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Re: Southern Environmental Law Center Comments on NPDES Wastewater Draft Permit NC0021636 North Harnett Regional WWTP

Dear Mr. Coco:

The Southern Environmental Law Center offers the following comments regarding the draft renewal National Pollutant Discharge Elimination System ("NPDES") Permit NC0021636, issued by the North Carolina Department of Environmental Quality ("the Department") to the Harnett Regional Water ("Harnett Regional") for the operation of its North Harnett wastewater treatment plant.[1] Harnett Regional discharges wastewater into a portion of the Cape Fear River protected as a water supply.[2] Approximately 10 river miles downstream, the city of Dunn pulls its drinking water from the Cape Fear River. Harnett Regional is proposing to expand its discharges from 7.5 million gallons per day ("MGD") to 16.5 MGD.[3]

Harnett Regional's wastewater contains 1,4-dioxane and per- and polyfluoroalkyl substances ("PFAS"),[4] chemicals known to cause cancer. The PFAS and 1,4-dioxane flowing into the wastewater plant are likely from the Sampson County Landfill, which sends leachate to Harnett Regional's North Harnett wastewater plant and South Harnett wastewater plant.[5] As the Department is aware, the Sampson County Landfill accepts PFAS contaminated sludge from The Chemours Company, a PFAS manufacturer in Fayetteville,[6] North Carolina, as well as 1,4-

[1] N.C. Dep't of Env't Quality, Draft NPDES Permit NC0021636 (May 16, 2023) [hereinafter "North Harnett Draft Permit"].
[2] North Harnett Draft Permit, *supra* note 1 at 2.
[3] N.C. Dep't of Env't Quality, Draft Fact Sheet NPDES Permit No. NC0021636 (May 16, 2023), at 1 [hereinafter "North Harnett Draft Fact Sheet"].
[4] *Id.* at 14–15; N.C. Dep't of Env't Quality, Cape Fear Municipal PFAS & 1,4-dioxane Monitoring (2020), Attachment 1 [hereinafter "Cape Fear Municipal PFAS & 1,4-dioxane Sampling"].
[5] Harnett Regional Water, 2020 Pretreatment Annual Report (Feb. 27, 2023), at 2 [hereinafter "Harnett Regional Pretreatment Report"]; *see also* Hart & Hickman, Collective Study of PFAS and 1,4-dioxane in Landfill Leachate and estimated Influence on Wastewater Treatment Plant Facility Influent (Mar. 10, 2020), at Table 2, https://perma.cc/TL5E-XPEQ [hereinafter "2020 Landfill Leachate Study"].
[6] *See* Steve DeVane, *Sludge From Chemours Plant Dumped in Sampson County Landfill*, THE FAYETTEVILLE OBSERVER (Oct. 20, 2018), https://www.fayobserver.com/story/news/2018/10/20/sludge-from-chemours-plant-dumped-in-sampson-county-landfill/9501213007/.

dioxane contaminated sludge from DAK Americas, a resins manufacturer also in Fayetteville.[7] This industrial pollution from the sludge flows into the landfill's leachate and, because wastewater plants cannot remove the chemicals, are reflected in the wastewater plants' effluent.[8]

Despite knowing about the concentrations of PFAS and 1,4-dioxane in the landfill's leachate and the wastewater plant's effluent,[9] the Department did not impose limits or conditions on the facility's discharge of either chemical, opting instead to continue studying pollution it already knows exists.[10] The U.S. Environmental Protection Agency ("EPA") has made clear state permitting agencies have existing authority to control PFAS through NPDES permits.[11] This past December, EPA issued guidance to state agencies "describ[ing] steps permit writers can implement under existing authorities to reduce the discharge of PFAS."[12] EPA's guidance describes tools within the Clean Water Act that should be used to control PFAS from wastewater plants like Harnett Regional, including effluent limits and pretreatment conditions. Those tools should be used for 1,4-dioxane as well.

I. Harnett Regional discharges 1,4-dioxane and PFAS, chemicals linked to cancer.

The Cape Fear River Basin and those who rely upon it suffer from some of the highest levels of PFAS and 1,4-dioxane in the entire country.[13] In 2019, the Department directed wastewater plants in the river basin, including Harnett Regional, to sample their wastewater plants for these chemicals in order to understand the scope of pollution.[14] The results of that sampling confirmed that Harnett Regional receives waste laden with toxic chemicals.

a. Harnett Regional discharges 1,4-dioxane, a human carcinogen.

Harnett Regional receives wastewater containing 1,4-dioxane, a chemical likely to cause cancer.[15] 1,4-dioxane is a clear, man-made chemical that is used in or created as a byproduct of many industrial processes.[16] The chemical is toxic to humans,[17] causing liver and kidney damage at incredibly low levels.[18] As a result of the harms caused by 1,4-dioxane, EPA established a

