain PFAS compounds, such as PFOA, because it was leaving the bodies of animal test subjects more readily than long-chain compounds. For humans, however, GenX and other short-chain PFAS compounds “could likely be intrinsically as potent as their predecessors.”<sup>53</sup> As explained by the 2018 study cited by the California Department of Toxic Substances Control, “short-chain PFASs that are rapidly excreted in a species such as the rat may not reach internal concentrations sufficient to result in toxic effects that it could in other species with a longer half-life, such as humans.”<sup>54</sup> Therefore, short-chain PFAS compounds are likely to stay in the human bodies long enough to cause severe toxic effects. GenX and other PFAS compounds created to replace PFOA and PFOS could be as harmful, if not more harmful, than the compounds they were created to replace.

The North Carolina Department of Health and Human Services examined data from the North Carolina Central Cancer Registry and found that residents in New Hanover County consistently had significantly higher rates of testicular cancer from 1996 to 2016, and higher rates of liver cancer for the large majority of that period.<sup>55</sup> From 2006 to 2010, liver cancer rates in New Hanover County were over 30 percent higher than the state average.<sup>56</sup> PFOA and PFOS cause both testicular cancer and liver disease,<sup>57</sup> and recent studies of short-chain PFAS alternatives, including DuPont’s own studies, show that GenX is likely to do the same. The prevalence of these diseases in the communities surrounding Chemours’ facility demonstrates the dangers caused by the company’s past and ongoing PFAS pollution.

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<sup>53</sup> Gomis 2018 study at 7-8.

<sup>54</sup> *Id.*

<sup>55</sup> NC DHHS, “Summary of Selected Cancer Rates for Bladen, Brunswick, New Hanover and Pender Counties, 1997-2015, and Comparison to Statewide Rates,” Table 2, included as Attachment 45.

<sup>56</sup> *Id.*

<sup>57</sup> The Madrid Statement at A 107 (May 2015); *see also* EPA, Fact Sheet on PFOA & PFOS Drinking Water Health Advisories, 2, included as Attachment 16.

Aware of the human health risks of GenX, the North Carolina Department of Health and Human Services has issued a health goal of 140 parts per trillion for the chemical.<sup>58</sup> Although the agency's establishment of a health goal validates the threat that GenX poses to public health and safety, compliance with the health goal does not ensure protection of the public, as the agency determined the health goal before many key studies on the human health risks of short-chain compounds had been published.<sup>59</sup>

A. Chemours and DuPont have caused a generalized condition of PFAS air and water pollution.

DEQ has recognized that Chemours has “caused significant and widespread groundwater contamination,” and that Chemours “continues to contaminate North Carolina’s air, surface water and groundwater through the release of GenX.”<sup>60</sup> DEQ has already determined that Chemours and DuPont have caused a generalized condition of PFAS air and water pollution.

In August 2010, DuPont met with DEQ to discuss its intent to replace its production of PFOA at the Fayetteville Works Facility with GenX, and indicated “that the GenX compounds would be produced in a closed-loop system,”<sup>61</sup> although, at the time, DuPont had already knowingly released GenX into the Cape Fear River for three decades.<sup>62</sup> As DEQ has stated, Chemours simply withheld information regarding its discharge of GenX and similar compounds, and “knowingly misled [DEQ] into believing that GenX Compounds were not being discharged from the Facility into surface waters.”<sup>63</sup>

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<sup>58</sup> NC DHHS, “Questions and Answers Regarding North Carolina Department of Health and Human Services Updated Risk Assessment for GenX (Perfluoro-2-propoxypropanoic acid),” July 14, 2017, included as Attachment 46.

<sup>59</sup> NC DHHS published its GenX health goal of 140 ppt on July 14, 2017. *Id.* Numerous studies on short-chain PFAS alternatives were published after that date. *See supra* note 47.

<sup>60</sup> NC DEQ Amended Complaint at 1 (quotations omitted).

<sup>61</sup> *Id.* at 18.

<sup>62</sup> Notes from Chemours meeting with local, state officials, *StarNews*, Jun. 15, 2017, included as Attachment 27; *see also* NC DEQ Amended Complaint at 16.

<sup>63</sup> NC DEQ Amended Complaint at 33.

DEQ's investigation into the facility began in June of 2017.<sup>64</sup> At the time, GenX levels at Chemours' outfall into the Cape Fear River reached levels of up to 39,000 ppt, and GenX levels in the finished drinking water from the Cape Fear Public Utility Authority's Sweeney Water Treatment Plant reached levels of up to 1,100 ppt.<sup>65</sup> Chemours' early sampling of GenX in groundwater monitoring wells at the site showed GenX at concentrations of up to 61,300 ppt.<sup>66</sup> After discovering that DuPont and Chemours had discharged GenX and other PFAS compounds into drinking water supplies for decades without notifying the agency, DEQ filed a complaint against Chemours for its violation of the Clean Water Act and state water quality laws.<sup>67</sup> In September 2017, the company agreed to stop its discharge of wastewater containing GenX and two other compounds.<sup>68</sup> Nevertheless, Chemours has continued to contaminate the air, surface and groundwaters, sediment, and even honey with a slew of toxic PFAS compounds.

*1. DEQ has extensive evidence of Chemours' widespread and ongoing GenX contamination.*

Within two weeks of the company's agreement with the agency to stop discharging its PFAS-laden wastewater, DEQ had to order the company to provide bottled water to 11 homeowners near the facility.<sup>69</sup> Since then, DEQ has been trying to determine how far the contamination has spread from the facility, consuming significant staff resources.<sup>70</sup> From September to December of 2017, DEQ found at least 33 different PFAS compounds, including

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<sup>64</sup> NC DEQ Press Release, "DEQ, DHHS investigating reports of unregulated chemical in Cape Fear River," Jun. 14, 2017, included as Attachment 47.

<sup>65</sup> June 19 to July 25, 2017 GenX Surface Water Sampling Results, included as Attachment 48.

<sup>66</sup> "Chemours Preliminary Data, August 2017," included as Attachment 49.

