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December 1, 2021

Members of the State Water Commission:

Please accept the following comments from the Southern Environmental Law Center (SELC) on addressing per- and polyfluoroalkyl substances (PFAS) contamination in Virginia. The Virginia Department of Health (VDH) presented information about the state's on-going work on PFAS pollution during today's State Water Commission meeting. SELC is a non-profit, non-partisan organization that is working in six states—Virginia, North Carolina, South Carolina, Georgia, Alabama, and Tennessee—and at the federal level to protect the basic right to clean air, clean water, and a livable climate; to preserve our region's natural treasures and rich biodiversity; and to provide a healthy environment for all. SELC has significant experience with PFAS contamination issues due to our involvement with the GenX pollution crisis in North Carolina's Cape Fear River.

PFAS are toxic chemicals that have substantial human health and environmental impacts and are not effectively removed from wastewater by traditional treatment techniques. VDH's initial study of PFAS in drinking water is an important first step towards addressing PFAS contamination in Virginia, but more needs to be done to stop this contamination at its source.

The Virginia Department of Environmental Quality (DEQ) has authority under the Clean Water Act to require polluters to disclose whether their discharges contain PFAS—providing important information about the state of PFAS contamination in the Commonwealth—and to establish technology-based effluent limitations for these chemicals. We encourage the Commission to work to ensure that DEQ uses and enforces this existing authority to address PFAS pollution. Until the discharge of PFAS is controlled at the source, drinking water suppliers—and ultimately the public—will continue to bear the risks and costs of removing PFAS from drinking water, and PFAS will continue to enter the environment uncontrolled.

I. PFAS are toxic chemicals that are harmful to human health and the environment.

PFAS are a toxic class of man-made chemicals that have been used in manufacturing since the 1940s.[1] They are used in the production of coatings for non-stick cookware, stain-resistant carpeting and upholstery, grease-resistant pizza boxes, and waterproof outdoor gear.[2] PFAS are found in numerous other consumer and industrial products, as well as in firefighting foam used at airports and military installations.[3]

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[1] U.S. ENVTL. PROT. AGENCY (EPA), *Our Current Understanding of the Human Health and Environmental Risks of PFAS*, https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas (last visited Oct. 27, 2021).

[2] *See id.*; AGENCY FOR TOXIC SUBSTANCES & DISEASE REGISTRY (ATSDR), PFAS: AN OVERVIEW OF THE SCIENCE AND GUIDANCE FOR CLINICIANS ON PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) 3 (2019), https://www.atsdr.cdc.gov/pfas/docs/ATSDR_PFAS_ClinicalGuidance_12202019.pdf.

[3] EPA, *supra* note 1.

It is well established that PFAS are a threat to the health and safety of the public. Two of the most commonly studied PFAS, perfluorooctanoic acid (PFOA) and perfluorooctyl sulfonate (PFOS), have been found to cause developmental effects to fetuses and infants, kidney and testicular cancer, liver malfunction, hypothyroidism, high cholesterol, ulcerative colitis, lower birth weight and size, obesity, decreased immune response to vaccines, reduced hormone levels and delayed puberty.[4] Additionally, based upon a review of the existing literature, it is thought that PFAS exposure—because of its effect on the immune system—can exacerbate the effects of Covid-19.[5] Epidemiological studies show that many of these same health outcomes result from exposure to other types of PFAS.[6]

The U.S. Environmental Protection Agency (EPA) established a lifetime health advisory of 70 parts per trillion (ppt) for the combined concentrations of PFOA and PFOS in drinking water in 2016.[7] The Agency for Toxic Substances and Disease Registry (ATSDR) has since released an updated *Toxicological Profile for Perfluoroalkyls* and the report suggests that many of the chemicals are much more harmful than previously thought.[8] States like Michigan, New York, New Hampshire, New Jersey, and Vermont have acknowledged the dangers of these compounds and have either proposed or finalized drinking water standards for various PFAS that are 20 ppt or lower.[9]

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[4] Blum et al., *The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs)*, 123 ENVTL. HEALTH PERSP. 5, A 107 (May 2015); EPA, FACT SHEET ON PFOA & PFOS DRINKING WATER HEALTH ADVISORIES 2 (Nov. 2016), https://bit.ly/37o3eWp.

