

**Chemical Uncertainty: How to Regulate the Ever-Expanding Group of PFAS in Our
Nation's Waterbodies**

Theo Ross

Background

Per- and polyfluoroalkyl substances (PFAS) are a group of over 4,700 manufactured chemicals with a similar molecular structure that allows for the persistence in the body and environment for an extended period of time (U.S. DHHS, 2021). Figure 1 shows the unique chemical bond between the carbon and fluorine atoms of PFOA, a very common type of PFAS. Because of this strong carbon-fluoride bond, PFAS are some of the hardest chemicals to break down in the environment (U.S. DHHS, 2021). For decades, the discharge of PFAS from chemical manufacturing plants has been largely unregulated by federal law, and only recently have minor steps been taken to recognize the potential hazard of the substances in humans and the environment.

As early as the 1940s, companies such as 3M and Dupont began manufacturing various types of PFAS around the country (3M, n.d.; Formuzis, 2019). With relatively few regulations in place during the time period, there was little monitoring or focus on these types of contaminants being discharged. Even after the introduction of substantial environmental protection policies such as the Clean Water Act and the Safe Drinking Water Act in the 1970s, regulating PFAS went largely overlooked. It was not until the early 2000s when the dangers of PFAS began to gain public attention. Events such as the discovery of excessive PFAS in the Ohio River in Parkersburg, West Virginia, linked PFAS contamination to an excessive amount of livestock deaths over a short period of time (Benesh, 2020). However, it was later discovered that many of the major PFAS manufacturers (primarily 3M and Dupont) had done substantial studies prior to then that linked PFAS with adverse health effects (EWG, 2018).

Although it might be logical to think that the significant national attention of various reportings on high PFAS in water bodies and drinking water throughout the country would have

caused substantial change in the regulation of PFAS, there has been little change to federal policies in recent years, such as the Safe Drinking Water Act (SDWA), which allows the EPA to set maximum contamination levels (MCLs) for specific contaminants in drinking water (EPA, n.d.). Although there is new legislation that aims to establish an MCL for major types of PFAS, including PFOA and PFOS, there are currently no federal MCLs for PFAS (EPA, n.d.). In addition, the Clean Water Act (CWA) lacks any formal effluent limits on National Pollutant Discharge Elimination Systems (NPDES) permits for point source polluters discharging PFAS into U.S. surface waters (Peters, 2021). One EPA act where progress has been made in recent years is the Toxic Substances Control Act (TSCA). In 2016, the act was amended in order to increase the efficiency in which new chemicals are reviewed before being allowed to be commercialized and discharged into a water body (EPA, n.d.). One of the notable amendments includes using a ranking system that allows for chemicals to be placed into risk categories and for the prioritization of reviewing high risk chemicals (EPA, n.d.). While PFAS are yet to be placed in any high risk category, there have been steps made to increase the reporting of PFAS effluent including adding 148 PFAS to the EPA's public interim report that aims to identify the active PFAS dischargers (EPA, n.d.).

Stakeholder Positions

There are many differing views surrounding how to regulate PFAS, but in general stakeholders have taken two opposing sides.

Corporations and conservative politicians who value the free market and little regulation tell one side of the story. 3M and Dupont, two of the primary manufacturers of PFAS, both continue to manufacture the substances and rely on their own research studies to estimate the

toxicity and effluent limits that are necessary. 3M claims to value transparency in their research and reiterates how the free market allows for the consumer to make product decisions without slowing down the economy. 3M also argues that there is not significant evidence and causality that current or past levels of PFAS could harm human health (3M, n.d.).

The opposing view belongs to the public and NGOs (such as the Environmental Working Group (EWG)) who demand stricter regulations for the contaminants. Several lawsuits against corporations such as Dupont have emerged, and in certain instances have required companies to establish cleanup projects in contaminated areas. Many NGOs and individuals still feel as if the regulation of PFAS is a perpetuating problem that fails to regulate contamination at its source.

Solutions

The first solution I will propose involves regulating PFAS at the federal level. This means starting at the top with federal regulations including setting a national MCL for all recognized substances that fall into the PFAS category based on the research and technology available, setting a national effluent level under the CWA that can be enforced by states who issue NPDES permits, and placing PFAS under the high risk category of the TSCA to allow for better monitoring and reporting of areas in higher risk and need of cleanup efforts under the CERCLA.

The second solution involves regulating PFAS contaminants only where needed. With this, corporations are required to support cleanup efforts where there is sufficient evidence of PFAS contamination being linked with health problems. This includes installing filtering methods on both the point source dischargers and any water treatment plants that are within a given proximity. This solution allows companies to continue developing new chemicals and trusts in consumer research and public trust of company research.

My Viewpoint

Personally, I support the idea of the first solution and starting at the federal level in terms of policy making. This avoids the environmental and human health degradation of certain states where water quality standards are lower and more corporations are likely to migrate.

Additionally, it creates a system better prepared for the future production of new chemicals belonging to the PFAS family, as regulations would be put into place before significant discharging of the chemical. This in turn would cut costs of environmental cleanup.

Furthermore, there is still room for the MCL and effluent standards to be refined as better regulating technology and filtering methods are introduced, but at least setting a standard would create a baseline that would limit severe discharge cases.

