Ohio Environmental Council

April 20, 2018

Administrator Scott Pruitt
United States Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Mailcode: 1101A
Washington, DC 20460

Director Peter C. Grevatt
Office of Ground Water and Drinking Water
United States Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
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Acting Principal Deputy Assistant Administrator
Charlotte Bertrand
Office of Chemical Safety and Pollution Prevention United States Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
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Washington, DC 20460

Regional Administrator Cathy Stepp
Region 5
United States Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604

RE: Amended Petitions for Rulemaking regarding Perfluoroalkyl Substances (PFASs)

Dear Administrator Scott Pruitt, Director Peter Grevatt, and Regional Administrator Cathy Stepp:

The Ohio Environmental Council ("OEC") submits the attached amended Petitions for Rulemaking to replace our Petition for Rulemaking submitted on April 10, 2018. In pursuit of regulatory efficiency and expediency, the OEC has decided to retract its Petitions for Rulemaking under the Toxic Substances Control Act and proposes only its Petitions for Rulemaking under the Clean Water Act and Safe Drinking Water Act regarding perfluorooctanoic acid ("PFOA") and other perfluoroalkyl substances ("PFASs").

Please disregard the previously received Petitions for Rulemaking and consider the Petition attached herein. If the United States Environmental Protection Agency requires a digital version of the Petition, we would happily provide a copy via email.

Respectfully submitted,

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BY POSTAL MAIL

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77 West Jackson Boulevard
Chicago, IL 60604

RE: Petitions for Rulemaking regarding Perfluoroalkyl Substances (PFASs)

Dear Administrator Pruitt, Director Grevatt, Acting Principal Deputy Assistant Administrator Bertrand, and Regional Administrator Stepp:

On behalf of the Ohio Environmental Council ("OEC"), please find enclosed for submission a Petition for Rulemaking to establish regulations for perfluorooctanoic acid ("PFOA") and perfluoroalkyl substances ("PFAS" or "PFASs") pursuant to the federal Administrative Procedure Act ("APA"), the Clean Water Act ("CWA"), and Safe Drinking Water Act ("SDWA"). The Petition makes five separate requests under the aforementioned federal laws. The United States Environmental Protection Agency ("EPA") must consider this petition with due diligence and grant these five requests in order to protect the environment as well as the health of hundreds of millions of present and future Americans.

The regulation of PFOA and PFASs is necessary for the protection of human health and the environment. PFOA and PFAS contamination is both a global and a localized problem. In February 2018, Ohio Attorney General Mike DeWine filed suit against DuPont for its pollution of the Ohio River with PFOA and its endangerment of Ohio's public water systems.

The OEC recognizes that the EPA has recently scheduled a "National Leadership Summit to Take Action on PFAS." In his announcement, EPA Administrator Scott Pruitt stated that the agency would provide national leadership while "ensuring that our state, tribal, and local partners

have the opportunity to help shape our path forward." The EPA and all state governors that attend this Summit should use this Petition for Rulemaking as a federal baseline from which all states develop their own protective programs. By creating a federal baseline that protects the Waters of the United States and drinking water supplies from PFOA and PFASs, the EPA would demonstrate the national leadership Administrator Pruitt seeks.

With these considerations in mind, the OEC petitions the EPA to take immediate action to propose, allow for public comment, and promulgate standards and regulations related to perfluoroalkyl substances under the aforementioned laws.

We thank you in advance for your prompt and diligent attention to this matter and look forward to your response.

Respectfully submitted,

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PETITION TO THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

OHIO ENVIRONMENTAL COUNCIL,
1145 Chesapeake Avenue, Suite I
Columbus, Ohio 43212

Petitioner,

Filed with:

SCOTT PRUITT,
In his official capacity as
EPA Administrator,
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PETER C. GREVATT,
in his official capacity as
Director for the Office of Ground Water and Drinking Water (OGWDW),
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CATHY STEPP
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Regional Administrator for Region 5,
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77 West Jackson Boulevard
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Petitions for Rulemaking regulating perfluorooctanoic acid and other perfluoroalkyl substances to protect public health, water quality, and the environment, under the Clean Water Act and Safe Drinking Water Act.

Submitted April 20, 2018

Contents

Executive Summary

Any party may petition a federal agency for an agency rulemaking under the APA and other applicable laws. The OEC exercises this right through this Petition for Rulemaking by requesting regulations promulgated by the EPA that regulate PFOA and other PFASs. PFASs pose a significant risk to human health and the environment and the EPA must take immediate action.

PFOA has been linked by scientists to a variety of health risks including high cholesterol, ulcerative colitis, thyroid disease, testicular and kidney cancer, and pregnancy-induced hypertension. Insufficient research exists to definitively state the health risks of all PFASs, and that fact is the exact reason why the EPA should regulate this immense group of over 3000 substances. Not only might many of these PFASs have a range of individual side-effects, their inundation throughout U.S. waterways may lead to mixture toxicity, a question unaddressed by the EPA in its PFOA Health Advisory.

Therefore, the OEC proposes the following regulations:

Under the Clean Water Act:

(1) Water Quality Criteria for PFOA at 0.014 micrograms per liter;

(2) Water Quality Criteria for PFASs at 0.07 micrograms per liter;

(3) A National Water Quality Standard for the Ohio River that includes Water Quality Criteria at 0.014 micrograms per liter for PFOA and 0.07 micrograms per liter for PFASs.

Under the Safe Drinking Water Act:

(4) A Primary Drinking Water Regulation for PFOA at 0.014 micrograms per liter;

(5) A Primary Drinking Water Regulation for PFASs at 0.07 micrograms per liter;

We have provided these proposed regulations in **Attachment I.** The EPA must respond to these requests for rulemaking within a reasonable timeframe as required under the APA.

The five rulemakings the OEC requests in this petition are necessary to protect the public from the human health and environmental risks of PFOA and PFASs. Numerous communities and regions across the country, from Parkersburg, WV and Southeast Ohio to Minneapolis, MN and New Jersey, have been rocked by PFOA and PFASs. The EPA must act to protect every American's right to safe drinking water. The rules requested are a necessary step toward securing that goal.

I. Under its right to Petition for Rulemaking, the OEC requests that the EPA regulate PFOA and other PFASs because they endanger human health and the environment.

The OEC is a nonprofit organization created in 1969 that thrives nearly 50 years later because of individuals and groups working together to protect and restore Ohio's natural resources and beauty. The OEC continues to pursue its mission to secure healthy air, land, and water for all who call Ohio home. The OEC has a vision of a clean, beautiful Ohio where diverse people, innovation, all of our natural treasures thrive.

PFOA and other PFASs have plagued the people of Ohio for decades as a serious public health risk, both as a known and unknown threat. Since the late 1990s, Southeast Ohio has suffered through a long history of civil class action lawsuits as the region's residents pursued damages from DuPont, the owner of the Washington Works chemical plant at the time (the plant is now owned by DuPont's spinoff company, Chemours). While significant progress has been made at the federal level to regulate such companies, the EPA has not taken significant action to protect the waters of the United States or public water systems from PFOA and PFASs other than through a non-binding Drinking Water Health Advisory.

State governments and customers of public water systems should not need to resort to bringing post-injury statutory and common law claims against polluting companies that damage their health and well-being. The public health threat itself should be controlled and eliminated before harm occurs. The EPA has a legal and moral obligation to promulgate regulations that protect human health and the environment, require point sources to install technology that limits the emission of dangerous and toxic pollutants into waters of the United States, and provide the means through which public water systems may protect their consumers from drinking water contaminants.

The OEC submits this Petition for Rulemaking regarding PFOA and PFASs because it sees the substantial danger that these substances pose to human health and the environment. At the same time, the US lacks rules and countermeasures that adequately protect its citizens. These rulemakings are a first step toward eliminating the substantial risks posed by FPOA and PFASs.

a. The Ohio Environmental Council has a right to petition the Administrator under 5 U.S.C. §553(e), and should receive a response within a reasonable time.

The First Amendment to the United States Constitution enshrines the right of each and every U.S. citizen to petition their federal government: "Congress shall make no law...abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and *to petition the government for a redress of grievances.*"[1] This right to petition inexorably links with the First Amendment's dedication to the free flow of ideas, because the right to petition clause assures the public that "decision-makers will be sufficiently informed to carry out their function."[2] However, the First Amendment did not include a right for the government to

[1] U.S. Constitution, Amendment I, emphasis added.

[2] *Osborn v. Pennsylvania-Delaware Serv. Station Dealers Ass'n*, 499 F.Supp. 553, 556 (D.Del.1980).

officially respond or even consider a petition's call for a redress to particular grievances.[3]

Fortunately, The APA builds on the First Amendment's "right to petition." First, the APA provides that "each agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule."[4] This law embodies the policy that the public should participate in the regulatory process and that just as legislators are beholden to listen to the needs of their constituents, regulatory agencies must listen, too.

Furthermore, the agencies must not only listen, they must also respond, pushing the law beyond just the right to petition built into the U.S. Constitution. The APA states: "Prompt notice shall be given of the denial in whole or in part of a written application, petition, or other request of an interested person made in connection with any agency proceeding. Except in affirming a prior denial or when the denial is self-explanatory, the notice shall be accompanied by a brief statement of the grounds for denial."[5]

When a citizen, or group of citizens, believes they have a grievance deserving redress, they not only may petition the federal government, the government must respond. And not only must it respond, it must provide, at the very least, a brief statement of the grounds for denial if it chooses to reject the petition, unless the denial is self-explanatory.

But even when denying a petition for rulemaking, an agency cannot base its decision on arbitrary reasoning. When the EPA responds to a petition for rulemaking, "its reasons for action or inaction must conform to the authorizing statute."[6] In *Massachusetts v. EPA,* the Supreme Court considered the EPA's reasons for choosing not to regulate greenhouse gases, specifically in response to a petition for rulemaking pursued by states from across the nation. The EPA provided a list of reasons for why they chose not to regulate greenhouse gases under the Clean Air Act, but because those reasons weren't grounded in the statute, the EPA's response to the relevant petition for rulemaking was insufficient.[7] Thus, when a petition for rulemaking lands on the desk of a federal official delegated the authority to make the changes requested in the petition, they must respond. And when they respond, they must ground their reasoning for denial, or approval, in the statutory grounds under which the petition seeks redress.

With this petition, the OEC exercises its right under the APA to petition the Administrator of the EPA to exert his legal authority to commence rulemaking procedures that will protect human health, aquatic life, water quality, and the environment. The OEC respectfully requests that the EPA respond within a reasonable time, and if the agency decides to deny the petition, that it

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[3] This oversight in the First Amendment eventually created a divide in public access to the immense administrative state that slowly formed in this country over the past two and a half centuries. See *We the People Found., Inc. v. United States*, 485 F.3d 140, 143 (D.C.Cir.2007). See also *Stengel v. City of Columbus, Ohio*, 737 F.Supp. 1457 (S.D.Ohio 1988).

[4] 5 U.S.C. §553(e).

[5] 5 U.S.C. §555(e).

[6] *Massachusetts v. E.P.A.*, 549 U.S. 497, 533, 127 S.Ct. 1438, 1462, 167 L.Ed.2d 248 (2007).

[7] Specifically, the Court stated: "While the President has broad authority in foreign affairs, that authority does not extend to the refusal to execute domestic laws." Id. at 534.

provides prompt notice of such denial with a statement of the grounds for denial as required under 5 U.S.C. §555(e) and *Massachusetts v. EPA*.

b. The United States Environmental Protection Agency has the authority to regulate perfluorooctanoic acid and perfluoroalkyl substances under the Clean Water Act and the Safe Drinking Water Act.

The OEC pursues this petition for rulemaking under three separate statutory grounds. Each rulemaking can stand under the weight of its own statutory authority, though to solve this problem entirely the EPA should implement all requested rulemakings. First, the OEC petitions the EPA to regulate PFOA and other PFASs under the Clean Water Act by developing Water Quality Criteria and a nationally promulgated Water Quality Standard for the Ohio River. Second, the EPA should regulate PFOA and other PFASs under the Safe Drinking Water Act by issuing a national Primary Drinking Water Regulation that covers those contaminants. Later sections of the petition more fully detail the statutory authority for rulemaking under each of these laws, but we have provided brief summaries below.

Under the CWA, the Administrator has the authority and mandate to promulgate Water Quality Criteria under 33 U.S.C. §1313 that accurately reflect scientific knowledge regarding the health effects of particular contaminants. Similarly, the Administrator has the authority and mandate to promulgate Water Quality Standards when doing so is necessary to protect the environment and public health under 33 U.S.C. §1314 when states fail to promulgate adequate Water Quality Standards.

Under the SDWA, the Administrator has the authority to promulgate Primary Drinking Water Regulations under 42 U.S.C. §300g-1. These regulations protect human health when public water systems are likely to have concentrations of certain contaminants, and such regulation represents a meaningful opportunity for the EPA to protect customers of public water systems.

Because separate statutory grounds exist for the regulation of this substance under these two laws within the purview of the EPA, the Administrator must consider each of these requests separately from one another. Therefore, if the Administrator decides to promulgate a rule under one statutory ground, but not the others, the OEC respectfully requests a statement of why the Administrator has chosen not to regulate under those particular statutes. If the Administrator decides to deny the petition in its entirety, the OEC respectfully requests a statement of grounds for denial that explains separate reasons under each of the Acts: The CWA and the SDWA, as required by the Supreme Court in *Massachusetts v. EPA*.

II. The EPA should regulate PFOA and PFASs because they are human health hazards and unreasonable threats to the environment.

The EPA has been painfully aware of the human health and environmental impact of PFOA and PFASs since the early part of the twenty-first century. The publicized story of PFOA begins back in 2001, when Cincinnati lawyer Robert A. Bilott wrote to the EPA regarding the threat the

substance posed to human health and the environment.[8] That same year, DuPont settled with a family that had alleged that PFOA had harmed them and their cattle.[9] In 2002, EPA announced that in a separate settlement deal, DuPont had "agreed to replace the water supply of any resident whose water contains more than 14 parts per billion of [PFOA]."[10] However, even at that time, DuPont's own studies showed that levels of PFOA much lower than 14 parts per billion could harm the health of its employees and residents that lived in nearby communities.[11]

As the years passed and the facts piled up, Ohio attorneys filed class-action lawsuits against DuPont. While these lawsuits are important, they do not provide solutions to the underlying contamination and human health problems. PFOA remains unregulated by the EPA. It remains unregulated in Ohio and in West Virginia. While a few states have chosen to directly regulate PFOA and in some cases PFOS, greater action is needed to protect Ohioans and Americans. In addition, thousands of PFASs similar to PFOA are currently manufactured, produced, and used throughout the United States. What's worse, little to no data exists on whether PFASs cause an unreasonable risk to human health and the environment.

For the record, the OEC recognizes that EPA has taken some steps toward fully regulating PFOA and other PFASs. In 2006, the EPA asked eight companies to reduce PFOA emissions to all media by 95 percent by 2010, and all eight companies committed to this goal.[12] This program has seen some success. Some companies stopped manufacturing and importing these substances, especially PFOA; other companies left the industry.[13] However, many companies just switched to other PFASs. When each company selects a new PFAS to use as a replacement for an old substance, yet another unregulated substance enters the market and subsequently the waters of the United States.

