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***Via U.S. mail and e-mail***

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**RE: Northwest Water Treatment Plant – Comments on Draft NPDES Permit**

Dear Ms. Young:

The Southern Environmental Law Center offers the following comments on Draft National Pollutant Discharge Elimination System (“NPDES”) Permit NC0057533, released by the North Carolina Department of Environmental Quality to Brunswick County on October 31, 2019. These comments are submitted on behalf of Cape Fear River Watch, Clean Cape Fear, Center for Environmental Health, Haw River Assembly, North Carolina Coastal Federation, North Carolina Conservation Network, Toxic Free NC, and the Cape Fear Group of the Sierra Club.

This draft permit is the first of many that DEQ will issue related to the ongoing crisis of per- and polyfluoroalkyl substances (“PFAS”) in our streams, rivers, and drinking water. Brunswick’s project that would be authorized by the permit is a necessary response to industry and wastewater treatment plant failures to control PFAS upstream—and the failure of DEQ’s permitting process to identify and control PFAS discharges. Brunswick County plans to install a reverse osmosis treatment system at its Northwest Water Treatment Plant to remove PFAS and other contaminants from upstream users. Brunswick’s new water treatment facility is a significant step forward in providing safer drinking water to its customers by removing PFAS from its intake water. We support that process, and these comments are not intended to delay or prevent the construction of the facility. Providing clean drinking water to Brunswick County’s customers is of paramount importance.

DEQ must also ensure that residents who fish, boat, and swim downstream of the discharge are protected. Most of Brunswick County lies downstream of the proposed discharge location. County residents and visitors fish, harvest shellfish, boat, swim, and live downstream. As discussed below, emerging research is showing that PFAS—even at low levels—are harmful. In addition, one of the key characteristics of the class is that they bio-accumulate, including in popular sport fish like striped bass.

The reverse osmosis treatment process will create a highly PFAS-concentrated stream of wastewater<sup>1</sup> that must be dealt with responsibly. There are two key problems with this draft permit. First, neither the application nor the permit discloses the PFAS that will be discharged or the quantity of those PFAS. Brunswick County did not disclose its proposed PFAS discharge in its application. The public, therefore, has no means of assessing the amount of PFAS that would be discharged by the county or evaluating the potential threat from the chemicals.

The second problem is DEQ's apparent failure to evaluate alternative methods of treatment or disposal of Brunswick County's discharge that would remove PFAS. Neither Brunswick nor DEQ appear to have evaluated any technology capable of removing PFAS from the facility's waste stream. The draft permit fails to evaluate any limits on PFAS or to include a process to develop future limits. In addition, the proposed monitoring requirements are simply inadequate.

This draft permit has been released following two and a half years of intensive focus on PFAS contamination in southeastern North Carolina. PFAS, a group of man-made chemicals that have been used in manufacturing since the 1940s,<sup>2</sup> are known to travel far and to be dangerous to human health and the environment. Because of this, DEQ must analyze Brunswick County's ability to responsibly dispose of, or treat, its wastewater before discharging it back into the Cape Fear River.

The agency must also ensure that upstream sources are subject to the most stringent controls achievable under the Clean Water Act. The single best method to eliminate PFAS from Brunswick County's concentrate is to keep the chemicals from being discharged into the river upstream. DEQ has the authority to prevent such discharges and must vigorously enforce the Clean Water Act to do so as it continues to receive information about upstream sources.

#### **I. Brunswick County has not adequately disclosed PFAS in its NPDES permit application.**

The Clean Water Act prohibits the discharge of any pollutant without a NPDES permit. The discharge of a specific pollutant (or group of pollutants) cannot be permitted if it is not disclosed in a NPDES permit application. Brunswick County failed to disclose PFAS in its permit application to discharge its reverse osmosis concentrate into the Cape Fear River, in violation of the Clean Water Act.

DEQ has acknowledged that disclosure of toxic pollutants, including PFAS, is required by the Clean Water Act and state water quality laws. In its enforcement action against The Chemours Company, LLC for the company's discharge of GenX and other PFAS into the Cape Fear River, the agency stated:

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<sup>1</sup> Vera Franke, et al. *Efficient removal of per- and polyfluoroalkyl substances (PFASs) in drinking water treatment: nanofiltration combined with active carbon or anion exchange*, 5 ENVIRON. SCI. WATER RES. TECHNOL. 1836-1843 (2019), included as Attachment 1.