[5] *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.

[6] ATSDR, TOXICOLOGICAL PROFILE FOR PERFLUOROALKYLS 5–6, 25–29 (May 2021), https://www.atsdr.cdc.gov/toxprofiles/tp200.pdf.

[7] EPA, *supra* note 4, at 2.

[8] ATSDR, *supra* note 6.

[9] Press Release, Mich. Dep't of Env't, Great Lakes, and Energy, *Michigan Moves Forward on PFAS in Drinking Water Rules* (Jun. 27, 2019), https://www.michigan.gov/egle/0,9429,7-135-3308_3323-500772--,00.html; *New York to Set Limits for Industrial Chemicals in Water*, AP (July 8, 2019), https://bit.ly/2zvrw4m; Annie Ropeik, *N.H. Approves Unprecedented Limits for PFAS Chemicals in Drinking Water*, NHPR (July 18, 2019), https://bit.ly/3dXqYTF; VT. AGENCY OF NAT. RES., *Agency of Natural Resources Initiates Rulemaking Process to Adopt Maximum Contaminant Level for PFAS Compounds*, https://bit.ly/2XUv6y6. (last visited Feb. 25, 2021); Kyle Bagenstose, *New Jersey Approves Drinking Water Standards for Toxic PFAS Chemicals. Will Legal Battles Follow?*, USA TODAY (Apr. 7, 2020), https://bit.ly/2AxAqPh.

PFAS are also harmful to the environment. They have been shown to cause harmful effects in fish,[10] amphibians,[11] mollusks,[12] and other aquatic invertebrates[13]—resulting in developmental and reproductive impacts, behavioral changes, adverse effects to livers, disruption to endocrine systems, and weakened immune systems.[14] Moreover, PFAS are extremely resistant to breaking down in the environment, can travel long distances, and bioaccumulate.[15]

II. PFAS contamination must be controlled at the source.

Virginia will now move forward with establishing drinking water standards for some PFAS, as required by HB1257 (2020). Strong standards will help ensure that Virginians have safe and clean drinking water, but they will not stop the contamination of drinking water in the first place. Tools already exist for DEQ to begin to address PFAS contamination at the source, and the Commission should work to ensure that DEQ uses and enforces its existing authority.

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[10] Chen et al., *Perfluorobutanesulfonate Exposure Causes Durable and Transgenerational Dysbiosis of Gut Microbiota in Marine Medaka*, 5 ENVTL. 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 Life-Cycle 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 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 ENVTL. 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 ENVTL. TOXICOLOGY & CHEM. 942–48 (2018).

[11] Ankley et al., *Partial Life-Cycle Toxicity and Bioconcentration Modeling of Perfluorooctanesulfonate in the Northern Leopard Frog (Rana Pipiens)*, 23 ENVTL. 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).

[12] Liu et al., *Oxidative Toxicity of Perfluorinated Chemicals in Green Mussel and Bioaccumulation Factor Dependent Quantitative Structure-Activity Relationship*, 33 ENVTL. TOXICOLOGY & CHEM. 2323–32 (2014); Liu et al., *Immunotoxicity in Green Mussels under Perfluoroalkyl Substance (PFAS) Exposure: Reversible Response and Response Model Development*, 37 ENVTL. TOXICOLOGY & CHEM. 1138–45 (2018).

[13] Houde et al., *Endocrine-Disruption Potential of Perfluoroethylcyclohexane Sulfonate (PFECHS) in Chronically Exposed Daphnia Magna*, 218 ENVTL. 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 ENVTL. TOXICOLOGY & CHEM. 2159 (2008); MacDonald et al., *Toxicity of Perfluorooctane Sulfonic Acid and Perfluorooctanoic Acid to Chironomus Tentans*, 23 ENVTL. TOXICOLOGY & CHEM. 2116 (2004).