The OEC also credits the EPA for developing a robust reporting tool under the Toxic Substances Control Act for the family of PFASs. EPA reviews substitutes for PFOA under its New Chemicals Program. It has performed these reviews since 2000, but these reviews do not place any binding regulations on the manufacture or import of such substances other than reporting requirements.

In 2016, the EPA issued a Health Advisory for PFOA under the Safe Drinking Water Act after monitoring it as an unregulated contaminant, yet chose not to promulgate a Primary Drinking

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[8] Ken Ward Jr., *Dupont agrees to pay $107 million*, THE CHARLESTON GAZETTE, (September 10, 2004), available at: http://newslibrary.cnpapers.com/cgi-bin/texis/search/+5meZc9jeShbtqyiwGmaAnDam1pdDBaq8a5nBBcnMnDBqzmxwwwmzme1-wwwhFq0eRGlnGeRRHmqwceRkHmGprveRDxxLo5eRS3t+XXXtFqwrFqw/storypage.html?id=47d94c7062.

[9] Id.

[10] 14 parts per billion is equivalent to 14 micrograms per liter, over a hundred times more than the 0.07 micrograms per liter eventually established by the U.S. EPA in its Health Advisory. Id.

[11] Id.

[12] Arkema, Asahi, BASF Corporation, Clariant, Daikin, 3M/Dyneon, DuPont, and Solvay Solexis participated in the PFOA Stewardship Program. *Fact Sheet: 2010/2015 PFOA Stewardship Program*, UNTED STATES ENVIRONMENTAL PROTECTION AGENCY, (December 10, 2017), https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/fact-sheet-20102015-pfoa-stewardship-program#launch.

[13] Id.

Water Regulation for PFOA or any PFAS. The EPA has hinted that it might still consider such an option, but as of now it has not made any direct action toward promulgating such a regulation.

These steps, while headed in the right direction, are simply insufficient to protect the public. Even with these voluntary actions and health advisories, PFOA and other PFASs still exist in U.S. and Ohio waterways and public water systems. Companies around the world continue to use and produce PFOA.[14] If the EPA is to correctly do its job and protect human health and the environment, it must promulgate rules that ensure substances like PFOA do not, and will never again, pose unreasonable risks to Americans.

The following subheadings will discuss the dangers of PFOA in the context of the broader family of PFASs and their persistence throughout the environment. If the EPA promulgates rules governing PFOA, it should also consider a broader regulation that covers all PFASs. They will outline the health risks of PFOA as determined by the best available science, and provide a review of the reasonably available literature regarding the health risks of other commonly used PFASs. They will discuss why the present Health Advisory covering PFOA is insufficient to protect human health and the environment. They will explain what certain governmental entities have proposed as reasonable regulations that would protect the public from the dangers of PFOA and PFASs. Finally, this section will outline the technology already available for public water systems to treat their water supplies for PFASs, while also emphasizing the fact that these public water systems should not bear the sole burden of protecting their residents.

The OEC hopes that the EPA will engage closely with this complicated issue and go beyond its current work on PFASs. The EPA has the opportunity to show the American public that it can and will protect it from the thousands of unregulated PFASs that permeate the environment. Given the wealth of knowledge (and lack thereof in certain instances) that has been established on PFOA and other PFASs over the past twenty-some years, EPA has the data necessary to change this nation's regulations. If the Agency does not have the willpower to protect the public, the public will know exactly whom to blame when these PFASs continue to accumulate across the country, posing untold risks to human health and the environment.

a. The thousands of perfluoroalkyl substances on the market endanger human health and the environment.

PFASs have enhanced molecular properties due to the "strong electronegativity and small atomic size of fluorine."[15] Because of these beneficial properties, many companies use them in a wide variety of products and for a wide array of uses.[16] The most well known PFAS, PFOA, was used

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[14] See *DuPont finds high levels of C8 in Chinese Workers*, BEASLEY ALLEN LAW FIRM, (November 6, 2008), http://www.beasleyallen.com/news/dupont-finds-high-levels-of-c8-in-chinese-workers/. See also Sharon Lerner, *Under DuPont Bridge: The Teflon Toxin Goes to China*, THE INTERCEPT, (September 15, 2016), https://theintercept.com/2016/09/15/the-teflon-toxin-goes-to-china/.

[15] Zhanyun Wang, Jame C. DeWitt, Christopher P. Higgins, and Ian T. Cousins, *A Never Ending Story of Per- and Polyfluoroalkyl Substances (PFASs)*, 51 Environ. Sci. Technol. 2017, 2508 - 2518, 2508, https://pubs.acs.org/doi/pdf/10.1021/acs.est.6b04806.

[16] Id.

as a "processing aid . . . during the polymerization of tetrafluoroethylene to make polytetrafluoroethylene (e.g., Teflon™)."[17]

PFOA in particular was used "as an aqueous dispersion agent" due to its useful chemical properties. One of its most useful properties is its stable nature; it is solid at room temperature, has a low vapor pressure, and has a melting point of 50 to 60 degrees Celsius.[18] In particular, PFOA is stable in water at 25 degrees Celsius and "when bound" in the air.[19] The EPA importantly notes the following environmental characteristics of PFOA:

> PFOA is stable in environmental media because it is resistant to environmental degradation processes, such as biodegradation, photolysis, and hydrolysis. In water, no natural degradation has been demonstrated, and dissipation is by advection, dispersion, and sorption to particulate matter. PFOA has low volatility in ionized form, but can adsorb to particles and be deposited on the ground and into water bodies. Because of its persistence, it can be transported long distances in air or water, as evidenced by detections of PFOA in the arctic media and biota, including in polar bears, ocean-going birds, and fish found in remote areas....PFOA is present in ambient air and seawater globally."[20]

However, while PFOA is the best known PFAS, numerous other long-chain PFASs have been identified by the scientific and regulatory community as having potential health risks.[21] But even while the EPA has released an immense body of knowledge on their understanding of PFOA, PFOS, and other long-chain PFASs, long-chain PFASs are just a small subset of thousands of PFASs. PFOA and PFOS are not the only long-chain PFASs considered for regulation throughout the world, either. Within PFOA's direct family of perfluoroalkyl carboxylic acids (PFCAs), perfluorononanoic acid ("PFNA"), perfluorodecanoic acid ("PFDA"), perfluoroundecanoic acid ("PFUnA"), perfluorododecanoic acid ("PFDoA"), perfluorotridecanoic acid ("PFTrA"), and perfluorotetradecanoic acid ("PFTeA") have all been considered for regulation by certain governmental entities. Each of those compounds is a longer carbon chain than PFOA - for instance, PFTeA has 14 carbon chains, as opposed to PFOA's 8 carbon chains.[22]

Companies still produce these other PFASs, both short and long-chain, in high volumes, and some of them have been slated to replace the well-known long-chain PFASs like PFOA or PFOS. Current literature reviews note that "little to no information [exists in the public domain] about their fate/transport, exposure, and toxicological effects...or even awareness to study them...although existing evidence suggests a need for concern."[23]

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[17] *Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)*, UNTED STATES ENVIRONMENTAL PROTECTION AGENCY, at 15, (May 2016), https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_health_advisory_final_508.pdf.

[18] Id.

[19] Id. at 16.

[20] Id.

[21] "Since the late 1990s, multiple long-chain PFASs (perfluoroalkyl carboxylic acids (PFCAs) with ≥7 perfluorinated carbons, perfluoroalkanesulfonic acids (PFSAs) with ≥6 perfluorinated carbons, and their precursors), in particular perfluorooctanoic acid (PFOA) and perfluorooctanesulfonate (PFOS), have attracted world-wide attention in the scientific and regulatory community and among the public." Supra FN 17, at 2508.

[22] Id. at 2510.

[23] Id.

Between 2012 and 2017, approximately 4,066 peer-reviewed articles were published regarding PFOA.[24] These articles provide the EPA and other decision-makers with the necessary information to understand the dangers that the substance poses to human health and the environment. With the exception of a few other PFASs, like PFOS, PFNA, PFDA, many PFASs have little scientific literature exploring their chemical properties, health effects, and environmental risks. Consider "GenX." GenX has been touted as a potential replacement for PFOA.[25] However, as of 2017, only 26 peer-reviewed articles have analyzed the substance.[26]

The OEC believes that the EPA should not allow any of these PFASs into our waterways until scientific literature properly establishes the safety of each substance individually and in the aggregate. Over the past decade and a half, the EPA has constantly revised its guidelines and suggestions regarding PFOA, and even now when scientists have identified a laundry list of probable health risks linked with PFOA, the EPA has still refused to promulgate regulations covering even just PFOA. The American public cannot afford to wait for the United States government to go through the same process with each PFAS.

Consider the following issues that PFASs present for human health and the environment, as identified in *Environmental Science & Technology*:

(1) All PFASs "ultimately transform into highly stable end products, which are usually the highly persistent perfluoroalkyl or perfluoroalkyl(poly)ether acids."[27]

(2) Due to their ability to travel vast distances while remaining stable, PFASs produced in certain countries will lead to distribution of PFASs and their end products across the world, "in the environment, wildlife, and humans."[28]

(3) Very little research has been performed on the toxicity of most PFASs, with most studies performed by industry itself.[29]

(4) Many countries have failed to consider "mixture toxicity." Regulatory paradigms should consider the dangers of exposure to large numbers of known and unknown PFASs simultaneously, not just concentrations of individual substances like PFOA one at a time.[30]

(5) Replacing one PFAS with another PFAS (such as PFOA with GenX) "does not solve issues in relation to PFASs as a whole group - it will only increase the numbers of PFASs on the market and the difficulties in tracking them."[31]

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[24] Id.

[25] GenX has experienced its own host of problems in the eyes of the public already. It has been detected in public and private water supplies in the Cape Fear River basin in North Carolina, and Chemours was ordered to provide bottled water to residents in the area. The company has received subpoenas regarding their discharges of GenX in North Carolina. See Catherine Clabby, *GenX Questions Continue: What about Food?*, COASTAL REVIEW ONLINE, (February 5, 2018), https://www.coastalreview.org/2018/02/genx-questions-continue-food/.

[26] Supra FN 15, at 2510.

[27] Id. at 2511.

[28] Id.

[29] Id. at 2512.

[30] Id.

This is a non-exhaustive list of the issues connected with PFASs. The EPA has spent resources focused on PFOA and has required the registration of new uses for PFASs as they come to market through its Significant New Uses rule, but these actions do not scratch the surface of the immense iceberg of complications that could occur as companies continue to expand the use of thousands of different PFASs. It takes time for the EPA to identify which PFASs might pose a risk - only recently in January 2018 did the EPA request sampling of GenX (a PFOA replacement) in water supplies near the Washington Works facility of Chemours, a subsidiary of DuPont.[32]

The precautionary principle represents a cornerstone of conservation and environmental protection. Even in the absence of fully established causal relationships, regulatory agencies should take precautionary measures that protect human health and the environment from potential presently unquantifiable risks. When considering the risks of PFASs, the EPA should follow the precautionary principle and restrict the manufacture and use of these substances and develop adequate regulations that protect our nation's waters until science establishes which ones are safe. Not only could each PFAS pose an individual health risk, but when combined together all PFASs pose a potential problem due to potential mixture toxicity.

As for PFOA, the EPA need not follow the precautionary principle, as the following subsections show. The science has established the dangers of PFOA and implicates the dangers of PFASs. States and international bodies have chosen to regulate PFOA and technology exists to clean our public water systems of PFOA. The following subsection demonstrates why the EPA must regulate PFOA to protect human health and the environment.

b. PFOA poses serious risks to human health and the environment.

The risks PFOA poses to human health and the environment fit into three silos. First, PFOA poses a direct risk to human health through exposure within the bloodstream. The C8 Science Panel has made a number of conclusions regarding the relationship between PFOA exposure and certain health risks. Second, PFOA poses a risk within public water systems - PFOA has inundated a number of public water systems across the country, and if the EPA is to properly protect Americans from the aforementioned health risks, they must properly regulate PFOA concentrations within public water systems. Finally, because PFOA is a highly stable compound, it has found its way into the environment across the country and the world. The EPA must promulgate regulations that properly account for this accumulation, and implement rules that provide the tools necessary rehabilitate regions with high exposure to PFOA.

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[31] Id. at 2513.

[32] See *EPA Region III Letter. Request for sampling; GenX in water supplies*, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, (January 11, 2018), https://www.epa.gov/pfas/epa-region-iii-letter-request-sampling-genx-water-supplies.

i. PFOA poses a direct risk to human health because it has a probable link to numerous human diseases, including certain cancers, heart disease, autoimmune disease, thyroid disease, and pregnancy-induced hypertension.

The Ohio Department of Health has issued a simple fact sheet intended to educate the public on the health risks of PFOA, which it identifies as "C8," DuPont's internal name for the substance.[33] Following the scandal associated with DuPont's Washington Works facility in West Virginia that released high levels of PFOA into the Ohio River and surrounding public water districts, scientists began to engage in a robust analysis on the substance's effects on human health. According to the Ohio Department of Health, the Centers for Disease Control measured the blood of thousands of individuals for 12 PFASs, including PFOA.[34] PFOA was discovered in almost every single person tested, though the PFOA levels have dropped significantly between 2000 and 2010.[35]

As a result of the class action lawsuit connected with the DuPont Washington Works facility, a West Virginia Court ordered an immense health study involving 70,000 participants from the region.[36] Blood data and health histories of these participants were used by the C8 Science Panel, which after years of study made comprehensive conclusions regarding the health risks of PFOA.

High Cholesterol

The C8 Science Panel concluded that there is a *probable link* between PFOA and high cholesterol, or hypercholesterolemia.[37] High levels of cholesterol can cause it to build up on the walls of arteries, potentially leading to heart disease and stroke.[38] Eight studies reviewed by the panel identified a positive association of PFOA with high cholesterol, with four of the eight studies concluding that a statistically significant association existed. These first studies found that "the magnitude of effect of PFOA on cholesterol was greatest in the general population low exposure setting, and lowest in the occupational high exposure setting."[39]

In the C8 Science Panel's own studies conducted on links between cholesterol and PFOA, it connected "lipids and PFOA in a cross-sectional study of 12,000 highly exposed children and adolescents in the mid-Ohio valley."[40] Even after adjusting for age, BMI, fasting, gender, and exercise levels, the study found a "steady increase in cholesterol with increasing serum PFOA."[41]

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[33] See *C8 Community Fact Sheet*, OHIO DEPARTMENT OF HEALTH, (Last Updated May 2, 2017), https://www.odh.ohio.gov/-/media/ODH/ASSETS/Files/eh/Chemical-Fact-sheets/041-C-8-Community-Fact-Sheet-rev02-20170502.pdf?la=en.

[34] Id. at 2.

[35] Id.

[36] Id.

[37] *Probable Link Evaluation for heart disease (including high blood pressure, high cholesterol, coronary artery disease)*, C8 SCIENCE PANEL, (October 29, 2012), http://www.c8sciencepanel.org/pdfs/Probable_Link_C8_Heart_Disease_29Oct2012.pdf, emphasis added.

