UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

MEMORANDUM

MAY 18 2018

SUBJECT: Notice of Citizen Suit Against Violating Facility – Cape Fear River Watch v Chemours Company FC, LLC ("Chemours")" Regarding NPDES Permit NC0003573 and TSCA Consent Order P-08-508/P-08-509 located in Fayetteville, NC – **NON EJ POTENTIAL**

FROM: Patricia Bullock, Regional Hearing Clerk P.B.
Office of General Law, Criminal and Cross
Office Support

TO: Daniel J. O'Lone, Acting Chief
NPDES Permitting and
Enforcement Branch

Anthony Toney, Chief
Chemical Safety and
Enforcement Branch

Attached is an Intent to Sue dated **May 15, 2018,** submitted by Southern Environmental Law Center on behalf of above individuals. Notice is given pursuant to the Clean Water Act § 505 33 U.S.C. § 1365(b) and Pursuant to 15 U.S.C. § 2619 of the TSCA. The Sixty-day notice period expires on **July 16, 2018.**

EPA Region 4 relies upon guidance developed and refined over the years to determine if compliance and enforcement activities occur in a potential environmental justice area. The Office of Regional Counsel Accountability's Guidelines for Implementing Environmental Justice in Enforcement Activities was developed to identify and address potential environmental justice areas. The factors used by EPA Region 4 to determine if an area is a potential environmental justice area is through analysis of demographics, population, community identification, public input, and other EPA, State, or local knowledge. Based on the geographical location of the Defendant's operation and current Region 4 procedures for determining if compliance and enforcement activities are located in a potential environmental justice areas, the Defendant's operations are not located in a potential environmental justice area.

The letter gives notice of intent to file suit against above defendant for discharging GenX and other perfluoroalkyl and polyfluoroalkyl substances from Outfall 002 into the Cape Fear River from the 1980s located in Fayetteville, NC. Allegedly, defendant has numerous permit conditions that they need to comply with.

Please review the attachments and any information you may have regarding the alleged violations. After your review, please provide a copy of your recommendation to the attention of Patricia Bullock, Office of General Law, Criminal and Cross Office Support, **by July 02, 2018.** If you need to further discuss this notice; please contact Bill Bush, Office of Water Legal Support at (404) 562-9538 and Bob Caplan, Air/Pesticides/Toxics Legal Support.

Attachments (2)

Cc: Mita Ghosh/Bill Bush
Valerie Nowell/Bob Caplan
Leif Palmer/Kavita Nagrani
Scott Gordon

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NPDES Permitting and
Enforcement Branch

Anthony Toney, Chief
Chemical Safety and
Enforcement Branch

TO: Patricia Bullock, Regional Hearing Clerk
Office of General Law, Criminal and Cross
Office Support

CITIZEN SUIT DEFENDANT: Chemours

STATUTE: CWA

RECOMMENDATION:

1. Initiate federal enforcement action: _____

2. Take no action at this time (state reason): _____

3. Other: _____

Name: _____

Title: _____

Date: _____

***Two (2) original disks came with the NOI and can be readily viewed.**

Cc: Bill Bush, OWLS & Bob Caplan, Air/Pesticides/Toxics

SOUTHERN ENVIRONMENTAL LAW CENTER

Telephone 919-967-1450 | 601 WEST ROSEMARY STREET, SUITE 220 CHAPEL HILL, NC 27516-2356 | Facsimile 919-929-9421

May 7, 2018

Region 4 - RA's Office
MAY 15 2018
Received

Via U.S. Certified Mail – Return Receipt Requested

Ellis H. McGaughy
Fayetteville Works Plant Manager
The Chemours Company FC, LLC
22828 NC Highway 87 West
Fayetteville, NC 28306-7332

The Chemours Company PC, LLC
c/o CT Corporation System, Registered Agent
160 Mine Lake Court, Suite 200
Raleigh, NC 27615-6417

E.I. du Pont de Nemours and Company
c/o CT Corporation System, Registered Agent
160 Mine Lake Court, Suite 200
Raleigh, NC 27615-6417

Administrator E. Scott Pruitt
U.S. Environmental Protection Agency
Office of the Administrator
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Trey Glenn
Region 4 Administrator
U.S. Environmental Protection Agency
61 Forsyth Street, S.W.
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Jeff Sessions
U.S. Attorney General
U.S. Department of Justice
950 Pennsylvania Avenue, NW
Washington, DC 20530-0001

Michael S. Regan
Secretary
N.C. Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699-1601

Notice of Intent to Sue
Clean Water Act Section 505 - 33 U.S.C. § 1365

RE: 60-Day Notice of Violations by Chemours Company FC, LLC
Fayetteville Works Facility
NPDES Permit # Permit No. NC0003573

To Whom It May Concern:

Pursuant to Section 505(b) of the Clean Water Act (33 U.S.C. §1365(b)), the Cape Fear River Watch, through its undersigned counsel, provides notice of the violations of the Clean

Water Act set forth below.[1] After sixty days from today, Cape Fear River Watch intends to bring suit for these violations pursuant to the citizen suit provision of the Clean Water Act, Section 505 (a), 33 U.S.C. §1365(a).

I. Background

A. The Fayetteville Works Facility and its NPDES permit

The Fayetteville Works Facility, located at 22828 NC Highway 87 W., Fayetteville, North Carolina, is currently owned and operated by Chemours Company FC, LLC ("Chemours"). From approximately 1971 until 2015, the facility was owned and operated by E.I. du Pont de Nemours and Company ("DuPont").[2] The Fayetteville Works facility has five discrete manufacturing areas:

1. Fluoromonomers/Nafion Membrane Manufacturing Area (operated by Chemours);[3]
2. Polymer Processing Aid ("PPA") Manufacturing Area (operated by Chemours);
3. Butacite Manufacturing Area (operated by Kuraray America Inc. and rented from Chemours);
4. SentryGlas Manufacturing Area (operated by Kuraray America Inc. and rented from Chemours); and
5. Polyvinyl Fluoride Manufacturing Area (operated by DuPont and rented from Chemours).[4]

Chemours is authorized to discharge into the Cape Fear River from its facility under National Pollution Discharge Elimination System ("NPDES") Permit No. NC0003573, issued by the North Carolina Department of Environmental Quality ("DEQ"). Under its NPDES permit, Chemours is only authorized to discharge wastewater into the Cape Fear River through Outfall 002 of the facility.[5]

Chemours' NPDES permit also contains numerous permit conditions that the company must comply with.[6] In particular, the Removed Substances provision requires that:

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[1] All attachments have been provided on enclosed compact discs.

[2] 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 2015. Amended Complaint, N.C. Dept. of Environmental Quality v. Chemours, 17 CVS 580, 14 (N.C. Super. 2018) (hereinafter "N.C. DEQ Amended Complaint"), included as Attachment 1.

[3] The N.C. Department of Environmental Quality also refers to this manufacturing area as the "Vinyl Ethers North process area." N.C. DEQ Amended Complaint at 15; N.C. DEQ, N.C. Division of Air Quality, Letter to Chemours, "60-Day Notice of Intent to Modify Air Quality Permit No. 03735T43, Apr. 6, 2018, 2 (hereinafter "N.C. DAQ 60-Day NOI"), included as Attachment 2.

[4] Chemours NPDES Permit Renewal Application, Supplemental Information – Current Facility Operating Conditions (Apr. 27, 2016), included as Attachment 3.

[5] Chemours NPDES Permit NC0003573, effective July 1, 2015, included as Attachment 4.

[6] 40 C.F.R. §122.41("The following conditions apply to all NPDES permits. [...] All conditions applicable to NPDES permits shall be incorporated into the permits either expressly or by reference."); Exhibit 1 of N.C. DEQ Amended Complaint, "NPDES Permit Standard Conditions," (hereinafter "NPDES Standard Conditions"), Nov. 9, 2011, included as Attachment 5.

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Water Act set forth below.[1] After sixty days from today, Cape Fear River Watch intends to bring suit for these violations pursuant to the citizen suit provision of the Clean Water Act, Section 505 (a), 33 U.S.C. §1365(a).

