PUBLIC EMPLOYEES FOR ENVIRONMENTAL RESPONSIBILITY
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To: U.S. Senate Committee on Environment & Public Works

From: Public Employees for Environmental Responsibility

Date: July 3, 2023

RE: Draft per- and polyfluoroalkyl substances (PFAS) legislation for stakeholder comment

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Public Employees for Environmental Responsibility (PEER)[1] writes to express our concerns about the draft per- and polyfluoroalkyl substances (PFAS) legislation released by U.S. Senators Tom Carper (D-Del.) and Shelley Moore Capito (R-W.Va.), Chair and Ranking Member of the Senate Environment and Public Works (EPW) Committee, and offer changes for consideration.

The stated goals of the legislation are to: 1) support EPA's ability to address PFAS contamination for communities through infrastructure and new technologies; 2) expand EPA science related to PFAS; and 3) assist communities dealing with PFAS contamination.

Unfortunately, this legislation will fail to achieve these goals. It will undermine state, national and international efforts to address PFAS pollution, lock the nation into a reliance on dangerous PFAS despite the fact that alternatives are available, and allow the chemical industry to continue escaping responsibility for their chemicals' harm to human health and the environment.

Consequently, we urge that this legislation instead: 1) define PFAS as any substance with at least one fully fluorinated carbon atom; 2) regulate PFAS as a class; and 3) not rely on voluntary programs and standard setting organizations in place of strong regulatory action.

I. PFAS Should be Defined Broadly to Capture the Entire Class of Chemicals

This legislation would undermine state, national and national efforts to address PFAS pollution by providing a definition that is so weak and so vague that it could possibly exclude even polytetrafluoroethylene (PTFE, or Teflon), and many refrigerants, in its definition.

Currently, the draft legislation defines PFAS as:

> (A) IN GENERAL.—The term "perfluoroalkyl or polyfluoroalkyl substance" means—
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> (i) a non-polymeric perfluoroalkyl or polyfluoroalkyl substance; and

[1] PEER is a is a nonprofit organization headquartered in Silver Spring, Maryland. PEER's mission includes educating the public and speaking out, as well as providing legal defense to those who speak out, about environmental ethics and compliance with environmental laws. PEER works nationwide with government scientists, land managers, environmental law enforcement agents, field specialists, and other resource professionals committed to responsible management of America's public resources.

(ii) a side chain fluorinated polymer that is a member of a group of human made chemicals that contain at least 2 fully fluorinated carbon atoms.

(B) INCLUSION.—The term "perfluoroalkyl or polyfluoroalkyl substance" includes the degradants of a substance described in clause (i) or (ii) of subparagraph (A).[2]

By requiring at least two fully fluorinated carbon atoms, rather than one fully fluorinated carbon atom, this definition fails to capture the entire class of chemicals and ignores scientific consensus. PFAS, as a class, have diverse molecular structures and physical, chemical and biological properties. The definition contained in this draft legislation leaves many toxic and persistent PFAS outside of federal. A broad regulatory definition is necessary to protect human health and the environment.

In 2011, scientists led by Robert C. Buck, a chemist who then worked at E. I. du Pont de Nemours and Company, published a paper which defined PFAS as highly fluorinated aliphatic compounds with one or more carbon atoms on which all hydrogen substituents are replaced by fluorine atoms and "contain the perfluoroalkyl moiety C_nF_{2n+1}–"[3] In their formula-based definition, Buck and his colleagues contrasted PFAS with molecules that have undergone polyfluorination and contain scattered, multiple fluoride atoms. The team stated, "We consider that only those polyfluorinated substances having at least one perfluoroalkyl moiety CnF2n+1– belong to the PFAS family."[4]

The Organisation for Economic Co-operation and Development (OECD) expanded on Buck's work and defined PFAS as fluorinated substances that contain at least one fully fluorinated methyl or methylene carbon atom (without any H/Cl/Br/I atom attached to it), i.e. with a few noted exceptions, any chemical with at least a perfluorinated methyl group (–CF3) or a perfluorinated methylene group (–CF2–) is a PFAS.[5] This broadened the PFAS universe to include chemicals that lack fluorines at either end of a carbon chain and instead have a hydrogen or a functional group at both ends. It also includes aromatic compounds that have at least one aliphatic side chain containing at least one fully fluorinated, saturated-carbon moiety.