[38] *Know the facts about high cholesterol,* CENTERS FOR DISEASE CONTROL, https://www.cdc.gov/cholesterol/docs/consumered_cholesterol.pdf.

[39] Supra FN 37, at 6.

[40] Id.

[41] Id.

This conclusion was in a similar cross-sectional study performed on 46,000 adults "who were not taking lipid-lowering drugs."[42] Based on a consideration of all the evidence, the C8 Science Panel concluded "that there is a probable link between exposure to PFOA and diagnosed high cholesterol."[43]

Ulcerative Colitis

The C8 Science Panel concluded that a probable link exists between PFOA and ulcerative colitis.[44] Ulcerative colitis is a type of inflammatory bowel disease, the other most common bowel disease being Crohn's disease.[45] These diseases are most likely caused by an autoimmune response to bacteria which does not properly subside in the lining of the digestive tract.[46]

Based on an analysis of 245 cases of inflammatory bowel disease, the C8 Science Panel found a positive trend of increased risk with increasing cumulative exposure.[47] After a further breakdown of the data between ulcerative colitis and Crohn's disease, the C8 Science Panel concluded that a probable link exists between PFOA and ulcerative colitis.[48] Unfortunately, no other toxicology research had been done on PFOA's relationship with autoimmune disease, so the Science Panel was forced to make their judgment based entirely on their own studies.[49] The lack of these sorts of studies for even PFOA further emphasizes the need for greater toxicology research for all PFASs.

Thyroid Disease

The C8 Science Panel concluded that a probable link exists between PFOA exposure and thyroid disease.[50] A multitude of disorders can cause the thyroid gland to malfunction, but most commonly humans experience hypothyroidism and hyperthyroidism.[51] Hypothyroidism occurs when the body does not produce enough thyroid hormone, while hyperthyroidism is the opposite, where the body produces too much of the hormone.[52]

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[42] Id.

[43] While this Petition for Rulemaking will only share the positive health links, it is important to note that the C8 Science Panel considered dozens of possible health risks, finding many health risks were not linked with PFOA. Thus the Panel did not just look for any potential health risk and find a way to link PFOA to that risk - the Panel was very thorough in its review of its own studies and studies conducted elsewhere. Id. at 8.

[44] *Probable Link Evaluation of Autoimmune Disease*, C8 SCIENCE PANEL, (July 30, 2012), http://www.c8sciencepanel.org/pdfs/Probable_Link_C8_Autoimmune_Disease_30Jul2012.pdf.

[45] Crohn's disease affects the entire digestive tract while ulcerative colitis affects the large intestine. See *Inflammatory bowel disease*, CENTERS FOR DISEASE CONTROL, https://www.cdc.gov/ibd/index.htm.

[46] Supra FN 44, at 4.

[47] Id. at 6.

[48] "The positive trend with PFOA exposure was found primarily for ulcerative colitis, for which there was a strong dose-response gradient. RRs by quartile of increasing exposure were 1.0, 1.89 (1.08 - 3.31), 2.58 (152 - 4.38), and 3.18 (1.84 - 5.51), p value test for trend <0.0001)." Id. at 6 - 7.

[49] Id.

[50] *Probable Link Evaluation of Thyroid disease*, C8 SCIENCE PANEL, (July 30, 2012), http://www.c8sciencepanel.org/pdfs/Probable_Link_C8_Thyroid_30Jul2012.pdf.

[51] Id. at 4.

[52] Id.

Prior to the C8 Panel's conclusions, two experimental studies had occurred on cynomolgus monkeys and rats, where scientists dosed the animals with PFOA and observed for changes in the thyroid hormone. In both studies, FT3 and TT3, forms of the thyroid hormone, dropped with increased serum levels of PFOA.[53] The C8 Panel also reviewed other epidemiologic studies conducted on the general population with mixed results.

When the C8 Panel conducted their studies on the people of the Mid-Ohio Valley, it found a "slight increasing trend of functional thyroid disease with increasing cumulative PFOA in serum."[54] Following additional studies, the C8 Panel found that the results were "consistent with a weak positive association between [thyroid] hormone levels and measured TSH, more apparent for women than for men (as this was found in relation to both modeled and measured PFOA)."[55] This measured increase in average TSH is "consistent with either an increased risk of hypothyroidism or a reduced risk for hyperthyroidism."[56]

Overall, the C8 Science Panel found the available evidence demonstrated a probable link between thyroid disease and PFOA. Consider the following:

> "We carefully considered how much weight to put on the different studies and analytic approaches, particularly whether it is appropriate to add up the pieces of supportive evidence despite their coming from different subsets of individuals or different indicators of thyroid disease. While each finding in isolation was not compelling, plausibly a result of chance or other errors, the presence of some independent pieces of evidence indicative of an association was not easily dismissed, despite a lack of coherence among them. Among the positive pieces, the strongest was the evidence of increased occurrence of medically validated thyroid disease (hyperthyroidism in women, hypothyroidism in men) with increasing measured PFOA exposure (2005 - 2006) in the prospective analyses (2005 - 2010). After taking into account the available evidence in its totality, despite inconsistencies in the evidence, the Panel concluded that there was evidence of a probable link between C8 and thyroid disease."[57]

Cancer

The C8 Science Panel found a probable link between PFOA exposure, testicular cancer, and kidney cancer.[58] Testicular cancer accounts for 0.5% of cancer cases, while kidney cancer accounts for 3.8%.[59] Previous studies on PFOA's relationship with cancer had found that it could cause "liver tumors, testicular tumors, and pancreatic tumors in rodents."[60] However, animal carcinogen data is only suggestive, and such relationships usually "aren't sufficiently consistent

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[53] Id. at 4 - 5.

[54] Id. at 7.

[55] Id.

[56] Id. at 9.

[57] Id. at 11.

[58] *Probable Link Evaluation of Cancer*, C8 SCIENCE PANEL, (April 15, 2012), http://www.c8sciencepanel.org/pdfs/Probable_Link_C8_Cancer_16April2012_v2.pdf.

[59] See *Cancer Stat Facts: Testicular Cancer*, NATIONAL CANCER INSTITUTE, https://seer.cancer.gov/statfacts/html/testis.html; See also *Cancer Stat Facts: Kidney and Renal Pelvis Cancer*, NATIONAL CANCER INSTITUTE, https://seer.cancer.gov/statfacts/html/kidrp.html.

[60] Supra FN 58, at 2.

to allow reliable prediction of potential site(s) of carcinogenesis in humans from bioassay data in rodents."[61]

In 2008, a mortality study was performed on workers at the DuPont Washington Works plant, which originally found "no statistically significant ($p<0.05$) excesses for any cancers reported. However, numbers of specific cancers were small (8 liver, 11 pancreas, 12 kidney, 3 thyroid, 1 testis, 2 breast)."[62] A similar study covering 3M workers in Minnesota found no excess cancer deaths, and a study of the general population of Denmark did not find any links, either.[63]

However, when the C8 Science Panel conducted studies on the residents of the Mid-Ohio Valley and on the workers at the Washington Works plant, it found different results. When the Panel compared exposed water districts to non-exposed areas, the Panel found a positive trend with a p value of 0.002.[64] The trends for kidney cancer were less consistent, though one study found an increased rate of kidney cancer with a p value of 0.01.[65]

Following a string of inclusive studies, the C8 Science Panel developed a comprehensive cancer incident study which included 32,254 individuals.[66] This massive study, combined with the Panel's previous work, provided the following conclusions regarding PFOA's link to cancer:

> "For **testicular cancer**, there is evidence of a positive trend in risk across exposure groups, in some analyses, with the highest exposure group in both the internal analyses of the cohort study and the geographical cancer study showing estimated relative risks ranging from 3 to over 6 comparing the highest to lowest exposure groups. On the other hand there was little or no evidence of increasing risk in analyses from the same cohort compared with the U.S. population, and in the period after 2005, there were no new cases compared to about five expected. The high exposure group, where the higher risk was observed, comprise only six cases therefore there remains some uncertainty."[67]

> "For **kidney cancer,** the worker mortality study conducted by the Science Panel showed a higher risk in the most highly exposed group compared to lower exposure groups among the workforce, but the risks were not elevated compared to the U.S. population. In the cohort study, there was a gradient of increasing risk with increasing exposure but most strongly in the analyses that included exposure up to the time of diagnosis. When the 10 years of exposure prior to diagnosis was excluded, the association was less evidence. No association was seen in the prospective analysis of cohort data, although the latter is limited by small numbers. In the geographic study some results suggested an increasing risk of kidney cancer with increasing exposure and others did not. The science panel considers that the excesses observed indicate a probable link between PFOA and kidney cancer."[68]

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[61] Id. at 3.
[62] Id.
[63] Id.
[64] Id. at 5.
[65] Id.
[66] Id. at 6.
[67] Id. at 10.
[68] Id.

Pregnancy-induced Hypertension

The C8 Science Panel concluded that PFOA exposure is probably linked with pregnancy-induced hypertension.[69] Pregnancy-induced hypertension is a condition that can occur after the 20th week of pregnancy - a woman's blood pressure reaches levels considered "significantly elevated."[70] The condition can result in "reduced fetal growth and an increased risk of preterm birth."[71]

The C8 Science Panel analyzed four studies covering this particular condition and its relationship with PFOA, with two other studies looking at the relationship between PFOA and preeclampsia specifically. Additional toxicology studies performed on rodents also found reduced fetal growth and increased fetal death.[72]

The Panel found that "while few of the individual measures of association are strong or show clear evidence of increasing risk with increasing exposure across the full range of PFOA exposure....[and] while individually the observed associations could have alternative explanations, it is unlikely that the full pattern of findings could be explained by a series of hypothesized biases."[73] Furthermore, the odds for developing pregnancy-induced hypertension increased "for pregnancies that were closest in time to the measured serum PFOA values."[74]

Thus, the C8 Panel developed five probable links between health risks and PFOA:

(1) high cholesterol
(2) ulcerative colitis
(3) thyroid disease
(4) testicular and kidney cancer
(5) pregnancy-induced hypertension

However, these conclusions were made almost four years prior to the EPA's own Health Advisory. After four years of more scientific study, the EPA made the following statement of risk:

> "Taken together, the weight of evidence for human studies supports the conclusion that **PFOA exposure is a human health hazard.** At this time, EPA concludes that the human studies are adequate for use qualitatively in the identification hazard and are supportive of the findings in laboratory animals."[75]

However, the Health Advisory does not provide any mandatory regulations regarding PFOA for public water systems, waters of the United States, or for the manufacture or import of the substance. Even with these clear probable risks to human health, the EPA declined to promulgate

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[69] *Probable Link Evaluation of Pregnancy Induced Hypertension and Preeclampsia*, C8 SCIENCE PANEL, (December 5, 2011), at 1, http://www.c8sciencepanel.org/pdfs/Probable_Link_C8_PIH_5Dec2011.pdf.

[70] Id.

[71] Preeclampsia, a form of pregnancy-induced hypertension, "can cause serious health problems for the mother and the fetus that can be alleviated only by delivering the fetus." Id.

[72] Id. at 5.

[73] Id.

[74] Id.

[75] Supra FN 19, at 30, emphasis added.

the necessary regulations needed to protect human health and the environment.

ii. PFOA poses a risk to public water systems given its high concentrations discovered across the country.

PFOA's serious health risks are multiplied by its prevalence throughout U.S. public water systems. A combination of EPA data and other water monitoring data shows the location of PFOA public water system hotspots. The majority of PFOA data for public water systems was procured when PFOA and other PFASs[76] were listed on the EPA's Unregulated Contaminant Monitoring Rule ("UCMR").[77] While all public water systems serving 10,000 people or more were required to report data, only 800 "representative" public water systems with less than 10,000 people were required to monitor on the UCMR.[78]

The EPA has compiled the occurrence data for all unregulated contaminants monitored between 2013 and 2015 as part of the third UCMR.[79] While the EPA provides useful summary reports, it is difficult to visualize the full scope of PFOA inundation throughout America's public water systems using the agency's data. Fortunately, the Environmental Working Group in collaboration with the Social Science Environmental Health Research Institute of at Northeastern University has compiled all of the relevant data for PFOA into an easy to read map while also providing narratives for particular cases where a public water system measured a high concentration of PFOA.[80] The Social Science Environmental Health Research Institute also has its own PFAS contamination site tracker that it regularly updates.[81]

In total, the Institute's analysis identifies 162 systems that found PFOA and/or PFOS.[82] However, these 162 sites only include locations that reported PFOA over 0.02 micrograms per liter or reported PFOS over 0.04 micrograms per liter. The EPA only required systems to report at those levels or higher. These reporting limitations make it difficult to accurately assess the full extent of exposure to PFASs, especially when certain organizations have advocated for drastically lower limitations, though such proposed limits will be discussed in further detail in the next section. This lack of comprehensive data is further complicated by the EPA's decision to only task 800 of the thousands of public water systems that serve less than 10,000 people with monitoring under the UCMR.

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[76] In particular, the third UCMR measured perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), perfluoroheptanoic acid (PFHpA), and perfluorobutanesulfonic acid (PFBS). *Third Unregulated Contaminant Monitoring Rule*, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, (December 9, 2016), https://www.epa.gov/dwucmr/third-unregulated-contaminant-monitoring-rule.

[77] See Id.

[78] Id.

[79] See *Occurrence Data for the Unregulated Contaminant Monitoring Rule*, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, (January 29, 2018), https://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule.

[80] Bill Walker and Soren Rundquist, *Mapping a Contamination Crisis*, ENVIRONMENTAL WORKING GROUP, (June 8, 2017), https://www.ewg.org/research/mapping-contamination-crisis#4.

[81] See *PFAS Contamination Site Tracker*, SOCIAL SCIENCE ENVIRONMENTAL HEALTH RESEARCH INSTITUTE, https://pfasproject.com/pfas-contamination-site-tracker/.

[82] Supra FN 80.

While the OEC could spend pages highlighting all of the serious cases of PFOA exposure identified by the Environmental Working Group, we will instead provide a few key examples of PFAS contamination that highlight this health crisis. We have already discussed the pollution that has occurred from the Washington Works facility in West Virginia along the Ohio River and briefly mentioned GenX pollution in North Carolina. But dozens of other examples exist, too, including the following stories.

Alabama

Following the release of the EPA's Health Advisory for PFOA, the Alabama Department of Public Health and the Alabama Department of Environmental Management worked together to assist public water systems that had detected high levels of PFOA and PFOS.[83] Alabama identified two systems in the state that needed to take action: The West Morgan-East Lawrence Water Authority, and the West Lawrence Water Co-op.[84] The agencies performed additional sampling and provided recommendations regarding the use of water in those systems, suggesting that "pregnant and breastfeeding mothers served by identified water systems consider using alternate sources of drinking water."[85]

A few months later, the Gadsden Water Works and Sewer Board in Alabama actually initiated a lawsuit against 32 carpet makers located near Dalton Georgia, "charging the companies with releasing potentially dangerous chemicals used in stain-resistant carpet into the river from which Gadsden and nearby communities get their water supply."[86] The lawsuit specifically identified PFOA and PFOS as the culprits, noting samples "that showed 84 parts per trillion of PFOA...in one test and 82 parts per trillion of PFOA in another."[87] These measurements were above the 70 parts per trillion, or 0.07 micrograms per liter, that the EPA declared in their Health Advisory in 2016.