<sup>67</sup> See NC DEQ Complaint.

<sup>68</sup> Partial Consent Order, 17 CVS 580 (N.C. Super. 2017), included as Attachment 50.

<sup>69</sup> NC DEQ Press Release, "State directs Chemours to provide residents with bottled water after GenX found in preliminary well tests," Sept. 21, 2017, included as Attachment 51.

<sup>70</sup> NC DEQ Presentation to House Select Committee on North Carolina River Quality, Sep. 28, 2017, included as Attachment 52; NC DEQ Presentation to House Select Committee on North Carolina River Quality, Oct. 26, 2017, included as Attachment 53; NC DEQ Presentation to House Select Committee on North Carolina River Quality, Nov. 30, 2017, included as Attachment 54; NC DEQ Presentation to Science Advisory Board, Dec. 4, 2017, included as Attachment 55; NC DEQ Presentation to House Select Committee on North Carolina River Quality, Feb. 21, 2018, included as Attachment 56; NC DEQ March 22 Presentation, included as Attachment 9.

GenX, Nafion By-products 1 and 2, PFOA, and PFOS, in private drinking water wells around the facility.<sup>71</sup> Within those four months, DEQ issued seven press releases stating that 100 homeowners would need to rely on bottled water instead of the contaminated well water they and their families had been drinking for decades.<sup>72</sup> Robeson County started its own testing of wells, and as of April 26, 2018, had found GenX in 33 of the wells it had tested.<sup>73</sup> GenX has now been found in at least 690 private wells up to 5.5 miles away from the facility's border, in levels as high as 4,000 ppt—28 times the state's health goal of 140 ppt, and 400 times GenX's applicable groundwater standard, or 10 ppt.<sup>74</sup> Robeson County's health director has stated that the presence of GenX in Robeson County likely indicates that Chemours' contamination has spread into the Lumber River basin and even the Pee Dee River in South Carolina.<sup>75</sup> Groundwater sampled at the site of the facility has contained concentrations of GenX up to 640,000 ppt—over 4,500 times the state's health goal, and over 64,000 times GenX's applicable groundwater standard.<sup>76</sup>

The problem continues. DEQ has determined that “the flow of onsite groundwater directly to the Cape Fear River” is “the most significant source of contaminant loading in the River.”<sup>77</sup> Polluted groundwater is discharging north of Chemours' facility into Willis Creek, where GenX has been detected at levels of up to 450 ppt, and south of the facility into Georgia

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<sup>71</sup> NC DEQ, “Expanded PFAS Analysis on DEQ Collected Private Wells Associated with Chemours-Fayetteville,” included as Attachment 57.

<sup>72</sup> Screenshot of NC DEQ's GenX News Releases taken on Apr. 5, 2018, NC DEQ GenX website, included as Attachment 58.

<sup>73</sup> NC DEQ Apr. 26 Presentation at slide 9, included as Attachment 87.

<sup>74</sup> NC DEQ Apr. 26 Presentation at slides 9-10; NC DEQ Amended Complaint at 10-22; *see also* Exhibit 23 of NC DEQ Amended Complaint, “Sample Results of Residential Well Groundwater Testing,” included as Attachment 59. DEQ states in its complaint that “GenX is not permitted in groundwater at concentrations at or above the [practical quantitation limit]” as defined in N.C. Admin. Code 2L .0102(15).

<sup>75</sup> Steve DeVane, “Robeson County testing for GenX near St. Pauls,” *the Fayetteville Observer*, Feb. 2, 2018, included as Attachment 60.

<sup>76</sup> NC DEQ Amended Complaint at 10-22, 24-25.

<sup>77</sup> NC DEQ Amended Complaint at 26; *see also* Exhibit 22 of NC DEQ Amended Complaint, “Focused Feasibility Study Report – PFAS Remediation,” included as Attachment 61.

Branch, where GenX has been detected at levels of 690 ppt.<sup>78</sup> Both Willis Creek and Georgia Branch connect with the Cape Fear River, so the company's pervasive pollution of the groundwater has resulted in continuing levels of GenX in the Cape Fear River.<sup>79</sup>

Scientists at the University of North Carolina in Wilmington have also found GenX, along with a number of other PFAS compounds, in the sediment of the Cape Fear River over 40 miles away from the plant,<sup>80</sup> and have determined that sediments in the river are likely "acting as a repository of GenX that may be released into the overlying water column, potentially impacting sensitive estuarine ecosystems as well as drinking water utilities..."<sup>81</sup>

GenX is not only in the ground and surface water, and the underlying sediments. DEQ has found that "a primary source of surface water and groundwater contamination [...] is Chemours' ongoing emission of GenX and related compounds into the atmosphere and the deposition of those compounds onto the land and waters ..." <sup>82</sup> Despite Chemours' agreement to stop discharging GenX-laden wastewater directly into the Cape Fear River, DEQ has found GenX in several other unexpected locations, including in rainwater, spring-fed lakes, and honey.

For the past several months, DEQ has been sampling rainwater for GenX. The agency stated that "[e]ach time" it sampled, it "found that GenX was present in rainwater above [10 ppt] *and at increasingly greater distances from the Chemours facility.*"<sup>83</sup> DEQ has found the chemical in rainwater at levels as high as 810 ppt five miles from the facility, and *as far as 7*

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<sup>78</sup> NC DEQ Amended Complaint at 26.

<sup>79</sup> *Id.* at 26 ("Concentrations of GenX in effluent being released from Outfall 002 continue, with higher levels occurring during or after rain events.").

<sup>80</sup> Gen-X Orientation Map for Lock and Dam #3, included as Attachment 62.

<sup>81</sup> "Report to the Environmental Review Commission from the University of North Carolina at Wilmington Regarding the Implementation of Section 20(a)(2) of House Bill 56 (S.L. 2017-209)," included as Attachment 63; University of North Carolina in Wilmington Presentation to House Select Committee on North Carolina River Quality, "Sediments and GenX in the CFR," Feb. 21, 2018, slide 3, included as Attachment 64.

<sup>82</sup> NC DEQ Amended Complaint at 3.