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[7] DAK Americas, Permit Renewal and Modification NPDES Permit No.: NC0003719 (May 3, 2022), at PDF pg. 14.
[8] *See* 2020 Landfill Leachate Study, *supra* note 5 at Table 2.
[9] North Harnett Draft Fact Sheet, *supra* note 3 at 14–15.
[10] North Harnett Draft Permit, *supra* note 1 at 4.
[11] Memorandum from Radhika Fox, Assistant Administrator, U.S. Env't Prot. Agency, *Addressing PFAS Discharges in NPDES Permits and Through the Pretreatment Program and Monitoring Programs* (December 5, 2022) (emphasis added) [hereinafter "EPA's PFAS NPDES Guidance"], Attachment 2.
[12] *See generally id.*
[13] *Data Summary of The Third Unregulated Contaminant Monitoring Rule*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/dwucmr/data-summary-third-unregulated-contaminant-monitoring-rule (last visited June 25, 2023); N.C. Div. of Water Res., *1,4-Dioxane in the Cape Fear River Basin of North Carolina: An Initial Screening and Source Identification Study* 2 (2016), *available at* https://www.deq.nc.gov/water-quality/environmental-sciences/eco/dioxanereport-yr1final-20160127/download.
[14] Letter from Linda Culpepper, N.C. Dep't of Env't Quality (Apr. 30, 2019), Attachment 3.
[15] Cape Fear Municipal PFAS & 1,4-dioxane Sampling, *supra* note 4.
[16] U.S. Env't Prot. Agency, *Technical Fact Sheet – 1,4-Dioxane* 1-2 (2017), https://www.epa.gov/sites/default/files/2014-03/documents/ffrro_factsheet_contaminant_14-dioxane_january2014_final.pdf [hereinafter "EPA, *Technical Fact Sheet – 1,4-Dioxane*"].
[17] *Id.* at 1.
[18] *Id.*; U.S. Env't Prot. Agency, *Integrated Risk Information System, Chemical Assessment Summary: 1,4,-dioxane* 2 https://iris.epa.gov/static/pdfs/0326_summary.pdf (Aug. 11, 2010).

drinking water health advisory with an associated lifetime cancer risk of one-in-one-million at a concentration of 0.35 parts per billion ("ppb").[19] The State of North Carolina has similarly determined that 1,4-dioxane is toxic and poses a cancer risk at levels higher than 0.35 ppb.[20]

In 2019, Harnett Regional reported that its influent (water flowing into the wastewater plant) contains 1,4-dioxane at concentrations as high as 11.7 ppb.[21] Despite this sampling, Harnett Regional did not disclose that it receives and likely discharges 1,4-dioxane into the Cape Fear River.[22]

b. Harnett Regional discharges PFAS, a class of chemicals known to cause harm to human health and the environment.

The same sampling event that informed the Department about Harnett Regional's 1,4-dioxane pollution also confirmed that the utility's influent contains PFAS at levels exceeding 240 parts per trillion ("ppt").[23] PFAS are a group of man-made chemicals manufactured and used broadly by industry since the 1940s.[24] PFAS pose a significant threat to human health at extremely low concentrations. Two of the most studied PFAS—perfluorooctanoic acid ("PFOA") and perfluorooctane sulfonate ("PFOS")—are bioaccumulative and highly persistent in humans.[25] PFOA and PFOS have been shown to cause developmental effects to fetuses and infants, kidney and testicular cancer, liver malfunction, hypothyroidism, high cholesterol, ulcerative colitis, obesity, decreased immune response to vaccines, reduced hormone levels, delayed puberty, and lower birth weight and size.[26] Because of its impacts on the immune

[19] *2018 Edition of the Drinking Water Standards and Health Advisories*, EPA OFFICE OF WATER 4 (2018), https://www.epa.gov/system/files/documents/2022-01/dwtable2018.pdf; EPA, *Technical Fact Sheet – 1,4-Dioxane*, *supra* note 16 at 3.

[20] N.C. Div. of Water Res., *1,4-dioxane Monitoring in the Cape Fear River Basin of North Carolina: An Ongoing Screening, Source Identification, and Abatement Verification Study* (2017), at 2, https://files.nc.gov/ncdeq/Water%20Quality/Environmental%20Sciences/Dioxane/DioxaneYear2ReportWithMemo_20170222.pdf (affirming EPA's conclusions); *see also* N.C. Dep't of Env't Quality, Div. Water Res., Surface Water Quality Standards, Criteria & In-Stream Target Values (2019) (stating that the one-in-one million cancer risk for 1,4-dioxane is 0.35 ppb), Attachment 4.

[21] Cape Fear Municipal PFAS & 1,4-dioxane Sampling, *supra* note 4.

[22] *See generally* MBD Consulting Engineers, North Regional WWTP Expansion NPDES Permit Application (Apr. 19, 2022).

[23] Cape Fear Municipal PFAS & 1,4-dioxane Sampling, *supra* note 4.

[24] Lifetime Drinking Water Health Advisories for Four Perfluoroalkyl Substances, 87 Fed. Reg. 36,848, 36,849 (June 21, 2022); *Our Current Understanding of the Human Health and Environmental Risks of PFAS*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas (last visited Jan. 24, 2023).

[25] 87 Fed. Reg. at 36,849; U.S. Env't Prot. Agency, Interim Drinking Water Health Advisory: Perfluorooctanoic Acid (PFOA) CASRN 335-67-1 (June 2022), at 3–4, *available at* https://www.epa.gov/system/files/documents/2022-06/interim-pfoa-2022.pdf; U.S. Env't Prot. Agency, Interim Drinking Water Health Advisory: Perfluorooctane Sulfonic Acid (PFOS) CASRN 1763-23-1 (June 2022), at 3–4, *available at* https://www.epa.gov/system/files/documents/2022-06/interim-pfos-2022.pdf.