Minnesota

3M, a company that produced PFASs for decades similar to DuPont, maintains its "Cottage Grove" facility near Minneapolis, Minnesota. 3M did not remove PFASs from its wastewater before the sewage entered the Mississippi River.[88] PFASs may have also entered the environment through sludge disposed on site, from firefighting foams used in training exercises, or released into the air.[89] The Minnesota Department of Health also found, through environmental testing, "that the groundwater beneath the 3M Cottage Grove site is contaminated

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[83] *Health Department modifies Health Advisories impacting north Alabama water systems*, Alabama Department of Public Health, (May 23, 2016), https://www.adph.org/news/assets/160523.pdf.

[84] *PFOS and PFOA in Drinking Water*, ALABAMA A&M & AUBURN UNIVERSITIES EXTENSION, (2016), http://www.aces.edu/pubs/docs/A/ANR-2326/ANR-2326.pdf.

[85] Supra FN 83.

[86] Dave Flessner, *Lawsuit claims Dalton, Ga., carpet companies polluted Alabama drinking water with chemical linked to cancer*, TIMES FREE PRESS, (September 24, 2016), http://www.timesfreepress.com/news/business/aroundregion/story/2016/sep/24/lawsuit-dalton-ga-carpet-companies-polluted-a/388373/.

[87] 84 parts per trillion equals 0.084 micrograms per liter and 82 parts per trillion equals 0.082 micrograms per liter. Id.

[88] *3M Cottage Grove Facility*, MINNESOTA DEPARTMENT OF HEALTH, (June 2016), http://www.health.state.mn.us/divs/eh/hazardous/sites/washington/3Mcottagegrove.html.

[89] Id.

with PFOA, and other [PFASs] including perfluorooctane sulfonate (PFOS) and perfluorobutanoic acid (PFBA)."[90]

In addition to the Cottage Grove site, the Minnesota Department of Health believes other sources of PFASs in the region include the 3M-Woodbury Disposal Site, the 3M-Oakdale Disposal Site, and the Washington County Landfill at Lake Elmo.[91] Due to these detections of PFASs in the region, the Minnesota Department of Health tested residents for PFAS levels in their bloodstream, finding that concentrations "were higher than the averages for the general U.S. population."[92] Fortunately, when the residents that participated in the study drank treated water, their PFAS concentrations decreased over time.[93]

Just like in Alabama and in Ohio, plaintiffs pursued a lawsuit against 3M because of their contribution to PFAS pollution in public water systems.[94]

Michigan

While most Americans know of the Flint, Michigan water crisis regarding lead, many Americans probably do not know that the Flint River also had a problem with PFASs. In 2016, water sampling of the river found PFOA levels at 1.309 micrograms per liter and PFOS levels of .410 micrograms per liter.[95] In addition to PFOA and PFOS, eleven other PFASs were identified in samples of the Flint River's water and fish populations.[96]

In northern Michigan, PFOA levels of 7.4 micrograms per liter were identified at a fire hydrant at the Wurtsmith Air Force Base.[97] On March 23, 2016, a number of different agencies held an open house to discuss the contamination of PFASs in the base's water supply, including the Michigan Department of Environmental Quality, Michigan Department of Health and Human Services, and the U.S. Air Force.[98] During that meeting, the agencies attributed the presence of PFASs to firefighting foam.[99]

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[90] Id.

[91] Id.

[92] Id.

[93] Id.

[94] Sharon Lerner, *Lawsuits charge that 3M knew about the dangers of its chemicals*, THE INTERCEPT, (April 11, 2016), https://theintercept.com/2016/04/11/lawsuits-charge-that-3m-knew-about-the-dangers-of-pfcs/.

[95] *Flint, Michigan*, SOCIAL SCIENCE ENVIRONMENTAL HEALTH RESEARCH INSTITUTE, https://pfasproject.com/flint-michigan/.

[96] Id.

[97] *Oscoda Township, Michigan*, SOCIAL SCIENCE ENVIRONMENTAL HEALTH RESEARCH INSTITUTE, https://pfasprojec t.com/oscoda-township-michigan/.

[98] *Perflourinated Chemicals in Drinking Water Wells in Oscoda Township: Responses to Community Concerns as of June 6, 2016,* MICHIGAN DEPARTMENT OF HEALTH AND HUMAN SERVICES, (June 6, 2016), https://www.mich igan.gov/documents/mdhhs/General_Questions_from_March_2016_Public_Meeting_Posted_527011_7.pdf.

[99] Id. at 3.

New Jersey

In 2009, the DuPont Chambers Works facility region had dangerously high PFOA levels.[100] Even as the EPA had instituted a 0.4 micrograms per liter advisory level for PFOA, New Jersey had already instituted a more stringent regulatory standard of 0.04 micrograms per liter in a rule that also allowed the New Jersey Department of Environmental Protection to "require or provide for treatment" in the event a concentration exceeds that action level.[101] Wells located near the DuPont facility registered above even the EPA's 0.4 micrograms per liter requirement in 2008, clearly well above New Jersey's 0.04 micrograms per liter requirement.[102]

Montclair, New Jersey had three wells sampled in 2015 that resulted in PFOA measurements between .035 micrograms per liter and .048 micrograms per liter.[103] In response, the municipality installed carbon filtration systems, a technology that successfully removes PFOA from a water source.[104]

In 2016, a well in South Orange, New Jersey had PFOA levels of .058 micrograms per liter, above the New Jersey guideline in that year of 0.04 micrograms per liter.[105] The town argued against the PFOA exposure being a health threat to its citizens, saying that "Well #17 water represents only about 10% of the water introduced into the distribution system and it is blended with other non-contaminated water prior to delivery to any customer....the water actually delivered to consumers likely has PFOA levels below the guidance limits."[106] Even if we accept that argument, this polluted drinking water well still illustrates the inundation of PFOA throughout the nation's water bodies and ground water.

New York

In 2005, the New York State Department of Environmental Conservation had data indicating that wells near the Taconic Plastics factory in Petersburgh, New York had PFOA levels as high as 152 micrograms per liter.[107] Residents who lived near the factory actually rented homes from the company, and the company had instructed residents not to drink tap water; the company provided both its workers and nearby residents bottled water to drink instead.[108]

A plastics manufacturing plant near Hoosick Falls, New York had a groundwater sample that revealed PFOA levels at 130 micrograms per liter - high on its own, but also seven times higher

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[100] *PFOA pollution in the vicinity of the DuPont Chambers Works Facility, Deepwater, Salem County, New Jersey*, DELAWARE RIVERKEEPER, (April 28, 2009), http://www.delawareriverkeeper.org/sites/default/files/resources/Letters/PFOA_pollution_in_the_vicinity_of_the_DuPont_Chambers_Works_Facility_4-28-09.pdf.

[101] Id.

[102] Id.

[103] *Montclair, New Jersey*, SOCIAL SCIENCE ENVIRONMENTAL HEALTH RESEARCH INSTITUTE, https://pfasproject.com/montclair-new-jersey/.

[104] Id.

[105] *South Orange, New Jersey*, SOCIAL SCIENCE ENVIRONMENTAL HEALTH RESEARCH INSTITUTE, https://pfasproject.com/south-orange-new-jersey/.

[106] Id.

[107] *Rensselaer County and Petersburgh, New York*, SOCIAL SCIENCE ENVIRONMENTAL HEALTH RESEARCH INSTITUTE, https://pfasproject.com/rensselaer-county-and-petersburgh-new-york/.

[108] Id.

than a previous sample at the same site reaching 18 micrograms per liter.[109] Following this discovery of contamination, Taconic alerted the Department of Environmental Contamination who began testing near the factory again.[110] After discovering high PFAS contamination, the state provided the residents with bottled water.[111] For its part, Taconic has paid "to install carbon filter systems on private homes and a system for the municipal water supply."[112] New York declared PFOS a "hazardous substance" in 2016.[113]

Vermont

After the Vermont Department of Health established their PFOA advisory level as 0.02 micrograms per liter, three samples in Pownal, Vermont had PFOA concentrations of 0.026 and 0.027 micrograms per liter.[114] Following the discovered contamination, the Vermont Department of Environmental Conservation tested private drinking wells in a one-mile radius around the Warren Wire plant, the suspected source of the contamination.[115]

That PFOA discovery is only the tip of the iceberg in Vermont, however. A month prior to discovering contamination near Pownal, PFOA was also detected in North Bennington. Near a ChemFab factory, the Vermont environmental officials tested private wells and discovered levels of PFOA over 1 microgram per liter.[116]

New Hampshire

In 2014, the city of Portsmouth, New Hampshire shut down a well that serves the Pease International Tradeport because PFOS was found in the water source.[117] The officials investigating the well speculated that the concentrations found in the well resulted from firefighting foam used by the Air Force starting in the 1970s.[118] In 2014, the New Hampshire Department of Health and Human Services communicated to the public that "health officials don't know the health impacts - if any - from drinking water containing PFOS."[119]

Colorado

In 2016, two Colorado law firms filed class action suits due to PFAS contamination in El Paso County water systems.[120] After the EPA issued its Health Advisory in May 2016, the law firms

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[109] Amanda Fries, *Hoosick Falls residents shocked by high PFOA test results*, TIMES UNION, (June 19, 2017), http://www.timesunion.com/7dayarchive/article/Hoosick-Falls-meeting-11231034.php.

[110] Supra FN 109.

[111] Id.

[112] Id.

[113] Id.

[114] Edward Damon, *Vermont will test Pownal wells for PFOA contamination*, THE BERKSHIRE EAGLE, (March 26, 2016), http://www.berkshireeagle.com/stories/vermont-will-test-pownal-wells-for-pfoa-contamination,191787.

[115] Id.

[116] Id.

[117] Jeff McMenemy, *Water contamination shuts down well at Pease*, SEACOAST ONLINE, (May 22, 2014), http://www.seacoastonline.com/article/20140522/NEWS/140529897.

[118] Id.

[119] Id.

[120] Jake Brownell, *A Closer Look at PFC Contamination in Southern El Paso County*, KRCC, (September 28, 2016), http://krcc.org/post/closer-look-pfc-contamination-southern-el-paso-county.

pursued suits regarding drinking water systems with PFAS levels above the Health Advisory guidelines.[121] As defendants, the suits targeted companies like 3M that sold firefighting foam to a nearby Air Force base.[122] The PFAS Project references data that at one point, all 32 Security Water and Sanitation District municipal wells in El Paso County exceeded the 2016 EPA Health Advisory level, with one well having 1.37 micrograms per liter of PFAS.[123]

ii. PFOA and PFASs pose a risk to the environment due to their persistent nature and their high rates of accumulation in all Americans.

While the past historical concerns regarding PFOA and PFASs across the country should give anyone pause regarding the health risks of these substances, the most pressing risk regarding PFASs lies in the future. While long-chain PFASs like PFOA, PFOS, and PFNA pose the greatest risks, all PFASs threaten human health and the environment due to their persistent nature in the environment and the bloodstream of humans and animals. Furthermore, we simply do not know what will happen to human health if PFASs build up together in the blood stream, forming a toxic mixture whose individual components may or may not be dangerous individually.

PFOA has traits that make it particularly persistent in the environment. First, the molecule is quite mobile due to its ability to adsorb to particles in the air. Research in 2006 and 2012 identified PFOA in the Arctic and Antarctic regions of Earth.[124] PFOA is "resistant to hydrolysis, photolysis, volatilization, and biodegradation."[125] Two main methods exist to eliminate PFOA: either allow it to dissipate in water through dilution, advection, and absorption, or destroy it through municipal waste incineration of papers and textiles that contain the substance.[126] Of course, the latter option is not available when PFOA is discharged into water bodies.

When PFOA enters a biological organism, it spreads throughout body tissue with a tendency to accumulate in the liver, kidneys, lungs, heart, muscles, testes, and uterus.[127] The human body cannot metabolize PFOA, so health effects due to PFOA are the result of PFOA itself, not metabolites.[128] PFOA can transfer during pregnancy through the placenta and the amniotic fluid.[129] The half-life for PFOA in humans is 2.3 years based on studies of the Lubeck Public Services District in West Virginia and the Little Hocking Water Association in Ohio.[130] However, the half-life is much higher, at 3.8 years, for individuals who are exposed occupationally.[131]

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[121] Id.
[122] Id.
[123] *El Paso County, Colorado*, SOCIAL SCIENCE ENVIRONMENTAL HEALTH RESEARCH INSTITUTE, https://pfasproject.com/el-paso-county-colorado/.
[124] Supra FN 17, at 24.
[125] Id.
[126] Id. at 24 - 25.
[127] Id. at 26.
[128] Id.
[129] Id.
[130] Id.
[131] Id.

Fortunately, data supports the proposition that PFOA levels in the general U.S. population is decreasing, with a mean of 5.2 micrograms per liter in 1999 to 2.1 micrograms per liter in 2012.[132] The EPA notes this decrease is most likely due to the reduction in emissions and phase-out of production of PFOA across the country.[133] However, this data does not take a deep dive into PFAS concentrations in humans as a whole; instead, it only looks at PFOA. PFOA has its own persistent characteristics, and long-chain PFASs will generally be more persistent than their short-chain counterparts, yet the Americans and the EPA cannot ignore the environmental risks of these other PFASs.

In 2015, the Danish Ministry of the Environment released "a literature review of information on human health effects and environmental fate and effect aspects of short-chain PFAS[s]."[134] The objectives of the study were twofold - the Danish government hoped to provide a holistic overview "of the human health and environmental fate and effects aspects of short-chained polyfluorinated substances introduced as alternatives to PFOS/PFOA and other long-chain PFAS," while also supporting "the Danish EPA's strategy on this substance group by providing background documentation in relation to further activities, including possible regulation."[135] The Danish government was particularly concerned that little published data existed on the properties of short-chain PFASs that could serve as alternatives to their long-chain counterparts.[136]

As of 2015, most of "the toxicokinetics and toxicity in humans for short-chain PFAS[s] [were] mainly investigated for PFHxS."[137] PFHxS has 6 carbon chains as opposed to the 8 carbon chains of PFOA and PFOS.[138] While the health effects of PFHxS seem similar to that of PFOS, the Danish government concluded that it was impossible to evaluate any other short-chain PFAS from the available data.[139] This lack of available data represents the crux of the problem - companies across the United States and the world have begun using replacements for PFOA and other long-chain PFASs without sufficiently understanding the health and environmental effects of these short-chain siblings.