In fact, previously implemented broad definitions of PFAS have been successful in capturing a more inclusive range of PFAS compounds in line with current scientific research. For example, the United State Geological Survey (USGS) performance standard defines PFAS broadly by stating a highly fluorinated compound is as "a perfluoroalkyl substance or a polyfluoroalkyl substance with at least one fully fluorinated carbon atom." 15 U.S.C. § 8931. The U.S. National

[2] Staff Draft Pages 2-3.
[3] Buck et al. Buck RC, Franklin J, Berger U, Conder JM, Cousins IT, De Voogt P, et al. 2011. Perfluoroalkyl and polyfluoroalkyl substances in the environment: terminology, classification, and origins. Integrated Environmental Assessment and Management 7(4), 513–541, https://doi.org/10.1002/ieam.258
[4] *Id.*
[5] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, RECONCILING TERMINOLOGY OF THE UNIVERSE OF PER- AND POLYFLUOROALKYL SUBSTANCES: RECOMMENDATIONS AND PRACTICAL GUIDANCE, (July 9, 2021, https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/CBC/MONO(2021)25&docLanguage=En#:~:text=PFASs%20comprise%20a%20class%20of,to%20be%20reported%20and%20recognized.

Defense Authorization Act (NDAA) includes the PFAS Act of 2019, which adopts a structural definition classifying PFAS as any compound with at least "one fully fluorinated carbon."[6] Similarly, many states, including Colorado, Washington, Maine, Maryland, New York, California[7] and others define PFAS as "a class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom." This definition encompasses a broader range of compounds consistent with OECD.

This proposed definition of PFAS excludes ultra-short-chain PFAS (C=2 or 3). Although many of these PFAS do not have the potential for bioaccumulation, their persistence will result in increasing concentrations in the environment, and we must be very cautious about unfettered use of them.[8] This definition also excludes fluorinated gases and trifluoroacetic acid (TFA), the atmospheric byproduct of certain fluorinated gases. TFA is potentially toxic, and worldwide concern about its use and fate is increasing.[9] A broader definition captures a wider universe of chemical compounds that best represent PFAS as a class, which would further allow EPA the scientific knowledge to adequately protect human health and the environment. Therefore, PEER urges Senators Carper and Moore Capito to define PFAS as any substance with at least one fully fluorinated carbon.

II. PFAS Must be Regulated as a Class

Due to their high persistence, PFAS have the capacity, as a class, to harm human health and the environment and be regulated as such. While the draft legislation contains some language indicating support for regulating PFAS as a class, the lack of definitive and comprehensive language fails to support communities and EPA in tackling the PFAS contamination crisis.

High persistence of chemicals, an important element of chemical hazard assessments, creates the potential to do harm. This is because high persistence indicates the potential for long-lasting human exposure to a chemical that is difficult to control and reverse. In 2019, researchers demonstrated that "if a chemical is highly persistent, its continuous release will lead to continuously increasing contamination irrespective of the chemical's physical–chemical properties."[10] They argue that "increasing concentrations will result in increasing probabilities of the occurrence of known and unknown effects and that, once adverse effects are identified, it will take decades, centuries or even longer to reverse contamination and therefore effects."[11] Therefore, the main concerns with highly persistent chemicals are: 1) their continuous release

[6] https://www.congress.gov/bill/116th-congress/senate-bill/1790/text

[7] Various state statutes define PFAS as "a class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom." *See e.g.*, C.R.S. 25-5-1302; Rev. Code Wash. § 70A.350.010; 32 M.R.S. § 1732; Md. Environment Code Ann. § 6-1601; NY CLS ECL § 37-0101; Cal. Health & Saf. Code § 109000.