Finally, the pressure is put on the corporations instead of consumers to manufacture safe products. This solution could also set precedents for new chemical groups, and require certain standards, such as MCLs and NPDES effluent limits, to start at a baseline, derived from the standards of substances with similar molecular structures and from research done within and outside of the EPA before ever being discharged. Companies would then work to develop, test, and prove the safety of PFAS variants or alternatives in order to be placed into lower risk categories.

Figures

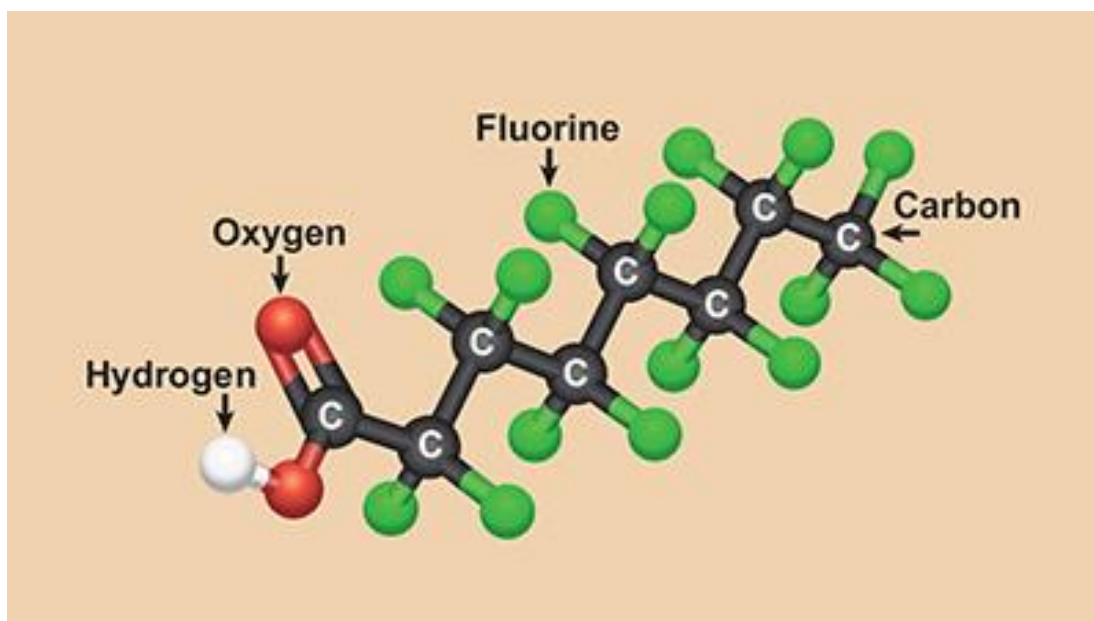


Figure 1. Molecular structure of PFOA, sometimes referred to as C8 because of the eight carbon atoms chained together.

From: <https://www.niehs.nih.gov/health/topics/agents/pfc/index.cfm>

References

- Benesh, M. (2020, October 26). *Why Are DuPont and Chemours Still Discharging the Most Notorious 'Forever Chemical'?* Environmental Working Group.
<https://www.ewg.org/news-insights/news/why-are-dupont-and-chemours-still-discharging-most-notorious-forever-chemical#:~:text=For%20decades%2C%20DuPont%20dumped%20PFAS,feature%20film%20released%20last%20year.>
- Environmental Protection Agency. (n.d.). *PFAS Laws and Regulations*. EPA.
<https://www.epa.gov/pfas/pfas-laws-and-regulations>.
- Environmental Working Group. (2018). *For Decades, Polluters Knew PFAS Chemicals Were Dangerous But Hid Risks From Public*. EWG. <https://www.ewg.org/pfastimeline/>.
- Formuzis, A. (2019, December 12). *DuPont Made Billions Polluting Tap Water With PFAS; Will Now Make More Cleaning It Up*. Environmental Working Group.
<https://www.ewg.org/news-insights/news-release/dupont-made-billions-polluting-tap-water-pfas-will-now-make-more#:~:text=Since%20the%201940s%2C%20DuPont%20made,year%20for%20the%20chemical%20giant.>
- Peters, J. (2021, February 17). *When it comes to tackling toxic 'forever chemicals', the Clean Water Act has many powerful, yet underutilized, policy tools*. Clean Water Action.
<https://www.cleanwateraction.org/2021/02/17/when-it-comes-tackling-toxic-%E2%80%98forever-chemicals%E2%80%99-clean-water-act-has-many-powerful-yet#:~:text=Clean%20Water%20Act%20policy%20tools,to%20regulate%20these%20toxic%20chemicals.>

PFAS History. 3M. (n.d.).

https://www.3m.com/3M/en_US/pfas-stewardship-us/pfas-history/#:~:text=Processes%20to%20commercially%20produce%20PFAS,on%20PFAS%2C%20including%20Scotchgard%E2%84%A2.

U.S. Department of Health and Human Services. (2021, April 27). *Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)*. National Institute of Environmental Health Sciences. <https://www.niehs.nih.gov/health/topics/agents/pfc/index.cfm#:~:text=PFAS%20are%20used%20in%20hundreds,of%20this%20type%20of%20chemical>.

What the weight of scientific evidence on PFOS & PFOA currently shows. 3M in the United States. (n.d.). https://www.3m.com/3M/en_US/pfas-stewardship-us/health-science/.