The Danish report does provide conclusions regarding the persistence of short-chain molecules, noting that "perfluorinated carboxylic and sulfonic acids, including short-chained [molecules], are not transformed/degraded by abiotic reaction mechanisms such [as] hydrolysis or photolysis in water to any appreciable extent."[140] While long-chained substances are more bioaccumulative than short-chained substances, all are "hydrophobic and lipophobic...[and] tend to bind to proteins and therefore are present rather in highly perfused tissues than in lipid tissue."[141]

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[132] Id. at 27.
[133] Id.
[134] *Short-chain Polyfluoroalkyl Substances (PFAS)*, THE DANISH ENVIRONMENTAL PROTECTION AGENCY, (2015), https://www2.mst.dk/Udgiv/publications/2015/05/978-87-93352-15-5.pdf.
[135] Id. at 5.
[136] Id.
[137] Id. at 8.
[138] Id. at 7.
[139] Id. at 8.
[140] Id.
[141] Id.

Generally, the Danish report emphasizes that for most short-chain PFASs, "there is virtually no available health-related information....[and] there is a general lack of specific experimental data....the environmentally relevant physico-chemical data identified appeared somewhat inconsistent and confusing."[142]

Another report from Europe discussed the effects of PFASs and their accumulation in the environment, coming to many of the same conclusions as the Danish report. In particular, the Concawe Soil and Groundwater Taskforce concluded the following:

> "It should be noted...that given the range of compounds present there is still uncertainty about their properties. In addition, low environmental concentration limits have been set for short-chain PFAS[s] (i.e. <C6 PFSA; <C7 PFCA) in many EU countries due to their persistence. Where possible, therefore, water containing PFAS-based fire-fighting foam residues should be captured for treatment and not discharged to the environment."[143]

The persistent nature of PFOA and other PFASs is potentially the most problematic of all of the environmental and health risks posed by these substances. As companies produce and use more and more PFASs, they perpetually inundate waters of the United States, public water systems, fish stocks, soil, and the atmosphere.

c. The Drinking Water Health Advisory issued by the United States Environmental Protection Agency in November 2016 inadequately protects Ohioans and Americans from the dangers of perfluorooctanoic acid and other perfluoroalkyl substances.

In the United States, recent literature from the American Chemical Society notes that public water systems inundated with PFASs can be predicted using spatial analysis. Specifically, "the number of industrial sites that manufacture or use these compounds, the number of military fire training areas, and the number of wastewater treatment plants are all significant predictors of PFAS detection frequencies and concentrations in public water supplies."[144] The researchers used the data acquired by the EPA during the third UCMR, and in doing so noted a few problems with the UCMR data.[145]

Because geospatial data for U.S. drinking water supplies is classified, the researchers found their ability to predict which supplies would contain elevated levels of PFASs restricted.[146] Additionally, their geospatial data lacked potentially important PFAS point sources "such as a wide range of industries, landfills, biosolids application, and other AFFF-impacted sites where

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[142] Id. at 9.

[143] *Environmental fate and effects of poly- and perfluoroalkyl substances (PFAS)*, CONCAWE SOIL AND GROUNDWATER TASKFORCE, (June 2016), https://www.concawe.eu/wp-content/uploads/2016/06/Rpt_16-8.pdf.

[144] Xindi C. Hu, David Q. Andrews, Andrew B. Lindstrom, Thomas A. Bruton, Laurel A. Schaider, Philippe Grandjean, Rainer Lohmann, Courtney C. Carignan, Arlene Blum, Simona A. Balan, Christopher P. Higgins, and Elsie M. Sunderland, *Detection of Poly- and Perfluoroalkyl Substances (PFASs) in U.S. Drinking Water Linked to Industrial Sites, Military Fire Training Areas and Wastewater Treatment Plants*, 3 Environ. Sci. Technol. Lett. 2016, 344–350, https://pubs.acs.org/doi/pdf/10.1021/acs.estlett.6b00260.

[145] Id. at 4.

[146] Id.

relatively smaller volumes of AFFF were released."[147] Similarly, data on PFAS releases from smaller facilities can be withheld "as confidential business information."[148]

But most importantly:

> "Approximately 44.5 million U.S. individuals rely on private drinking water wells, and 52 million individuals rely on smaller public water supplies (<10,000 served). The UCMR3 program includes 0.5% testing incidence for smaller public water supplies and no testing of private wells, meaning that information about drinking water PFAS exposures is therefore lacking for almost one-third of the U.S. population."[149]

The EPA presented a robust analysis of the problem of PFOA, PFOS, and PFASs in its Health Advisory, but its data was largely incomplete because it lacked the water supplies of nearly a third of the U.S. population. These data analysis issues pale in comparison to the insufficiency of the actual level for lifetime exposure proposed in the Health Advisory.

In the 2016 Health Advisory, the EPA established a Health Advisory level of lifetime exposure of both PFOA and PFOS in drinking water at 70 parts per trillion, or 0.07 micrograms per liter.[150] However, many governmental entities have proposed maximum contaminant levels well below 0.07 micrograms per liter. The EPA has proposed a standard that it purports as cognizant of health risks, but really, this standard caters to the economic needs of businesses who still need PFOA, PFOS, and other PFASs for their bottom line. If the EPA were working to protect human health and the environment, it would instead adopt a more stringent standard, a standard that is binding instead of voluntary. The following subsection will illustrate the actions taken by other governments at both the state and international level that illustrate the clear failings of the EPA Health Advisory.

d. New Jersey, Minnesota, Vermont, New York, and the international community have taken significant stances against perfluorooctanoic acid and perfluoroalkyl substances that go beyond any actions taken by the United States Environmental Protection Agency.

Even as the federal EPA continues to fail to adequately regulate PFOA, a few states have taken direct action to protect their citizens. Similarly, countries across the world have acted to protect their own people from PFASs. The OEC summarizes below the choices made by a sampling of these governmental entities.

New Jersey

On October 3, 2017, New Jersey took steps to update its guidance on PFOA. The New Jersey Drinking Water Quality Institute conducted a "detailed evaluation of the relevant scientific information that is currently available;" based on that evaluation, it concluded that the Maximum

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[147] Id.

[148] Id.

[149] Id.

[150] *Fact Sheet: PFOA & PFOS Drinking Water Health Advisories*, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, (November 2016), https://www.epa.gov/sites/production/files/2016-06/documents/drinkingwaterhealthadvisories_pfoa_pfos_updated_5.31.16.pdf.

Contaminant Level for PFOA should be 14 nanograms per liter, or 0.014 micrograms per liter, a level much lower than the federal level suggested in the EPA's Health Advisory.[151] What's more interesting is that New Jersey's guidance proposes an update to an already existing New Jersey requirement from 2007 that instituted a 0.04 microgram per liter level for PFOA, already lower than the non-binding standard later instituted by the EPA's Health Advisory in 2016.[152] New Jersey's guidance letter emphasized that the New Jersey Department of Environmental Protection planned on proposing 0.014 micrograms per liter for PFOA as a regulatory Maximum Contaminant Level, not just a guidance level for public water systems to take into consideration. In November, the state officially adopted 0.014 micrograms per liter as its MCL for PFOA.

Minnesota

Last October, Minnesota modified its guidance values for PFOA and PFOS. While non-binding, these guidance levels instruct local health officials to take action when PFOA concentrations are 0.035 micrograms per liter or when PFOS concentrations are 0.027 micrograms per liter.[153] The Minnesota Department of Health decided that it needed lower values than the EPA to "reflect new state-level analysis of the potential for mothers to pass along the chemicals to fetuses and nursing infants."[154]

Vermont

Vermont has taken action by performing blood samples and water samples in connection with a PFOA contamination that occurred in the State. For instance, in April 2016 the Health Department offered PFOA to affected residents in North Bennington and Bennington.[155] In addition, Governor Scott signed S.10 on June 2, 2017, which required "any person who released PFOA to extend a municipal water line to all wells impacted by PFOA....[the bill] supplements the Agency [of Natural Resources'] existing authority and simplifies the process for ensuring responsible parties pay for costs to connect impacted homes to municipal water lines."[156]

New York

New York responded with force following a major PFOA contamination in Hoosick Falls, performing biomonitoring, blood-testing, cancer investigations, and water supply tests.[157] On March 3, 2017, New York released its final rule governing PFOA and PFOS, which added the

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[151] *Updated Drinking Water Guidance for Perfluorooctanoic Acid (PFOA)*, NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, (October 3, 2017), http://www.nj.gov/dep/watersupply/pdf/pfoa_dwguidance.pdf.

[152] Id. See also *Determination of Perfluorooctanoic Acid (PFOA) in Aqueous Samples: Final Report*, NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, (January 2007), http://www.nj.gov/dep/watersupply/pdf/final_pfoa_report.pdf.

[153] *MDH Current Activities: Perflurochemicals (PFCs) in Minnesota*, MINNESOTA DEPARTMENT OF HEALTH, (October 2017), http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcs/current.html.

[154] Id.

[155] *PFOA in Drinking Water*, VERMONT HEALTH DEPARTMENT, (2018), http://www.healthvermont.gov/response/environmental/pfoa-drinking-water-2016.

[156] *PFOA Contamination Response: Community Update*, VERMONT AGENCY OF NATURAL RESOURCES, http://myemail.constantcontact.com/PFOA-Community-Update.html?soid=1105757924138&aid=zwcQOdpGobw.

[157] *PFOA in Drinking Water in the Village of Hoosick Falls and Town of Hoosick*, NEW YORK STATE DEPARTMENT OF HEALTH, (December 28, 2017), https://www.health.ny.gov/environmental/investigations/hoosick/.

two substances to the state's list of hazardous substances.[158] However, the amendment also continued to allow the use of firefighting foam that contains PFOA or PFOS.[159]

Ohio

While Ohio has not taken direct regulatory action regarding PFOA or other PFASs, in February 2018 Attorney General Mike DeWine filed a lawsuit against DuPont for their PFOA pollution in the Ohio River and nearby public water systems.[160] The Attorney General brought the action "to redress contamination by Defendant E. I. du Pont de Nemours and Company ("DuPont") of Ohio's natural resources with a *toxic substance, perfluorooctanoic acid*...which has caused significant damages and poses a significant ongoing threat to Ohio's natural resources and the citizens of Ohio."[161] With regards to the health risks of PFOA, the lawsuit states the following:

> "PFOA is a synthetic chemical compound that does not exist in nature. Human exposure to PFOA - even at very low levels - has been linked to kidney and testicular cancer, thyroid disease, pregnancy-induced hypertension and low birth weight, high cholesterol, and ulcerative colitis. PFOA is also a known toxicant and carcinogen in animals. The U.S. Environmental Protection Agency...has recognized that PFOA is extremely persistent in the environment, in both water and soil, and resistant to typical environmental degradation processes."[162]

If actual regulations existed on the books regarding PFOA and other PFASs, Ohio's Attorney General would not need to resort to lawsuits making claims of public nuisance, negligence, statutory nuisance, and trespass and rather could rely on the regulations mandating certain Water Quality Standards or requirements within NPDES permits.

The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs)

Developed and signed by scientists and professionals from across the world, the Madrid Statement communicates the scientific community's concern regarding the dangers of PFASs.[163] The Madrid Statement calls for the following actions from governments:

1. "Enact legislation to require only essential uses of PFASs, and enforce labeling to indicate uses.
2. Require manufacturers of PFASs to
    a. conduct more extensive toxicological testing,
    b. make chemical structures public,
    c. provide validated analytical methods for detection of PFASs, and
    d. assume extended producer responsibility and implement safe disposal of products and stockpiles containing PFASs.
3. Work with industry to develop public registries of products containing PFASs.

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[158] *Adoption of Final Rule: 6 NYCRR Part 597 (Hazardous Substances Identification, Release Prohibition, and Release Reporting*, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, (March 3, 2017), http://w ww.dec.ny.gov/regulations/104968.html.

[159] Id.

[160] See *State of Ohio, ex rel. DeWine v. E.I. Du Pont De Nemours and Co.*, Case No. 180T32, Court of Common Pleas, Washington County, Ohio, (February 8, 2018), Available at: http://www.ohioattorneygeneral.gov/Files /Briefing-Room/News-Releases/Environmental-Enforcement/2018-02-08-DuPont-Complaint.aspx

[161] Id. at 1 - 2.

[162] Id. at 2.

[163] *The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs)*, 123 Environmental Health Perspectives 5, (May 1, 2015), https://ehp.niehs.nih.gov/wp-content/uploads/123/5/ehp.1509934.alt.pdf.

4. Make public annual statistical data on production, imports, and exports of PFASs.
5. Whenever possible, avoid products containing, or manufactured using, PFASs in government procurement.
6. In collaboration with industry, ensure that an infrastructure is in place to safely transport, dispose of, and destroy PFASs and PFAS-containing products, and enforce these measures."[164]

Similarly, the Madrid Statement calls for actions from chemical manufacturers:

1. "Make data on PFASs publicly available, including chemical structures, properties, and toxicology.
2. Provide scientists with standard samples of PFASs, including precursors and degradation products, to enable environmental monitoring of PFASs.
3. Work with scientists and governments to develop safe disposal methods for PFASs.
4. Provide the supply chain with documentation on PFAS content and safe disposal guidelines.
5. Develop nonfluorinated alternatives that are neither persistent nor toxic."[165]

Finally, the Statement calls for product manufacturers to take action steps to:

1. "Stop using PFASs where they are not essential or when safer alternatives exist.
2. Develop inexpensive and sensitive PFAS quantification methods for compliance testing.
3. Label products containing PFASs, including chemical identity and safe disposal guidelines.
4. Invest in the development and use of nonfluorinated alternatives."[166]

The Madrid Statement cites dozens of sources regarding the danger of PFASs and includes the signatures of well over a hundred scientists.

European Union

On June 14, 2017, the European Union took the first steps to regulate PFOA, "its salts, and certain related substances."[167] The EU made the following conclusion:

> "The Commission concluded that an unacceptable risk to human health and the environment from the manufacture, use or placing on the market of PFOA, its salts and PFOA-related substances on their own, as a constituent of other substances, in mixtures and in articles. The Commission considers that those risks need to be addressed on a Union wide basis."[168]

While there are a few exceptions to the regulation, generally speaking PFOA and its salts will be completely prohibited by the EU after July 4, 2020.[169]

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[164] Id. 1 - 2.

[165] Id. at 2.

[166] Id.

[167] *EU Regulates PFOA and Related Substances Under Reach*, SAFEGUARDS, (June 23, 2017), http://www.sgs.com/en/news/2017/06/safeguards-09717-eu-regulates-pfoa-and-related-substances-under-reach.

[168] *Commission Regulation (EU) 2017 | 1000*, (June 13, 2017), L 150/14, http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R1000&from=EN.

[169] Supra FN 167.

e. Technology already exists for public water systems to protect their water sources from perfluorooctanoic acid, and that same technology could apply to companies that could potentially emit PFOA or PFASs into America's waterways.