<sup>2</sup> EPA, *Basic Information on PFAS*, included as Attachment 2.

Part of the permit applicant's burden in this regard is to disclose all relevant information, such as the presence of known constituents in a discharge that pose a potential risk to human health. The permit applicant is required to disclose "all known toxic components that can be reasonably expected to be in the discharge, including *but not limited to* those contained in a priority pollutant analysis." 15A N.C.A.C. 2H .0105(j) (emphasis added). [...] These disclosure obligations are critical, in part, because they define the scope of the Clean Water Act's "permit shield." While compliance with the express terms of an NPDES permit generally "shields" the permittee from liability for violations of 33 U.S.C. § 1311, the permit does not shield the permittee from liability where the pollutant being discharged was not within the "reasonable contemplation" of the permitting agency when it issued the permit due to nondisclosure by the permittee.<sup>3</sup>

The agency further acknowledged that the company had violated its NPDES permit and state water quality laws by "failing to fully disclose all known toxic components reasonably expected to be in [the company's] discharge."<sup>4</sup>

DEQ's position in the Chemours enforcement case was correct. The Clean Water Act generally prohibits discharges to streams and rivers.<sup>5</sup> The NPDES permitting program is a limited exception to that prohibition,<sup>6</sup> and discharges under the program cannot be approved unless they are adequately disclosed.<sup>7</sup> The Environmental Protection Agency has stressed the need for disclosure of pollutants during the permitting process:

[D]ischargers have a duty to be aware of any significant pollutant levels in their discharge. [...] Most important, [the disclosure requirements] provide the information which the permit writers need to determine what pollutants are likely to be discharged in significant amounts and to set appropriate permit limits. [...] [P]ermit writers need to know what pollutants are present in an effluent to determine approval permit limits in the absence of applicable effluent guidelines.<sup>8</sup>

The EPA Environmental Appeals Board's decision in *In re: Ketchikan Pulp Company* further emphasized the importance of disclosure,<sup>9</sup> and this decision has been adopted by the Fourth Circuit. In *Piney Run Pres. Ass'n v. Cty. Comm'rs of Carroll Cty., Maryland*, the Fourth Circuit stated:

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<sup>3</sup> Amended Complaint, N.C. Dept. of Environmental Quality v. Chemours, 17 CVS 580, 6-7 (N.C. Super. 2018) (hereinafter "N.C. DEQ Amended Complaint") (citing 33 U.S.C. § 1342(k), *Piney Run Pres. Ass'n v. Cty. Comm'rs of Carroll Cty., MD*, 268 F.3d 255, 265 (4th Cir. 2001)), included as Attachment 3.

<sup>4</sup> *Id.* at 33.

<sup>5</sup> 33 U.S.C. § 1311(a).

<sup>6</sup> *Nat'l Ass'n of Home Builders v. Def. of Wildlife*, 551 U.S. 644, 650 (2007).

<sup>7</sup> See *In re Ketchikan Pulp Co.*, 7 E.A.D. 605 (EPA) (1998); *Piney Run Pres. Ass'n v. Cty. Comm'rs of Carroll Cty., Maryland*, 268 F.3d. 255 (4th Cir. 2001); *Southern Appalachian Mountain Stewards v. A & G Coal Corp.*, 758 F.3d 560 (4th Cir. 2014).

<sup>8</sup> Consolidated Permit Application Forms for EPA Programs, 45 Fed. Reg. 33,526-31 (May 19, 1980).

<sup>9</sup> See *In re Ketchikan Pulp Co.*, 7 E.A.D. 605 (EPA) (1998).