[8] Björnsdotter, M.K., Yeung, L.W.Y., Kärrman, A. *et al.* Challenges in the analytical determination of ultra-short-chain perfluoroalkyl acids and implications for environmental and human health. *Anal Bioanal Chem* **412**, 4785–4796 (2020). https://doi.org/10.1007/s00216-020-02692-8

[9] Jieying Zhou, Navid Saeidi, Lukas Y. Wick, Yanlin Xie, Frank-Dieter Kopinke, Anett Georgi, Efficient removal of trifluoroacetic acid from water using surface-modified activated carbon and electro-assisted desorption, Journal of Hazardous Materials, Volume 436, 2022, 129051, ISSN 0304-3894, https://doi.org/10.1016/j.jhazmat.2022.129051

[10] Cousins, Ian T.; Ng, Carla A.; Wang, Zhanyun; Scheringer, Martin (2019). Why is high persistence alone a major cause of concern?. Environmental Science: Processes & Impacts, 21(5), 781–792. doi:10.1039/c8em00515j.

[11] *Id.*

will lead to widespread, long lasting, and increasing contamination; 2) increasing concentrations will result in increasing probabilities that known and unknown effects occur; and 3) once adverse effects are identified, it will be technically challenging, energy intensive, and thus costly, to reverse the chemical contamination and therefore the effects. Therefore, the inherent and intrinsic trait of high persistence in chemicals is sufficient to be considered a hazard that creates the potential to cause harm.

PFAS, as a class, have been found to be a highly persistent class of chemicals, which means that all PFAS inherently have both the potential and capacity to produce harm. PFAS, as a class, share one common, intrinsic, structural feature: perfluoroalkyl moieties.[12] In organic chemistry, a moiety is specific group of atoms within a molecule that is responsible for characteristic chemical reactions of that molecule. The perfluoroalkyl moiety has been found to impart "enhanced properties to molecules (e.g., stronger acidity, higher surface activity at very low concentrations, stability, and/or water- and oil-repellency)" which mean that PFAS are persistent under natural conditions.[13] As there is no current effective risk management around the class of PFAS, these chemicals will continue to be released.[14] The increasing concentrations from this continuous release mean that PFAS, as a class, "have a much higher likelihood for particularly serious (widespread, long-lasting) adverse effects associated with highly persistent chemicals."[15] Additionally, the same chemical properties that make PFAS desirable to manufacture make them particularly hard to remediate.

Therefore, PFAS as a class are inherently highly persistent chemicals due to their perfluoroalkyl moieties, which in turn means that all PFAS are inherently hazardous and should be regulated as a class.

III. Reliance on Voluntary Programs and Standard Setting Organizations Fails Communities

The draft legislation's reliance on voluntary programs and standard setting organizations fail to adequately protect communities from toxic PFAS. Specifically, the legislation directs the Administrator of the EPA to "establish a ***voluntary*** program to identify and promote strategies and technologies that prevent, detect, destroy, or verify emerging contaminants, including perfluoroalkyl or polyfluoroalkyl substances, through ***voluntary*** labeling of, or other forms of communication about, products that prevent the use of, detect, reduce, destroy, or verify

[12] Cousins, Ian T.; DeWitt, Jamie C.; GlÃ¼ge, Juliane; Goldenman, Gretta; Herzke, Dorte; Lohmann, Rainer; Ng, Carla A.; Scheringer, Martin; Wang, Zhanyun (2020). The high persistence of PFAS is sufficient for their management as a chemical class. Environmental Science: Processes & Impacts, (), 10.1039.D0EM00355G–. doi:10.1039/D0EM00355G.

[13] Wang, Zhanyun; DeWitt, Jamie C.; Higgins, Christopher P.; Cousins, Ian T. (2017). A Never-Ending Story of Per- and Polyfluoroalkyl Substances (PFASs)?. Environmental Science & Technology, 51(5), 2508–2518. doi:10.1021/acs.est.6b04806.