[26] Arlene Blum et al., *The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs)*, 123 ENV'T. HEALTH PERSP. 5, A 107 (May 2015); U.S. Env't Prot. Agency, Drinking Water Health Advisories for PFAS: Fact Sheet for Communities, at 1–2 (June 2022), *available at* https://www.epa.gov/system/files/documents/2022-06/drinking-water-ha-pfas-factsheet-communities.pdf.

system, PFAS can also exacerbate the effects of Covid-19.[27] Studies show that exposure to mixtures of different PFAS can worsen these health effects.[28] Given these harms, EPA in June 2022 established interim updated lifetime health advisories for PFOA and PFOS in drinking water of 0.004 ppt and 0.02 ppt, respectively.[29]

Epidemiological studies show that many of the negative health outcomes associated with PFOA and PFOS can result from exposure to other PFAS, including, but not limited to, perfluorohexane sulfonic acid ("PFHxS"),[30] perfluorobutanesulfonic acid ("PFBS"),[31] perfluorobutanoic acid ("PFBA"),[32] perfluorohexanoic acid ("PFHxA"),[33] perfluorononanoic acid ("PFNA"),[34] perfluorodecanoic acid ("PFDA"),[35] and hexafluoropropylene oxide dimer acid ("GenX Chemicals").[36]

While the harms to human health are extreme, PFAS are also detrimental to wildlife and the environment. The chemicals have been shown to cause damaging effects in fish,[37]

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[27] *See* Lauren Brown, *Insight: PFAS, Covid-19, and Immune Response–Connecting the Dots*, BLOOMBERG LAW (July 13, 2020, 4:00 AM), https://news.bloomberglaw.com/environment-and-energy/insight-pfas-covid-19-and-immune-response-connecting-the-dots?context=article-related.

[28] Emma V. Preston et al., *Prenatal Exposure to Per- and Polyfluoroalkyl Substances and Maternal and Neonatal Thyroid Function in the Project Viva Cohort: A Mixtures Approach*, 139 ENV'T INT'L 1 (2020), https://perma.cc/DJK3-87SN.

[29] 87 Fed. Reg. at 36,848–49.

[30] U.S. Env't Prot. Agency, DRAFT Systematic Review Protocol for the PFBA, PFHxA, PFHxS, PFNA, and PFDA (anionic and acid forms) IRIS Assessments (updated Jan. 2021), at 2-22, https://perma.cc/32DL-AAQK [hereinafter "DRAFT Toxicological Data PFBA, PFHxA, PFHxS, PFNA, and PFDA"] (explaining that studies indicate that PFHxS is associated with developmental, endocrine, hepatic, immune, reproductive, and urinary effects); Minn. Dep't of Health, Toxicological Summary for: Perfluorohexane sulfonate (Aug. 2020), at 7 https://perma.cc/4CWG-9UQB (stating that exposure to PFHxS has been associated with detrimental endocrine and reproductive impacts).

[31] U.S. Env't Prot. Agency, Drinking Water Health Advisory: Perfluorobutane Sulfonic Acid (CASRN 375-73-5) and Related Compound Potassium Perfluorobutane Solfonate (CASRN 29420-49-3) (June 2022), https://perma.cc/X74T-EQ83 (explaining that literature confirms exposure to PFBS impacts to thyroid, reproductive systems, development, kidneys, liver, and lipid and lipoprotein homeostasis).

[32] U.S. Env't Prot. Agency, IRIS Toxicological Review of Perfluorobutanoic Acid (PFBA, CASRN 375-22-4) and Related Salts (Dec. 2022), at xii, https://perma.cc/HD3F-78VJ (explaining "available evidence indicates that developmental, thyroid, and liver effects in humans are likely caused by PFBA exposure in utero or during adulthood").

[33] DRAFT Toxicological Data PFBA, PFHxA, PFHxS, PFNA, and PFDA, *supra* note 30 at 2-22.

[34] *Id.*; N.J. Drinking Water Quality Inst., Health-Based Maximum Contaminant Level Support Document: Perfluorononanoic acid ("PFNA"), at 35 (June 22, 2015), https://perma.cc/JU9Z-AG9T (explaining exposure to PFNA has been associated with developmental issues, including neonatal mortality, and liver functions).

[35] DRAFT Toxicological Data PFBA, PFHxA, PFHxS, PFNA, and PFDA, *supra* note 30 at 2-22.

[36] U.S. Env't Prot. Agency, Drinking Water Health Advisory: Hexafluoropropylene Oxide (HFPO) Dimer Acid (CASRN 13252-13-6) and HFPO Dimer Acid Ammonium Salt (CASRN 62037-80-3), Also Known as "GenX Chemicals" (June 2022), at vii, https://perma.cc/9F6H-5BBY (explaining that exposure to GenX increases harms to liver, reproductive, and developmental functions).