The *Ketchikan* decision therefore made clear that a permit holder is in compliance with the [Clean Water Act] even if it discharges pollutants that are not listed in its permit, as long as it only discharges pollutants that have been adequately disclosed to the permitting authority. [...] **To the extent that a permit holder discharges a pollutant that it did not disclose, it violates the NPDES permit and the [Clean Water Act].**<sup>10</sup>

In Brunswick County’s NPDES permit application, the County simply points to an attached table of pilot testing results, “Concentrate Pilot Study Results,” to describe its proposed discharge.<sup>11</sup> That table includes fewer than 30 parameters—none of which are PFAS.<sup>12</sup> This does not bring PFAS into the “reasonable contemplation” of DEQ, the permitting agency. As such, Brunswick County has not met its burden of disclosure under the Clean Water Act and state water quality laws. If Brunswick were to discharge undisclosed PFAS, it would violate the Clean Water Act. Moreover, because of this omission, DEQ does not have the information it needs to make a fully informed decision to issue the permit,<sup>13</sup> and the public does not have adequate information to meaningfully comment on it. The County must disclose expected PFAS discharges for DEQ to analyze.

## **II. DEQ has failed to evaluate effluent limits for PFAS in Brunswick County’s draft NPDES permit.**

Rather than evaluating limits for Brunswick County’s discharge of PFAS, DEQ proposes to require that the company only monitor for certain PFAS twice a year.<sup>14</sup> The Clean Water Act demands more. The Act requires permitting agencies to, at the very least, evaluate technology-based effluent limitations on the discharge of pollutants.<sup>15</sup> If these limits are not enough to ensure compliance with water quality standards, then water quality-based effluent limits must be included.<sup>16</sup> DEQ has not evaluated any limits on PFAS.

Technology-based effluent limits are “the minimum level of control that *must be imposed* in a permit.”<sup>17</sup> These limits “are developed independently of the potential impact of a discharge on the receiving water, which is addressed through water quality standards and water quality-based effluent limitations.”<sup>18</sup> As EPA has recognized, “technology-based limits aim to prevent pollution by requiring polluters to install and implement various forms of technology designed to

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<sup>10</sup> *Piney Run*, 268 F.3d. at 268 (emphasis added).

<sup>11</sup> Brunswick County – Northwest Water Treatment Plant, National Pollutant Discharge Elimination System (NPDES) Permit Application, Reverse Osmosis Concentrate Discharge to the Cape Fear River, Form 2D, 3-4 (Mar. 2019).

<sup>12</sup> *Id.* at \*16 (Concentrate Pilot Study Results).

<sup>13</sup> *See Southern Appalachian*, 758 F.3d at 566.

<sup>14</sup> N.C. DEQ, Draft NPDES Permit Number NC0057533, Northwest Water Treatment Plant, Part I(A)(2), (8) (Oct. 31, 2019) (“Draft NPDES Permit NC0057533”).

<sup>15</sup> 40 C.F.R. § 125.3(a); *see also* 33 U.S.C. § 1311.

<sup>16</sup> 15A N.C. Admin. Code 2H.0112(c) (stating that DWR must “reasonably ensure compliance with applicable water quality standards and regulations.”); *see* 33 U.S.C. § 1311(b)(1)(c) (requiring that permit limits be established as necessary to comply with water quality standards).

<sup>17</sup> 40 C.F.R. § 125.3(a) (emphasis added).

<sup>18</sup> U.S. EPA, NPDES Permit Writers’ Manual, 5-1 (2010), included as Attachment 4.

reduce the pollution discharged into the nation's waters."<sup>19</sup> When EPA has not issued a national effluent limitation guideline for a particular industry,<sup>20</sup> permitting agencies must implement technology-based effluent limits on a case-by-case basis using their "best professional judgment."<sup>21</sup>

This case-by-case analysis for technology-based effluent limits is routinely done for the drinking water treatment point source category. For example, EPA conducted a case-by-case analysis for technology-based effluent limits when issuing a general permit for Idaho drinking water facilities.<sup>22</sup> The agency similarly conducted a facility-specific, case-by-case analysis for technology-based effluent limits when issuing a discharge permit to the water treatment facility in Guaynabo, Puerto Rico.<sup>23</sup> EPA also conducted a case-by-case analysis for technology-based effluent limits for a reverse osmosis system's treatment of reject water when permitting a Massachusetts biotech facility<sup>24</sup> as well as a desalination plant.<sup>25</sup>

To carry out the case-by-case analysis for implementing technology-based effluent limitations, DEQ must consider appropriate technology for the category of point source and any unique factors related to the applicant.<sup>26</sup>

The American Water Works Association, the "largest organization of water supply professionals in the world," has recognized that the industry must install technology to control PFAS. The organization has stated that the "[r]eject water" from reverse osmosis systems "must be treated for discharging," and that it "can be successfully combined with [granular activated carbon]."<sup>27</sup>