[14] *See* supra notes 10–13.

[15] ATSDR, *supra* note 6.

a. <u>Under the Clean Water Act, undisclosed PFAS discharges are illegal, whether direct or indirect.</u>

The Clean Water Act generally prohibits discharges to water bodies.[16] The National Pollutant Discharge Elimination System (NPDES) permitting program, implemented in Virginia as the Virginia Pollutant Discharge Elimination System (VPDES) program, is a limited exception to that prohibition,[17] and discharges under the program cannot be approved unless they are adequately disclosed.[18] EPA has stressed the need for disclosure during the permitting process of pollutants that may be discharged:

> [D]ischargers have a duty to be aware of any significant pollutant levels in their discharge. […] Most important, [the disclosure requirements] provide the information which the permit writers need to determine what pollutants are likely to be discharged in significant amounts and to set appropriate permit limits. […] [P]ermit writers need to know what pollutants are present in an effluent to determine appropriate permit limits in the absence of applicable effluent guidelines.[19]

The EPA Environmental Appeals Board's decision in *In re: Ketchikan Pulp Company* further emphasized the importance of disclosure,[20] and this decision has been adopted by the Fourth Circuit. In *Piney Run Preservation Ass'n v. County Commissioners*, the Fourth Circuit stated:

> The *Ketchikan* decision therefore made clear that a permit holder is in compliance with the [Clean Water Act] even if it discharges pollutants that are not listed in its permit, as long as it only discharges pollutants that have been adequately disclosed to the permitting authority. […] *To the extent that a permit holder discharges a pollutant that it did not disclose, it violates the NPDES permit and the [Clean Water Act]*.[21]

Disclosure of PFAS discharges through VPDES permit applications is a key tool to understanding PFAS sources in the Commonwealth, and permit conditions can then be used to reduce and control these discharges.

Linked to this prohibition, municipalities that own and operate wastewater treatment plants are required to "fully and effectively exercise[] and implement[]" their authority to "[i]dentify the character and volume of pollutants contributed to the [publicly owned treatment works]" by Industrial Users, or the industrial facilities that release wastewater into treatment plants.[22] Municipalities that fail to do so—thereby neglecting their obligations under pretreatment regulations—risk discharging industrial chemicals that were not disclosed in the

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[16] 33 U.S.C. § 1311(a).
[17] *Nat'l Ass'n of Home Builders v. Defs. of Wildlife*, 551 U.S. 644, 650 (2007).
[18] *See In re Ketchikan Pulp Co.*, 7 E.A.D. 605 (EPA 1998); *Piney Run Pres. Ass'n v. Cty. Comm'rs*, 268 F.3d 255 (4th Cir. 2001); *S. Appalachian Mountain Stewards v. A&G Coal Corp.*, 758 F.3d 560 (4th Cir. 2014).
[19] Consolidated Permit Application Forms for EPA Programs, 45 Fed. Reg. 33516, 33526 (May 19, 1980).
[20] *See In re Ketchikan Pulp Co.*, 7 E.A.D. 605.
[21] *Piney Run*, 268 F.3d at 268 (emphasis added).
[22] 40 C.F.R. § 403.8(f)(1)(vi)(B).

permitting process, were not reasonably contemplated by DEQ, and have not been expressly or implicitly approved in a municipality's permit.

b. Case-by-case technology-based limits are a key tool that DEQ must use to control PFAS.

