PUBLIC EMPLOYEES FOR ENVIRONMENTAL RESPONSIBILITY • NEW ENGLAND

February 28, 2020

ATTN: PFAS MCL Comment
MassDEP
Drinking Water Program
1 Winter Street, 5th Floor
Boston, MA 02108

SENT VIA EMAIL TO: Program.director-dwp@mass.gov

To Whom It May Concern,

Thank you for the opportunity to comment on Massachusetts Department of Environmental Protection's (MADEP's) proposed new regulation establishing a total PFAS drinking water Maximum Contaminant Level (MCL) of 20 ppt for six PFAS contaminants: PFOS, PFOA, PFHxS, PFNA, PFHpA, and PFDA. Public Employees for Environmental Responsibility (PEER) applauds MADEP's efforts to tackle the PFAS contamination crisis. While PEER agrees that the proposed MCL is a good start, we urge MADEP to regulate PFAS as a class, to lower the MCL, and to persuade other Commonwealth agencies to prevent more contamination from occurring. Our specific comments are set forth below.

Background

PFAS chemicals are known as "forever chemicals" because of their persistence in the environment. PFAS chemicals have been manufactured since the 1940s, and are utilized in various industries because of their ability to repel oil, stains, and water. They are ubiquitous in both the environment and in consumer products, and are found in nonstick cookware, stain and water repellants, paints, cleaning products, food packaging, carpeting, upholstery, artificial turf, make-up, dental floss, biosolid fertilizer, and firefighting foams. This extreme persistence is a substantial hazard, as PFAS will stay in the environment for decades to centuries.[1]

[1] Cousins, I.T., et al. The precautionary principle and chemicals management: the example of perfluoroalkyl acids in groundwater. Environ Int. Vol. 94: 331–340 (2016).

Long-chain PFAS

Long-chain PFAS bioaccumulate and easily migrate. A study by the Centers for Disease Control and Prevention (CDC) found four PFAS (PFOS, PFOA, PFHxS, and PFNA) in the serum of nearly all of the people tested, indicating widespread exposure in the U.S. population.[2] PFOA and PFOS were found in up to 99 percent of the U.S. general population between 1999 and 2012.[3] PFAS are found in human breast milk and umbilical cord blood.[4] Epidemiological studies identify the immune system as a target of long-chain PFAS toxicity.[5] Other studies have found decreased antibody response to vaccines, and associations between blood serum levels of PFAS and immune system hypersensitivity and autoimmune disorders.[6]

Long-chain PFAS are also toxic to humans in very small concentrations—in the parts per trillion (ppt).[7] Long-chain PFAS are suspected carcinogens and have been linked to growth, learning and behavioral problems in infants and children; fertility and pregnancy problems, including pre-eclampsia; interference with natural human hormones; increased cholesterol; immune system problems; and interference with liver, thyroid, and pancreatic function,[8] and increases in testicular and kidney cancer in human adults.[9] The developing fetus and newborn babies are particularly sensitive to certain long-chain PFAS.[10]

Short-chain PFAS

Short-chain PFAS are highly mobile, and are also becoming ubiquitous.[11] Such mobility means that short-chain PFAS easily reach water bodies, which can result in drinking water contamination.[12] Data show that short-chain PFAS are present in remote areas and have a widespread distribution in both biotic and abiotic environments.[13] Due to the manufacturing

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[2] Center for Disease Control and Prevention, Per-and Polyfluorinated Substances (PFAS) Factsheet (Apr. 7, 2017), https://www.cdc.gov/biomonitoring/PFAS_FactSheet.html.

[3] U.S. Environmental Protection Agency (USEPA), Drinking Water Health Advisory for Perflourooctanoic Acid (PFOA)(May 2016) at 9, https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_health_advisory_final_508.pdf.

[4] Agency for Toxic Substances and Disease Registry, Toxicological Profile for Perfluoroalkyls, supra note 2, at 3.