DEQ is aware of the use of granular activated carbon to remove PFAS. On September 30, 2019, Chemours submitted to DEQ the most recent test results from its pilot study evaluating granular activated carbon.<sup>28</sup> The results show that granular activated carbon is capable of removing more than 99 percent of 20 PFAS.<sup>29</sup> Almost all of those PFAS were reduced to levels so low they were not detectable in the discharge.<sup>30</sup> Similarly, the Cape Fear Public Utility Authority is installing granular activated carbon at its Sweeney Water Treatment Plant and implementing a process that captures PFAS on the carbon filters and replaces those filters as

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<sup>19</sup> U.S. EPA, Technical Analysis for Determination of Technology-Based Permit Limits for the Guaynabo Drinking Water Treatment Facility NPDES Number PR0022438, 2-1 (Mar. 2009) ("Guaynabo TBEL Analysis"), included as Attachment 5.

<sup>20</sup> 33 U.S.C. § 1314(b).

<sup>21</sup> 40 C.F.R. § 125.3; *see also* 33 U.S.C. § 1342(a)(1)(B); 15A N.C. Admin. Code 02B .0406(e).

<sup>22</sup> U.S. EPA, Fact Sheet, NPDES Permit Number IDG380000, Idaho Drinking Water Treatment Facilities (2016), included as Attachment 6.

<sup>23</sup> Guaynabo TBEL Analysis at 2-1.

<sup>24</sup> U.S. EPA, NPDES Permit Number MA0036366, OPK Biotech, LLC (Dec. 14, 2011), included as Attachment 7.

<sup>25</sup> U.S. EPA, Draft NPDES Permit Number MA0040193, INIMA, USA Corporation, included as Attachment 8.

<sup>26</sup> *See* Guaynabo TBEL Analysis at 2-1 (applying 40 C.F.R. § 125.3).

<sup>27</sup> American Water Works Association, *Perfluorinated Compounds – Treatment and Removal*, included as Attachment 9.

<sup>28</sup> Parsons, Engineering Report: Old Outfall 002 GAC Pilot Study Results, Chemours Fayetteville Plant (Sept. 2019), included as Attachment 10.

<sup>29</sup> *See id.* at 17-18.

<sup>30</sup> *Id.*, Appendix D at Table 20.

needed.<sup>31</sup> Spent carbon filters will then be regenerated by burning off PFAS or disposed of in a properly permitted landfill. Despite this recent testing data showing the effectiveness of granular activated carbon, it does not appear that DEQ evaluated any technology-based effluent limits for PFAS in Brunswick County's draft NPDES permit. The county's application omitted any analysis.

Several unique factors relate to this project. Southeastern North Carolina has been exposed to decades of high levels of PFAS pollution. Given DuPont and Chemours' decades of PFAS pollution, it is unsurprising that PFAS have been found in high concentrations in the fish and alligators in the Cape Fear River and Wilmington areas. Samples from striped bass, a popular sport fish, averaged 551,000 parts per trillion ("ppt") of PFAS.<sup>32</sup> Samples taken from alligators in Greenfield Lake—which is in western Wilmington and flows into the Cape Fear River downstream of the companies' facility—were measured as high as 419,000 ppt of total PFAS.<sup>33</sup> Not only is the aquatic environment threatened by PFAS pollution in these areas, there is a possibility that PFAS accumulation in fish and shellfish, including oysters, can harm people who eat them.

Other unique factors are also at issue here. DEQ is currently engaged in implementation of a consent order with Chemours that will significantly reduce the level of PFAS entering the Cape Fear and, ultimately, Brunswick County's facility. In addition, Chemours has submitted a NPDES application for its outfalls. Implementation of technology-based limits in that NPDES permit could substantially reduce PFAS loading to the Cape Fear. Brunswick County has its own litigation against Chemours, which could result in additional funding available to treat the reverse osmosis concentrate. Last, DEQ already has sampling data identifying other sources of PFAS in the Cape Fear Watershed and will soon have additional data. Meaningful action to control those sources of PFAS would also reduce PFAS levels entering Brunswick County's facility—but only if DEQ fully enforces the Clean Water Act. These factors must be considered by DEQ in a case-by-case technology-based effluent limitation analysis.