When proposing the regulation of a contaminant, it helps when public water systems can use technologies to protect drinking water from the contaminant or that removes the contaminant from discharges into the waters of the United States. In the case of PFOA, public water systems along the Ohio River have already experimented with methods that protect their residents from the contaminant.[170] In addition, New Jersey and the Water Research Foundation have both provided recommendations on how to treat PFASs in drinking water.[171]

Following the contamination of water supplies along the Ohio River by PFOA from the Washington Works DuPont plant, the Lubeck Public Service District and the Little Hocking Water Association "began routine treatment with granular activated carbon to remove PFOA from the potable water supply."[172] These public water systems needed to find a way to treat their water; even though DuPont reduced their PFOA emissions at the Washington Works plant by 99% between 2000 and 2006, groundwater supplies remained contaminated with PFOA when the public water systems began their filtration efforts.[173]

Prior to treatment efforts, the Little Hocking Water Association had PFOA concentrations that ranged from 1.9 to 4.9 nanograms per milliliter, or approximately 0.0019 to 0.0049 micrograms per liter.[174] These levels were already far below the EPA advisory levels at that time and even today, yet these water systems still chose to reduce concentrations further, most likely to reduce lifetime buildup of the PFOA in their residents. Following treatment, PFOA concentrations dropped drastically, reaching a nearly unquantifiable level, or less than 0.016 nanograms per milliliter.[175] The Little Hocking Water Association replaces their carbon every three months in an effort to ensure there are "no detectable levels" of PFOA and related compounds in the water.[176]

A granulated activated carbon treatment method works by adsorbing molecules to the carbon.[177] The effectiveness of the method depends heavily on how many contaminants compete to adsorb

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[170] See Scott M. Bartell, Antonia M. Calafat, Christopher Lyu, Kayoko Kato, P. Barry Ryan, and Kyle Steenland, *Rate of Decline in Serum PFOA Concentrations after Granular Activated Carbon Filtration at Two Public Water Systems in Ohio and West Virginia*, Environ Health Perspect 118:222–228 (February 2010), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2831921/pdf/ehp-118-222.pdf.

[171] See *Recommendation on Perfluorinated Compound Treatment Options for Drinking Water*, New Jersey Drinking Water Quality Institute, (June 2015), http://www.nj.gov/dep/watersupply/pdf/pfna-pfc-treatment.pdf; See also Eric R. V. Dickenson and Christopher Higgins, *Treatment Mitigation Strategies for Poly- and Perfluoroalkyl Substances*, WATER RESEARCH FOUNDATION, (February 2016), http://www.waterrf.org/ExecutiveSummaryLibrary/4322_ProjectSummary.pdf.

[172] Supra FN 170.

[173] Id.

[174] Id.

[175] Id.

[176] *Recommendation on Perfluorinated Compound Treatment Options for Drinking Water*, NEW JERSEY DRINKING WATER QUALITY INSTITUTE, (June 2015), at 4 - 5, http://www.nj.gov/dep/watersupply/pdf/pfna-pfc-treatment.pdf.

[177] Id. at 3.

to the carbon, but the New Jersey Drinking Water Quality Institute estimates that for PFNA, PFOA, and PFOS these activated carbon filtration systems reduce concentrations in water supplies by more than 90%.[178] Costs of the granulated carbon treatment method depends heavily "on the level of contaminant in the source water as well as the presence and concentration of other contaminants that compete for carbon surface area....in addition to capital costs...disposal of exhausted carbon is also a cost consideration."[179]

In addition to the Little Hocking Water Association, other water treatment facilities have installed this technology such as the cities of Oakdale, Minnesota and Penn's Grove, New Jersey. In 2006, Oakdale installed ten granulated activated carbon filters into a plant with a capacity to treat 2,000 gallons of water per minute.[180] The technology cost $3,000,000 and has annual operating costs of $25,000.[181] The Penn's Grove system, operated by New Jersey American Water, installed a granulated activated carbon system that cost $12.2 million with an annual cost of $80,000.[182] However, the treatment for PFOA "did not reach 50% breakthrough even after treating more than 231,666 Kgal."[183] Fortunately, New Jersey American Water had better success with the granulated activated carbon filtration in the Logan System Birch Creek, where PFOA levels of 33 to 60 nanograms per liter were reduced below 5 nanograms per liter after installation.[184]

While most public water systems have focused on treatment systems for long-chain PFASs like PFOA, PFNA, or PFOS, the Water Research Foundation has conducted research on treating the whole class of PFASs. Specifically, the stated goal of their study was to "evaluated the ability of a wide spectrum of full-scale water treatment techniques to remove PFASs from contaminated raw water or potable reuse sources to protect humans from this important route of exposure."[185] The project measured the levels of 23 PFASs, including "9 perfluorocarboxylic acids (PFCAs), 4 perfluorosulfonic acids (PFSAs), perfluorooctane sulfonamide (FOSA), 2 perfluorosulfonamidoacetic acids, 3 flurotelomer unsaturated carboxylic acids and 3 fluorotelomer sulfonates."[186]

The project concluded that granulated activated carbon treatments "were more effective at removing long-chain PFASs and PFSAs than PFCAs."[187] However, the most effective treatment method was not granulated activated carbon or the other common treatment technology, flat-sheet membranes; reverse osmosis "demonstrated significant removal for all the PFASs,

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[178] Id.
[179] Id. at 4.
[180] Id. at 5.
[181] Id.
[182] Id.
[183] Id.
[184] Id. at 5 - 6.
[185] Eric R. V. Dickenson and Christopher Higgins, *Treatment Mitigation Strategies for Poly- and Perfluoroalkyl Substances*, WATER RESEARCH FOUNDATION, (February 2016), at 2, http://www.waterrf.org/ExecutiveSummaryLibrary/4322_ProjectSummary.pdf.
[186] Id.
[187] Id.

including the smallest PFAS [included in the study], perfluorobutanoic acid."[188] Perfluorobutanoic acid has 4 carbon links as opposed to PFOA's 8 carbon links.[189]

Reverse osmosis is more costly than granulated activated carbon filtration, so the Water Research Foundation recommends the use of reverse osmosis only for public water systems that have high concentrations of short-chain PFASs.[190] But the research demonstrates that treatment techniques exist for both long-chain and short-chain PFASs. Not only can public water systems (or point sources) install technology that protects against PFOA, they can install technology that protects against all PFASs.

Most importantly, if public water systems can install technology that treats water before it is sent to its customers, emitters of PFASs can install that technology too as pollutants are discharged into water bodies. At the very least, the cost of installing this technology should not be on the shoulders of public water systems, especially public water systems under 10,000 residents. While solutions to this cost problem are beyond the scope of this Petition, many options exist for the EPA to utilize to ensure the privilege of protecting our water supplies from PFOA and PFASs is given to the appropriate parties.

III. The OEC requests the following rules, each of which would regulate PFOA and PFASs.

Therefore, based on the science explained above and in accordance with the laws outlined below, the OEC proposes specific regulations under the CWA and the SDWA that would regulate both PFOA and all PFASs. While the OEC recognizes the comprehensive nature of this request, the OEC also emphasizes the need for comprehensive protection of human health and the environment. The CWA establishes that "it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited."[191] It is in an effort to achieve this national policy and other similar policies that the OEC proposes the following rules. In this section, we briefly state each proposed rule along with a short justification for the proposed rule. Sections IV and V provide the in-depth legal analysis required to justify the promulgation of these rules. For an example of what potential language might look like for any of these proposed Rulemakings, see Attachment I.

a. The EPA should develop Water Quality Criteria for PFOA at 0.014 micrograms per liter of water.

The Clean Water Act tasks the EPA with the promulgation of Water Quality Criteria that the states use in developing their Water Quality Standards and other rules that protect Waters of the United States and of the several States. Based on the conclusions made by states like New Jersey, the OEC proposes Water Quality Criteria of 0.014 micrograms per liter. This value will ensure

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[188] Id. at 3.

[189] See *Perfluorobutanoic Acid*, ALS ENVIRONMENTAL, (Accessed February 20, 2018), http://www.caslab.com/Perfluorobutanoic-Acid-3.php5.

[190] Id.

[191] 33 U.S.C. §1251(a)(3).

that water bodies inundated with PFOA will receive the necessary treatment to protect human health and the environment and regulate future discharges of PFOA.

b. The EPA should develop Water Quality Criteria for PFASs at 0.07 micrograms per liter of water.

The OEC proposes that the EPA promulgate Water Quality Criteria that limits PFASs to a maximum concentration of 0.07 micrograms per liter of water in any particular water body. Thus, in a situation where PFOA does not reach over 0.014 micrograms per liter, yet collectively all PFASs have inundated a water body at over 0.07 micrograms per liter, the water body would still receive the necessary protections to halt the potential collective harm from these substances.

c. The EPA should develop a national Water Quality Standard for the Ohio River that accounts for the high levels of PFOA and PFASs in that watershed.

Because the Ohio River has been seriously harmed by PFOA and other PFASs over the past half century, the EPA should take immediate action and promulgate a national Water Quality Standard that includes a 0.014 microgram per liter limitation for PFOA and 0.07 micrograms per liter for all PFASs. The Ohio River and its tributaries cannot wait for the States or a regional organization such as the Ohio River Valley Water Sanitation Commission (ORSANCO) to take the necessary steps to protect the Ohio River from PFOA and PFASs.

d. The EPA should develop a Primary Drinking Water Regulation for PFOA at 0.014 micrograms per liter.

The OEC believes that the 0.014 micrograms per liter limitation proposed by the EPA in its Health Advisory is insufficient to adequately protect human health and the environment. Instead, the EPA should promulgate a Primary Drinking Water Regulation for PFOA that requires a public water system to take action if it has levels of PFOA over 0.014 micrograms per liter. This lower threshold for action will ensure public water systems act before PFOA levels reach dangerous levels.

e. The EPA should develop a Primary Drinking Water Regulation for PFASs at 0.07 micrograms per liter.

The OEC proposes a Primary Drinking Water Regulation for PFASs that, at 0.07 micrograms per liter, would require action by a public water system. 0.07 micrograms per liter matches the original number proposed by the EPA for PFOA in its Health Advisory, but instead would cover all PFASs. This regulation would ensure that if a public water system becomes inundated with a multiplicity of PFASs, it would take action with the necessary treatment techniques.

IV. The EPA should regulate PFOA and PFASs under the CWA.

33 U.S.C. §1251 spells out the purpose of the CWA, emphasizing seven specific goals, the first three of which are of import to this Petition for Rulemaking:

> (1) "it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985;
>
> (2) it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983; [and]
>
> (3) it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited."[192]

While the United States failed to achieve these goals by the timelines stated in 1972, the substantive purposes remain the same. The United States has a national goal to eliminate the discharge of pollutants into navigable waters, achieve water quality suitable for aquatic life and recreation, and prohibit the discharge of toxic pollutants in toxic amounts. With these policies in mind, the OEC hereby proposes its Petition for Rulemaking regarding PFOA and PFASs under the Clean Water Act.

a. The Administrator of the EPA has the authority to establish Water Quality Criteria and a Water Quality Standard for the Ohio River under 33 U.S.C. §1313 and 1314.

The OEC has two specific requests for the EPA under the CWA that are separate from its requests under the SDWA. First, the OEC requests that the Administrator develop and publish Water Quality Criteria that reflects the latest scientific knowledge on the effects of PFOA and PFASs, as pursuant to 33 U.S.C. §1314(a). Second, the OEC requests that the Administrator prepare and make public regulations setting forth a Water Quality Standard for the Ohio River that includes a specific limitation on the levels of PFOA and PFASs, pursuant to 33 U.S.C. §1313(c)(4)(B).

The Administrator not only can promulgate these regulations; the Clean Water Act mandates that he must promulgate these regulations. Otherwise, the EPA is in ongoing violation with the requirements of the CWA.

i. The Administrator has the duty to publish Water Quality Criteria that informs the public of all effects a pollutant may have upon health and welfare.

The CWA envisioned a robust federalist system of regulation, where the EPA publishes Water Quality Criteria that assist state agencies in their direct regulation of pollution into water bodies. While states, for the most part, do the lion's share of water body protection, the EPA plays an

[192] 33 U.S.C. §1251(a)(1) - (3).

important role in guiding those state agencies with suggested "Water Quality Criteria." The CWA states:

> "The Administrator...shall develop and publish...(and from time to time thereafter revise) criteria for water quality accurately reflecting on the latest scientific knowledge on the kind and extent of all identifiable effects on health and welfare...which may be expected from the presence of pollutants in any body of water, including ground water."[193]

In addition to the requirement regarding Water Quality Criteria, the Administrator must publish "information" that explains how to "restore and maintain the chemical, physical, and biological integrity of all navigable waters, [and] ground waters."[194] This information also includes data "necessary for the protection and propagation" of aquatic wildlife, "measurement and classification of water quality," and "identification of pollutants" that can be measured for TMDL purposes.[195]

In practice, the EPA provides "Water Quality Criteria" for aquatic life, biology, human health, microbes and recreational activity, and suspended and bedded sediment.[196] For instance, the EPA has promulgated Water Quality Criteria for arsenic, proposing 0.018 micrograms per liter of water and fish consumption, or 0.14 micrograms per liter of fish consumption.[197]

The states as well as tribal governments use the criteria to develop their Water Quality Standards, so it is of paramount importance that the federal government provides the most robust set of data possible that fulfills the CWA's principal purpose: "restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[198] If the Administrator does not develop Water Quality Criteria for PFOA, then the Administrator has acted in an arbitrary and capricious manner and abused his mandate to develop Water Quality Criteria that protects our nation's water resources. The science shows that PFOA poses a risk to human health, and the EPA must provide Water Quality Criteria that protects human health.

ii. The Administrator has the duty to publish Water Quality Standards that satisfy the requirements of the CWA.

While individual states normally develop Water Quality Standards for particular water bodies by stating specific designated uses through either numeric or narrative criteria for those water bodies, the Administrator of the EPA has the authority to develop Water Quality Standards for navigable waters. The Administrator's power in this regard is defined as follows:

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[193] 33 U.S.C. §1314(a)(1).

[194] 33 U.S.C. §1314(a)(2).

[195] Id.

[196] See *Basic Information on Water Quality Criteria*, UNTED STATES ENVIRONMENTAL PROTECTION AGENCY, (July 5, 2017), https://www.epa.gov/wqc/basic-information-water-quality-criteria.

[197] See *National Recommended Water Quality Criteria - Human Health Criteria Table*, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, (October 10, 2017), available at: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria- table.

[198] 33 U.S.C. §1251(a).

> "Promptly prepare and publish proposed regulations setting forth a revised or new Water Quality Standard for the navigable waters involved in any case where the Administrator determines that a revised or new standard is necessary to meet the requirements of this chapter."[199]

Normally, water bodies in Ohio receive their Water Quality Standards from the Ohio Environmental Protection Agency ("OEPA"). For example, The OEPA gave the Scioto River drainage basin has hundreds of different use designations for different portions of the river and different streams contained within the watershed. At River Mile 33.6, the Scioto River is designated as a "Warmwater Habitat,"[200] while at River Mile 132.3 to Greenlawn Dam, the river is designated as a "Modified Warmwater Habitat."[201] Water Quality Standards also implement specific limitations on the concentrations of substances in the water bodies; those numbers are developed in accordance with TMDLs created for the watershed.

These Water Quality Standards are then approved by the EPA. If the EPA believes that a Water Quality Standard proposed by a state agency fails to satisfy the requirements of the CWA, it may reject the standard and order the state agency to create a new standard. If the state agency fails to satisfy the EPA's request, the EPA may promulgate a Water Quality Standard that supersedes the state agency's previous failed rulemaking.[202]

Ohio also implements Water Quality Criteria at Ohio Administrative Code §§3745-1-33, 3745-1-34, 3745-1-35, and 3745-1-37 that are then used when developing Water Quality Standards for specific water bodies. Ohio has not promulgated its own Water Quality Criteria for PFOA.