<sup>83</sup> NC DEQ, NC Division of Air Quality, Letter to Chemours, "60-Day Notice of Intent to Modify Air Quality Permit No. 03735T43, Apr. 6, 2018, 3 (hereinafter "NC DAQ 60-Day NOI"), included as Attachment 65.

miles from the facility.<sup>84</sup> DEQ has also found GenX in spring-fed recreational lakes far from the facility—at levels of up to 620 ppt in Camp Dixie, a lake about two miles away from the plant that is drained about once a year,<sup>85</sup> and at levels of 915 ppt in Marshwood Lake, about a mile away, and upstream, from the plant.<sup>86</sup> Last December, GenX was found in local honey at 2,070 ppt—nearly 15 times higher than the state’s health goal.<sup>87</sup>

DEQ is now testing for the compound in sediment and fish tissue,<sup>88</sup> and is analyzing studies of Chemours plants in the Netherlands which have revealed high concentrations of GenX and other PFAS compounds in vegetable gardens nearby.<sup>89</sup> Scientists at the University of North Carolina in Wilmington have also expressed concern that Chemours’ PFAS compounds have collected in water towers, water heaters, and even the bacteria that coat the inside of pipes which pump treated drinking water.<sup>90</sup>

2. *Chemours’ toxic pollution of the air, surface water, and groundwater includes dozens of other PFAS compounds in addition to GenX.*

Chemours’ toxic pollution of the environment does not only involve GenX. For decades, Chemours and DuPont have released numerous other PFAS compounds into the environment.<sup>91</sup>

In 2015, a study conducted by Mark Strynar at the U.S. Environmental Protection Agency and a team of researchers found “a large increase in number and magnitude [...] of

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<sup>84</sup> NC DAQ 60-Day NOI at 3; NC DEQ Amended Complaint at 2.

<sup>85</sup> Lisa Sorg, “It’s even been found in honey: Mysteries deepen about extent, risks of GenX contamination,” *NC Policy Watch*, Dec. 5, 2017, included as Attachment 66.

<sup>86</sup> NC DEQ Press Release, “Latest test results show concentrations of GenX in Camp Dixie’s lake, Marshwood Lake and Hall Park baseball field’s well,” Nov. 7, 2017, included as Attachment 67; *see also* Gen-X Orientation Map for Camp Dixie and Marshwood Lake, included as Attachment 68.

<sup>87</sup> Adam Wagner, “How did GenX end up in a jar of honey? DEQ is investigating,” *StarNews Online*, Dec. 4, 2017, included as Attachment 69.

<sup>88</sup> NC DEQ March 22 Presentation at slide 15.

<sup>89</sup> Lisa Sorg, “State officials struggle to keep up as GenX pollution issues spread, grow more complex,” *NC Policy Watch*, Mar. 20, 2018, included as Attachment 70.

<sup>90</sup> Cheryl Hogue, “What’s GenX still doing in the water downstream of a Chemours Plant,” *c&en*, Feb. 12, 2018, included as Attachment 71.

<sup>91</sup> Sun 2016 Study, included as Attachment 28; EPA, “Laboratory PFAS Results for NC DEQ Cape Fear Watershed Sampling,” Aug. 21, 2017, included as Attachment 29; Strynar 2015 Study, included as Attachment 30.

unknown compounds” downstream from the facility.<sup>92</sup> At the time, the team identified at least twelve PFAS compounds.<sup>93</sup>

In 2016, Dr. Detlef Knappe of North Carolina State University and a team of researchers found that the following PFAS compounds were downstream, but not upstream, of Chemours’ facility:

- Perfluoro-2-methoxyacetic acid (PFMOAA), CAS No. 674-13-5,
- Perfluoro-3-methoxypropanoic acid (PFMOPrA), CAS No. 377-73-1,
- Perfluoro-4-methoxybutanoic acid (PFMOBA), CAS No. 863090-89-5,
- Perfluoro-2-propoxypropanoic acid (PFPrOPrA), CAS No. 13252-13-6,
- Perfluoro(3,5-diolxahexanoic) acid (PFO2HxA), CAS No. 39492-88-1,
- Perfluoro(3,5,7-trioxaoctanoic) acid (PFO3OA), CAS No. 39492-89-2, and
- Perfluoro(3,5,7,9-tetraoxadecanoic) acid (PFO4DA), CAS No. 39492-90-5.<sup>94</sup>

Knappe’s study cautions that this is not an exhaustive list of PFAS compounds being discharged by Chemours: “Other [PFAS compounds] were present in water samples [downstream of the facility] but could not be quantified and were therefore not included...”<sup>95</sup>

After DEQ began its investigation into GenX, the agency has found extensive evidence that Chemours’ contamination of the air, water, and soil includes numerous other PFAS compounds—some of which are being discharged and emitted at far higher rates than GenX.

Numerous other PFAS compounds have been found in onsite groundwater wells, including, but not limited to:

- Perfluoro- 2-methoxyacetic acid (PFMOAA), CAS No. 674-13-5, at levels of up to 8,174,250 ppt and 6,662,860 ppt,<sup>96</sup>
- Perfluoro(3,5-diolxahexanoic) acid (PFO2HxA), CAS No. 39492-88-1, at levels of up to 1,935,440 ppt and 1,610,185 ppt,<sup>97</sup>

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<sup>92</sup> Strynar 2015 Study at E.

<sup>93</sup> *See generally* Strynar 2015 Study.

<sup>94</sup> Mei Sun et al., “Legacy and Emerging Perfluoroalkyl Substances Are Important Drinking Water Contaminants in the Cape Fear River Watershed of North Carolina—Supporting Information” (2016), included as Attachment 72.

<sup>95</sup> *Id.* at 6.

<sup>96</sup> NC DEQ Amended Complaint at 25-26.