Technology-based effluent limits are "the minimum level of control that *must be imposed* in a permit."[23] These limits "are developed independently of the potential impact of a discharge on the receiving water, which is addressed through water quality standards and water quality-based effluent limitations."[24] As EPA has recognized, "technology-based limits aim to prevent pollution by requiring polluters to install and implement various forms of technology designed to reduce the pollution discharged into the nation's waters."[25]

When EPA has not issued a national effluent limitation guideline for a particular industry,[26] permitting agencies must implement technology-based effluent limits on a case-by-case basis using their "best professional judgment."[27] These types of controls are vital when dealing with pollutants such as PFAS, which lack either nationwide effluent limitation guidelines or water quality standards, yet can be easily controlled using widely applicable technology. For example, granular activated carbon has been found to be capable of removing more than 99 percent of 20 types of PFAS.[28]

c. Failing to control PFAS at the source puts an unreasonable burden on utilities and downstream communities.

Once these chemicals have been released into drinking water supplies, treatment at drinking water treatment plants is extremely costly and difficult due to the volume of water that must be treated.[29] Unfairly, these costs will be borne by communities that bear no responsibility for creating the problem and may already be at risk from drinking polluted water. Rather than

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[23] 40 C.F.R. § 125.3(a) (emphasis added).
[24] EPA, NPDES PERMIT WRITERS' MANUAL 5-1 (Sept. 2010), https://bit.ly/2YeeAt3.
[25] EPA, TECHNICAL ANALYSIS FOR DETERMINATION OF TECHNOLOGY-BASED PERMIT LIMITS FOR THE GUAYNABO DRINKING WATER TREATMENT FACILITY NPDES NUMBER PR0022438 2-1 (Mar. 23, 2009), https://bit.ly/3hLMzAY (hereinafter "Guaynabo TBEL Analysis").
[26] *See* 33 U.S.C. § 1314(b). While EPA plans to develop ELGs for PFAS for several industries, EPA, *supra* note 53, at 13–14, EPA still notes that "the full suite of permitting approaches" under the Clean Water Act should be used to address these chemicals in NPDES permits. *Id.* at 14.
[27] 40 C.F.R. § 125.3; *see also* 33 U.S.C. § 1342(a)(1)(B); 9 VAC 25-31-210, 220.
[28] CHEMOURS COMPANY FC, LLC, ENGINEERING REPORT: OLD OUTFALL 002 GAC PILOT STUDY RESULTS, CHEMOURS FAYETTEVILLE PLANT 17–18 (Sept. 2019), https://www.chemours.com/en/-/media/files/corporate/12e-old-outfall-2-gac-pilot-report-2019-09-30.pdf.
[29] For instance, in North Carolina, public drinking water utilities are spending hundreds of millions of dollars to clean up the water that Chemours has polluted. Brunswick County is planning to spend over $156 million for a reverse osmosis treatment system. Letter from Randell Woodruff, Brunswick Cnty. Manager to Brunswick Cnty. Bd. of Comm'rs 13 (May 17, 2021), https://perma.cc/9JEN-25BB. Cape Fear Public Utility Authority in Wilmington, North Carolina is spending $43 million on a granular activated carbon treatment system. *CFPUA Files Motion to Intervene in North Carolina's Complaint Against Chemours*, WECT NEWS 6 (Sept. 10, 2020), https://perma.cc/Q6LT-EFA3. In January 2020, the Cumberland County Board of Commissioners allocated $10.5 million to pipe clean water to schools and residences whose wells were contaminated. Paul Woolverton, *Cumberland County to Spend $10.5M to Send Water to GenX ContaminatedGray's Creek*, THE FAYETTEVILLE OBSERVER (Jan. 6, 2020), https://perma.cc/E9M7-ZEAM.

taxpayers, it is polluters that should bear the burden of protecting communities against the harms from their toxic chemicals. The most effective way to accomplish this is to use existing authority under the Clean Water Act to require polluters to install control technologies at their facilities to prevent PFAS from entering our water in the first place.

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Thank you for your consideration of these comments. We encourage the Commission to work to ensure that DEQ uses and enforces its existing authority to control PFAS pollution at the source, and we look forward to continued attention by the Commission to this issue.

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