

Minnesota Center for Environmental Advocacy’s Comments on the Minnesota Department of Health’s “Possible Amendments to Rules Governing Health Risk Limits”

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INTRODUCTION

Per- and Polyfluoroalkyl substances (“PFAS”) “are a family of manmade chemicals that have been used for decades to make products that resist heat, oil, stains, grease, and water.”¹ They are found in an array of products, including firefighting foam, food packaging, and non-stick cookware.² There are nearly 5,000 unique compounds that comprise the PFAS family, and more are currently in development.³

PFAS are problematic mainly because they are extremely toxic to human health and stable in the natural environment. PFAS molecules are composed of carbon-fluorine bonds, one of the strongest bonds in existence, meaning that “these chemicals do not degrade in the environment” and accumulate in humans over time.⁴ Regulators consider some PFAS compounds to be hazardous to human health at shockingly small amounts, with safe levels measured in parts per trillion (“ppt”). For context, 1 part per trillion is “equivalent to a single drop of water in 20 olympic-

¹ *Conceptual Drinking Water Supply Plan*, Minn. Pollution Control Agency & Minn. Dep’t of Natural Res. 21 (Sept. 2020), https://3msettlement.state.mn.us/sites/default/files/Draft_CDWSP_Chapters1_7.pdf.

² Geologic Society of America, *PFAS: These ‘Forever Chemicals’ are Highly Toxic, Under-Studied, and Largely Unregulated*, Science Daily (Oct. 29, 2020), <https://www.sciencedaily.com/releases/2020/10/201029122943.htm>.

³ *Per and Polyfluoroalkyl Substances (PFAS)*, U.S. Food & Drug Admin., <https://www.fda.gov/food/chemicals/and-polyfluoroalkyl-substances-pfas> (last visited Dec. 4, 2020); *What are PFAS?*, U.S. Agency for Toxic Substances & Disease Registry, <https://www.atsdr.cdc.gov/pfas/health-effects/overview.html> (last visited Mar. 15, 2021).

⁴ *Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)*, Nat’l Institute of Health, <https://www.niehs.nih.gov/health/topics/agents/pfc/index.cfm> (last visited Mar. 15, 2021).

sized swimming pools.”⁵ And once PFAS enter the natural environment, either through spills, industrial releases, or another pathway, they are extremely difficult to remediate. PFAS has created significant public health challenges for Minnesota. Unfortunately, these are statewide issues that have affected places like the East Metro,⁶ Bemidji,⁷ and close to 100 landfills, “stretching from the Northwest Angle nearly to the Iowa border.”⁸

Fortunately, the State of Minnesota (the “State”) has chosen to be a leader in the fight against PFAS pollution. From achieving a \$850 million settlement in 2018,⁹ to the recent rollout of the State’s PFAS Blueprint,¹⁰ the State clearly understands the extreme dangers PFAS present to human health.¹¹ In its PFAS Blueprint, the State has articulated an inter-agency approach to combating this problem.¹² This vision centers on the need to “[q]uantify[] PFAS risks to human health.”¹³ Establishing Health Risk Limits (“HRLs”) for PFAS is crucial because, as the State has

⁵ *1 Part Per Trillion (ppt) is Equivalent to a Single Drop of Water in 20 Olympic-Sized Swimming Pools*, State of Michigan, https://www.michigan.gov/documents/pfasresponse/1ppt_is_Equal_to_1_Drop_of_Water_in_20_Olympic_Swimming_Pools_664966_7.pdf (last visited Mar. 15, 2021).

⁶ *Minnesota 3M PFC Settlement*, Minn. Pollution Control Agency & Minn. Dep’t of Natural Res., <https://3msettlement.state.mn.us/> (last visited Mar. 15, 2021).

⁷ Kristi Marohn, *‘Forever’ Chemicals Leave Costly Water Problem in Bemidji, Cities Across the Country*, MPR News (Feb. 14, 2019), <https://www.mprnews.org/story/2019/02/14/pfas-leaves-costly-water-problem-in-bemidji-and-other-cities>.

⁸ Kristi Marohn, *‘Forever Chemicals’ Found in Groundwater at Dozens of Minn. Landfills*, MPR News (Mar. 18, 2021), <https://www.mprnews.org/story/2021/03/18/forever-chemicals-found-in-groundwater-at-dozens-of-minn-landfills>.

⁹ *Minnesota 3M PFC Settlement*, Minn. Pollution Control Agency & Minn. Dep’t of Natural Res., <https://3msettlement.state.mn.us/> (last visited Mar. 15, 2021).