<sup>97</sup> *Id.*

- Nafion Byproduct 1, “PFESA Byproduct 1,” CAS No. 29311-67-9, at levels of up to 260,295 ppt and 144,625 ppt,<sup>98</sup>
- Nafion Byproduct 2, “PFESA Byproduct 2,” CAS No. 749836-20-2, at levels of up to 76,230 ppt and 76,125 ppt,<sup>99</sup>
- Perfluoro(3,5,7-trioxaoctanoic) acid (PFO3OA), CAS No. 39492-89-2, at levels of up to 488,640 ppt and 399,610 ppt,<sup>100</sup> and
- Perfluoro(3,5,7,9-tetraoxadecanoic) acid (PFO4DA), CAS No. 39492-90-5, at levels of up to 99,015 ppt and 79,740 ppt.<sup>101</sup>

From September to December of 2017, DEQ found at least *33 different PFAS compounds*

in *private drinking water wells*, including:

- 2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)-propanoic acid (PFPrOPrA, "GenX"), CAS No. 13252-13-6,
- Perfluorooctanesulfonate (PFOS), CAS No. 1763-23-1,
- Perfluoro-octanoic acid (PFOA), CAS No. 335-67-1,
- Perfluoro- 2-methoxyacetic acid (PFMOAA), CAS No. 674-13-5,
- Perfluoro- (3,5-dioxahexanoic) acid (PFO2HxA), CAS No. 39492-88-1,
- Perfluoro- 3-methoxypropanoic acid (PFMOPrA), CAS No. 377-73-1,
- Perfluoro- butanesulfonate (PFBS), CAS No. 375-73-5,
- Perfluoro- butyric acid (PFBA), CAS No. 375-22-4,
- Perfluoro- (3,5,7-trioxaoctanoic) acid (PFO3OA), CAS No. 39492-89-2,
- Perfluoro-4-methoxy- botanic acid (PFMOBA), CAS No. 863090-89-5,
- Perfluoropentanesulfonate (PFPeS), CAS No. 2706-91-4,
- Perfluoropentanoic acid (PFPeA), CAS No. 2706-90-3,
- Fluorotelomer sulfonate 4:2 (4:2 FTS), CAS No. 757124-72-4,
- Perfluorohexanesulfonate (PFHxS), CAS No. 355-46-4,
- Perfluorohexanoic acid (PFHxA), CAS No. 307-24-4,
- Nafion Byproduct 1, CAS No. 29311-67-9,
- Nafion Byproduct 2, CAS No. 749836-20-2,
- Perfluoroheptanesulfonate (PFHpS), CAS No. 375-92-8,
- Perfluoro- heptanoic acid (PFHpA), CAS No. 375-85-9,
- Fluorotelomer sulfonate 6:2 (6:2 FTS), CAS No. 27619-97-2,
- Perfluoro- octanesulfonamide (PFOSA), CAS No. 754-91-6,
- Perfluoro- nonanesulfonate (PFNS), CAS No. 68259-12-1,
- Perfluoro- nonanoic acid (PFNA), CAS No. 375-95-1,
- Fluorotelomer sulfonate 8:2 (8:2 FTS), CAS No. 39108-34-4,

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<sup>98</sup> *Id.*

<sup>99</sup> *Id.*

<sup>100</sup> Exhibit 21 of NC DEQ Amended Complaint, “Chemours Additional Site Investigation Report,” Table 4, 9-10, included as Attachment 73.

<sup>101</sup> *Id.*

- Perfluoro- (3,5,7,9-tetraoxadecanoic) acid (PFO4DA), CAS No. 39492-90-5,
- Perfluorodecanesulfonate (PFDS), CAS No. 335-77-3,
- Perfluoro- decanoic acid (PFDA), CAS No. 335-76-2,
- N-methylperfluoro- 1-octanesulfon-amidoacetic acid (NMeFOSAA), CAS No. 2355-31-9,
- Perfluoro- undecanoic acid (PFUdA), CAS No. 2058-94-8,
- N-ethylperfluoro- 1-octanesulfon-amidoacetic acid (NEtFOSAA), CAS No. 2991-50-6,
- Perfluorododecanoic acid (PFDoA), CAS No. 307-55-1,
- Perfluorotridecanoic acid (PFTrDA), CAS No. 72629-94-8, and
- Perfluorotetradecanoic acid (PFTeDA), CAS No. 376-06-7.<sup>102</sup>

Other PFAS compounds also persist in public drinking water supplies. The Cape Fear Public Utility Authority, which services 200,000 customers in North Carolina, reported sampling results from its finished drinking water on March 23, 2018:

GenX is not the only emerging contaminant in the Cape Fear River. [The Cape Fear Public Utility Authority] has tested water samples from the Sweeney Plant for a wide array of unregulated compounds [...] *GenX only accounts for only a small percentage* of these compounds. Results from a screening of the twenty different [PFAS] compounds with testing standards shows combined levels *consistently above health goals* for legacy compounds and for GenX. [...] To date, there are *at least five new [PFAS compounds], not reported in the literature*, that have been detected in both raw and finished drinking waters.<sup>103</sup>

During its presentation to the House Select Committee on North Carolina River Quality on April 26, 2018, the Cape Fear Public Utility Authority emphasized that even an upgraded treatment system will not eliminate PFAS compounds in finished drinking water, and that the only way to effectively address the contamination is by controlling the source of the compounds.

DEQ cannot ignore the prevalence of other PFAS compounds that are in surface and groundwaters, given that some of them have been found in concentrations of several millions of parts per trillion.

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<sup>102</sup> NC DEQ, Expanded PFAS Analysis on DEQ Collected Private Wells Associated with Chemours-Fayetteville, included as Attachment 57.

<sup>103</sup> Cape Fear Public Utility Authority, “HB56 GenX Reponse Measures- Cape Fear Public Utility Authority (CPFUA) Final Report,” Mar. 23, 2018, 2 (emphasis added), included as Attachment 74.

B. Chemours continues to release tens of thousands of pounds of PFAS compounds into the environment, extending an emergency that requires immediate action.

DEQ must act now to eliminate the sources of air and water pollution that have created the generalized condition of air and water pollution that extends from Fayetteville to Wilmington. The agency's actions so far have not stopped releases and have failed to address the full suite of PFAS pollution from the company. DEQ has asked the Bladen County Superior Court to take immediate action; the agency has the authority to take that action on its own.