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> Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be utilized/disposed of [...] in a manner such as to prevent any pollutant from such materials from entering waters of the State or navigable waters of the United States...[7]

The Duty to Mitigate provision requires that:

> The Permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit with a reasonable likelihood of adversely affecting human health or the environment.[8]

The Operation and Maintenance provision requires that:

> The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit.[9]

Failure to comply with any of these permit provisions "constitutes a violation of the Clean Water Act and is grounds for enforcement action."[10]

B. Discharges of PFAS compounds from the Fayetteville Works Facility

In violation of the Clean Water Act, DuPont began discharging GenX (also known as HFPO Dimer Acid) from Outfall 002 into the Cape Fear River in the 1980s.[11] At some point in time, the companies also began releasing numerous other perfluoroalkyl and polyfluoroalkyl substances (collectively, "PFAS compounds") into the river.[12] 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.[13] In September 2017, the company agreed to stop its discharge of wastewater from Outfall 002 containing GenX and two other compounds.[14]

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[7] NPDES Standard Conditions at 8.
[8] NPDES Standard Conditions at 4; *see also* 40 C.F.R. §122.41(d).
[9] NPDES Standard Conditions at 7; *see also* 40 C.F.R. §122.41(e).
[10] 40 C.F.R. §122.41(a).
[11] *See* N.C. DEQ Amended Complaint; "Notes from Chemours meeting with local, state officials," *StarNews*, Jun. 15, 2017, included as Attachment 6.
[12] 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), included as Attachment 7; EPA, "Laboratory PFAS Results for NC DEQ Cape Fear Watershed Sampling," Aug. 21, 2017, included as Attachment 8; 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), included as Attachment 9.
[13] *See* Complaint, N.C. Dept. of Environmental Quality v. Chemours, 17 CVS 580, 11-22 (N.C. Super. 2017), included as Attachment 10.
[14] Partial Consent Order, 17 CVS 580 (N.C. Super. 2017), included as Attachment 11.

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Despite DEQ's enforcement actions, Chemours continues to release GenX and other PFAS compounds into surface waters through its contamination of the air, groundwater, and soil surrounding the facility, in violation of the company's NPDES permit and the Clean Water Act. In particular:

- Chemours is releasing nearly 100,000 pounds of PFAS compounds from its stack emissions each year, including GenX compounds at a rate of 2,758 pounds per year.[15] DEQ has determined these emissions to be a primary source of surface water and groundwater contamination,[16] including offsite groundwaters that then seep into Willis Creek and Georgia Branch Creek which flow into the Cape Fear River.[17]
- Chemours has kept an unlined wastewater ditch, or "Nafion Ditch," which collects up to 5 to 8 million gallons a day of PFAS contaminated wastewater.[18] The contaminated water from the ditch infiltrates groundwater beneath the facility and seeps into the Cape Fear River.[19]
- Chemours has kept two large unlined sedimentation basins that are pumped with a PFAS-contaminated fluid that also infiltrates groundwater beneath the facility and flows into the Cape Fear River.[20]
- Chemours has kept an old unlined outfall, or "Old Outfall 002," which has eroded enough to reach deep groundwater aquifers and channel PFAS-contaminated water from the aquifers directly into the Cape Fear River.[21]
- Chemours has continued to discharge PFAS-contaminated water through its current Outfall 002, despite its agreement to stop discharging its wastewater through the outfall.[22]

Groundwaters around the facility have been heavily polluted by Chemours' air emissions and unlined sedimentation basins and ditches. GenX has 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.[23] Groundwater sampled at the site of the facility has contained concentrations of GenX up to 640,000 parts per

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[15] *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; N.C. DEQ Presentation to the House Select Committee on North Carolina River Quality, Apr. 26, 2018, slide 15 (hereinafter "N.C. DEQ Apr. 26 Presentation"), included as Attachment 14.

[16] N.C. DEQ Amended Complaint at 3; *see also* Exhibit 22 of N.C. DEQ Amended Complaint, "Focused Feasibility Study Report – PFAS Remediation," Table 2 (hereinafter "Chemours Feasibility Report"), included as Attachment 15.

[17] Chemours Feasibility Report at 8.

[18] *Id.* at 10-12.

[19] *Id.* at 9-10.

[20] *Id.* at 9-10, 12-13.

[21] *Id.* at 9, Table 2.

[22] *Id.* at 8, Table 2.

[23] N.C. DEQ Apr. 26 Presentation at slides 9-10.

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trillion.[24] All three layers of groundwater beneath the facility are contaminated with GenX and other PFAS compounds, including the deepest layer which is between 80 and 100 feet below ground surface.[25]

All three layers of groundwater connect with surface waters around the facility.[26] 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."[27] Not surprisingly, GenX levels in the Cape Fear River, as well as Willis Creek and Georgia Branch Creek, have continued to persist due to Chemours' Clean Water Act violations.[28]

C. Toxic effects of PFAS pollutants

Chemours' violations of the Clean Water Act are causing imminent danger to human health and safety. DEQ has stated that "GenX and related compounds" from Chemours' facility meet the state's definition of toxic substances.[29] 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 abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions or suppression in reproduction or growth) or physical deformities in such organisms or their offspring.[30]

In DuPont's 2009 Toxic Substances Control Act ("TSCA") Consent Order for GenX, which the company entered into with the Environmental Protection Agency ("EPA"), EPA expressed human health concerns because GenX is "structurally similar" to other heavily studied PFAS compounds that are known to persist in the environment and bioaccumulate in humans.[31] 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 are expected "to be highly persistent in the environment," and that "there is high concern for possible environmental effects over the long-term."[32] 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."[33] Due to these concerns,

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[24] Exhibit 21 of N.C. DEQ Amended Complaint, "Chemours Additional Site Investigation Report," 6 (hereinafter "Chemours Additional Site Investigation"), included as Attachment 16.
[25] Chemours Feasibility Report at 5-6; Chemours Additional Site Investigation at Figures 7-12.
[26] Chemours Feasibility Report at 5-7, 10.
[27] N.C. DEQ Amended Complaint at 26; *see also* Chemours Feasibility Report.
[28] Chemours Additional Site Investigation at 17-18.
[29] N.C. DEQ Amended Complaint at 32-33.
[30] 15A N.C. Admin. Code 2B .0202(64).
[31] EPA, Consent Order and Determinations Supporting Consent Order for PMN Substances P-08-508 and P-08-509, vii (2009), included as Attachment 17.
[32] *Id.* at vii, xi, xii.
[33] *Id.* at xiv-xv.

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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)."[34]

After 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,[35] 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).[36]

The hyperplasia, or increased cellular growth, that Chemours found in many of the organs is a known precursor to cancer.[37] 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.[38]

Numerous studies have been conducted that also indicate GenX, and similar PFAS alternatives with shorter carbon chains, are dangerous to human health and safety.[39] The California Department of Toxic Substances Control reviewed recent

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[34] *Id.* at 36.
[35] *Id.* at ix.
[36] DuPont and Chemours' TSCA filing to EPA, "8EHQ-06- 1643 6/8EHQ-06- 16478," Jan. 8, 2013, included as Attachment 18.
[37] "[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 19.
[38] "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 20.
[39] *See* Melisa Gomis et al., "Comparing the toxic potency in vivo of long-chain perfluoroalkyl acids and fluorinated alternatives," 113 *Environ. International* 1 (2018), included as Attachment 21; 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 22; Melissa Gomis, "From emission sources to human tissues: modelling the exposure to per- and polyfluoroalkyl substances," (2017), included as Attachment 23; Nan Sheng et

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scientific literature on such compounds and found that they, in particular GenX, are likely 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.[40]

Accordingly, GenX and similar short-chain PFAS compounds could be as harmful, if not more harmful, than the compounds they were created to replace and Chemours' continued discharges and emissions threaten public health and safety.

II. Description of Chemours' Clean Water Act Violations

Section 301(a) of the CWA, 33 U.S.C. § 1311(a), prohibits the discharge of pollutants from a point source to waters of the United States except in compliance with, among other conditions, an NPDES permit issued pursuant to § 402 of the CWA, 33 U.S.C. § 1342. Each violation of the permit—and each discharge that is not authorized by the permit—is a violation of the Clean Water Act.

The CWA defines a "point source" as "*any* discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, [or] container ... from which pollutants are or may be discharged."[41] Under this broad definition, the discharge of pollutants from mining pits, slurry ponds, sediment basins, and mining leachate collection systems have been held to be point sources,[42] as well as from apparatuses attached to trucks and helicopters used to spray aerosol pesticides.[43]

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al., "Cytotoxicity of novel fluorinated alternatives to long chain," 92 *Archives of Toxicol.* 359 (2017), included as Attachment 24; 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 25; 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).