¹⁰ *Minnesota’s PFAS Blueprint*, Minn. Pollution Control Agency, <https://www.pca.state.mn.us/waste/minnesotas-pfas-blueprint> (last visited Mar. 15, 2021).

¹¹ Jennifer Bjorhus, *With PFAS Everywhere, Minnesota Calls for Big New Crackdown on the ‘Forever Chemicals’*, Star Trib. (Feb. 10, 2021), <https://www.startribune.com/with-pfas-everywhere-minnesota-calls-for-big-new-crackdown-on-the-forever-chemicals/600021420/?refresh=true>.

¹² See generally *Minnesota’s PFAS Blueprint*, Minn. Pollution Control Agency Feb. 2021), <https://www.pca.state.mn.us/sites/default/files/p-gen1-22.pdf>.

¹³ *Id.* at 42.

noted, “[t]he scientific literature regarding PFAS toxicity and occurrence is evolving rapidly,”¹⁴ and “new PFAS are being invented, used in industry and incorporated into commercial products, and released into the environment every day.”¹⁵

In January 2021, the Minnesota Department of Health (“MDH”) published a Request for Comments in the *Minnesota State Registrar* for “Possible Amendments to Rules Governing Health Risk Limits,”¹⁶ which contemplate adopting new HRL values for thirty chemicals, including three PFAS compounds: Perfluorohexane Sulfonate (“PFBS”), Perfluorobutane Sulfonate (“PFHxS”), and Perfluorooctane Sulfonate (“PFOS”).¹⁷ Under this rulemaking process, MDH will accept preliminary comments now before “[a]nother more formal comment period opens up later.”¹⁸

In order to aid MDH’s determination of HRL values for PFBS, PFHxS, and PFOS, MCEA is submitting this public comment to ensure that MDH sets aggressive and scientifically supported HRLs for these acutely toxic chemicals. MDH should follow the precautionary principle. The precautionary principle “encourages policies that protect human health and the environment in the face of uncertain risks.”¹⁹ The principle enables decision makers “to adopt precautionary measures

¹⁴ *Id.*

¹⁵ Jennifer Bjorhus, *With PFAS Everywhere, Minnesota Calls for Big New Crackdown on the ‘Forever Chemicals’*, Star Trib. (Feb. 10, 2021), <https://www.startribune.com/with-pfas-everywhere-minnesota-calls-for-big-new-crackdown-on-the-forever-chemicals/600021420/?refresh=true>.

¹⁶ 45 29 Minn. Reg. 792 (Jan. 19, 2021), available at https://mn.gov/admin/assets/SR45_29%20-%20Accessible_tcm36-463399.pdf#page=8.

¹⁷ Health Risk Limits Rules for Groundwater: Rules Amendments-Contaminants, Minn. Dep’t of Health (Feb. 2021), <https://www.health.state.mn.us/communities/environment/risk/rules/water/chemicals.html>.

¹⁸ Health Risk Limits Rules for Groundwater: Request for Comments, Minn. Dep’t of Health (Jan. 2021), <https://www.health.state.mn.us/communities/environment/risk/rules/water/reqcomments.html>.

¹⁹ Joel A. Tickner, *Guest Editorial: Precaution and Preventative Public Health Policy*, 117 Public Health Reports 493 (Nov. 2002), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1497489/pdf/12576528.pdf>.

when scientific evidence about an environmental or human health hazard is uncertain and the stakes are high.”²⁰ Following this principle, MDH should establish HRLs that are the most protective of human health under current scientific understanding, but building in a margin for safety that anticipates inevitable future scientific research demonstrating PFAS is toxic at lower levels than currently understood.

I. BACKGROUND ON PFAS HRL AMENDMENTS

A. Through This Rulemaking Process, The State Of Minnesota Has A Key Opportunity To Support Its Broader Vision For Addressing The Threats Of PFAS.

The State recently outlined its comprehensive vision for addressing PFAS, envisioning “a holistic and systematic approach.”²¹ In the PFAS Blueprint, the State identified “[t]en priorities to protect communities and families.”²² One of these priorities is “[q]uantifying PFAS risk to human health.”²³ This is a critical step; assessing the risk of particular PFAS compounds will inform much of the State’s future work on combatting PFAS pollution, such as limiting PFAS exposure from drinking water and food sources, remediating contaminated sites, and managing PFAS in waste.²⁴ Thus, it is vital for MDH use its regulatory power to set aggressive HRLs that are protective of human health. The State should seize this opportunity to be a leader in the fight against PFAS, especially since the federal government has been slow to react to this public health crisis.²⁵

²⁰ *The Precautionary Principle*, European Parliamentary Research Serv. (Dec. 2015), [https://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_IDA\(2015\)573876](https://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_IDA(2015)573876).