In addition to analyzing technology-based effluent limits, DEQ must ensure that water quality standards will not be violated by the County's discharge. If there is a "reasonable potential" that water quality standards will be exceeded, DEQ must include water quality-based effluent limits in the permit as well.<sup>34</sup> PFAS are known to harm human health, and their discharge threatens to violate multiple water quality standards. For instance, the state toxic substances standard requires that:

the concentration of toxic substances, either alone or in combination with other wastes, in surface waters shall not render waters injurious to aquatic life or

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<sup>31</sup> Jim Ware, *CFPUA moving forward with \$46M GenX filtration system*, STARNEWS, Jun. 11, 2019, included as Attachment 11.

<sup>32</sup> N.C. Policy Collaboratory, *Emerging Contaminants in the Cape Fear Region: University Collaborations on Environmental, Drinking Water Supply and Human Health Effects*, 11, included as Attachment 12.

<sup>33</sup> Adam Wagner, *Wilmington-area gators, fish show high levels of contaminants*, FAYETTEVILLE OBSERVER, Apr. 9, 2019, included as Attachment 13.

<sup>34</sup> 40 CFR § 122.44(d)(1)(i), *see also* 33 U.S.C. § 1311(b)(1)(C); (1)(i); 15A N.C. Admin. Code 2H.0112(c) (stating that DWR must "reasonably ensure compliance with applicable water quality standards and regulations.").

wildlife, recreational activities, public health, or impair the waters for any designated uses.<sup>35</sup>

North Carolina defines toxic substances as:

any substance or combination of substances [...], which after discharge and upon exposure [...], either directly from the environment or indirectly [...], *has the potential* to cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions or suppression in reproduction or growth) or physical deformities in [...] organisms or their offspring.<sup>36</sup>

As discussed below, many PFAS are proven to harm human health and others are expected to be harmful. These chemicals certainly have the potential to cause adverse health effects and qualify as toxic substances under state law. DEQ itself has stated in its lawsuit against Chemours that PFAS “meet the definition of ‘toxic substance’” under North Carolina rules.<sup>37</sup>

Without additional information and analysis, Brunswick County also has not demonstrated, and DEQ cannot reasonably ensure compliance with, North Carolina’s prohibition against allowing “[o]ils, deleterious substances, colored, or other wastes” in waters classified as Class C waters—which include the section of the Cape Fear River that would receive Brunswick County’s discharge—“to render the waters injurious to public health, secondary recreation, or to aquatic life and wildlife, or adversely affect the palatability of fish, aesthetic quality, or impair the waters for any designated uses.”<sup>38</sup> DEQ has thus failed to ensure that either the toxic substances standard or standards applicable to Class C waters will not be violated by Brunswick County’s discharge, in violation of the Clean Water Act.

Therefore, DEQ must require Brunswick to disclose the type and quantity of PFAS in the proposed discharge so that DEQ can evaluate whether or not water quality standards will be violated, and then impose water quality-based effluent limits as necessary to ensure compliance with standards.

### **III. The proposed monitoring requirements are inadequate.**

In the draft permit, DEQ requires Brunswick County to sample its discharge for PFAS twice a year.<sup>39</sup> As demonstrated by data collected by DEQ, Chemours, and Cape Fear Public

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<sup>35</sup> 15A N.C. Admin. Code 2B.0208(a).

<sup>36</sup> 15A N.C. Admin. Code 2B.0202(64) (emphasis added).

<sup>37</sup> N.C. DEQ Amended Complaint at 32 (stating that “the process wastewater from [Chemours’] Fluoromonomers/Nafion® Membrane Manufacturing Area contains and has contained substances or combinations of substances which meet the definition of “toxic substance” set forth in 15A N.C.A.C. 2B .0202,” referring to GenX and other PFAS).

<sup>38</sup> 15A N.C. Admin. Code 02B .0211(12) (“[o]ils, deleterious substances, colored, or other wastes shall not render the waters injurious to public health, secondary recreation, or to aquatic life and wildlife, or adversely affect the palatability of fish, aesthetic quality, or impair the waters for any designated uses”).

<sup>39</sup> Draft NPDES Permit NC0057533 at 10-11.