1. *DEQ has the authority to immediately address GenX contamination, and it is obligated to use that authority.*

As documents attached to the agency's amended complaint demonstrate, DEQ has continued to find GenX and other PFAS compounds in high concentrations wherever it looks. All this time, while DEQ has been gathering data and studying groundwater contamination and air deposition, the company has continued to release GenX and other toxic PFAS compounds into the air at a rate of nearly 100,000 pounds each year.<sup>104</sup> As DEQ has stated,

It is now evident that a primary source of surface water and groundwater contamination in and around the Fayetteville Works facility is Chemours' ongoing emissions of GenX and related compounds into the atmosphere and the deposition of those compounds onto the land and waters of the State.<sup>105</sup>

DEQ initially announced that approximately 500 pounds of GenX compounds are released by the facility each year.<sup>106</sup> After DEQ requested further emissions testing from Chemours, however, it found that the company currently emits GenX compounds at a rate of

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<sup>104</sup> See Chemours' GenX Air Emission Summary, included as Attachment 12; Chemours' other Emerging Compounds Air Emissions Summary, included as Attachment 13.

<sup>105</sup> NC DEQ Amended Complaint at 3.

<sup>106</sup> See NC DEQ Presentation to House Select Committee on North Carolina River Quality, Nov. 30, 2017, slide 35, included as Attachment 54.

2,758 pounds per year—over 41 times higher than originally reported in early 2017 and over 4.5 times higher than the company’s revised estimate submitted to DEQ in October 2017.<sup>107</sup>

Chemours is also polluting drinking water supplies by leaking large amounts of GenX emissions, some of which travel directly into the Cape Fear River. On October 6, 2017, Chemours covered up an air emissions leak that lasted 13 hours, containing 125 pounds of GenX compounds.<sup>108</sup> The release from the facility’s stack was then “deposited onto the ground” and rain carried the chemicals into the Cape Fear River,<sup>109</sup> causing GenX to spike in the river at levels of up to 3,700 ppt—over 26 times the state’s health goal,<sup>110</sup> and to far exceed the health goal at the Bladen Buffs water treatment facility.<sup>111</sup> Similar spikes of up to 2,400 ppt have occurred in the Cape Fear River since then.<sup>112</sup> Chemours has further estimated that simply the leaks from pumps, valves, and connectors located on the facility cause 314 pounds of GenX compounds to be emitted into the air each year.<sup>113</sup>

During DEQ’s investigation of GenX, the company has also kept multiple unlined wastewater conveyance ditches and basins that continuously leach GenX compounds into ground and surface waters.<sup>114</sup> These include an unlined “ditch” carrying up to 5 to 8 million gallons a

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<sup>107</sup> NC DEQ Apr. 26 Presentation at slide 15; NC DAQ 60-Day NOI at 2; NC Amended Complaint at 28. Note that this figure includes the 314 pounds of GenX per year that are emitted from pumps, valves, and connectors located in outdoor process areas.

<sup>108</sup> DEQ Press Release, “DEQ investigating air emissions leak at Chemours,” Nov. 17, 2017, included as Attachment 75.

<sup>109</sup> DEQ Letter to Chemours, “Notice of Violation & Intent to Assess Civil Penalty,” Nov. 13, 2017, included as Attachment 76.

<sup>110</sup> DEQ Press Release, “DEQ will take additional enforcement action against Chemours for unreported spill,” Nov. 9, 2017, included as Attachment 77.

<sup>111</sup> DEQ Press Release, “Surface water results from October show GenX was above state health goal at one water treatment facility after Oct. 6 spill,” Nov. 27, 2017, included as Attachment 78; DEQ Surface Water Sampling Results, Nov. 27, 2017, included as Attachment 79.

<sup>112</sup> DEQ Press Release, “October, early November data shows high GenX concentrations at Chemours wastewater discharge outfall,” Nov. 22, 2017, included as Attachment 80.

<sup>113</sup> Chemours Letter to NC DEQ, “Chemours – Fayetteville Works – Emissions Test Report,” 2, Mar. 12, 2018, included as Attachment 81.

<sup>114</sup> See generally Exhibit 22 of NC DEQ Amended Complaint, “Focused Feasibility Study Report – PFAS Remediation,” included as Attachment 61.

day of PFAS contaminated wastewater which “has been a significant contributing source of contamination” to groundwater sitting beneath the facility, two unlined sedimentation basins that are also leaching into the groundwater,<sup>115</sup> and an old outfall which has eroded enough to reach deep groundwater aquifers and channel contaminated water from the aquifers directly into the Cape Fear River.<sup>116</sup>

DEQ has recently amended its complaint before the Superior Court of Bladen County to request that the court: “enter a prohibitory and/or mandatory injunction requiring Chemours to: [r]emove, treat or control air emissions” and “all other sources of GenX Compounds such that they no longer cause or contribute to any violation of the North Carolina’s groundwater rules.”<sup>117</sup>

No court action is necessary. DEQ has the authority to grant the relief it seeks, and it is obligated by statute to use these emergency powers. DEQ’s investigation has showed that Chemours’ ongoing GenX contamination of the air, water, and soil constitutes “a generalized condition of water or air pollution” which is causing imminent danger to the health and safety of the public.<sup>118</sup> Accordingly, DEQ must order Chemours to “discontinue immediately the emission of air contaminants or the discharge of wastes” that are causing an “imminent danger to the health or safety of the public.”<sup>119</sup>

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<sup>115</sup> Chemours Feb. 2018 Response at 10-12, included as Attachment 6.

<sup>116</sup> Exhibit 22 of NC DEQ Amended Complaint, “Focused Feasibility Study Report – PFAS Remediation” at 9, Table 2.

<sup>117</sup> NC DEQ Amended Complaint at 35.

<sup>118</sup> N.C. Gen. Stat. § 143-215.3(a)(12).