[40] California Department of Toxic Substances Control, "Product – Chemical Profile for Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs) in Carpets and Rugs" 29 (2018) (hereinafter "CDTSC 2018 Report"), included as Attachment 26.

[41] 33 U.S.C. § 1362(14) (emphasis added).

[42] *See e.g.*, *Consolidation Coal Co. v. Costle*, 604 F.2d 239, 249-50 (4th Cir. 1979) (finding regulation of "discharges from coal preparation plant associated areas," which in turn included slurry ponds, drainage ponds, and coal refuse piles, was within CWA definition of point source), *rev'd on other grounds*, 449 U.S. 64 (1980); *Tennessee Clean Water Network v. Tennessee Valley Authority*, 273 F.Supp.3d 775, *44, *47 (M.D. Tenn. 4 Aug. 2017) ("Ash Pond Complex, as a series of discernible, confined, and discrete ponds that receive wastewater, treat that wastewater, and ultimately convey it to the Cumberland River, is a point source. [...] [W]here a discernible, discrete, and confined impoundment is unlined and leaking pollutants, it is also, by definition *conveying* pollutants through those leaks.") (quotations omitted) (citing *Yadkin Riverkeeper, Inc. v. Duke Energy Carolinas, LLC,* 141 F. Supp. 3d 428, 444 (M.D.N.C. 2015)); *U.S. v. Earth Sciences, Inc.*, 599 F.2d 368, 374 (10th Cir. 1979) ("[W]hether

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In addition, a "point source need not be the original source of the pollutant; it need only convey the pollutant to 'navigable waters.'"[44] Thus, ditches and channels that convey pollutants but are themselves not the original source constitute point sources. This includes unintentional conveyance of pollutants, for example, through natural-formed ditches, gullies, or fissures,[45] as well as "channeled or collected" surface run-off of contaminated waters that "result from such natural phenomena as rainfall and gravity."[46] "[T]he touchstone for finding a point source is the ability to identify a discrete facility from which pollutants have escaped."[47]

The Clean Water Act prohibits "any addition of any pollutant to navigable waters from any point source."[48] When unpermitted pollution travels from a point source to a river or lake via hydrologically connected groundwater, there is an illegal "addition of any pollutant to navigable waters."[49] The Fourth Circuit recently held that

> an alleged discharge of pollutants, reaching navigable waters [...] by means of ground water with a direct hydrological connection to such navigable waters, falls within the scope of the CWA.[50]

In addition to the Fourth Circuit, an overwhelming majority of federal courts have held that the Clean Water Act protects the nation's waters from unpermitted pollution transmitted from a point source to surface waters by groundwater with a direct hydrologic connection.[51]

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from a fissure in the dirt berm or overflow of a wall, the escape of liquid from the confined system is from a point source.").

[43] *Peconic Baykeeper, Inc. v. Suffolk Cty.*, 600 F.3d 180, 188 (2d Cir. 2010); *League of Wilderness Defs./Blue Mountains Biodiversity Project v. Forsgren*, 309 F.3d 1181, 1185 (9th Cir. 2002).

[44] *S. Fla. Water Mgmt. Dist. v. Miccosukee Tribe of Indians*, 541 U.S. 95, 105 (2004); *accord W. Va. Highlands Conservancy*, 625 F.3d at 168 (permits are required for discharges from point sources that "merely convey pollutants to navigable waters").

[45] *See Sierra Club v. Abston Constr. Co.*, 620 F.2d 41, 45 (5th Cir. 1980) (discharge from mining pits and spoil piles through naturally formed ditches caused by gravity flow at a coal mining site are point sources); *Earth Sciences*, 599 F.2d 368 (holding unintentional discharges of pollutants from a mine system designed to catch runoff from gold leaching site during periods of excess melting met the statutory definition of a point source); *O'Leary v. Moyer's Landfill, Inc.*, 523 F. Supp. 642, 655 (E.D. Pa. 1981) (intent of the discharging entity is irrelevant).

[46] *N.C. Shellfish Growers Ass'n v. Holly Ridge Assocs., LLC*, 278 F. Supp. 2d 654, 679 (E.D.N.C. 2003) ("Notwithstanding that it may result from such natural phenomena as rainfall and gravity, the surface run-off of contaminated waters, once channeled or collected, constitutes discharge by a point source.").

[47] *Wash. Wilderness Coal. v. Hecla Mining Co.*, 870 F. Supp. 983, 987 (E.D. Wash. 1994).

[48] 33 U.S.C. § 1362(12)(A).

[49] 33 U.S.C. § 1362(12).

[50] *Upstate Forever v. Kinder Morgan Energy Partners, L.P.*, No. 17-1640, 2018 WL 1748154 (4th Cir. Apr. 12, 2018).

[51] *Haw. Wildlife Fund v. Cnty. of Maui*, --- F.3d ----, 2018 WL 1569313 (9th Cir. 2018), denying rehearing en banc and amending opinion reported at 881 F.3d 754 (9th Cir. 2018); *Yadkin Riverkeeper, Inc. v. Duke Energy Carolinas, LLC*, 141 F. Supp. 3d 428 (M.D.N.C. 2015); *Tenn. Clean Water Network v. Tenn. Valley Auth.*, 273 F. Supp. 3d 775 (M.D. Tenn. 2017), *appeal docketed*, No. 17-6155 (6th Cir. Oct. 3, 2017) (holding that TVA violated the CWA by polluting surface waters with coal ash that flow into the river with groundwater through sinkholes, seeps, and leaks in its coal ash lagoons); *Sierra Club v. Va. Elec. & Power Co.*, 2017 WL 4476832 (E.D. Va. July 31, 2017), *appeal docketed*, No. 17-1895 (4th Cir. Aug. 2, 2017) (finding that Dominion Energy violated the CWA by polluting surface waters with arsenic flowing out of its riverfront coal ash lagoon via groundwater into the Elizabeth river); *Waterkeeper Alliance, Inc. v. U.S. Envtl. Prot. Agency*, 399 F.3d 486, 515 (2d Cir. 2005); *Quivira Mining Co. v.*

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A. Chemours' unauthorized discharges through hydrologically connected groundwaters to waters of the United States violate the Clean Water Act

During DEQ's investigation of GenX, the company has continued to release GenX and other PFAS compounds from its stack emissions, unlined wastewater conveyance ditches and sedimentation basins, contaminated equipment, and numerous leaks and spills. The PFAS compounds then contaminate groundwaters which are hydrologically connected to navigable waters of the United States. These are all unpermitted point sources under the Clean Water Act.

1. Chemours' air emissions pollute surface waters through hydrologically connected groundwaters

Chemours' PPA and the Nafion Membrane Manufacturing Areas release air emissions containing GenX, as well as two other closely related compounds which both convert to GenX in the presence of water: HFPO Dimer Acid Fluoride and HFPO Dimer Acid Ammonium Salt.[52] Chemours currently emits these three GenX compounds from its stacks at a rate of 2,758 pounds per year.[53] Chemours has 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.[54]

Chemours' air emissions are causing extensive contamination to groundwaters that are hydrologically connected to surface waters. 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*.[55]

Due to Chemours' air emissions, 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.[56] Groundwater sampled on site has concentrations of GenX up to 640,000 parts per trillion.[57]

The company emits numerous other PFAS compounds in addition to GenX compounds. At least one of these PFAS compounds has been released at a rate of over 72,000 pounds in one

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U.S. Envtl. Prot. Agency, 765 F.2d 126, 130 (10th Cir. 1985); *U.S. Steel Corp. v. Train*, 556 F.2d 822, 852 (7th Cir. 1977).

[52] N.C. DAQ 60-Day NOI at 3.

[53] N.C. DEQ Apr. 26 Presentation at slide 15; N.C. DAQ 60-Day NOI at 2; N.C. Amended Complaint at 28. Note that this figure includes the 314 pounds of GenX per year that are emitted from pumps, valves, and connecters located in outdoor process areas.

[54] Chemours Letter to N.C. DEQ, "Chemours – Fayetteville Works – Emissions Test Report," 2, Mar. 12, 2018, included as Attachment 28.

[55] N.C. DEQ Apr. 26 Presentation at slide 10; N.C. DEQ Amended Complaint at 3; *see also* Chemours Feasibility Report at Table 2.

[56] N.C. DEQ Apr. 26 Presentation at slides 9-10.