EPA Administrators, using their authority under 33 U.S.C. §1314(c)(4)(B), have developed Water Quality Standards for a number of water bodies when state agencies have failed to adequately protect those water bodies. In 2004, the EPA promulgated Water Quality Standards for the state of Ohio regarding levels of bacteria in Lake Erie due to a statutory deadline the OEPA failed to meet.[203] Similarly, the EPA has recently proposed a regulation that would establish numeric criteria for the San Francisco Bay and Delta in California for selenium.[204]

As this Petition for Rulemaking shows, PFOA and PFASs represent a danger to human health and the environment in violation of the CWA. This Petition also shows that the Ohio River and

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[199] 33 U.S.C. §1314(c)(4)(B).

[200] A "warmwater habitat," is described by the Ohio EPA as satisfying the "baseline regulatory requirements in line with Clean Water 'fishable goal' expectations." *Summary of Ohio's Beneficial Use Designations*, OHIO ENVIRONMENTAL PROTECTION AGENCY, (April 2004), http://www.epa.ohio.gov/portals/35/wqs/designation_summary.pdf.

[201] A "modified warmwater habitat," is described by the Ohio EPA as a less restrictive requirement "for dissolved oxygen and ammonia," and "may result in less restrictive wastewater treatment requirements." Id.

[202] Specifically, the statute states: "The Administrator shall promptly prepare and publish proposed regulations setting forth a revised or new Water Quality Standard for the navigable waters involved...if a revised or new Water Quality Standard submitted by such State...for such waters is determined by the Administrator not to be consistent with the applicable requirements of this chapter." 33 U.S.C. §1313(c)(4)(A).

[203] See *Final Water Quality Standards for Coastal and Great Lakes Recreation Waters*, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, (March 17, 2017), available at https://www.epa.gov/beach-tech/final-water-quality-standards-bacteria-rule-coastal-and-great-lakes-recreation-waters.

[204] See *Water Quality Standards Regulations: California*, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, (October 24, 2017), https://www.epa.gov/wqs-tech/water-quality-standards-regulations-california.

other associated water bodies are seriously affected by these substances. The CWA grants the Administrator authority to promulgate Water Quality Standards when he "determines that a revised or new standard is necessary to meet the requirements of this chapter."[205]

b. The Administrator of the EPA should grant the relief requested under the CWA because PFOA and PFASs harm human health and the environment.

As outlined in §2, PFOA and PFASs pose a serious risk to human health and the environment. PFOA in particular is linked with the following health conditions:

(1) high cholesterol
(2) ulcerative colitis
(3) thyroid disease
(4) testicular and kidney cancer
(5) pregnancy-induced hypertension

Additionally, PFASs pose a risk due to the lack of sufficient knowledge regarding their potential health risks. While a massive body of knowledge has been compiled regarding PFOA through the efforts of many researchers and the C8 Science Panel, many PFASs have little to know toxicology research. Thus, even while the EPA does not know all of the health effects of these substances, it continues to allow polluters to discharge PFASs into the waters of the United States. The EPA is allowing a potentially toxic mixture of thousands of substances to form in our waterways without the knowledge to definitively state that such mixture is safe.

If PFASs degraded in the environment quickly, these discharges may not be much of an issue. However, PFASs are incredibly stable and remain in the environment for decades. The accumulation of high levels of PFASs may have untold long-term consequences for ecosystems and for human health. If the United States is to satisfy the purpose of the CWA, it must act and protect the nation's water bodies from PFOA and all PFASs. It can accomplish this goal by promulgating Water Quality Criteria, as well as Water Quality Standards for valuable water bodies like the Ohio River.

c. The OEC proposes the following regulations as the Water Quality Criteria for PFOA and PFASs.

The OEC, in an effort to assist the EPA in the important task of protecting human health and the environment, wishes to provide recommended text for promulgation as "Water Quality Criteria" and "Water Quality Standards" for the Ohio River. The OEC believes that these suggestions are simultaneously reasonable, non-arbitrary, and justified in light of the evidence presented establishing the danger of PFOA and PFASs. For a clear statement of the proposed regulations, see Attachment 1.

[205] 33 U.S.C. §1314(c)(4)(B).

i. The OEC petitions the Administrator of the EPA to issue Water Quality Criteria for PFOA that limits its presence in water bodies to 0.014 micrograms per liter of water.

Through its authority under the CWA at 33 U.S.C. §1314(a)(1), the EPA should regulate PFOA. The OEC proposes 0.014 micrograms per liter as the human health Water Quality Criteria for PFOA for consumption of water and organism, and consumption of an organism only. The 0.014 micrograms per liter concentration is calculated based on the action taken by New Jersey to regulate PFOA in 2017. New Jersey became the first state to issue a maximum contaminant level for PFOA at 0.014 micrograms per liter for public water systems due to the substance's health risks.[206] For the sake of consistency, the EPA should promulgate Water Quality Criteria identical to drinking water standards. When a public drinking water system has a legal requirement to act, so should polluters.

The OEC readily expects the EPA to reject 0.014 micrograms per liter in favor of 0.07 micrograms per liter, the number used in the agency's Health Advisory. However, New Jersey provided specific reasons for preferring 0.014 micrograms to the EPA's suggested value, or even the state's previous guidance level of 0.04 micrograms per liter. New Jersey's Department of Environmental Protection determined that it needed to account for uncertainty factors of effects that occur at low doses:

> "A Health-based MCL protective for increased relative liver weight was derived based on a study in which male mice were exposed to PFOA for 14 days....For increased relative liver weight, the Target Human Serum Level is 14.5 ng/ml and the Reference Dose is 2 ng/kg/day. This Target Human Serum Level and Reference Dose incorporate uncertainty factors to protect sensitive human subpopulations, to account for toxicodynamic differences between human and experimental animals, and to protect for more sensitive endpoints that occur from developmental exposures (delayed mammary gland development, persistent hepatic toxicity, and others). Default values for drinking water exposure assumptions (2 L/day water consumption; 70 kg body weight) and Relative Source contribution factor (20%) were used to develop a Health-based MCL of 14 ng/L based on the reference Dose for increased relative liver weight.
>
> A cancer slope factor of 0.021 $(mg/kg/day)^{-1}$ was developed based on increased incidence of testicular tumors in a chronic rat study. >This slope factor was used to develop a Health-based MCL protective for cancer effects at the 1×10^{-6} (one in one million) lifetime cancer risk level of 14 ng/L, identical to the Health-based MCL based on non-cancer endpoints."[207]

While the OEC proposes these same numeric values under the SDWA, it is essential that these numeric values also apply under the CWA to effectively protect human health and the environment at every step of the process. If the EPA can protect water bodies before contaminants ever reach public water systems, then local public water systems can save money because they do not need to install treatment technology. By developing a regulation under the CWA, the agency will place the burden of treatment upon the point sources themselves, rather than primarily upon drinking water systems. Further, Water Quality Criteria will ensure that

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[206] *Christie Administration Takes Action to Enhance Protection of New Jersey's Drinking Water*, NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, (November 1, 2017), http://www.nj.gov/dep/newsrel/2017/17_0104.htm.

[207] Supra FN 151, at 4.

organisms living in water bodies are protected from PFOA too. While a National Safe Drinking Water Regulation protects citizens from consuming water with PFOA, it does not protect against ingesting PFOA through fish consumption.

ii. The OEC petitions the Administrator of the EPA to issue Water Quality Criteria for PFASs that limits its presence in water bodies to 0.07 micrograms per liter of water.

Similarly, through its authority under the CWA at 33 U.S.C. §1314(a)(1), the EPA should regulate PFASs. If a particular water body becomes too inundated with PFASs, there must be a burden placed upon point sources to install appropriate technology to rectify the problem.

As explained in §2, the inadequate literature published on most PFASs poses a serious health risk due to the serious uncertainty of what a combination of many different PFASs in the bloodstream might cause. The EPA should embrace the precautionary principle and in the absence of certain science take action to protect human health and the environment. We cannot allow a potentially toxic mixture to form in our waterways nor the bloodstreams of U.S. citizens.

To that end, the OEC proposes that the EPA use 0.07 micrograms per liter as the values for the consumption of water and organism, and consumption of an organism only. These values should sufficiently protect human health and the environment, especially in accordance with the EPA's Health Advisory on PFOA and PFAS. Whenever a combination of PFOA, PFOS, and other long-chain PFASs reaches 0.07 micrograms per liter in a water body, states would need to promulgate a TMDL or take other necessary corrective action.

With a value of 0.07 micrograms per liter, the EPA ensures that human health and the environment is sufficiently protected. Consider the circumstance where PFOA is less than 0.014 micrograms per liter in a water body - such as 0.009 micrograms per liter. But a combination of other PFASs, such as PFOS, PFNA, adds up to a total concentration of 0.07 micrograms per liter. While the 0.009 micrograms per liter of PFOA may not cause serious harm to human health, the combination of many PFASs in a water body could cause serious health risks whether through fish consumption, through drinking water or another form of human exposure.

Furthermore, as outlined in the section above regarding the proposed Water Quality Criteria for PFOA, the EPA should place the burden of treatment upon the point sources, not the public water systems. Promulgating Water Quality Criteria accomplishes this goal.

Therefore, the OEC petitions the Administrator to take the necessary precautions to protect the public health from high concentrations of PFASs, setting the Water Quality Criteria at 0.07 micrograms per liter.

d. The OEC petitions the Administrator of the EPA to issue a Water Quality Standard for the Ohio River that protects the watershed from the dangers of PFOA and PFASs.

If the EPA promulgates the Water Quality Criteria established above, it must take immediate action to protect the water bodies most inundated by PFOA and other PFASs. While this petition focuses on the Ohio River, the OEC would be remiss not to mention that the EPA should consider taking immediate action to protect water bodies in other seriously affected regions, such as Minnesota, New York, Vermont, or New Jersey.

The EPA could take immediate action by issuing a national Water Quality Standard under its authority at 33 U.S.C. §1314(c)(4)(B). Additionally, the agency could coordinate with the OEPA, the Ohio River Valley Sanitation Commission ("ORSANCO"), and the several states of the Ohio River Valley to develop a Water Quality Standard that protects the River from PFOA and PFASs. When the EPA decides to develop these water quality standards, it should choose the method that will protect the River efficiently and expeditiously.

Ohio's government has recognized the risk PFOA poses to its citizens, as evidenced by its recent lawsuit against DuPont.[208] The federal EPA could coordinate with the Ohio EPA to develop Water Quality Standards quickly and efficiently and in line with the Water Quality Criteria proposed above. Alternatively, the EPA could coordinate with ORSANCO, though recently that commission proposed eliminating its Pollution Control Standards for the River.[209] Whatever avenue the EPA decides to take, it must act quickly to ensure that companies are not dumping tons of unregulated PFASs into the Ohio River, even if PFOA emissions have reduced drastically in the region since the scandal of the Washington Works plant.

V. The EPA should regulate PFOA and other PFASs under the SDWA.

Unlike the CWA, the SDWA does not contain a clear statement of U.S. purpose or national policy with regards to the regulation of public water systems. However, the primary tools of the SDWA, its "Primary Drinking Water Regulations," have a very specific definition pertinent to this Petition for Rulemaking. The SDWA defines a "Primary Drinking Water Regulation" as a rule that governs public water systems, "specifies contaminants which, in the judgment of the Administrator, *may have any adverse effect* on the health of persons," specifies a maximum contaminant level or a treatment technique if maximum contaminant level determinations are not economically or technologically feasible, and contains "criteria and procedures to assure a supply of drinking water which dependably complies with such maximum contaminant levels."[210]

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[208] See Supra FN 160.

[209] The Ohio Environmental Council and other public interest environmental groups submitted comments in opposition to the elimination of the pollution control standards specifically because it would eliminate a coordinated method through which the several States of the Ohio River could protect against pollutants like PFOA or other PFASs. For more information on the repeal of ORSANCO's Pollution Control Standards, see *Pollution Control Standards*, OHIO RIVER VALLEY SANITATION COMMISSION, http://www.orsanco.org/programs/pollution-control-standards/.

[210] 42 U.S.C. §300f(1)(A) - (D), emphasis added.

Thus, the OEC submits this Petition for Rulemaking because the EPA must establish drinking water regulations that account for all contaminants that may have an adverse effect on public health. In addition, this Petition hopes to provide scientifically verifiable means through which the EPA can assist public water systems in effectively protect public health. In this case, the OEC believes that PFOA and PFASs satisfy the requirements of the SDWA, as provided in detail in this Petition for Rulemaking.

a. The Administrator of the EPA has the authority to establish a Primary Drinking Water Regulation under the SDWA.

Between 2013 and 2015, public water systems across the country monitored 30 contaminants as required by the third "Unregulated Contaminant Monitoring Rule," ("UCMR") a process put in place by the 1996 amendments to the SDWA.[211] During this period, not only did the EPA mandate public water systems to monitor for PFOA, the EPA considered five other PFASs: PFOS, PFNA, perfluorohexane-sulfonic acid ("PFHxS"), perfluoroheptanoic acid ("PFHpA"), and perflurobutanesulfonic acid ("PFBS").[212]

Following the administration of this monitoring program, the EPA issued the aforementioned Drinking Water Health Advisory, instead of choosing to regulate the contaminant directly by issuing a Primary Drinking Water Regulation. While the OEC disputes that decision of the agency, the fact that it chose to issue an Advisory, or even consider PFOA, PFOS, and other similar compounds under the UCMR program, demonstrates that the agency has the authority to regulate this group of compounds under the SDWA. Thus, the agency could - indeed, should - regulate PFOA either through the emergency powers conferred upon the EPA Administrator under the SDWA, or through the ordinary procedure for developing a national "Primary Drinking Water Regulation" under the same Act.

i. The Administrator can regulate perfluorooctanoic acid under the emergency powers of the SDWA.

First and foremost, the Administrator of the EPA has the authority to use emergency powers to protect the health of persons from contaminants[213] in drinking water sources. Specifically, when the Administrator receives information regarding the presence of a contaminant in a public water system or other source of drinking water, the administrator may take necessary actions if the contaminant presents "an imminent and substantial endangerment to the health of persons, and...appropriate State and local authorities have not acted to protect the health of such persons."[214] These emergency powers present a broad and extensive range of tools to protect

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[211] *Third Unregulated Contaminant Monitoring Rule*, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, (December 9, 2016), https://www.epa.gov/dwucmr/third-unregulated-contaminant-monitoring-rule. See also 42 U.S.C. §300g-1(b)(B)(ii).

[212] Id.

[213] In the context of the Safe Drinking Water Act, "contaminant" means "any physical, chemical, biological, or radiological substance or matter in water." It does not refer only to contaminants actually regulated under the Safe Drinking Water Act. 42 U.S.C. §300f. (6).