[14] Kwiatkowski, Carol F.; Andrews, David Q.; Birnbaum, Linda S.; Bruton, Thomas A.; DeWitt, Jamie C.; Knappe, Detlef R. U.; Maffini, Maricel V.; Miller, Mark F.; Pelch, Katherine E.; Reade, Anna; Soehl, Anna; Trier, Xenia; Venier, Marta; Wagner, Charlotte C.; Wang, Zhanyun; Blum, Arlene (2020). Scientific Basis for Managing PFAS as a Chemical Class. Environmental Science & Technology Letters, acs.estlett.0c00255–. doi:10.1021/acs.estlett.0c00255.

[15] Cousins, Ian T.; Ng, Carla A.; Wang, Zhanyun; Scheringer, Martin (2019). Why is high persistence alone a major cause of concern?. Environmental Science: Processes & Impacts, 21(5), 781–792. doi:10.1039/c8em00515j.

emerging contaminants, including perfluoroalkyl or polyfluoroalkyl substances" (emphasis added). The legislation also directs the formation of a National Standard Setting Organization which would "administer … and coordinate … a ***voluntary*** standards and conformity assessment system in the United States; and … work … in close collaboration with ***stakeholders from industry*** and government to identify and develop standards- and conformance-based solutions to national and global priorities" (emphasis added).

Past attempts to protect consumers from PFAS in household products through voluntary programs have been unsuccessful because when one PFAS compound is phased out due to its toxicity, it is often replaced with another chemical with similar structure, function and potential for harm - a phenomenon that has been termed "regrettable substitution."[16]

The experience with perfluorooctanoic acid (PFOA) and GenX illustrates this issue. Until around 2006, PFOA was widely used in the manufacture of polytetrafluoroethylene (PTFE) and some other fluoropolymers, which are subsequently used to make consumer products, such as non-stick coatings for cookware and bakeware. However, PFOA has been linked to adverse health effects, including cancer, and to reduced effectiveness of childhood vaccines at very low levels of exposure.[17] In 2006, EPA brokered a voluntary agreement with DuPont, 3M and other major PFAS producers to phase out the use of PFOA and related PFAS. In 2013, DuPont introduced GenX as a replacement for PFOA in the production of fluoropolymers.[18] In 2020, the EPA's toxicity assessments of GenX found similar, if not worse, adverse health effects to those from PFOA.[19] While there has been a non-enforceable drinking water health advisory level for PFOA for years, a similarly non-enforceable drinking water health advisory level for GenX was only created in 2022.[20] Meanwhile, people were exposed to GenX for years.

Additionally, standards created by standard setting organizations have failed to adequately include the public within the decision making process, instead letting industry regulate itself. For example, the National Fireman's Protection Association (NFPA), a standard setting organization, created a Light Degradation Resistance Test as a part of NFPA standard 1971, which sets criteria for certification that all components of the firefighting ensemble must pass. The Light Degradation Resistance Test, created as a response to a series of moisture barrier failures which led to serious skin burns, tests the moisture barrier (middle layer) of firefighter turnout gear to

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[16] Arlene Blum et. al, *Organophosphate Ester Flame Retardants: Are They a Regrettable Substitution for Polybrominated Diphenyl Ethers?*, ENVIRON SCI TECHNOL LETT. 2019 Nov 12;6(11):638-649 (2019), *available at* https://pubmed.ncbi.nlm.nih.gov/32494578/; *see also* Linda Birnbaum, Betsy Southerland, and Robert Sussman, *EPA must protect public health by regulating PFAS as a class*, The Hill, (July 30, 2021) https://thehill.com/opinion/energy-environment/565528-epa-must-protect-public-health-by-regulating-pfas-as-a-class.

[17] Philippe Grandjean and Richard Clapp, *Perfluorinated Alkyl Substances: Emerging Insights Into Health Risks*, SAGE JOURNALS, (June 17, 2015) https://journals.sagepub.com/doi/abs/10.1177/1048291115590506.

[18] BUSINESS & HUMAN RIGHTS RESOURCE CENTRE, *Dupont lawsuits (re PFOA pollution in USA)*, https://www.business-humanrights.org/en/latest-news/dupont-lawsuits-re-pfoa-pollution-in-usa/ (Last visited Sept. 20, 2021).