[57] Chemours Additional Site Investigation at 6.

year, or 221 pounds per day.[58] In 2012, Chemours emitted over 85,000 pounds of PFAS compounds into the air.[59] In 2013, Chemours emitted over 96,000 pounds of PFAS compounds into the air.[60] In 2014, Chemours emitted over 102,000 pounds of PFAS compounds into the air.[61] In 2015, Chemours emitted over 125,000 pounds of PFAS compounds into the air.[62] In 2016, Chemours emitted over 89,000 pounds of PFAS compounds into the air.[63]

Many of the other PFAS compounds that Chemours has been emitting into the air also *directly correlate* with some of 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_8O3, 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-trioxaoctanoic) 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.[64]

Therefore, the company's emissions of other PFAS compounds are also polluting ground and surface waters. At least one PFAS compound has been found at levels of *over 8 million ppt* in onsite groundwater wells.[65]

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[58] 72,585 pounds of C_3F_6O, a PFAS compound, were emitted in the year 2015. *See* Chemours' GenX Air Emission Summary.
[59] *See* Chemours' GenX Air Emission Summary; Chemours' other Emerging Compounds Air Emissions Summary.
[60] *Id.*
[61] *Id.*
[62] *Id.*
[63] *Id.*
[64] *See* Chemours' GenX Air Emission Summary; Chemours' other Emerging Compounds Air Emissions Summary; N.C. DEQ, Expanded PFAS Analysis on DEQ Collected Private Wells Associated with Chemours-Fayetteville, included as Attachment 29. 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 for illustration of hydrolysis, Hexafluoropropene Oxide Chemistry, 2, included as Attachment 30; *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 31.

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Chemours' stack emissions, as well as the emission leaks from pumps, valves, and connectors located on the facility, are all unpermitted point sources in violation of the Clean Water Act. Chemours has announced 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.[66] As long as *any* amount of PFAS compounds from Chemours' stacks are contaminating groundwater that is hydrologically connected to surface waters, these claims by the company do not resolve its Clean Water Act violations.

2. *Chemours' unlined Nafion ditch, sedimentation basins, and old Outfall 002 pollute surface waters*

During DEQ's investigation of GenX, the company has allowed GenX and other PFAS compounds to leak into ground and surface waters through multiple unlined ditches and basins. These include, but are not limited to, Chemours' unlined Nafion Ditch and two large sedimentation basins near its Nafion Membrane Manufacturing Area.

Chemours has kept an unlined Nafion Ditch, which collects up to 5 to 8 million gallons a day of PFAS contaminated wastewater.[67] The contaminated water from the ditch "infiltrate[s] the underlying sandy soil" and "has been a significant contributing source of contamination" to the perched groundwater zone beneath the facility and, subsequently, the Cape Fear River,[68] as well as the Surficial and Black Creek Aquifers below the perched zone.[69]

Chemours has also kept two large unlined sedimentation basins that are pumped with a PFAS contaminated "slurry," which "infiltrates into the underlying sandy soil" to the perched groundwater zone beneath the facility and, subsequently, the Cape Fear River, as well as the Surficial and Black Creek Aquifers below the perched zone.[70]

These are all unpermitted point sources under the Clean Water Act, and Chemours' plans for remediation will not stop these discharges.

3. *The groundwaters contaminated by these point sources are hydrologically connected to protected surface waters*

Chemours' unpermitted point sources, including its stack emissions and unlined wastewater conveyance ditches and sedimentation basins, are polluting three layers of groundwater underneath and surrounding the facility. All three layers of groundwater are hydrologically connected to waters of the United States, so that Chemours' PFAS pollution has persisted in surface waters surrounding the facility.

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[65] N.C. DEQ Amended Complaint at 25.
[66] Chemours' Letter to N.C. DEQ, "Notice of Violation - Immediate Action Required," Feb. 26, 2018, 15-17 (hereinafter "Chemours Feb. 2018 Response"), included as Attachment 32.
[67] *Id.* at 10-12.
[68] Chemours Feasibility Report at 9-10; Chemours Additional Site Investigation at 10.
[69] Chemours Feb. 2018 Response at 11-12.
[70] Chemours Feasibility Report at 9-10, 12-13; Chemours Additional Site Investigation at 10.

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The Fayetteville Works Facility is bordered by Willis Creek to the north, the Georgia Branch Creek channel to the south, and the Cape Fear River—a public drinking water supply—to the east.[71] Both Willis Creek and the Georgia Branch Creek flow into the Cape Fear River.[72] Beneath the site are layers of groundwater partially confined by clay, including the perched zone and the Surficial and Black Creek Aquifers.[73] The Surficial Aquifer is approximately 50 feet below ground surface, and the Black Creek Aquifer is between 80 and 100 feet below ground surface.[74] Together, they are "the principal potable water aquifers in the region."[75]

The heavily contaminated "perched zone" of groundwater located directly beneath the facility, on the other hand, is completely unnatural. It exists from DuPont and Chemours' "seepage of surface water through the bottom of" the companies' contaminated sedimentation basins and "infiltration of" water from the Nafion Ditch.[76]

All three layers of groundwater have been contaminated with GenX. The perched zone has had concentrations of GenX of up to 640,000 ppt.[77] The Surficial Aquifer has had concentrations of GenX of up to 45,000 ppt right along the Cape Fear River.[78] Only four wells were tested for GenX in the Black Creek Aquifer, yet those samples had concentrations of GenX of up to 9,900 ppt.[79] GenX has 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.[80]

All three layers of groundwater have been contaminated with other PFAS compounds as well. The perched zone has had concentrations of one PFAS compound of up to 80,000 ppt.[81] The Surficial Aquifer has had concentrations of one PFAS compound of up to 23,000 ppt.[82] The Black Creek Aquifer has had concentrations of one PFAS compound of up to 410 ppt.[83] All three layers of groundwater have contained at least eight different PFAS compounds.[84] DEQ has found at least 33 different PFAS compounds in private drinking water wells.[85]

All three layers of groundwater connect with surface waters surrounding the facility.[86] Water from the perched zone "discharge[s] or contribute[s] flow to the Cape Fear River,"[87] and infiltrates the Surficial and Black Creek aquifers before entering the Cape Fear River.[88]

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[71] Chemours Feasibility Report at 5.
[72] *Id.*
[73] *Id.* at 5-6.
[74] *Id.* at 5-6.
[75] *Id.* at 5.
[76] *Id.* at 7.
[77] Chemours Additional Site Investigation at Figure 7.
[78] *Id.* at 6, Figure 8.
[79] *Id.* at 7.
[80] N.C. DEQ Apr. 26 Presentation at slides 9-10.
[81] Chemours Additional Site Investigation at Figure 10.
[82] *Id.* at Figure 11.
[83] *Id.* at Figure 12.
[84] *Id.* at Figures 10-12.
[85] N.C. DEQ, Expanded PFAS Analysis on DEQ Collected Private Wells Associated with Chemours-Fayetteville, included as Attachment 29.
[86] Chemours Additional Site Investigation at 10.
[87] *Id.*
[88] *Id.*

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Groundwater flow from the Surficial Aquifer "is generally toward the Cape Fear River."[89] Groundwater also discharges from the Surficial Aquifer into Willis Creek and the Georgia Branch Creek which are to the north and south of the facility, and connect to the Cape Fear River.[90] Groundwater from the Black Creek Aquifer is also "toward the Cape Fear River."[91]

DEQ states that Chemours has determined "the flow of onsite groundwater directly to the Cape Fear River" is "the most significant source of contaminant loading in the River."[92] GenX levels in the Cape Fear River, as well as Willis Creek and Georgia Branch Creek, have continued despite the company's agreement to begin collecting the wastewater that it discharged into the Cape Fear River for nearly four decades.[93] GenX has been found in Willis Creek at levels of up to 450 ppt and in Georgia Branch at levels of 690 ppt.[94]

Accordingly, Chemours' air emissions and unlined wastewater conveyance ditches and sedimentation basins are all unauthorized point sources which are polluting groundwaters that are hydrologically connected to navigable waters.

Any discharge of PFAS compounds through hydrologically connected groundwaters to surface waters is a violation of the Clean Water Act. Because these discharges from Chemours' air emissions and unlined wastewater conveyance ditches and sedimentation basins via hydrologically connected groundwater to waters of the United States are continuous and ongoing, they will continue after the date of this letter and the subsequent filing of a lawsuit.

B. Chemours' direct discharges to the Cape Fear River through Chemours' current Outfall 002 and old Outfall 002 violate the Clean Water Act

Chemours also discharges PFAS compounds directly into the Cape Fear River through its current Outfall 002 and its old Outfall 002 which "now operates as a conveyance of stormwater" directly into the Cape Fear River.[95] These are unauthorized point source discharges in violation of the Clean Water Act.