Utility Authority; PFAS levels change dramatically throughout the year.<sup>40</sup> Sampling twice per year simply cannot account for the known variability in these pollutants. That sampling data is, therefore, inadequate to characterize PFAS discharges. It is also inconsistent with DEQ's monitoring requirements for other facilities that potentially discharge PFAS or other toxic wastes. DEQ has recently required facilities to sample monthly for PFAS or 1,4 dioxane,<sup>41</sup> and should require at least monthly monitoring here.

#### **IV. PFAS are harmful to human health and the environment.**

DEQ must require Brunswick County to control its PFAS discharge because it is widely known that PFAS are a threat to human health and the environment. 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.<sup>42</sup>

EPA established a lifetime health advisory of 70 ppt for the combined concentrations of PFOA and PFOS, in drinking water.<sup>43</sup> Since then, in June 2018, the Agency for Toxic Substances and Disease Registry released an updated Draft Toxicological Profile for PFOA, PFOS, and other PFAS. The report suggested that many of the chemicals are much more harmful than previously thought. For instance, the minimum 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.<sup>44</sup> Epidemiological studies show that many of these same health outcomes result from exposure to other PFAS.<sup>45</sup> Given these harms, 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.<sup>46</sup>

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<sup>40</sup> N.C. DEQ Website – GenX Results, included as Attachment 14; Cape Fear Public Utility Authority Website – PFAS History, \*6-7, included as Attachment 15; Extract from The Chemours Company FC, LLC, Characterization Of PFAS In Process And Non-Process Wastewater And Stormwater (2019), included as Attachment 16.

<sup>41</sup> Letter from Linda Culpepper to N.C. Municipalities, Apr. 30, 2019, included as Attachment 17; Letter from Jeff Poupart to Kevin Eason, Reidsville Wastewater Treatment Plant, Additional Monitoring Requirement, Oct. 31, 2017, included as Attachment 18; Letter from Jeff Poupart to John Ogburn, City of Asheboro, Additional Monitoring Requirement, Oct. 31, 2017, included as Attachment 19; Letter from Jeff Poupart to Steve Drew, City of Greensboro, Additional Monitoring Requirement, Oct. 31, 2017, included as Attachment 20.

<sup>42</sup> Arlene Blum et al., *The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs)*, 123 ENVTL. HEALTH PERSPECTIVES 5, A 107 (2015), included as Attachment 21; U.S. EPA, *Fact Sheet: PFOA & PFOS Drinking Water Health Advisories*, 2, included as Attachment 22.

<sup>43</sup> EPA, *Fact Sheet: PFOA & PFOS Drinking Water Health Advisories* at 2.

<sup>44</sup> Cape Fear Public Utility Authority (CFPUA), *CFPUA Statement on Recently Released DHHS Report* (June 21, 2018), included as Attachment 23; see also ATSDR, *Toxicological Profile for Perfluoroalkyls, Draft for Public Comment* (June 2018) ("Draft 2018 Toxicological Profile for Perfluoroalkyls"), included as Attachment 24.

<sup>45</sup> Draft 2018 Toxicological Profile for Perfluoroalkyls at 5-6, 25-26.

<sup>46</sup> Press Release, Mich. Dep't of Env't, Great Lakes, and Energy, *Michigan moves forward on PFAS in drinking water rules* (June 27, 2019), included as Attachment 25; *New York to set limits for industrial chemicals in water*, AP, July 8, 2019, included as Attachment 26; Annie Ropeik, *N.H. Approves Unprecedented Limits for PFAS Chemicals in Drinking Water*, NHPR, July 18, 2019, included as Attachment 27; Press Release, Vt. Agency of Nat. Res., *Agency Of Natural Resources Initiates Rulemaking Process To Adopt Maximum Contaminant Level For PFAS*



PFAS are also harmful to the environment. They have been shown to cause harmful effects in fish,<sup>47</sup> amphibians,<sup>48</sup> mollusks,<sup>49</sup> and other aquatic invertebrates<sup>50</sup>—resulting in developmental and reproductive impacts, behavioral changes, adverse effects to livers, disruption to endocrine systems, and weakened immune systems.<sup>51</sup> Moreover, they are extremely resistant to breaking down in the environment, can travel long distances, and bio-accumulate in organisms.<sup>52</sup>