[214] 42 U.S.C. §300i. (a).

public health, including requiring alternative water supplies (provided by those who caused the public endangerment) and civil actions against perpetrators.[215] This is a non-exhaustive list of powers - in the end, the Administrator may take "such actions as he may deem necessary in order to protect the health of such persons."[216]

Therefore, if the evidence shows that a public water system is sufficiently inundated with a contaminant, even if that contaminant is not regulated by the EPA, the Administrator can take actions to protect the public when that contaminant poses a substantial endangerment to the health of persons.

Thus, even if the EPA erroneously determines that PFOA does not deserve a national Primary Drinking Water Regulation, the Administrator should use his emergency powers to protect the public in regions where abnormally high levels of PFOA have been detected. As outlined in §2, different places across the nation have experienced PFOA and PFAS concentrations well above the current Health Advisory or any reasonably safe levels. These communities deserve assistance when dealing with pollution that exists in their public water systems due to the fault of others who decided they would not take the necessary precautions. The EPA should provide that assistance and assist local communities as they take action against the people who caused the pollution in the first place.

ii. If the Administrator has sufficient information on PFOA and PFASs, he can use it to promulgate a Primary Drinking Water Regulation under the SDWA.

However, even if the Administrator were to determine that he should not use his emergency powers in the context of PFOA, the EPA must still administer a Primary Drinking Water Regulation under the SDWA. The EPA receives its authority to regulate contaminants through drinking water regulations under 42 U.S.C. §300g-1(b)(1)(A)(i)-(iii). In addition, the EPA can promulgate interim national Primary Drinking Water Regulations, as provided for under 42 U.S.C. §300g-1(b)(D).

Generally, the Administrator promulgates a national Primary Drinking Water Regulation when he or she makes the following three determinations:

(1) "the contaminant may have an adverse effect on the health of persons;
(2) the contaminant is known to occur or there is a substantial likelihood that the contaminant will occur in public water systems with a frequency and at levels of public health concern; and
(3) in the sole judgment of the Administrator, regulation of such contaminant presents a meaningful opportunity for health risk reduction for persons served by public water systems."[217]

Upon making these determinations and the publishing of a national Primary Drinking Water Regulation, the Administrator must also publish a cost benefit analysis, specifically explaining

[215] Id.
[216] Id.
[217] 42 U.S.C. §300g-1(b)(1)(A)(i)-(iii).

"whether the benefits of the maximum contaminant level justify, or do not justify, the costs" as determined through the analyses required under 42 U.S.C. §300g-1(b)(3)(C).[218]

b. The OEC proposes the following Primary Drinking Water Regulation that would regulate PFOA at 0.014 micrograms per liter and PFASs at 0.07 micrograms per liter.

Using its authority under 42 U.S.C. §300g-1(b)(1)(A)(i)-(iii), the EPA must promulgate a Primary Drinking Water Regulation that matches the Maximum Contaminant Level recently established by the New Jersey Department of Environmental Protection: 0.014 micrograms per liter for PFOA. Additionally, the EPA should promulgate a Primary Drinking Water Regulation that limits PFASs as a family of substances to 0.07 micrograms per liter. For a clear statement of the proposed regulations, see Attachment 1.

While the OEC understands that the EPA recently issued a Health Advisory covering PFOA and PFOS and may still be internally considering a Primary Drinking Water Regulation that would regulate these two PFASs, the OEC believes the time for inaction and comprehensive scientific investigation has passed. The agency must act now, rather than push the decision further and further into the future. The science shows the danger of PFOA, and the lack of science regarding all PFASs mandates caution. Thus, the OEC will show how PFOA and PFASs satisfy the three prong test required under the SDWA.

i. PFOA and PFASs may have an adverse effect on the health of people.

Section II of this Petition establishes the health risks of PFOA and PFASs. PFOA in particular is linked with the following health conditions:

(1) high cholesterol
(2) ulcerative colitis
(3) thyroid disease
(4) testicular and kidney cancer
(5) pregnancy-induced hypertension

PFASs pose a risk due to the lack of sufficient knowledge regarding their potential health risks. While a massive body of knowledge has been compiled regarding PFOA through the efforts of many researchers and the C8 Science Panel, many PFASs have been subject to little to no toxicology research. Thus, even while the EPA does not know all of the health effects of PFASs, it continues to allow polluters to discharge them into the waters of the United States. If the EPA fails to promulgate a Primary Drinking Water Regulation that also covers PFASs, it may allow a toxic mixture to form in public water supplies before we adequately understand the effects of the thousands of PFASs that exist. The EPA must follow the Precautionary Principle and protect the public now, rather than later.

Thus, because PFOA and PFASs may have an adverse effect on the health of people, the proposed Primary Drinking Water Regulation satisfies the first prong of the test.

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[218] 42 U.S.C. §300g-1(b)(4)(C).

ii. PFOA and PFASs are known to occur and have a high chance to occur in many public water systems.

The EPA's own Health Advisory outlines the data regarding the inundation of PFOA and other long-chain PFASs throughout the water systems that serve millions of Americans. Approximately 2% of U.S. public water systems detected PFOA at greater than 0.02 micrograms per liter; however, the monitoring for PFOA did not account for updated science used by New Jersey to calculate its Maximum Contaminant Level of 0.014 micrograms per liter.[219] And as noted in §2, nearly one third of all public water systems were not evaluated during the third administration of the Unregulated Contaminant Monitoring Rule. Many of those unmonitored water systems are private groundwater wells that may not have access to funds to install the necessary treatment technology for PFASs. If at least 2% of U.S. public water systems detected PFOA at greater than 0.02 micrograms per liter, then presumably many systems have PFOA levels greater than 0.014 micrograms per liter, or close to that level.

Opponents may argue that 2% of public water systems is not "many public water systems." However, notwithstanding the unknown number of systems with more than 0.014 micrograms per liter, "2%" is still a large number of public water systems in a country with over 300 million citizens. "Many" does not mean "majority" of public water systems. Hundreds if not thousands of public water systems have high concentrations of PFOA and other PFASs, even if those concentrations do not currently exceed the present 0.07 micrograms per liter of the EPA's nonbinding Health Advisory. The EPA cannot ignore this reality.

While less data exists regarding the inundation of PFASs in public water systems, the EPA does have data on PFOA, PFOS, PFNA, PFHxS, PFHpA, and PFBS. However, during the UCMR systems were not required to report unless they detected concentrations above 0.02 micrograms per liter. If the EPA chooses not to regulate PFOA of PFASs, it should, at the very least, conduct additional studies to detect the concentrations of all PFASs that persist in U.S. public water systems.

Thus, the data establishes that at least 2% of public water systems are inundated by PFOA at a concentration higher than the 0.014 micrograms per liter referenced in our proposed Primary Drinking Water Regulation. If the EPA considers the lack of data from thousands of other public water systems, along with the likely case that many public water systems had concentrations between 0.01 micrograms per liter and 0.02 micrograms per liter of PFOA, then PFOA and PFASs satisfy the second prong of the statutory test: PFOA and PFASs have a high chance to occur in many public water systems.

[219] See Supra FN 17; see also Supra FN 151.

iii. The regulation of PFOA and PFASs presents a meaningful opportunity to reduce health risks for people served by public water systems.

The EPA has the authority to regulate PFOA and PFASs. We know that PFASs harm the public in many serious ways, whether through increased cancer risks or other toxicological effects. But more importantly, the regulation of PFOA and PFASs presents a meaningful opportunity to reduce the health risks for people served by public water systems. The EPA must ensure that other PFASs never pose a risk to communities like PFOA posed a risk to the people that lived along the Ohio River for decades.

The EPA might claim that it does not need to regulate PFOA directly because of its PFOA Stewardship Program or its Health Advisory. It might claim that it does not need to regulate PFASs because the science has not settled regarding their cumulative danger. Right now, if a company decided to begin using PFOA again in the future, no regulations actually stop that company from doing so. Every week, new stories arise where yet another community detects significant levels of PFOA because a local fire department uses certain types of firefighting foam. For instance, early in March 2018 eight private drinking wells in Doylestown Township, Pennsylvania had concentrations of PFOS and PFOA over 0.07 micrograms per liter.[220]

Shorter chain PFASs most likely will have similar toxicological effects as PFOA, once scientists do their due diligence. If the EPA does not act, then local citizens will resort to massive class action lawsuits like the suits filed against DuPont, Chemours, and 3M. Or, state Attorneys General will file a multiplicity of nuisance claims for each and every PFAS as their health risks are uncovered by scientists. To think that PFOA is the only dangerous substance out of thousands of PFASs to pose a risk to human health and the environment is an arrogant conclusion at best. When a pharmaceutical company produces new drugs for human consumption, that drug must undergo extensive testing through the FDA before they can enter the market. Industrial companies should not discharge unregulated PFASs into the country's waterways before we properly understand their toxicological effects.

When combined with the proposed Water Quality Criteria and Water Quality Standards discussed in §4, the EPA has the opportunity to create a holistic framework for managing these substances from production to emission to consumption. The CWA and SDWA regulations work together to ensure that both point sources and public water systems take action to protect against PFOA and PFASs. If a water body has over 0.014 micrograms per liter of PFOA or 0.07 micrograms per liter of all PFASs, the state would issue a TMDL. Through permits, point sources would have limitations placed upon their discharges of PFASs.

Similarly, if a public water system intakes water with a concentration of 0.014 micrograms per liter for PFOA or 0.07 micrograms per liter for PFASs, it would need to take corrective action and install technology such as granulated activated carbon filtration or reverse osmosis. But in theory, if a state acts to protect the water body from point sources, then public water systems

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[220] Chris Ullery, *Eight private wells in Doylestown, Cross Keys above EPA PFAS limits*, THE INTELLIGENCE, (March 7, 2018), http://www.theintell.com/news/20180307/eight-private-wells-in-doylestown-cross-keys-above-epa-pfas-limits.

should never intake concentrations of PFOA or other PFASs above the proposed Primary Drinking Water Regulation.

The EPA has an opportunity to protect human health and the environment from PFASs. The European Union has already started to act. New Jersey has started to act. The United States can also lead the way and protect the consumers of public water systems from the health risks of PFOA and PFASs.

VI. The OEC asks the EPA to act on this Petition for Rulemaking and to respond within a reasonable timeframe.

Because PFOA and PFASs pose present and future threats to human health and the environment, the EPA and this nation must efficiently address the danger that these substances represent. The longer the EPA waits to act on this petition, the more U.S. citizens will experience irreparable harm from the dangers presented by PFOA and PFASs. More people will receive diagnoses for cancer and other serious illnesses, partially caused by exposure to PFOA and PFASs. The EPA must act now rather than sit on its hands and wait. And if the EPA decides to shirk this responsibility, it must provide a clear, responsive discussion of the science presented in this petition for rulemaking, especially the specific reasons why the agency believes PFOA and PFASs do not represent a danger to human health and the environment.

In conclusion, the OEC reiterates its separate requests for prompt rulemaking under the CWA and the SDWA.

First, the OEC petitions the Administrator of the EPA to establish Water Quality Criteria for PFOA and PFASs under the CWA. Specifically, the OEC believes that the correct Water Quality Criteria for PFOA is 0.014 micrograms per liter. For PFASs, the OEC proposes 0.07 micrograms per liter.

Next, the OEC petitions the Administrator of the EPA to establish an emergency Water Quality Standard for the Ohio River that includes PFOA and PFASs. PFOA still poses a health risk to Ohioans, as evidenced by the Attorney General's decision to pursue legal action against two of the main polluters of PFOA and PFASs, DuPont and Chemours. This represents an instance where the Administrator of the EPA must exercise their authority to act outside the purview of the states to protect an important water body and the citizens who rely on that water body for their drinking water. Thus, the OEC petitions for the development of a Water Quality Standard for the Ohio River which includes the Water Quality Criteria for PFOA and PFASs proposed in this petition.

Finally, the OEC petitions the Administrator of the EPA for the issuance of a National Public Drinking Water Regulation for PFOA and PFASs. The EPA's drinking water Health Advisory establishes the risk that PFOA poses to human health; additional scientific evidence further bolsters this argument for both PFOA and PFASs. Thus, the OEC proposes that the EPA regulate PFOA under the Safe Drinking Water Act at 0.014 micrograms per liter. Similarly, the OEC proposes that the EPA regulate PFASs under the Safe Drinking Water Act at 0.07 micrograms per liter.

Section 5 U.S.C. §555(e) of the APA requires prompt notice when an administrative agency denies a petition for rulemaking. This law embodies the procedural right to due process enshrined in the United States Constitution. In that spirit, the OEC asks that the EPA expeditiously consider this petition for rulemaking and approve, or deny, within a reasonable timeframe.

We respectfully ask EPA to respond to this Petition by initiating rulemaking proceedings as requested in the petition as expeditiously as possible. The EPA should reply to all five requests in this petition within the same timeframe, ensuring immediate protection of human health and the environment from the dangers of PFOA and PFASs.

Respectfully submitted,

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Attachment I

Water Quality Criteria for Human Health

Pollutant	CAS Number	Human Health for the consumption of Water + Organism (µg/L)	Human Health for the consumption of Organism Only (µg/L)	Publication Year	Notes
PFOA	335-67-1	0.014	0.014	20xx	*0.014 micrograms per liter is based on the MCL promulgated by the New Jersey Department of Environmental Protection.*
PFASs	xxxx[221]	0.07	0.07	20xx	*0.07 micrograms per liter is based on the original Health Advisory issued for PFOA and PFOS.*

[221] Because the OEC is requesting regulation of all PFASs, no single CAS number quantifies all PFASs together and many PFAS formulas are trade secrets. If the U.S. EPA would like the OEC to provide a list of the over 3000 PFASs on the market with publicly available CAS numbers, especially if that is the only way the agency will promulgate this regulation, the OEC will gladly provide that list.

Provisions for inclusion in a Water Quality Standard covering the Ohio River[222]

			Outside Mixing Zone Average	
Chemical	**Form**	**Units**	**Intakes**	**Outtakes**
PFOA	Total[223]	µg/L	0.014	0.014
PFASs	Total[224]	µg/L	0.07	0.07

Primary Drinking Water Regulation

Contaminant	**MCLG (µg/L)**	**MCL or TT (µg/L)**	**Potential Health Effects from Long-Term Exposure Above the MCL**	**Sources of Contaminant in Drinking Water**
PFOA	0.014	0.014	High cholesterol, ulcerative colitis, thyroid disease, testicular and kidney cancer, and pregnancy-induced hypertension	discharged from chemical factories; leachate at waste disposal sites; component of disposed firefighting foam
PFASs	0.07	0.07	See above; other potential health effects unquantifiable due to lack of testing. The uncertainty of the health effects of PFASs is a health risk itself.	See above

[222] The following proposed text is based on the language of the Ohio River water quality tandards found at OAC 3745-1-32.

[223] This is a term of art used by the Ohio Environmental Protection Agency to describe the concentration of a substance in the Ohio River.

[224] or Total Mixture, since this is a combination of a lot of different chemicals.

Attachment II

The OEC recognizes that we have provided an immense body of research throughout this petition. If the EPA would like access to the documents cited in this petition and is unable to access these documents using the citations provided throughout the petition, please let us know via email and we will assist you with finding the document of interest.

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