²¹

Minnesota’s PFAS Blueprint, Minn. Pollution Control Agency, <https://www.pca.state.mn.us/waste/minnesotas-pfas-blueprint> (last visited Mar. 15, 2021).

²² *Id.*

²³ *Id.*

²⁴ See generally *Minnesota’s PFAS Blueprint*, *supra* note 12.

²⁵ Paul Quackenbush, *A Persistent Problem: Applying RCRA’s Citizen Suit Provision to PFAS*, Vermont L. Rev. (Online), <https://lawreview.vermontlaw.edu/a-persistent-problem-applying->

MCEA is pleased to see MDH taking concerted action on some of the better understood PFAS compounds.²⁶ PFBS is a chemical that has been used “as a surfactant in industrial processes and in water-resistant or stain-resistant coatings on consumer products such as fabrics, carpets, and paper.”²⁷ The HRL for PFBS was last updated in 2011.²⁸ PFHxS is a chemical that has been used “in stain-resistant fabrics, fire-fighting foams, food packaging, and as a surfactant in industrial processes.”²⁹ Although MDH has not established an HRL for PFHxS, MDH recently set a Health-Based Value (HBV) in August 2020.³⁰ PFOS is one of the best understood PFAS chemicals,³¹ and has been used “in stain-resistant fabrics, fire-fighting foams, food packaging, and as a surfactant

rcras-citizen-suit-provision-to-pfas/#:~:text=Despite%20increased%20public%20scrutiny%2C%20the,been%20slow%20to%20regulate%20PFAS.&text=Yet%20few%20state%20regulations%20exist,from%20PFAS%20waste%20is%20widespread (last visited Mar. 22, 2021) (“Despite increased public scrutiny, the federal government has been slow to regulate PFAS. The Environmental Protection Agency (EPA) has not yet promulgated a legally enforceable standard for any of the more than 4,700 individual chemicals in the PFAS group, in part, due to the still incomplete understanding of the effects of PFAS on human health.” (citations omitted))

²⁶ *Human Health-Based Water Guidance Table*, Minn. Dep’t of Health, <https://www.health.state.mn.us/communities/environment/risk/guidance/gw/table.html> (last visited Mar. 15, 2021) (listing MDH’s current health standards for PFBS, PFHxS, and PFOS).

²⁷

PFBS and Drinking Water, Minn. Dep’t of Health (Dec. 2017), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfbsinfo.pdf>.

²⁸ *Toxicological Summary for Perfluorobutane Sulfonate (PFBS)*, Minn. Department of Health (Mar. 21, 2011), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfbs.pdf>.

²⁹

PFHxS and Groundwater, Minn. Dep’t of Health (Apr. 2019), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfhxsinfo.pdf>.

³⁰ *Toxicological Summary for Perfluorohexane Sulfonate (PFHxS)*, Minn. Dep’t of Health (Aug. 2020), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfhxs.pdf>.

³¹ *Basic Information on PFAS*, U.S. Env’tl. Protection Agency, <https://www.epa.gov/pfas/basic-information-pfas#:~:text=The%20most%2Dstudied%20PFAS%20chemicals,have%20caused%20tumors%20in%20animals> (last visited Mar. 15, 2021) (“PFOA and PFOS have been the most extensively produced and studied of these chemicals.”).

in industrial processes.”³² The HRL for PFOS was last updated in 2009.³³ Updating the HRLs for PFBS, PFHxS, and PFOS presents a critical opportunity for mitigating PFAS; doing so is also necessary for MDH to fulfill its statutory obligations.

B. Regulating PFAS Through HRLs And MDH’s Statutory Obligations.

HRLs are “a concentration of a substance or chemical adopted by rule of the commissioner of health that is a potential drinking water contaminant because of a systemic or carcinogenic toxicological result from consumption.”³⁴ Pursuant to the Groundwater Protection Act of 1989, MDH is authorized to “adopt and revise health risks limits for substances degrading groundwater.”³⁵ In this context, “[i]t is the goal of the state that groundwater be maintained in its natural condition, free from any degradation caused by human activities,” and “where prevention is practicable, it is intended that it be achieved.”³⁶ MDH has a statutory obligation to review adopted HRLs “at least every four years.”³⁷

For carcinogenic toxicants like PFAS, HRLs may be established only after the MDH Commissioner determines that the process has “undergone thorough scientific review.”³⁸ Another statutory provision specifies additional requirements for establishing safe drinking water standards, such as those related to PFAS, and imposes requirements that HRLs: (1) “be based on

³² *PFOS and Groundwater*, Minn. Dep’t of Health (Apr. 2019), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfosinfo.pdf>.