In September of 2017, DEQ filed a complaint against Chemours for discharging GenX and other toxic substances into the Cape Fear River through its current Outfall 002, in violation of the Clean Water Act and state water quality laws.[96] Despite DEQ's enforcement actions, however, Chemours continues to discharge PFAS compounds from the outfall in violation of its NPDES permit.[97] Chemours has stated that "there remains a steady low-level Target PFAS concentration in Outfall 002,"[98] and DEQ "continues to detect concentrations of GenX in the

[89] Chemours Feasibility Report at 6.
[90] *Id.* at 5-6.
[91] *Id.* at 6-7.
[92] N.C. DEQ Amended Complaint at 26; *see also* Chemours Feasibility Report.
[93] Chemours Additional Site Investigation at 17-18.
[94] *Id.*
[95] Chemours Feasibility Report at 9.
[96] *See* Complaint, N.C. Dept. of Environmental Quality v. Chemours, 17 CVS 580, 11-22 (N.C. Super. 2017).
[97] Chemours Feasibility Report at 8, Table 2.
[98] *Id.* at 8.

effluent being discharged from the Fayetteville Work facility's outfall into the Cape Fear River."[99]

In addition, Chemours discharges PFAS compounds directly into the Cape Fear River through its unlined old Outfall 002, which "was an unlined natural erosional channel" from the manufacturing area that "now operates as a conveyance of stormwater" directly into the Cape Fear River.[100] The channel has "continued to erode into the underlying land" so that it now reaches polluted groundwater coming from the Surficial and Black Creek Aquifers,[101] which are anywhere from 50 to 100 feet below ground surface.[102] "PFAS mass" is then discharged from the outfall directly into the Cape Fear River.[103]

Because these permit violations from Chemours' old and current Outfall 002 are continuous and ongoing, they will continue after the date of this letter and the subsequent filing of a lawsuit.

C. Chemours' direct discharges to surface waters through its air emissions violate the Clean Water Act

Chemours' air emissions of about 100,000 pounds of PFAS compounds each year are also directly discharging into surface waters, including the Cape Fear River and its tributaries, and nearby lakes. Chemours' own data shows that its air emissions are directly polluting Willis Creek, Georgia Branch Creek, and the Cape Fear River itself.[104] DEQ has further 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,[105] and at levels of 915 ppt in Marshwood Lake, about a mile away, and upstream, from the plant.[106]

Unplanned air emissions are also contaminating surface waters. On October 6, 2017, Chemours covered up an air emissions leak that lasted 13 hours, containing 125 pounds of GenX compounds.[107] The release from the facility's stack was then "deposited onto the ground" and rain carried the chemicals into the Cape Fear River,[108] causing GenX to spike in the river at levels of up to 3,700 ppt.[109]

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[99] N.C. DEQ Amended Complaint at 2.
[100] Chemours Feasibility Report at 9.
[101] *Id.* at 9.
[102] *Id.* at 6.
[103] *Id.* at 9, Table 2.
[104] *Id.* at Table 2, Figure 1.
[105] 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 33.
[106] N.C. 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 34; *see also* Gen-X Orientation Map for Camp Dixie and Marshwood Lake, included as Attachment 35.
[107] DEQ Press Release, "DEQ investigating air emissions leak at Chemours," Nov. 17, 2017, included as Attachment 36.
[108] DEQ Letter to Chemours, "Notice of Violation & Intent to Assess Civil Penalty," Nov. 13, 2017, included as Attachment 37.
[109] DEQ Press Release, "DEQ will take additional enforcement action against Chemours for unreported spill," Nov. 9, 2017, included as Attachment 38.

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Chemours' air emissions that are directly polluting surface waters are point source discharges in violation of the Clean Water Act. Because Chemours' air emissions are continuous and ongoing, the company's permit violations will continue after the date of this letter and the subsequent filing of a lawsuit.

D. Chemours is causing other unpermitted discharges to surface wasters

There are numerous other apparent sources of PFAS contamination, including but not limited to:

- An "an active, unlined area," called the "Borrow Pit," which has been used for the disposal of "[d]redged sediment" from the two contaminated sedimentation basins in the Nafion Membrane Manufacturing Area,[110]
- A series of 380-foot by 575-foot unlined lagoons "used for the settling and dewatering of wasted activated sludge from the site's Wastewater Treatment Plant" from 1979 until 1985,[111]
- Six 160-foot by 750-foot unlined lagoons "used for the settling and dewatering of wasted activated sludge from the site's Wastewater Treatment Plant" from 1972 to 1979. The sludge was never removed from these unlined lagoons. Instead, they were covered with soil "and abandoned in place,"[112]
- A process sewer system, or Chemours' "system of underground sewer pipes, manholes, and sumps that convey process wastewater," which "may contain any of the wastes generated or raw materials managed" from the main plant areas," including the Nafion Manufacturing Area, "to the site's wastewater treatment plant system" and which has had a series of historical releases,[113]
- A storm sewer system, which collects up to 13,900 gallons per minute of "storm water through a system of sumps, drains and ditches located throughout the plant which are routed to the Cape Fear River,"[114]
- A rain water retention basin north of the PPA Manufacturing Area that has previously leached contaminants from the deposition of PPA Manufacturing Area's air emissions into groundwater,[115]
- "a series of incised erosional channels [...] in the Cape Fear River floodplain located east of the manufacturing area" that receive contaminated groundwater,[116] and
- a NPDES Effluent Channel and Wood Lined Ditch.[117]

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[110] Phase III Resource Conservation and Recovery Act Facility Investigation Report for DuPont Fayetteville Works, Appendix D, SWMU 16 (2014) (hereinafter "RCRA Phase III Investigation"), included as Attachment 39.
[111] RCRA Phase III Investigation, Appendix D at SWMU 9 A-B.
[112] RCRA Phase III Investigation, Appendix D at SWMU 9 C.
[113] RCRA Phase III Investigation, Appendix D at SWMU 6.
[114] RCRA Phase III Investigation, Appendix D at SWMU 7.
[115] RCRA Phase III Investigation, Appendix D at SWMU 7 ("Evidence of APFO has been identified in shallow groundwater as a result of air deposition in the immediate vicinity of the APFO manufacturing area being carried via runoff to the former retention basin and infiltrating into the subsurface").
[116] Chemours Feasibility Report at 7.
[117] Chemours Feb. 2018 Response at 13.

E. Chemours is violating the conditions of its NPDES Permit

Chemours' NPDES permit contains a Removed Substances provision, which requires that:

> Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be utilized/disposed of [...] in a manner such as to prevent any pollutant from such materials from entering waters of the State or navigable waters of the United States...[118]

Removed Substances provisions ensure that "measures shall be taken to assure that pollutants [and] materials removed from the process water and waste streams will be retained in storage areas and not discharged or released..."[119] This provision aims to "ensure the integrity" of such systems so that pollution does not escape into the environment.[120]

Chemours has kept "two large unlined basins on the [s]ite that are used for disposal of solids removed from river water that is used for non-contact cooling."[121] The basins are pumped with a contaminated "slurry," and then solids are "removed" in the course of treatment when they settlement to the bottom of the basin.[122] Polluted water from the two basins then "infiltrate[] into the underlying sandy soil" to the perched groundwater zone beneath the facility, which then "flows radially away"[123] and deeper beneath to the Surficial and Black Creek Aquifers.[124] All three layers of groundwater "discharge or contribute flow to the Cape Fear River."[125] Accordingly, PFAS pollutants from the slurry pumped into Chemours' sedimentation basins are entering state waters, including surface and groundwaters.[126]

Sampling of groundwater in the immediate vicinity of the sedimentation basins shows elevated concentrations of GenX. Sampling in the perched groundwater zone at the boundary of the southern sedimentation basin showed GenX in concentrations of 14,000 ppt.[127] Sampling in the Surficial Aquifer (approximately 50 feet below ground surface) just west of the sedimentation basins showed GenX in concentrations of 3,600 ppt.[128] Sampling in the Black Creek Aquifer (between 80 and 100 feet below ground surface) showed GenX in concentrations of 9,700 ppt.[129]