[5] U.S. EPA, Drinking Water Health Advisory for Perflourooctanoic Acid (PFOA), supra note 4, at 10.

[6] Id. at 39.

[7] Agency for Toxic Substances and Disease Registry, Toxicological Profile for Perfluoroalkyls, supra note 2, at 5-6.

[8] Id.

[9] Id. at 6; Vaughn Barry et al., Perfluorooctanoic Acid (PFOA) Exposures and Incident Cancers among Adults Living Near a Chemical Plant, 121 Envtl. Health Perspectives 11-12, 1313-18 (2013), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3855514/pdf/ehp.1306615.pdf.

[10] USEPA, Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS), (May 2016) https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_health_advisory_final_508.pdf at 10.

[11] Zhao P, et al. Short-and long-chain perfluoroalkyl substances in the water, suspended particulate matter, and surface sediment of a turbid river. Sci Total Environ. 568: 57–65 (2016); See also Ahrens L., Polyfluoroalkyl compounds in the aquatic environment: a review of their occurrence and fate. J Environ Monit. 13: 20–31 (2011).

[12] Schwanz TG, M. Llorca, M. Farré, D. Barceló. Perfluoroalkyl substances assessment in drinking waters from Brazil, France and Spain. Sci Total Environ. 539: 143–152 (2016); See also Boiteux V, et al.. Concentrations and patterns of perfluoroalkyl and polyfluoroalkyl substances in a river and three drinking water treatment plants near and far from a major production source. Sci Total Environ. 583: 393–400 (2017).

[13] Ahrens L. RJ, Axelson S., Kallenborn R., Source tracking and impact of per- and polyfluoroalkyl substances at Svalbard. Svalbard Environ Prot Fund, 2016; Llorca M, et al. Fate of a broad spectrum of perfluorinated compounds in soils and biota from Tierra del Fuego and Antarctica. Environ Pollut. 163: 158–166 (2012); Kirchgeorg, T, et al. Seasonal accumulation of persistent organic pollutants on a high-altitude glacier in the Eastern Alps. Environ Pollut. 218: 804–812 (2016)..

phase-out of PFOA and PFOS in the United States,[14] manufacturing and use of short-chain PFAS and related substances are increasing.[15] Due to their low adsorption potential, short-chain PFAS do not bind to particles and stay mainly dissolved in water. Thus, while long-chain PFAS can be removed from water with activated carbon filters, this removal method is not as effective for short-chain PFAS.[16] The absence of effective measures on a larger scale is particularly problematic with respect to contaminated drinking water.

Considering that the use of short-chain PFAS will continue to increase, it is therefore likely that both humans and the environment will be permanently exposed to short-chain PFAS. Very little research has been performed on the toxicity of most PFAS, with the majority of studies performed by industry itself.[17] Additionally, scientists have failed to consider the mixture toxicity of PFAS. Regulatory paradigms should consider the dangers of exposure to several PFAS simultaneously, not just concentrations of individual substances one at a time.[18]

Federal and state regulation of PFAS. Because the current U.S. Environmental Protection Agency (EPA) is failing to take any significant actions on regulating PFAS, a number of states have developed much lower standards of PFAS in drinking water. A recent study from Harvard University researchers has suggested that a safe limit for PFAS in drinking water is 1 ppt.[19] In June 2019, Linda Birnbaum, director of the National Institute for Environmental Health Sciences (NIEHS) and the National Toxicology Program (NTP), suggested that the safety threshold for PFOA in drinking water should be as low as 0.1 ppt, which is 700 times lower than the advisory level set by the EPA.[20] Every reported case of PFAS contamination is higher than these suggested limits.