[37] Chen et al., *Perfluorobutanesulfonate Exposure Causes Durable and Transgenerational Dysbiosis of Gut Microbiota in Marine Medaka*, 5 ENV'T SCI. & TECH LETTERS 731–38 (2018); Chen et al., *Accumulation of Perfluorobutane Sulfonate (PFBS) and Impairment of Visual Function in the Eyes of Marine Medaka After a LifeCycle Exposure*, 201 AQUATIC TOXICOLOGY 1–10 (2018); Du et al., *Chronic Effects of Water-Borne PFOS Exposure on Growth, Survival and Hepatotoxicity in Zebrafish: A Partial Life-Cycle Test*, 74 CHEMOSPHERE 723–29 (2009); Hagenaars et al., *Structure–Activity Relationship Assessment of Four Perfluorinated Chemicals Using a Prolonged Zebrafish Early Life Stage Test*, 82 CHEMOSPHERE 764–72 (2011); Huang et al., *Toxicity, Uptake*

amphibians,[38] reptiles,[39] mollusks,[40] and other aquatic invertebrates[41]—resulting in developmental and reproductive impacts, behavioral changes, adverse effects to livers, disruption to endocrine systems, and weakened immune systems.[42]

PFAS are extremely resistant to breaking down in the environment.[43] Once released, the chemicals can travel long distances and bio-accumulate in organisms.[44] PFAS have been found in fish tissue across all 48 continental states,[45] and PFOS—a particularly harmful PFAS compound—is one of the most prominent PFAS found in freshwater fish.[46] As a result, the primarily low-income and minority communities that rely heavily on subsistence fishing have been found to have elevated PFAS levels in their blood.[47] In fact, researchers conclude that "[w]idespread PFAS contamination of freshwater fish in surface waters in the U.S. is likely a

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Kinetics and Behavior Assessment in Zebrafish Embryos Following Exposure to Perfluorooctanesulphonicacid (PFOS), 98 AQUATIC TOXICOLOGY 139–47 (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 160–70 (2016); 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 ENV'T SCI. & TECH. 4432–39 (2018); Rotondo et al., *Environmental Doses of Perfluorooctanoic Acid Change the Expression of Genes in Target Tissues of Common Carp*, 37 ENV'T TOXICOLOGY & CHEM. 942–48 (2018).

[38] Ankley et al., *Partial Life-Cycle Toxicity and Bioconcentration Modeling of Perfluorooctanesulfonate in the Northern Leopard Frog (Rana Pipiens)*, 23 ENV'T TOXICOLOGY & CHEM. 2745 (2004); Cheng et al., *Thyroid Disruption Effects of Environmental Level Perfluorooctane Sulfonates (PFOS) in Xenopus Laevis*, 20 ECOTOXICOLOGY 2069–78 (2011); Lou et al., *Effects of Perfluorooctanesulfonate and Perfluorobutanesulfonate on the Growth and Sexual Development of Xenopus Laevis*, 22 ECOTOXICOLOGY 1133–44 (2013).

[39] Guillette et al., *Blood Concentrations of Per- and Polyfluoroalkyl Substances Are Associated with Autoimmune-like Effects in American Alligators From Wilmington, North Carolina*, FRONTIER TOXICOLOGY 4:1010185 (Oct. 20, 2022).

[40] Liu et al., *Oxidative Toxicity of Perfluorinated Chemicals in Green Mussel and Bioaccumulation Factor Dependent Quantitative Structure-Activity Relationship*, 33 ENV'T TOXICOLOGY & CHEM. 2323–32 (2014); Liu et al., *Immunotoxicity in Green Mussels under Perfluoroalkyl Substance (PFAS) Exposure: Reversible Response and Response Model Development*, 37 ENV'T TOXICOLOGY & CHEM. 1138–45 (2018).

[41] Houde et al., *Endocrine-Disruption Potential of Perfluoroethylcyclohexane Sulfonate (PFECHS) in Chronically Exposed Daphnia Magna*, 218 ENV'T POLLUTION 950–56 (2016); Liang et al., *Effects of Perfluorooctane Sulfonate on Immobilization, Heartbeat, Reproductive and Biochemical Performance of Daphnia Magna*, 168 CHEMOSPHERE 1613–18 (2017); Ji et al., *Oxicity of Perfluorooctane Sulfonic Acid and Perfluorooctanoic Acid on Freshwater Macroinvertebrates (Daphnia Magna and Moina Macrocopa) and Fish (Oryzias Latipes)*, 27 ENV'T TOXICOLOGY & CHEM. 2159 (2008); MacDonald et al., *Toxicity of Perfluorooctane Sulfonic Acid and Perfluorooctanoic Acid to Chironomus Tentans*, 23 ENV'T TOXICOLOGY & CHEM. 2116 (2004).

[42] *See supra* notes 37–41.

[43] Carol F. Kwiatkowski, et al., *Scientific Basis for Managing PFAS as a Chemical Class*, ENV'T SCI. & TECH. LETTERS 8–9 (2020).

[44] *See What are PFAS?*, AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, https://www.atsdr.cdc.gov/pfas/health-effects/overview.html (last visited June 25, 2023); *see also Our Current Understanding of the Human Health and Environmental Risks of PFAS*, *supra* note 24.

[45] Nadia Barbo, et al., *Locally Caught Freshwater Fish Across the United States Are Likely A Significant Source of Exposure to PFOS and Other Perfluorinated Compounds*, 220 ENV'T RES. 115165 3 (2023), *available at* https://perma.cc/SB8F-C3Y6.

[46] *Id.* at 4.