<sup>119</sup> *Id.*

2. *DEQ must act immediately to address pollution by other PFAS compounds.*

In its amended complaint, DEQ does not request relief for any of the other PFAS compounds Chemours has pumped into the air, soil, and water. As such, DEQ has not addressed all emissions and discharges “causing imminent danger to the health and safety of the public.”<sup>120</sup>

DEQ has found at least 33 PFAS compounds in private drinking water wells.<sup>121</sup> DEQ’s complaint expresses deep concern that GenX has been found in private wells at levels of 4,000 ppt,<sup>122</sup> yet some PFAS compounds have been found in concentrations of *several million parts per trillion*—one of which has been found at levels of up to 8,174,250 ppt.<sup>123</sup> PFAS compounds have also been found in onsite groundwater monitoring wells as deep as 80 to 100 feet below ground surface, and at levels of up to 80,000 ppt.<sup>124</sup>

DEQ was alarmed to discover that GenX compounds are emitted at a rate of over 2,000 pounds per year,<sup>125</sup> but other PFAS compounds are emitted at severely higher rates. In 2012, Chemours emitted over 85,000 pounds of PFAS compounds into the air.<sup>126</sup> In 2013, Chemours emitted over 96,000 pounds of PFAS compounds into the air.<sup>127</sup> In 2014, Chemours emitted over 102,000 pounds of PFAS compounds into the air.<sup>128</sup> In 2015, Chemours emitted over 125,000 pounds of PFAS compounds into the air.<sup>129</sup> In 2016, Chemours emitted over 89,000

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<sup>120</sup> N.C. Gen. Stat. § 143-215.3(a)(12).

<sup>121</sup> NC DEQ, Expanded PFAS Analysis on DEQ Collected Private Wells Associated with Chemours-Fayetteville, included as Attachment 57.

<sup>122</sup> NC DEQ Amended Complaint at 27.

<sup>123</sup> *Id.* at 25-26.

<sup>124</sup> Exhibit 22 of NC DEQ Amended Complaint, “Focused Feasibility Study Report – PFAS Remediation” at 5-6, Figures 10-12.

<sup>125</sup> See NC DAQ 60-Day NOI.

<sup>126</sup> See Chemours’ GenX Air Emission Summary; Chemours’ other Emerging Compounds Air Emissions Summary.

<sup>127</sup> *Id.*

<sup>128</sup> *Id.*

<sup>129</sup> *Id.*

pounds of PFAS compounds into the air.<sup>130</sup> One of the many PFAS compounds has been released at a rate of over 72,000 pounds in one year, or 221 pounds per day.<sup>131</sup>

Moreover, many of the PFAS compounds the Chemours has been emitting into the air *directly correlate* with the 33 PFAS compounds that DEQ has found in private drinking water wells. PFAS compounds emitted by Chemours that have shown up in private wells include, but are not limited to:

- $C_3F_6O_2$ , which reacts with water to become  $C_3HF_5O_3$  (Perfluoro-2-methoxyacetic acid, PFMOAA, CAS No. 674-13-5) in groundwater,
- $C_4F_8O_2$ , which reacts with water to become  $C_4HF_7O_3$  (Perfluoro-3-methoxypropanoic acid, PFMOPrA, CAS No. 377-73-1) in groundwater,
- $C_4F_8O_3$ , which reacts with water to become  $C_4HF_7O_4$  (Perfluoro-(3,5-dioxahexanoic) acid, PFO2HxA, CAS No. 39492-88-1) in groundwater,
- $C_5F_{10}O_2$ , which reacts with water to become  $C_5HF_9O_3$  (Perfluoro-4-methoxy- botanic acid, PFMOBA, CAS No. 863090-89-5) in groundwater,
- $C_5F_{10}O_4$ , which reacts with water to become  $C_5HF_9O_5$  (Perfluoro-(3,5,7-trioxaooctanoic) acid, PFO3OA, CAS No. 39492-89-2) in groundwater,
- $C_6HF_{11}O_3$ , as well as and  $C_6F_{12}O_2$ , which reacts with water to become  $C_6HF_{11}O_3$  (2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)-propanoic acid, PFPrOPrA, "GenX", CAS No. 13252-13-6) in groundwater,
- $C_7HF_{14}O_4S$  which reacts with water to become  $C_7HF_{13}SO_5$  (Nafion Byproduct 1, "PFESA Byproduct 1," CAS No. 29311-67-9) in groundwater, and
- $C_8HF_{15}O_2$  (Perfluoro-octanoic acid (PFOA), CAS No. 335-67-1), which is found in the same form in groundwater.<sup>132</sup>

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<sup>130</sup> *Id.*

<sup>131</sup> 72,585 pounds of  $C_3F_6O$ , a PFAS compound, were emitted in the year 2015. *See* Chemours' GenX Air Emission Summary.

<sup>132</sup> *See* Chemours' GenX Air Emission Summary; Chemours' other Emerging Compounds Air Emissions Summary; NC DEQ, Expanded PFAS Analysis on DEQ Collected Private Wells Associated with Chemours-Fayetteville, included as Attachment 57. Many of the PFAS compounds emitted by Chemours undergo hydrolysis when reacting with water, thereby losing one fluorine atom, and gaining one oxygen atom and one hydrogen atom. *See* Equation 8

Based on these results, not only are Chemours' air emissions of GenX significantly contributing to GenX contamination of groundwater—the company's emissions of other PFAS compounds are also polluting ground and surface waters. Chemours' emission of other PFAS compounds cannot be neglected.

Instead of acting to eliminate Chemours' ongoing release of other PFAS compounds, DEQ merely states in its complaint that it “continues to investigate the extent of, and environmental risks associated with these contaminants.”<sup>133</sup> It has been 327 days since DEQ issued its first press release on its investigation of GenX. If Chemours has been releasing PFAS compounds at rates of up to 221 pounds per day, as it historically has with at least one of the compounds,<sup>134</sup> then Chemours has released over 70,000 pounds of PFAS compounds into the air since DEQ began its investigation of the facility last year.

In order to protect the health of the public, DEQ must order Chemours to stop *all* PFAS air emissions *until* it has developed and adequately tested the technology that can sufficiently reduce emissions so that human health is no longer endangered.