MADEP must consider regulating PFAS as a class. The chemical similarities of all PFAS, together with their toxicity, supports a broader regulatory scheme is necessary. There are currently more than 5,000 different PFAS chemicals.[21] While MADEP is proposing to regulate six PFAS, many others are found in drinking water throughout the Commonwealth, and these additional PFAS are chemically similar to those with known toxicity. In addition, new research into the newer PFAS chemicals indicates that they are just as toxic as the long-chain PFAS.[22] Because of the vast number of PFAS, together with the speed at which chemical manufacturers are creating new PFAS, it will take far too long to determine the toxicity of each PFAS chemical individually. Therefore, regulating PFAS as an entire class seems to be the only alternative that would be protective of both human health and the environment.

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[14] Renner R. The long and the short of perfluorinated replacements. Environ Sci Technol. 40: 12–13 (2006).
[15] https://www.ehn.org/forever-chemical-replacements-on-the-rise-in-the-great-lakes-2639219145.html

[16] Zhang C., H. Yan, F. Li, X. Hu, and Q. Zhou. Sorption of short-and long-chain perfluoroalkyl surfactants on sewage sludges. J Hazard Mater. 260: 689–699 (2013).
[17] A Never Ending Story of Per-and Polyfluoroalkyl Substances (PFASs), *Environ. Sci. Technol.* 2017, 51, 5, 2508-2518 (2017).
[18] Id.
[19] Grandjean P, Budtz-Jørgensen E. Immunotoxicity of perfluorinated alkylates: calculation of benchmark doses based on serum concentrations in children. *Environ Health* 12, 35 (2013).
[20] https://pfasproject.com/2019/02/05/2019-pfas-conference/
[21] PFAS and Protecting Your Health, Rogers, R. et al., CDC Public Health Grand Rounds, November 19, 2019, Event ID 4207262.
[22] See, e.g., https://theintercept.com/2019/09/19/epa-new-pfas-chemicals/

Moreover, laboratories can only test for approximately 36 PFAS. While total fluorine tests are indicative of PFAS, they are not determinative. If we cannot test for the presence of PFAS, we cannot regulate them. The only way out of this conundrum is to regulate the chemicals as a class.

MADEP's MCL is too high. Scientific understanding of the effects PFAS have on human health and the environment is changing swiftly. As the science surrounding PFAS evolves, we see adverse health effects at lower levels of exposure, and from different exposure pathways (including dermal exposure).[23] It is unclear whether MADEP took the new research on dermal exposure into account when developing its proposed standard. If it did not, MADEP should re-evaluate the proposed standard to ensure the drinking water MCL is protective of both human health and the environment.

Moreover, PEER believes that MADEP should set lower individual limits on certain PFAS, such as PFOA and PFOS, as well as including them in the cumulative exposure limit. Specifically, PEER suggests a limit of 10 ppt (or less) for PFOA and PFOS individually and cumulatively. Although PFOA and PFOS are no longer manufactured in the United States, they appear to still be imported and used in consumer goods. Setting a lower limit for these two PFAS may increase the likelihood that manufacturers stop using them.

The Commonwealth must regulate the sources of PFAS. It is non-sensical to regulate PFAS contamination in our drinking water without also attempting to reduce the sources of such contamination. As such, PEER believes that the Commonwealth must regulate PFAS in commercial products and waste streams, as well as in our drinking water. While some of these suggested actions might be outside the scope of MADEP, they are certainly actions that other divisions of the Commonwealth can address.

Landfill leachate: PFAS manufacturing waste, as well as consumer goods laden with PFAS, are sent to solid waste landfills, where it contaminates landfill leachate and becomes a source of release to the environment.[24] Leachate treatment by wastewater treatment plants (WWTPs) is common prior to discharge to surface water, or distribution for agricultural or commercial use.[25] However, standard WWTP technologies do little to reduce or remove PFAS, and can actually increase the amount of PFAS released to the environment.[26] MADEP should mandate the testing of all landfill leachate, and any leachate with PFAS levels over certain levels should not be allowed to be sent to WWTPs.