[47] Patricia A. Fair et al., *Perfluoralkyl Substances (PFASs) in Edible Fish Species from Charleston Harbor and Tributaries, South Carolina, United States: Exposure and Risk Assessment*, 171 ENV'T. RES. 266, 273–75 (April 2019), https://perma.cc/7976-XAVU; Chloe Johnson, *Industrial chemicals in Charleston Harbor taint fish – and those who eat them*, POST & COURIER (June 4, 2022), https://perma.cc/Z5TM-MB83.

significant source of exposure to PFOS and potentially other perfluorinated compounds for all persons who consume freshwater fish, but especially for high frequency freshwater fish consumers."[48] Other states have adopted health advisories for fish consumption[49] and it is reasonable to believe that North Carolina will soon because of the high levels of PFAS that have been recorded in the Cape Fear River.[50]

As mentioned, sampling conducted in 2019 confirmed that Harnett Regional discharges PFAS at concentrations ranging between 104 ppt and 240 ppt.[51] Like 1,4-dioxane, despite this sampling, Harnett Regional did not disclose its PFAS pollution in its permit application.

II. Harnett Regional receives toxic leachate from the Sampson County Landfill.

The toxic pollution flowing to the utility is likely from the Sampson County Landfill. Harnett Regional has a contract to treat leachate from the Sampson County landfill,[52] which accepts sludge from known sources of PFAS and 1,4-dioxane. For instance, Chemours sends the sludge created from its onsite wastewater treatment processes to the landfill for disposal.[53] Additionally, DAK Americas, a resins manufacturer, sends some of the sludge produced during its wastewater treatment process to the landfill.[54]

In 2020, the Department sampled leachate from major landfills across the state as well as the influent from wastewater plants that accepted the respective leachate. The results of that sampling confirm that leachate from the Sampson County landfill contains 1,4-dioxane at concentrations as high as 184 ppb.[55] PFOA and PFOS were detected in the leachate at 1,790 and 222 ppt, respectively.[56] And GenX (another harmful PFAS) was detected at 10,800 ppt.[57]

The concentration of PFAS and 1,4-dioxane in the Sampson County landfill's leachate may have increased over the past several years. DAK Americas has increased its production, thereby increasing the amount of the chemical it has released into the environment.[58] Similarly,

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[48] Barbo, *supra* note 45 at 9.
[49] *See, e.g.*, *PFAS in Fish*, MICH. PFAS ACTION RESPONSE TEAM, https://www.michigan.gov/pfasresponse/fishandwildlife/fish (last visited May 23, 2023); *Fish Consumption Advisories*, MASS.GOV, https://www.mass.gov/lists/fish-consumption-advisories (last visited May 23, 2023); *Maine CDC Issues Additional Advisories on Eating Freshwater Fish Due to PFAS Contamination*, ME. DEP'T OF HEALTH AND HUMAN SERVS. (Apr. 27, 2023), https://www.maine.gov/dhhs/news/maine-cdc-issues-additional-advisories-eating-freshwater-fish-due-pfas-contamination-thu-04272023-1200.
[50] *See* Frannie Nilsen, N.C. Dep't of Env't Quality, *Summer 2022 Water and Fish Collection Event* (Aug. 1, 2022), at slide 2, *available at* https://www.deq.nc.gov/science-advisory-panel/meeting-documents/water-and-fish-work-summary-presentation-ssab-august-1-2022/download?attachment (explaining that sampling collected over the past year was, in part, to inform fish consumption advisories).
[51] Cape Fear Municipal PFAS & 1,4-dioxane Sampling, *supra* note 4.
[52] Harnett Regional Pretreatment Report, *supra* note 5 at 2.
[53] DeVane, *supra* note 6.
[54] DAK Americas, *supra* note 7 at PDF pg. 14.
[55] 2020 Landfill Leachate Study, *supra* note 5 at Table 8.
[56] *Id.*
[57] *Id.* (listing PFPrOPrA, which is another chemical name for GenX).
[58] *See TRI Toxics Tracker*, U.S. ENV'T PROT. AGENCY, https://edap.epa.gov/public/extensions/TRIToxicsTracker/TRIToxicsTracker.html#continue (last visited June 25, 2023); *see also* Dak Americas, 2012-2021 TRI Water Releases Summary (2023), Attachment 5 (spreadsheet pulled from TRI Toxics Tracker on May 2, 2023 summarizing DAK's releases of 1,4-dioxane by poundage per year).

the amount of PFAS-laden sludge produced by Chemours has likely increased. In 2020 Chemours sent 182,460 pounds of sludge for disposal off-site.[59] But since that year, the facility has started to pump and treat heavily contaminated groundwater from the facility increasing the amount of flow into its treatment system and the sludge produced. Increased amounts of contaminated sludge sent to the landfill may have led to an increased concentration of both PFAS and 1,4-dioxane in the landfill's leachate, suggesting that the pollution flowing into Harnett Regional's wastewater plant could be more severe than previously understood. In recognition that landfills, such as the Sampson County Landfill are dumping grounds for harmful industrial chemical pollution, the Department has required that all landfills begin sampling for PFAS at regular intervals.[60] This required sampling will present a fuller picture of the scope of toxic pollution flowing to the plant.

III. Harnett Regional should be controlling pollution from the landfill through its pretreatment program.

While Harnett Regional receives PFAS and 1,4-dioxane laden leachate from the Sampson County landfill, the utility does not appear to regulate the leachate flowing to its facility through its pretreatment program. Harnett Regional references the contract in its pretreatment annual report but does not appear to have given the landfill a pretreatment permit nor regularly disclosed any pollution that the landfill sends to the utility.[61] As a result, the landfill is not mentioned in any of the Department's permitting materials accompanying this draft permit.