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[118] NPDES Standard Conditions at 8.
[119] *In re: 539 Alaska Placer Miners*, 1085-06-14-402C, 1990 WL 324284, at *8 (EPA Mar. 26, 1990); *see also* 40 C.F.R. § 440.148(c).
[120] *Yadkin Riverkeeper, Inc. v. Duke Energy Carolinas, LLC*, 141 F. Supp. 3d 428, 446-47 (M.D.N.C. 2015).
[121] Chemours Feasibility Report at 10.
[122] Chemours Feasibility Report at 10; *see Yadkin Riverkeeper*, 141 F. Supp. 3d at 447 ("[T]he removed substances provision does not require anything to be removed from the lagoons themselves").
[123] Chemours Feasibility Report at 10.
[124] *Id.* at 13.
[125] Chemours Additional Site Investigation at 10.
[126] *See* N.C. Gen. Stat. § 143-212(6) (defining waters of the state).
[127] Chemours Additional Site Investigation at Figure 7.
[128] *Id.*
[129] *Id.*

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Additionally, Chemours' NPDES permit contains a Duty to Mitigate provision, which requires that:

> The Permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit with a reasonable likelihood of adversely affecting human health or the environment.[130]

As discussed above, PFAS compounds are toxic substances and "adversely affect[]" human health. For decades, Chemours has discharged its toxic PFAS substances through its current Outfall 002, as well as its air emissions and unlined sedimentation basins and ditches. It has polluted both public drinking water supplies by discharging into the Cape Fear River and at least 690 private drinking water wells. Private wells up to 5.5 miles away from the facility's border have been found contaminated, in levels as high as 4,000 ppt.[131] GenX levels in the Cape Fear River and its tributaries have continued at levels of up to 690 ppt.[132] The Cape Fear Public Utility Authority, which services 200,000 customers in North Carolina has reported that PFAS compounds, including GenX, persist in its treated public drinking water, at combined levels above 200 ppt from November, 2017 through its testing period of January, 2018.[133] During its presentation to the House Select Committee on North Carolina River Quality on April 26, 2018, the Cape Fear Utility Authority emphasized that an upgraded multi-million dollar treatment system will not eliminate PFAS compounds in finished drinking water.

Chemours has not taken "all reasonable steps to minimize or prevent any discharge [...] or disposal in violation of [its] permit with a reasonable likelihood of adversely affecting human health or the environment," and is in violation of the Duty to Mitigate provision of its permit. Instead, Chemours is discharging dozens of toxic PFAS compounds through multiple unpermitted sources with full knowledge that its discharges have adversely affected human health for decades, and continue to harm the health of surrounding communities.[134]

Finally, Chemours' NPDES permit contains an Operation and Maintenance provision, which requires that:

> The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed

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[130] NPDES Standard Conditions at 4; *see also* 40 C.F.R. §122.41(d).
[131] N.C. DEQ Apr. 26 Presentation at slide 10; N.C. DEQ Amended Complaint at 27.
[132] Chemours Additional Site Investigation at 17-18.
[133] Cape Fear Public Utility Authority, "HB56 GenX Response Measures- Cape Fear Public Utility Authority (CPFUA) Final Report," Mar. 23, 2018, 2, 5, included as Attachment 40.
[134] 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. *See* Chemours Health Studies, *available at* https://edocs.deq.nc.gov/WaterResources/Browse.aspx?dbid=0&startid=624254&row=1&cr=1; *see also* N.C. DEQ Amended Complaint at 32-33 ("DuPont was aware that [GenX and related compounds] had potential toxic effects prior to submitting its 2012 Permit Application to DWR").

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or used by the Permittee to achieve compliance with the conditions of this permit.[135]

Chemours has allowed Nafion Ditch, Old Outfall 002, and sedimentation basins to leach PFAS compounds into surface and groundwaters for years. In fact, the company has created an entire layer of highly polluted groundwater beneath its facility by allowing PFAS contaminated waters to leak continuously from its unlined ditches and basins. Chemours states that the "perched water zone [...] that underlies most of the manufacturing area [...] appears *mainly to result from seepage* of surface water through the bottom of the North/South Sediment Basins that are used to settle out solids from the Cape Fear River water [...] and infiltration of non-contact cooling water from the Nafion Area ditch."[136] Chemours knew that it was creating this heavily contaminated zone of groundwater at least as early as 2006.[137]

Chemours failure to maintain "properly operate and maintain" the integrity of its stormwater and wastewater systems so that the company "achieve[s] compliance with the conditions of [its] permit" violates the Operation and Maintenance provision.

III. State Enforcement Action

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."[138] DEQ does not, however, request relief for any of the other PFAS compounds Chemours has pumped into the air, soil, and water.

DEQ has found at least 33 PFAS compounds in private drinking water wells.[139] DEQ's complaint expresses deep concern that GenX has been found in private wells at levels of 4,000 ppt,[140] yet some PFAS compounds have been found in onsite wells in concentrations of *several million parts per trillion*—one of which has been found at levels of up to 8,174,250 ppt.[141] DEQ was alarmed to discover that GenX compounds are emitted at a rate of over 2,000 pounds per year,[142] but Chemours has emitted over 125,000 pounds of other PFAS compounds into the air within a single year.[143] Moreover, many of the PFAS compounds that Chemours has been

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[135] NPDES Standard Conditions at 7; *see also* 40 C.F.R. §122.41(e).
[136] Chemours Additional Site Investigation at 15 (emphasis added).
[137] Phase II Resource Conservation and Recovery Act Facility Investigation Report for DuPont Fayetteville Works, 10 (2006) ("The presence of this perched zone appears to be the result of seepage of water through the bottom of the north/south sediment basins accumulating on the clay layer."), included as Attachment 41.
[138] N.C. DEQ Amended Complaint at 34-35.
[139] N.C. DEQ, Expanded PFAS Analysis on DEQ Collected Private Wells Associated with Chemours-Fayetteville, included as Attachment 29.
[140] N.C. DEQ Amended Complaint at 27.
[141] *Id.* at 25-26.
[142] *See* N.C. DAQ 60-Day NOI.
[143] *See* Chemours' GenX Air Emission Summary; Chemours' other Emerging Compounds Air Emissions Summary.

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SOUTHERN ENVIRONMENTAL LAW CENTER

Telephone 919-967-1450 | 601 WEST ROSEMARY STREET, SUITE 220 CHAPEL HILL, NC 27516-2356 | Facsimile 919-929-9421

May 7, 2018

Via U.S. Certified Mail – Return Receipt Requested

Ellis H. McGaughy
Fayetteville Works Plant Manager
The Chemours Company FC, LLC
22828 N.C. Highway 87 West
Fayetteville, N.C. 28306-7332

The Chemours Company PC, LLC
c/o CT Corporation System, Registered Agent
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Raleigh, N.C. 27615-6417

E.I. du Font de Nemours and Company
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Michael S. Regan
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N.C. Department of Environmental Quality
1601 Mail Service Center
Raleigh, N.C. 27699-1601

Notice of Intent to Sue
Toxic Substances Control Act - 15 U.S.C. § 2619

RE: 60-Day Notice of Intent to Sue
Fayetteville Works Facility
Violation of Toxic Substances Control Act Consent Order for P-08-508 and P-08-509

To Whom It May Concern:

Pursuant to 15 U.S.C. § 2619 of the Toxic Substances Control Act ("TSCA"), the Cape Fear River Watch, through its undersigned counsel, provides notice of the violation of the U.S.

Environmental Protection Agency's ("EPA") consent order for the chemicals with TSCA Pre-manufacture Notice Numbers P-08-508 and P-08-509, as set forth below.[1] After the expiration of sixty days, the Cape Fear River Watch intends to bring suit for these violations pursuant to the citizen suit provision of the Toxic Substances Control Act, 15 U.S.C. § 2619.

I. Background

A. The Fayetteville Works Facility

The Fayetteville Works Facility, located at 22828 N.C. Highway 87 W., Fayetteville, North Carolina is currently owned and operated by Chemours Company FC, LLC ("Chemours"). From approximately 1971 until 2015, the facility was owned and operated by E.I. du Pont de Nemours and Company ("DuPont"). Chemours and DuPont[2] (collectively, "the companies") have knowingly polluted North Carolina's air, ground and surface waters, and soil with toxic GenX compounds, in violation of the companies' TSCA Consent Order, for nearly four decades.