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[23] Poothang, S., et al., Multiple pathways of human exposure to poly- and perfluoroalkyl substances (PFASs): From external exposure to human blood, Environment Internat'l, Vol. 134, January 2020.
[24] See, e.g., https://www.bostonglobe.com/metro/2019/11/05/toxic-chemicals-can-dumped-into-merrimack-river-federal-and-state-officials-say/N0u3jOxo1CnpcQiACEW88N/story.html
[25] Lang JR, Allred BM, Peaslee GF, Field JA, Barlaz MA, Release of Per- and Polyfluoroalkyl Substances (PFASs) from Carpet and Clothing in Model Anaerobic Landfill Reactors. Environ Sci Technol. 50(10): 5024-32 (2016).
[26] Gallen, C. et al., A mass estimate of perfluoroalkyl substance (PFAS) release from Australian wastewater treatment plants, Chemosphere, Vol. 208: 975-983, 2018.

Biosolids: Sewage sludge, which is often applied on land and as fertilizer, has been found to be contaminated with PFAS.[27] MADEP should mandate the testing of all biosolids, and prohibit the sale, distribution, or use of PFAS-contaminated biosolids.

Artificial turf: PFAS has also been found in artificial turf.[28] Despite this, municipalities continue to install artificial turf fields, sometimes in the Zone IIs of their municipal wells. The Commonwealth should: 1) require artificial turf manufacturers to disclose whether they use PFAS as an ingredient or a process aid in their products; and 2) prohibit the installation of any fields containing PFAS in Massachusetts.

Pesticides: PFAS have been used in pesticides as inert ingredients in the past, and probably are still used.[29] Pesticide manufacturers are not required to disclose the list of so-called "inert" ingredients in their products. It is interesting to note (although anecdotal) that towns in the south coast area are finding PFAS in their water supplies without any known source. Since the south coast of Massachusetts is the area that is aerially sprayed most frequently, it is possible that the Anvil 10-10 contains PFAS. The Commonwealth should test (or require Clarke, the manufacturer of Anvil 10-10) to disclose all the ingredients in their pesticides before they are allowed to be used. In addition, the Commonwealth should test all larvicides and pesticides currently sprayed from trucks or applied to wetlands/waters, and should ensure that all pesticides considered for use in the future (whether sprayed aerially or used on the ground) are PFAS-free - *before* they are utilized.

Other exposure pathways. In March of 2019, PEER asked the Department of Public Health to consider a "Do Not Eat" advisory for fish, waterfowl, and deer caught near highly contaminated areas.[30] We never received a response. The State of Michigan has instituted a "Do Not Eat" advisory for game taken within five miles of PFAS-contaminated areas.[31] Massachusetts should consider doing the same.

Conclusion. PEER is supportive of MADEP's 20 ppt proposed drinking water standard for six PFAS, but we believe that MADEP should consider doing more to protect the citizens and environment of Massachusetts. Because PFAS is so potentially dangerous, it is prudent to use the precautionary principle and regulate PFAS as a class. Moreover, PEER feels strongly that a MCL in the absence of any attempt to control the sources of PFAS defies logic. As such, we respectfully request that the Commonwealth address PFAS in landfill leachate, biosolids, artificial turf, and pesticides.

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[27] See, e.g., https://www.bostonglobe.com/metro/2019/12/01/levels-toxic-chemicals-mwra-fertilizer-found-tests-are-raising-concern/tlnN0BffyugFKCweSpFq5J/story.html

[28] See, e.g., https://theintercept.com/2019/10/08/pfas-chemicals-artificial-turf-soccer/ and https://www.bostonglobe.com/metro/2019/10/09/toxic-chemicals-found-blades-artificial-turf/1mlVxXjzCAqRahwgXtfy6K/story.html

[29] See, e.g., http://www.fluoridealert.org/wp-content/pesticides/pfos.pfoas-page.htm

[30] See https://www.peer.org/massachusetts-needs-a-pfas-public-health-advisory-for-game/

[31] https://cvm.msu.edu/vdl/news/2019/do-not-eat-advisory-issued-for-deer-taken-in-oscoda-township

Thank you for the opportunity to comment.

Sincerely,

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