The Clean Water Act requires wastewater plants like Harnett Regional to control pollutants, including PFAS and 1,4-dioxane, through their pretreatment program. The pretreatment program governs the discharge of industrial wastewater to wastewater treatment plants and is intended to place the burden of treating polluted discharges on the entity that creates the pollution, rather than on the taxpayers that support municipal wastewater plants. Landfills—including landfills with toxic leachate—should be incorporated into pretreatment programs.[62]

Under the pretreatment requirements, utilities are required to know what waste they receive from their "Industrial Users."[63] EPA has confirmed that this requirement extends to pollutants that are not conventional or listed as toxic, like PFAS.[64] The same is true for 1,4-dioxane. Utilities like Harnett Regional must instruct their industries, including the landfill, to identify their pollutants in an industrial waste survey[65] and then to apply for a pretreatment permit by disclosing "effluent data," including information on internal waste streams, necessary

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[59] Chemours Fayetteville Works, NPDES Permit Application Update NC003573 (June 2021), at PDF pg. 119.
[60] Memorandum from Ed Mussler, N.C. Div. of Waste Mgmt., Re: PFAS Monitoring Requirements for Solid Waste Sanitary Landfills (Mar. 13, 2023), https://perma.cc/X7HN-Q2K3.
[61] *See generally* Harnett Regional Pretreatment Report, *supra* note 5.
[62] *See e.g.*, U.S. Env't Prot. Agency, Effluent Guidelines Program Plan 15 (Jan. 2023), at 6-13, https://www.epa.gov/system/files/documents/2023-01/11143_ELG%20Plan%2015_508.pdf (explaining that landfills are already part of the effluent guidelines program and that the category should be amended to address PFAS discharges into surface waters or wastewater plants).
[63] 40 C.F.R. § 403.8(f)(2).
[64] *See* U.S. Env't Prot. Agency, PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024 14 (Oct. 2021), available at https://perma.cc/LK4U-RLBH; EPA's PFAS NPDES Guidance, *supra* note 11 at 4.
[65] 40 C.F.R. § 403.8(f)(2)(ii); U.S. Env't Prot. Agency, Introduction to the National Pretreatment Program, at 4-3 (June 2011), *available at* https://www.evansvillegov.org/egov/documents/1499266949_62063.pdf.

to evaluate pollution controls.[66] Significant industrial users are further required to provide information on "[p]rincipal products and raw materials . . . that affect or contribute to the [significant industrial user's] discharge."[67]

A utility is required to regulate its industries so that industries do not cause "pass through" or "interference," or otherwise violate pretreatment laws.[68] "Pass through" is when an industrial discharge causes the wastewater plant to violate its own NPDES permit,[69] including standard conditions such as the one requiring permittees to "take all reasonable steps to minimize or prevent any discharge or sludge use" that has a "reasonable likelihood of adversely affecting human health or the environment."[70] Industries are also not permitted to interfere with publicly-owned treatment works operations. "Interference" occurs when a discharge disrupts the treatment works' operation or its sludge use or disposal and violates the facility's NPDES permit or other applicable laws.[71] Violating the prohibitions on pass through or interference constitutes a violation of the Clean Water Act's pretreatment standards and requirements.[72] Utilities must also act "immediately and effectively to halt or prevent any discharge of pollutants to the [treatment works] which reasonably appears to present an imminent endangerment to the health or welfare of persons."[73]

These rules are how the Clean Water Act "assures the public that [industrial] dischargers cannot contravene the [Clean Water Act's] objectives of eliminating or at least minimizing discharges of toxic and other pollutants simply by discharging indirectly through [wastewater treatment plants] rather than directly to receiving waters."[74] The laws governing the program ensure that municipally owned wastewater plants do not become dumping grounds for uncontrolled industrial waste.

IV. The Department has the authority and obligation to set limits for PFAS and 1,4-dioxane in this NPDES permit.

In December 2022, EPA released guidance instructing state agencies how to address PFAS through existing NPDES authorities.[75] The same tools embodied in the guidance exist for 1,4-dioxane. Federal and state law, as well as EPA's guidance make clear that if the landfill is

[66] U.S. Env't Prot. Agency, Industrial User Permitting Guidance Manual (2012), at 4-2 to 4-3, *available at* https://www.epa.gov/sites/default/files/2015-10/documents/industrial_user_permitting_manual_full.pdf.
[67] 40 C.F.R. § 122.21(j)(6)(ii)(C).
[68] *Id.* §§ 403.8(a), 403.5(a)(1).
[69] Pass through is defined as "a discharge which exits the [treatment works] into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the [treatment works'] NPDES permit (including an increase in the magnitude or duration of a violation)." *Id.* § 403.3(p).
[70] *Id.* § 122.41(d).
[71] *Id.* § 403.3(k).
[72] 40 C.F.R. § 403.5(a)(1).
[73] *Id.* § 403.8(f)(1)(vi)(B).
[74] General Pretreatment Regulations for Existing and New Sources, 52 Fed. Reg. 1586, 1590 (Jan. 14, 1987) (codified at 40 C.F.R. § 403).
[75] EPA's PFAS NPDES Guidance, *supra* note 11.

continuing to send PFAS and 1,4-dioxane laden sludge to the facility, the Department must consider effluent limits to control Harnett Regional's pollution.