The Fayetteville Works facility has five manufacturing areas:

1. Fluoromonomers/Nafion Membrane Manufacturing Area (hereinafter "Nafion Membrane Manufacturing Area") (operated by Chemours);[3]
2. Polymer Processing Aid ("PPA") Manufacturing Area (operated by Chemours);
3. Butacite Manufacturing Area (operated by Kuraray America Inc. and rented from Chemours);
4. SentryGlas Manufacturing Area (operated by Kuraray America Inc. and rented from Chemours); and
5. Polyvinyl Fluoride Manufacturing Area (operated by DuPont and rented from Chemours).[4]

Chemours' Fluoromonomers/Nafion Membrane Manufacturing Area produces, among other materials, fluorochemical products and components of the films and coatings used for electrochemical applications.[5] Chemours' PPA Manufacturing area produces a polymer processing aid known as GenX (also known as C3 Dimer Acid and HFPO Dimer Acid, and has a Chemical Abstracts Registry[6] ("CAS") number of 13252-13-6).[7]

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[1] All attachments have been provided on enclosed compact discs.
[2] E.I. du Pont de Nemours and Company owned and operated the Fayetteville Works facility from the 1970s until the company formed Chemours Company FC, LLC, and transferred ownership to Chemours in 2015. Amended Complaint, N.C. Dept. of Environmental Quality v. Chemours, 17 CVS 580, 14 (N.C. Super. 2018) (hereinafter "N.C. DEQ Amended Complaint"), included as Attachment 1.
[3] The N.C. Department of Environmental Quality also refers to this manufacturing area as the "Vinyl Ethers North process area." N.C. DEQ Amended Complaint at 15; N.C. DEQ, N.C. Division of Air Quality, Letter to Chemours, "60-Day Notice of Intent to Modify Air Quality Permit No. 03735T43, Apr. 6, 2018, 2 (hereinafter "N.C. DAQ 60-Day NOI"), included as Attachment 2.
[4] Chemours NPDES Permit Renewal Application, Supplemental Information – Current Facility Operating Conditions, Apr. 27, 2016 (hereinafter "Chemours NPDES Application"), included as Attachment 3.
[5] *Id.*
[6] CAS numbers are universally used to provide a unique identifier for chemical substances.
[7] Chemours NPDES Application; N.C. DEQ Amended Complaint at 14-15.

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Both the PPA and the Nafion Membrane Manufacturing Areas release air emissions containing GenX, as well as two other closely related compounds which both convert to GenX in the presence of water:

- HFPO Dimer Acid Fluoride (also known as C3 Dimer Acid Fluoride), which has a CAS number of 2062-98-8, and
- HFPO Dimer Acid Ammonium Salt (also known as C3 Dimer Acid Ammonium Salt), which has a CAS number of 62037-80-3.[8]

Chemours has determined that the stack from its Nafion Membrane Manufacturing Area releases 1,257 pounds of GenX compounds per year, and the stack from its PPA Manufacturing Area releases 670 pounds per year.[9] The company also estimated that leaks from the facility cause about 314 pounds of GenX compounds to be released.[10] In total, the company reported that it emits GenX compounds at a rate of 2,758 pounds per year.[11]

B. EPA's Toxic Substances Control Act consent order

Under Section 5 of the TSCA, no person may manufacture or import a "new chemical substance" or manufacture or process any chemical substance for "a significant new use" unless (1) pre-manufacture notice is filed with the EPA, (2) the EPA reviews the notice, and (3) the EPA makes a determination of the human health and environmental risks of the chemical.[12] Pre-manufacture notice submitted to the EPA must include data on the health and ecological effects of the chemical substance, including "all test data in the submitter's possession or control," as well as data "that are known to or reasonably ascertainable by the submitter."[13]

If EPA determines that there is insufficient information about the chemical substance,[14] the EPA "shall issue an order [...] to prohibit or limit the manufacture, processing, distribution in

[8] N.C. DAQ 60-Day NOI at 3.
[9] N.C. DAQ 60-Day NOI at 2.These estimates have likely changed. DEQ reported in its amended complaint that Chemours emits a total of 2,241 pounds of GenX compounds each year. On April 26, 2018, DEQ updated that number to 2,758 pounds per year. N.C. DEQ Presentation to the House Select Committee on North Carolina River Quality, slide 15, Apr. 26, 2018 (hereinafter "N.C. DEQ Apr. 26 Presentation"), included as Attachment 4.
[10] N.C. DAQ 60-Day NOI at 2.
[11] N.C. DEQ Apr. 26 Presentation at slide 15; N.C. DEQ Amended Complaint at 28; N.C. DAQ 60-Day NOI at 2.
[12] 15 U.S.C. § 2604.
[13] 40 C.F.R. § 720.50.
[14] The full text of 15 U.S.C. § 2604(e)(1)(A), as amended in 2016 states that the EPA "shall issue an order" if it determines that:

(i) the information available to the Administrator is insufficient to permit a reasoned evaluation of the health and environmental effects of a chemical substance with respect to which notice is required by subsection (a); or

(ii)(I) in the absence of sufficient information to permit the Administrator to make such an evaluation, the manufacture, processing, distribution in commerce, use, or disposal of such substance, or any combination of such activities, may present an unreasonable risk of injury to health or the environment, without consideration of costs or other nonrisk factors, including an unreasonable risk to a potentially exposed subpopulation identified as relevant by the Administrator under the conditions of use; or

(II) such substance is or will be produced in substantial quantities, and such substance either enters or may reasonably be anticipated to enter the environment in substantial quantities or there is or may be significant or substantial human exposure to the substance.

commerce, use, or disposal of such substance or to prohibit or limit any combination of such activities to the extent necessary to protect against an unreasonable risk of injury to health or the environment..."[15] The statute states that "the submitter of the notice may commence manufacture of the chemical substance, or manufacture or processing of the chemical substance for a significant new use, including while any required information is being developed, *only in compliance with the order*."[16] 15 U.S.C. §2614 further states that "[i]t shall be unlawful for any person to fail or refuse to comply with any [...] order issued" under Section 5 of TSCA, and 15 U.S.C. §2615 provides for both civil and criminal penalties for violations of orders issued under Section 5.

DuPont filed pre-manufacture notices for two GenX compounds:

- P-08-508- Perfluorinated aliphatic carboxylic acid, or "GenX," or HFPO Dimer Acid (CAS Number 13252-13-6) and
- P-08- 509- Perfluorinated Aliphatic Carboxylic Acid, Ammonium Salt, or HFPO Dimer Acid Ammonium Salt (CAS Number 62037-80-3).[17]

The EPA reviewed data submitted by DuPont on these two chemicals and voiced concerns that they would "persist in the environment" and that they "could bioaccumulate, and be toxic [...] to people, wild mammals, and birds."[18] The EPA described "human health concerns" for the chemicals because they "are expected to be absorbed by all routes of exposure" and GenX, in particular, "is expected to be highly irritating or corrosive."[19] Animal studies showed decreases in red blood cell counts, hemoglobin, and hematocrit, as well as increases in liver weights, and effects on kidneys.[20] The company's toxicity studies also showed "systemic toxicity in animals."[21]

Finding that DuPont was missing key toxicological studies, such as information on chronic and carcinogenic effects,[22] 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 perfluorooctanoic acid ("PFOA"),[23] which has 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.[24] The consent order

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[15] 15 U.S.C. § 2604(e)(1)(A).
[16] *Id.*
[17] EPA, Consent Order and Determinations Supporting Consent Order for PMN Substances P-08-508 and P-08-509, v (2009) (hereinafter "TSCA Consent Order"), included as Attachment 5; Chemical substance identities were also confirmed with EPA TSCA chemical substance tracking site, Entries for P-08-508 and P-08-509, EPA ChemView site, *available at* https://chemview.epa.gov/chemview (last visited Apr. 16, 2018).
[18] TSCA Consent Order at vii.
[19] *Id* at vii.
[20] *Id* at vii.
[21] *Id* at ix.
[22] *Id* at ix.
[23] *Id* at x-xi.
[24] The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs), A 107 (May 2015, included as Attachment 6; *see also* EPA, Health Effects Support Document for Perfluorooctanoic Acid (PFOA) (2016), included

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further stated that the substances are expected "to be highly persistent in the environment," and that "there is high concern for possible environmental effects over the long-term."[25]

Ultimately, pursuant to Section 5(e)(1)(A)(i) of TSCA, the EPA determined "that the information available to the Agency is insufficient to permit a reasoned evaluation of the human health and environmental effects of the [pre-manufacture notice] substances."[26] The consent order continues, "[i]n light of the potential risk of human health and environmental effects [...], EPA has concluded:

- that uncontrolled manufacture, import, processing, distribution in commerce, use and disposal of the [pre-manufacture notice] substances may present an unreasonable risk of injury to human health and the environment," [27] and
- "that the [pre-manufacture notice] substances will be produced in substantial quantities [...], may be reasonably anticipated to enter the environment in substantial quantities [..], and there may be significant (or substantial human exposure to the substances."[28]

The consent order therefore requires the company to:

> recover and capture (destroy) or recycle the [pre-manufacture notice] substances at an overall efficiency of 99% from all the effluent process streams and the air emissions (point source and fugitive).[29]

Although DuPont has since submitted multiple studies to the EPA on the two chemicals since EPA issued the consent order, the EPA has not modified the Order with based on the studies submitted.[30] When DuPont transferred ownership of the Fayetteville Works Facility to Chemours in 2015, Chemours became responsible for complying with the DuPont's consent order with the EPA.[31]

II. Chemours is in violation of its TSCA Consent Order with the EPA

Chemours is releasing GenX compounds, which include GenX, HFPO Dimer Acid Ammonium Salt, and HFPO Dimer Acid Fluoride, from at least two point sources—the Division stack from the Nafion Membrane Manufacturing Area and the PPA stack from the PPA Manufacturing Area without the controls required by the consent order. Based on testing the

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as Attachment 7; EPA, Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA) (2016), included as Attachment 8.

[25] TSCA Consent Order at vii, xi, xii.

[26] *Id.* at xv.

[27] *Id.*

[28] *Id.*

[29] *Id.* at 36.

[30] Entries for P-08-508 and P-08-509, EPA ChemView, *available at* https://chemview.epa.gov/chemview (last visited Apr. 16, 2018).

[31] TSCA Consent Order at 43 ("If the transfer from the Company to the Successor in Interest is effective after EPA receives a NOC, the Successor in Interest shall comply with the terms of this Order...").

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company conducted from January 22-25, 2018, Chemours determined that its stack from its Nafion Membrane Manufacturing Area releases 1,257 pounds of GenX compounds per year, and that its stack from its PPA Manufacturing Area releases 670 pounds per year.[32]

Chemours is also releasing fugitive air emissions in violation of its consent order. Chemours has also 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.[33] Chemours has also caused large leaks of air emissions from its stacks. On October 6, 2017, Chemours concealed an air emissions leak that lasted 13 hours, containing 125 pounds of GenX compounds.[34]

In total, Chemours estimates that it releases GenX compounds at a rate of 2,758 pounds per year.[35] Chemours has failed, and continues to fail, to "recover and capture (destroy) or recycle" its GenX, or HFPO Dimer Acid, and HFPO Dimer Acid Ammonium Salt air emissions "at an overall efficiency of 99%" in violation of its TSCA consent order.

III. Chemours' violations are causing imminent danger to human health and safety

Chemours' emissions of GenX and other perfluoroalkyl and polyfluoroalkyl substances compounds (collectively, "PFAS compounds") have caused, and continue to cause, extensive toxic contamination of the air, surface and groundwaters, sediment, and even honey. As the North Carolina Department of Environmental Quality 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.[36]

GenX has 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.[37] Groundwater sampled at the site of the facility has contained concentrations of GenX up to 640,000 parts per trillion.[38]

Studies conducted by DuPont and others since issuance of the consent order indicate toxicity for humans. For instance, DuPont conducted such a 2-year Chronic Toxicity/Carcinogenicity study and found the following effects in rats:

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[32] N.C. DAQ 60-Day NOI at 2. These estimates have likely changed. DEQ reported in its amended complaint that Chemours emits a total of 2,241 pounds of GenX compounds each year. On April 26, 2018, DEQ updated that number to 2,758 pounds per year. N.C. DEQ Apr. 26 Presentation at slide 15.
[33] Chemours Letter to N.C. DEQ, "Chemours – Fayetteville Works – Emissions Test Report," 2, Mar. 12, 2018, included as Attachment 9.
[34] DEQ Press Release, "DEQ investigating air emissions leak at Chemours," Nov. 17, 2017, included as Attachment 10.
[35] N.C. DEQ Apr. 26 Presentation at slide 15; N.C. DAQ 60-Day NOI at 2; N.C. DEQ Amended Complaint at 28.
[36] N.C. DEQ Amended Complaint at 3.
[37] N.C. DEQ Apr. 26 Presentation at slides 9-10.
[38] N.C. DEQ Amended Complaint at 10-22, 24-25.

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- 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).[39]

The hyperplasia, or increased cellular growth, that DuPont found in many of the organs is a known precursor to cancer.[40] 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.[41] Tellingly, the EPA did not modify its 2009 TSCA Consent Order with DuPont based on the studies that the company submitted.[42]

Numerous studies have been conducted that also indicate GenX, and similar PFAS alternatives with shorter carbon chains, are dangerous to human health and safety.[43] The California Department of Toxic Substances Control reviewed recent

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[39] DuPont and Chemours' TSCA filing to EPA, "8EHQ-06- 1643 6/8EHQ-06- 16478," Jan. 8, 2013, included as Attachment 11.

[40] "[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 12.

[41] "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 13.

[42] Entries for P-08-508 and P-08-509, EPA ChemView, *available at* https://chemview.epa.gov/chemview (last visited Apr. 16, 2018).

[43] *See* Melisa Gomis et al., "Comparing the toxic potency in vivo of long-chain perfluoroalkyl acids and fluorinated alternatives," 113 *Environ. International* 1 (2018), included as Attachment 14; 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 15; Melissa Gomis, "From emission sources to human tissues: modelling the exposure to per- and polyfluoroalkyl substances," (2017), included as Attachment 16; Nan Sheng et al., "Cytotoxicity of novel fluorinated alternatives to long chain," 92 *Archives of Toxicol.* 359 (2017), included as Attachment 17; 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 18; J.M. Rae et al., "Evaluation of chronic toxicity and carcinogenicity of ammonium 2,3,3,3-

scientific literature on such compounds and found that they, in particular GenX, are likely 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.[44]

Accordingly, GenX and similar short-chain PFAS compounds could be as harmful, if not more harmful, than the compounds they were created to replace.

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.[45] 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.[46]

IV. Persons responsible for violations

The Fayetteville Works Facility is owned and operated by Chemours Company FC, LLC. Chemours Company FC, LLC is a Delaware limited liability company registered and doing business in North Carolina. Chemours Company FC, LLC is responsible for all violations at the Fayetteville Works Facility.

V. Persons giving notice

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, drink water from, and fish, swim, and boat on the Cape Fear River downstream of the Chemours facility. 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 river from

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tetrafluoro-2-(heptafluoropropoxy)-propanoate in SpragueDawley rats," 2 *Toxicol. Rep.* 939 (2015), included as Attachment 19.

[44] California Department of Toxic Substances Control, "Product – Chemical Profile for Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs) in Carpets and Rugs" 29 (2018) (emphasis added), included as Attachment 20.

[45] N.C. 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 21.

[46] N.C. 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 43.

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pollution, including toxic chemicals, such as the GenX compounds that have been released from the Fayetteville Works Facility for decades, and continue to be pumped into the environment at alarming rates.

The names, addresses, and phone numbers of the persons giving notice are:

Kemp Burdette
Cape Fear Riverkeeper
Cape Fear River Watch
617 Surry St.
Wilmington, N.C. 28401
Phone: (910) 762-5606

If you have any questions concerning this letter or the described violations, or if you believe this notice is incorrect in any respect, please contact the undersigned counsel, the Southern Environmental Law Center, at (919) 967-1450 (tel.), (919) 929-9421 (fax). During the notice period, we are available to discuss this matter with you, but suggest if you desire to institute negotiations in lieu of a civil action that you do so immediately as we do not intend to delay prosecution of this suit once the notice period has expired. Please be advised that the failure to remedy any of the violations set forth in this letter can result in a court order enjoining further violations and imposing civil penalties of $37,500 per violation, per day for each violation of the Toxic Substances Control Act.[47] In addition, upon the successful prosecution of this suit, the Cape Fear River Watch to seek compensation for attorneys' fees and the costs of litigation under the citizen suit provisions of the Toxic Substances Control Act.[48]

[47] 15 U.S.C. § 2615.
[48] 15 U.S.C. § 2619.

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Thank you for your prompt attention to this matter.

Sincerely,

Geoff Gisler
ggisler@selcnc.org

Jean Zhuang
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Enclosures – compact disc
Cc (*Via electronic mail, without attachments*):
Kemp Burdette, Cape Fear River Watch

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