3. *Chemours' proposed controls will not protect the health and safety of the public.*

Chemours has announced that it plans to install technologies to “control” its GenX air emissions and that it is looking into a “longer term” solution that is “expected to be” 99.99 percent effective at reducing its emissions.<sup>135</sup> Chemours states that it will install “two granulated activated carbon adsorption systems to control HFPO Dimer Acid and other PFAS emissions” by

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for illustration of hydrolysis, Hexafluoropropene Oxide Chemistry, 2, included as Attachment 82; *see also* UNCW Presentation to House Select Committee on North Carolina River Quality, “Report from The University of North Carolina at Wilmington Regarding the Implementation of Section 20.(a)(2) of House Bill 56 (S.L. 2017-209),” Apr. 26, 2018, included as Attachment 88.

<sup>133</sup> NC DEQ Amended Complaint at 26.

<sup>134</sup> *See* Chemours' other Emerging Compounds Air Emissions Summary, entry for C<sub>3</sub>F<sub>6</sub>O.

<sup>135</sup> Chemours Feb. 2018 Response at 15-17.

May 25, 2018.<sup>136</sup> In a March 12, 2018 letter to DEQ, Chemours states that its GenX air emissions “translate into a maximum exposure on an annual average basis equivalent to 20-90 ppt in drinking water for the closest residences to the facility” and that it “expect[s]” its technology upgrades to “reduce the 20-90 ppt range” to “20-30 ppt.”<sup>137</sup>

These vague assertions simply are not satisfactory. First, DEQ has found GenX in private drinking water wells in levels as high as 4,000 ppt and in levels exceeding the state health goal of 140 ppt in 190 of the wells that have been tested.<sup>138</sup> DEQ has also determined that the primary source of groundwater contamination is Chemours’ air emissions.<sup>139</sup> Chemours’ claims that its air emissions “translate into” drinking water GenX concentrations as low as 20 to 90 ppt “for the closest residents to the facility” have no basis in fact. Second, it is not even clear that the technology planned will reduce GenX air emissions. Chemours states that it will “reduce the 20-90 ppt range” of drinking water concentrations to “20-30 ppt.”<sup>140</sup> The lower limit of 20 ppt will not change with installation of the technology, so it is possible that the current level of GenX air emissions will not decrease at all. Furthermore, Chemours only discusses a possible reduction in GenX compounds, and makes no assurances that any other PFAS compounds will be “control[ed].”<sup>141</sup>

Chemours has claimed that it has “longer term” plans to install a “thermal oxidizer unit” that is “expected to be at least 99.99% effective for HFPO Dimer Acid and other PFAS compounds.”<sup>142</sup> Yet Chemours gave *no* indication of *when* this unit can actually be installed, much less when it could be expected to reach 99.999% effectiveness, and still gives no assurance

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<sup>136</sup> Chemours Feb. 2018 Response at 16-17.

<sup>137</sup> Chemours Letter to NC DEQ, “Chemours – Fayetteville Works – Emissions Test Report,” 5, Mar. 12, 2018, included as Attachment 81.

<sup>138</sup> NC DEQ Amended Complaint at 27.

<sup>139</sup> See NC DEQ Amended Complaint.

<sup>140</sup> Chemours Letter to NC DEQ, “Chemours – Fayetteville Works – Emissions Test Report,” 5, Mar. 12, 2018.

<sup>141</sup> *Id.*

<sup>142</sup> Chemours Feb. 2018 Response at 15.

that any of the other PFAS compounds will be accounted for. Chemours' letter further states that "long-term effective remediation measures *can only be implemented after* a thorough remedial investigation and feasibility study have been completed."<sup>143</sup> Assistant Secretary of DEQ, Sheila Holman, acknowledged to the House Select Committee on North Carolina River Quality on April 26, 2018 that it could be 18 months before Chemours can install technology to control its ongoing emissions. In 18 months, Chemours will release at least another 100,000 pounds of PFAS compounds if it continues at its current rate.

Furthermore, these technologies are only proposed for two out of five manufacturing areas at the facilities. Chemours states that these areas "account for what are understood to be by far the two largest sources of HFPO Dimer Acid air emissions."<sup>144</sup> If, however, the other manufacturing areas also discharge or emit PFAS compounds, DEQ must address the discharges of those manufacturing areas as well.<sup>145</sup> The company may eventually develop a plan and implement technologies that eliminate its ongoing PFAS pollution. It cannot be allowed to continue to contaminate the air, water, and soil from Fayetteville to Wilmington as it develops that plan.

C. DuPont's history at the Fayetteville Works Facility and elsewhere supports urgent action.

This is not the first time the companies have been alerted to environmental and public health harm caused by its aerial stack emissions. As early as 1984, DuPont was aware that PFOA dust from its manufacturing stacks "settled well beyond the property line."<sup>146</sup>

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<sup>143</sup> *Id.* at 6-7.

<sup>144</sup> Chemours Feb. 2018 Response at 16-17.

<sup>145</sup> NC DEQ Amended Complaint at 34-35.

<sup>146</sup> Nathaniel Rich, "The Lawyer Who Became DuPont's Worst Nightmare," *N.Y. Times*, Jan. 6, 2016, \*10, included as Attachment 23.