The Clean Water Act requires permitting agencies to, at the very least, incorporate technology-based effluent limitations on the discharge of pollutants.[76] When EPA has not issued a national effluent limitation guideline for a particular industry,[77] permitting agencies must implement technology-based effluent limits on a case-by-case basis using their "best professional judgment."[78] North Carolina water quality laws further state that utilities must be treated like an industrial discharger if an industrial user "significantly impact[s]" a wastewater treatment system.[79] In this situation, the agency must consider technology-based effluent limits for the utility, even if effluent limits and guidelines have not been published and adopted.[80]

Effective treatment technologies for PFAS are available. Relevant here, a reverse osmosis treatment system installed at the Seneca Meadows Landfill in New York has virtually eliminated PFAS discharges from the landfill sent to the Seneca Falls wastewater plant.[81] The reverse osmosis plant costs the landfill approximately three cents per gallon suggesting that the treatment is not only effective, but also affordable.[82] Like reverse osmosis, granular activated carbon is a cost-effective and efficient technology that can reduce PFAS concentrations to virtually nondetectable levels. A granular activated carbon treatment system at the Chemours' facility, for example, has reduced PFAS concentrations as high as 345,000 ppt from a creek contaminated by groundwater beneath the facility to nearly nondetectable concentrations.[83] The Department must consider the feasibility of using these technologies or similarly effective technologies to control Harnett Regional's PFAS discharges—either at the point of the discharge or at the landfill.

As with PFAS, treatment technologies for 1,4-dioxane are available. For instance, the chemical can be removed using advanced oxidation processes, such as using ultraviolet light in combination with hydrogen peroxide.[84] Such a process has been used at the Tucson International

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[76] 40 C.F.R. § 125.3(a) ("Technology-based treatment requirements under section 301(b) of the Act represent the *minimum* level of control that *must* be imposed in a permit…" (emphasis added)); *see also* 33 U.S.C. § 1311; *see also* EPA's PFAS NPDES Guidance, *supra* note 11 at 3.
[77] 33 U.S.C. § 1314(b).
[78] 40 C.F.R. § 125.3; *see also* 33 U.S.C. § 1342(a)(1)(B); 15A N.C. Admin. Code 2B.0406.
[79] 15A N.C. Admin. Code 2B.0406(a)(1).
[80] *Id.*
[81] *See* David Shaw, *Two Area Landfills Show High PFAS Levels in Leachate*, Finger Lakes Times (Apr. 9, 2022), https://www.fltimes.com/news/two-area-landfills-show-high-pfas-levels-in-leachate/article_81f25f53-4c2a-58ee-a378-8c35c5bcf872.html; Cornerstone Engineering and Geology, Seneca Meadows Landfill 2022 Annual Report 209-4233133 (Mar. 1, 2023), at 3-1 *available at* https://perma.cc/UQ2W-7CZW.
[82] Seneca Meadows Landfill 2022 Annual Report, *supra* note 81 at 7-3.
[83] *See* Parsons, Engineering Report – Old Outfall 002 GAC Pilot Study Results (Sept. 2019), *available at* https://www.chemours.com/ja/-/media/files/corporate/12e-old-outfall-2-gac-pilot-report-2019-09-30.pdf?rev=6e1242091aa846f888afa895eff80e2e&hash=040CAA7522E3D64B9E5445ED6F96B0FB; *see also* Chemours Outfall 003, NPDES No. NC0089915 Discharge Monitoring Reports (2020–2022), *available at* https://perma.cc/8YND-XT5M.
[84] Amie C. McElroy, et al., *1,4-Dioxane in drinking water: emerging for 40 years and still unregulated*, 7 CURRENT OPINION IN ENV'T SCIENCE & HEALTH 117, 119 (2019), *available at* https://agris.fao.org/agris-search/search.do?recordID=US201900256076.

Airport Area Superfund Site to remove legacy 1,4-dioxane contamination.[85] That treatment system can remove over 97 percent of the chemical from polluted water.[86] Treatment technology for 1,4-dioxane has also been installed at industries in North Carolina that discharge into municipal sewer systems.[87] The Department must assess treatment technology available to control Harnett Regional's 1,4-dioxane waste.

If technology-based limits are not enough to ensure compliance with water quality standards, the Department must include water quality-based effluent limits in the permit.[88] North Carolina's toxic substances standard protects the public from the harmful effects of toxic chemicals, like PFAS and 1,4-dioxane.[89] For instance, the toxic substances standard mandates that the concentration of cancer-causing chemicals shall not result in "unacceptable health risks," defined as "more than one case of cancer per one million people exposed."[90] In order to comply with the Clean Water Act, therefore, the Department must analyze appropriate treatment technology and then determine if a discharger's pollution has the "reasonable potential to cause, or contribute" to pollution at levels that could harm human health.[91]

In acknowledgement of this requirement, the Department has already calculated effluent limits for 1,4-dioxane using this water quality standard—43.7 ppb for the expanded wastewater plant.[92] The Department, however, did not set limits in the draft permit citing a need for more information.[93] If the Department truly needs more information to know if the utility will exceed the calculated limits, it needs to demand that information during the application process. It cannot ask communities downstream to wait an undetermined amount of time for the Department to reopen the permit.