[19] ENVTL. PROT. AGENCY, *GenX Toxicity Assessments Documents*, https://www.epa.gov/pfas/genx-toxicity-assessments-documents (Last updated Apr. 8, 2021).

[20] ENVTL. PROT. AGENCY, *Questions and Answers: Drinking Water Health Advisories for PFOA, PFOS, GenX Chemicals and PFBS*, https://www.epa.gov/sdwa/questions-and-answers-drinking-water-health-advisories-pfoa-pfos-genx-chemicals-and-pfbs#q5 (Last updated Mar. 14, 2023).

determine whether water appears on the surface of the item after exposure to UV light.[21] This test was proposed to NFPA by University of Kentucky textiles professor Elizabeth Easter, who worked with PFAS manufacturers and whose laboratory was established thanks to a $50,000 donation from Lion Apparel, one of the largest manufacturers of firefighting gear, that was matched by the state.[22] Only fluoropolymers materials can pass this test. This NFPA standard was later determined to be based on a master's degree thesis which actually failed to support the need for such a test.[23] NFPA's standard setting committees are filled with members from industry, and when challenged on the requirement to have PFAS in the moisture barrier, industry refused to find fault with the test. Firefighters continue to have elevated levels of PFAS in their blood, a potential reason for the higher cancer rates experienced by firefighters.[24] The PFAS industry has a conflict of interest; they make more money by selling more PFAS-laden materials. Similarly, the provision in this bill to work "in close collaboration with stakeholders from industry" to identify and develop standards will lead to the same conflict of interest.

Voluntary programs developed for PFAS have failed in the past, and standard setting organizations including industry itself have conflicts of interest. These mechanisms also fail to include those most affected, like municipalities and citizens, during the decision making process. Therefore, this draft legislation would continue to allow industry to regulate itself which is wholly insufficient.

Instead, we suggest that any PFAS legislation focus on *mandatory* labeling for all products containing PFAS, and clear regulatory requirements that ban all non-essential uses of PFAS. Currently, industry often makes claims about the non-toxic nature of its products,[25] and consumers are lured into purchasing products that contain PFAS. The burden of discovering whether products contain toxic chemicals should not be on the consumer; rather, these products should be clearly labeled. Finally, every day that we fail to turn off the tap of toxic PFAS pollution dooms us to continued health and environmental impacts.

IV. Conclusion

In sum, PEER writes to respectfully urge changes to the draft legislation submitted by Senators Carper and Moore Capito, as the proposed legislation fails to achieve its stated goals. Heavy reliance on unsuccessful voluntary programs or standard setting organizations does little to support EPA and communities affected by contamination. The PFAS contamination crisis is

[21] *See* FireDex, NFPA 1971 Performance Requirements, https://www.firedex.com/education-resources/nfpa-performance-requirements/nfpa1971/.
[22] Ariel Wittenberg, *Firefighters face hurdles in quest for PFAS-free gear*, E&E News Greenwire (July 13, 2021, 1:50 PM), https://www.eenews.net/articles/firefighters-face-hurdles-in-quest-for-pfas-free-gear/.
[23] Chastity Danielle Newsome, *Evaluation of Moisture Barriers for Fire Fighting Turnout Gear Assessment of Product Failure and Test Method Development Predicting Failure Modes*, https://legacy-assets.eenews.net/open_files/assets/2021/07/13/document_gw_03.pdf (2000).
[24] Front. Mater., 23 March 2023 Sec. Polymeric and Composite Materials Volume 10 - 2023 | https://doi.org/10.3389/fmats.2023.1143411
[25] See, e.g., Dickens v. Thinx, Inc., 1:22-cv-04286, (S.D.N.Y. May 25, 2022) ECF No. 1

national in scope and deserves a strong, targeted approach. Legislation should be focused on defining PFAS broadly, regulating PFAS, and banning all non-essential uses..

Respectfully submitted,

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