As recently as 2013, the Fayetteville Works Facility manufactured Ammonium Perfluorooctanoate (“APFO”), or the ammonium salt of PFOA—long known to be highly toxic to human health and pervasive in the environment.<sup>147</sup> Nevertheless, as it did with GenX, DuPont misled DEQ about the risks of the chemical, claiming during its permit application process that PFOA did not pose a health concern to humans or animals, and that it was not a known developmental toxin or carcinogen.<sup>148</sup> By that time, DuPont had already known about the health risks of PFOA for about four decades.<sup>149</sup>

In 2002, DuPont conducted modeling of its APFO air emissions that specifically considered the deposition of air particles into the surrounding watershed that “would be carried into the nearby Cape Fear River as storm-water runoff.”<sup>150</sup> In 2006, DuPont investigated AFPO contamination in the ground and surface waters around the facility, and it found that the depositions from the facility’s air emissions were likely contaminating the groundwater. The 2006 documents stated that the “[w]et and dry deposition of airborne materials [...] can lead to subsurface soil and groundwater loading.”<sup>151</sup> They further found that,

the fact that the majority of the airborne APFO is present as a particle and that, under certain conditions, a significant portion of the material can be present in the coarse fraction suggests *a reasonable potential for deposition from ambient air to the ground surface near the AFPO stack*. Once the material is deposited on the ground surface, it *would be available for transport through subsurface soil to the groundwater*. This *potential is increased due to the porous nature of local soils and the shallow depth to groundwater north of the APFO stack*, and the preference of APFO to partition to the water compartment.<sup>152</sup>

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<sup>147</sup> 2014 RCRA Investigation at 36-37, included as Attachment 25.

<sup>148</sup> NC Amended Complaint at 19.

<sup>149</sup> See Nathaniel Rich, “The Lawyer Who Became DuPont’s Worst Nightmare,” *N.Y. Times*, Jan. 6, 2016.

<sup>150</sup> DuPont Engineering Technology, “Exposure Evaluation for New Process at Fayetteville Site,” EDD0068704 (Aug. 20, 2001, rev. Feb. 20, 2002), included as Attachment 84.

<sup>151</sup> Phase II RCRA Facility Investigation Report for DuPont Fayetteville Works, Appendix A1, 34-35 (2006), included as Attachment 85.

<sup>152</sup> *Id.* at 34-35.

The investigation found that groundwater contamination was likely and that stormwater was likely transporting the aerial deposition of APFO underground, allowing it to

accumulate[] on the underlying clay layer [...]. Soil samples collected [...] showed increasing concentrations with depth. This data suggests that *migration through the clay layer is possible*. [...] [I]t is possible that APFO may be reaching the lower saturated zone by means of a direct infiltration of storm water.<sup>153</sup>

Not surprisingly, the toxic compound was found in monitoring wells located around the plant, including one located 300 feet northeast.<sup>154</sup>

Despite all of the evidence indicating widespread groundwater contamination, the company simply concluded in 2014 that, because it no longer produced APFO, “[t]here is therefore no further potential for air deposition of PFOA to occur at the Site.”<sup>155</sup> By that time, however, the company had already begun producing GenX in the same manufacturing area.<sup>156</sup>

In 2015, after finding PFAS compounds, including PFOA, in the Cape Fear River, DEQ instructed Chemours to conduct groundwater sampling.<sup>157</sup> DEQ states in its complaint that “Chemours provided DEQ only with the PFOA groundwater sampling results, and, until July 2017, failed to share the results showing the elevated concentration of the additional PFAS.”<sup>158</sup>

DuPont has faced thousands of lawsuits and EPA pressure for its reckless release of PFAS compounds into the environment. In a 2015 case in the Southern District of Ohio, a public water provider sued DuPont for its contamination of soil and groundwater through the company’s air emissions, and DuPont did not deny that its PFAS emissions contaminated the public’s drinking wells. The opinion states that

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<sup>153</sup> *Id.* at 35-36.

<sup>154</sup> *Id.* at 36.

<sup>155</sup> 2014 RCRA Investigation at 36-37.

<sup>156</sup> NC DEQ Amended Complaint at 16.

<sup>157</sup> *Id.* at 24.

<sup>158</sup> *Id.*

[DuPont] agrees that [PFOA] from the DuPont Facility was transported via air emissions from DuPont's stacks by wind and was deposited on Little Hocking's Wellfield vegetation and surface soils. It also agrees that precipitation and possible flooding leaches the [PFOA] downward through the unsaturated zone through the aquifer, and that groundwater containing [PFOA] is pumped from the aquifer through the production wells.<sup>159</sup>

The fact that the companies' facilities cause widespread and persistent contamination of our air, water, and soil is old news to DuPont and Chemours. The companies have simply dealt with public and regulatory pressure by secretly replacing old compounds with GenX and other PFAS compounds that have similarly disastrous effects on human health and the environment.

## **V. Conclusion**

The actions of DuPont and Chemours over the last four decades have put the health of hundreds of thousands of North Carolinians at risk. Chemours continues to emit hundreds of pounds of contaminating chemicals into the environment each day. Even if DEQ's enforcement actions are successful, important sources of air and water pollution would go unaddressed.

The citizens whose water is contaminated by that air and water pollution cannot wait for Chemours to try out one technology after another before DEQ acts. The public has already been exposed to decades of PFAS contamination in the water they drink, swim, and fish in, as well as the air they breathe. DEQ is required by law to act in times of emergency to protect the health and safety of the public, and now is the time to do so. DEQ must order Chemours Company FC, LLC to immediately discontinue all emissions and discharges of perfluoroalkyl and polyfluoroalkyl substances (collectively, "PFAS compounds"), also known as perfluorinated compounds, into the environment.

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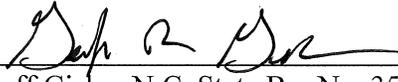
<sup>159</sup> *Little Hocking Water Ass'n, Inc. v. E.I. du Pont Nemours & Co.*, 91 F. Supp. 3d 940, 962 (S.D. Ohio 2015), included as Attachment 86.

## VI. Proposed Ruling

Pursuant to N.C. Gen. Stat. § 150B-4 and § 143-215.3(a)(12), the Cape Fear River Watch respectfully requests that DEQ issue a ruling declaring that:

- A. Previous and ongoing activities of Chemours Company FC, LLC and E.I. du Pont de Nemours and Company at the Fayetteville Works Facility have caused, and continue to cause, a generalized condition of water and air pollution which is causing imminent danger to the health and safety of the public.
- B. In order to protect public health and safety, Chemours Company FC, LLC must immediately discontinue all air emissions as well as all surface water, groundwater, and/or stormwater discharges of perfluoroalkyl and polyfluoroalkyl substances from the Fayetteville Works Facility.

Respectfully submitted this 7th day of May 2018.



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