## V. PFAS contamination is unnecessary.

As the crisis surrounding Chemours' discharges makes clear, once PFAS are released into the environment, they are difficult to contain. DEQ must use its authority to aggressively control PFAS discharges upstream of Brunswick County's facility so as to prevent the pollution from appearing in the facility's waste stream. Brunswick County's treatment facility will isolate

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*Compounds*, included as Attachment 28; James M. O'Neill, *NJ proposes strict new drinking water standards for cancer-linked chemicals*, NORTH JERSEY RECORD, Apr. 1, 2019, included as Attachment 29; Interstate Tech. Regulatory Council, PFAS Fact Sheets, Section 4 Tables (Aug. 2019), included as Attachment 30.

<sup>47</sup> Huang, et al., *Toxicity, uptake kinetics and behavior assessment in zebrafish embryos following exposure to perfluorooctanesulphonic acid (PFOS)*, 98 AQUATIC TOXICOLOGY 139–147 (2010); 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); Hagenaaars, et al., *Structure–activity relationship assessment of four perfluorinated chemicals using a prolonged zebrafish early life stage test*, 82 CHEMOSPHERE 764–772 (2011); 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); 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); Liu, et al., *The thyroid-disrupting effects of long-term perfluorononanoate exposure on zebrafish (Danio rerio)*, 20 ECOTOXICOLOGY 47–55 (2011); 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); Chen, et al., *Perfluorobutanesulfonate Exposure Causes Durable and Transgenerational Dysbiosis of Gut Microbiota in Marine Medaka*, 5 ENVIRON. SCI. & TECH. LETTERS 731–738 (2018); 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).

<sup>48</sup> Ankley, et al., *Partial Life-Cycle Toxicity And Bioconcentration Modeling of Perfluorooctanesulfonate in the Northern Leopard Frog (Rana pipiens)*, 23 ENVIRON. TOXICOLOGY & CHEM. 2745 (2004); Cheng, et al., *Thyroid disruption effects of environmental level perfluorooctane sulfonates (PFOS) in Xenopus laevis*, 20 ECOTOXICOLOGY 2069–2078 (2011); Lou, et al., *Effects of perfluorooctanesulfonate and perfluorobutanesulfonate on the growth and sexual development of Xenopus laevis*, 22 ECOTOXICOLOGY 1133–1144 (2013).

<sup>49</sup> 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); 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).

<sup>50</sup> Ji, et al., *Oxicity 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); Houde, et al., *Endocrine-disruption potential of perfluoroethylcyclohexane sulfonate (PFECHS) in chronically exposed Daphnia magna*, 218 ENVIRON. POLLUTION 950–956 (2016); Liang, et al., *Effects of Perfluorooctane sulfonate on immobilization, heartbeat, reproductive and biochemical performance of Daphnia magna*, 168 CHEMOSPHERE 1613–1618 (2017); MacDonald, et al., *Toxicity Of Perfluorooctane Sulfonic Acid and Perfluorooctanoic Acid to Chironomus Tentans*, 23 ENVIRON. TOXICOLOGY & CHEM. 2116 (2004).

<sup>51</sup> See supra notes 47–50.

<sup>52</sup> Draft 2018 Toxicological Profile for Perfluoroalkyls at 2, 534; see also EPA, *Technical Fact Sheet - Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA)*, 1, 3 (Nov. 2017), included as Attachment 31.

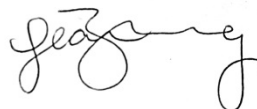
PFAS in a concentrated stream, providing cleaner water to its customers. DEQ must also ensure that downstream users are protected when the concentrate is discharged back into the Cape Fear.

Therefore, DEQ must require adequate disclosure of PFAS, evaluate expected PFAS discharges, conduct an appropriate analysis of technology-based—and, if necessary, water quality-based—effluent limitations, and require at least monthly monitoring for PFAS. Again, we are committed to the protection of Brunswick County’s drinking water customers, and are confident that can be achieved, without delay, in a way that is consistent with the requirements of the Clean Water Act. Thank you for considering these comments; we are available to discuss them with you at your convenience. Please contact me at 919-967-1450 or [ggisler@selcnc.org](mailto:ggisler@selcnc.org) if you have any questions regarding this letter.

Sincerely,



Geoff Gisler



Jean Zhuang

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