While the Department has calculated possible limits for 1,4-dioxane, it has neglected to do the same for PFAS. This is particularly worrisome when the concentrations of PFAS in the landfill's leachate are so high. The Department must evaluate the utility's PFAS discharges and limit them appropriately.

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[85] *See Advanced Treatment for 1,4-Dioxane – Tucson Removes Contamination Through UV-oxidation*, TROJANUV CASESTUDIES (2019), *available at* https://www.resources.trojanuv.com/wp-content/uploads/2018/05/Treatment-of-Groundwater-Contaminated-with-14-Dioxane-Tucson-Arizona-Case-Study-Environmental-Contaminant-Treatment.pdf.

[86] *Id.* at 2; *see also Educational Brochure,* TUCSON AIRPORT AREA REMEDIATION PROJECT, *available at* https://www.tucsonaz.gov/files/water/docs/AOP_TARP_educational_signs.pdf.

[87] *See* City of Greensboro, EMC SOC WQ S19-010 Year One Report: May 1, 2021 – April 30, 2022 4 (June 13, 2022), *available at* https://www.greensboro-nc.gov/home/showpublisheddocument/53017/637908166316270000.

[88] 40 C.F.R. § 122.44(d)(1)(i); *see also* 33 U.S.C. § 1311(b)(1)(C); 15A N.C. Admin. Code 2H.0112(c) (stating that Department must "reasonably ensure compliance with applicable water quality standards and regulations").

[89] 15A N.C. Admin. Code 2B.0208.

[90] *Id.* at 2B.0208(a)(2)(B).

[91] 40 C.F.R. § 122.44(d)(1)(i).

[92] North Harnett Draft Fact Sheet, *supra* note 3 at 15.

[93] *Id.*

V. The Department has the authority and obligation to set conditions requiring Harnett Regional to control any PFAS and 1,4-dioxane coming from the landfill.

In addition to using effluent limits to control PFAS and 1,4-dioxane pollution, the Department has tools and obligations under the Clean Water Act's pretreatment program.[94] Just last December, EPA recognized that incorporating PFAS into the pretreatment program is an important tool for state agencies to utilize when faced with wastewater treatment plants that are a source of PFAS contamination.[95] The same is true for 1,4-dioxane.

Utilities like Harnett Regional have broad authority to control their industries so that municipally owned treatment works can comply with the pretreatment laws discussed in Section III. They can "deny or condition" pollution permits for industries, control industrial pollution "through Permit, order or similar means," and "require" "the installation of technology."[96] Utilities can also implement local limits to control industrial pollution sent to treatment works in the first place.[97] In recognition of that authority, EPA's PFAS NPDES Guidance explicitly directs that permits issued to wastewater treatment plants, like Harnett Regional, "contain requirements to identify and locate all possible [industrial users]" that is "expected or suspected for PFAS discharges."[98] This directive is all the more important here because Harnett Regional has not previously reported information about the landfill in its annual reports.[99] Once sources are identified, EPA recommends that utilities develop local limits for PFAS or impose best management practices to control the pollution at the source.[100]

The Department, as the approval authority of Harnett Regional's pretreatment program should incorporate similar directives here. The Department should therefore include conditions in Harnett Regional's permit to require the town to: (1) add the Sampson County landfill to its industrial user survey, (2) determine all industrial sources of PFAS and 1,4-dioxane, and (3) control any industrial sources of the chemicals "through Permit, order," "the installation of technology,"[101] local limits,[102] or other means under the Clean Water Act pretreatment program.

As stated in EPA's NPDES Permit Writers' Manual, "NPDES permits drive the development and implementation of pretreatment programs."[103] They do so by requiring "control mechanisms issued to significant industrial users," "compliance monitoring activities," and "swift and effective enforcement."[104] The Department must impose the above conditions in Harnett Regional's permit for PFAS and 1,4-dioxane.

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[94] 40 C.F.R. § 403.8.
[95] EPA's PFAS NPDES Guidance, *supra* note 11 at 4.
[96] 40 C.F.R. § 403.8(f)(1).
[97] *Id.* § 403.5.
[98] *Id.*
[99] *See* Harnett Regional Pretreatment Report, *supra* note 5.
[100] EPA's PFAS NPDES Guidance, *supra* note 11 at 4.
[101] 40 C.F.R. § 403.8(f)(1) (emphasis added).
[102] *Id.* § 403.5.
[103] U.S. Env't Prot. Agency, NPDES Permit Writers' Manual 9-10 (2010), *available at* https://www.epa.gov/sites/default/files/2015-09/documents/pwm_2010.pdf.
[104] *Id.*

VI. Conclusion.

In summary, the Department must use this NPDES permit to control PFAS and 1,4-dioxane waste being released into the Cape Fear River upstream of a city's water supply. The Department should impose the permit limit it has already calculated for 1,4-dioxane and calculate a similar limit for PFAS. In addition, because this contamination is likely coming from the Sampson County landfill, which does not appear to be presently controlled through Harnett Regional's pretreatment program, the Department must include conditions instructing the utility to add the landfill to its pretreatment program and control the toxic waste at the source—before it reaches the wastewater treatment plant. Because the draft permit fails to meet these requirements, it should be amended.

Thank you for considering these comments. Please contact me at 919-967-1450 or *hnelson@selcnc.org* if you have any questions regarding this letter.

Sincerely,

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