³³ *Toxicological Summary for Perflourooctane Sulfonate (PFOS)*, Minn. Dep’t of Health (May 5, 2009), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfos2010.pdf>.

³⁴ Minn. Stat. § 103H.005.

³⁵ 45 29 Minn. Reg. 792 (Jan. 19, 2021), *available at* https://mn.gov/admin/assets/SR45_29%20-%20Accessible_tcm36-463399.pdf#page=8.

³⁶ Minn. Stat. § 103H.001.

³⁷ Minn. Stat. § 103H.201, subd. 3(a).

³⁸ Minn. Stat. § 103H.201.

scientifically acceptable, peer-reviewed information,” and (2) “include a reasonable margin of safety.”³⁹

MDH has previously regulated four PFAS compounds through the HRL process: PFOS (2009), PFBS (2011), PFBA (2018), and PFOA (2018).⁴⁰ With respect to the three PFAS compounds of concern for this rulemaking process, the HRLs for PFBS and PFOS are outdated, since the HRLs were last updated ten years ago and twelve years ago, respectively.⁴¹ HRLs are developed for individual PFAS compounds, which contrasts with recent State of Washington legislation that “directs agencies to address classes of chemicals [including PFAS] and moves away from a chemical by chemical approach, which has historically resulted in companies switching to equally bad or worse substitutes.”⁴² Moving forward, setting HRLs for the whole PFAs class of chemicals in the same regulatory cycle would be beneficial, both in terms of efficiency and administrative consistency. In this way, MDH could revisit HRLs for all known PFAS compounds at the same time, enabling the public to be better involved in the process.⁴³

C. The Importance Of Regulating PFAS Through HRLs.

HRLs are a vital regulatory tool for MDH to use in the fight against PFAS. Until an HRL exceedance occurs, the State lacks effective options to help remediate contamination in a water supply. Once an HRL is exceeded, however, the State must “promote implementation of best

³⁹ Minn. Stat. § 144.0751.

⁴⁰ *Minnesota’s PFAS Blueprint*, *supra* note 12, at 143. MCEA anticipates that MDH will revisit the 2018 HRLs for PFBA and PFOA in 2022, consistent with Minn. Stat. § 103H.201, subd. 3(a).

⁴¹ Minn. Stat. § 103H.201, subd. 3(a).

⁴² Erin Brockovich, *Plummeting Sperm Counts, Shrinking Penises: Toxic Chemical Threaten Humanity*, *The Guardian* (Mar. 18, 2021), <https://www.theguardian.com/commentisfree/2021/mar/18/toxic-chemicals-health-humanity-erin-brockovich>.

⁴³ *See Minnesota’s PFAS Blueprint*, *supra* note 12, at 45 (“Costs for assessing the chronic or multi-generational toxicity can exceed several million dollars per chemical.”).

management practices to prevent or minimize the source of pollution to the extent practicable.”⁴⁴ Best management practices relate to activities such as restrictions of practices, management plans, treatment requirements, and other activities that cause groundwater degradation.⁴⁵ HRLs “specify a minimum level of quality for water used for human consumption,”⁴⁶ are related to developing Class 1 Water Quality Standards,⁴⁷ and are used by the U.S. Environmental Protection Agency (“EPA”) and U.S. Department of Defense as “applicable or relevant and appropriate requirements” (“ARARs”) in remediation efforts.⁴⁸ These ARARs could be critically important under federal superfund laws, particularly if the federal government continues to lag behind in regulating PFAS.⁴⁹

Conversely, HBVs are “developed to provide water guidance between rule-making cycles for chemicals that may have been recently detected in the water or for which new health information has become available.”⁵⁰ In the recent PFAS Blueprint, the State appeared to conflate HBVs with HRLs, citing an HRL statutory provision in a discussion of “health-based guidance values.”⁵¹

⁴⁴ Minn. Stat. § 103H.275.

⁴⁵ Minn. Stat. § 103H.005, subd. 4.

⁴⁶ Minn. R. 4717.7810.

⁴⁷ *Minnesota’s PFAS Blueprint*, *supra* note 12, at 72, Minn. Pollution Control Agency (Feb. 2021), <https://www.pca.state.mn.us/waste/minnesotas-pfas-blueprint>.

⁴⁸ *Id.* at 130.

⁴⁹ *Applicable or Relevant and Appropriate Requirements (ARARs)*, U.S. Env’tl. Protection Agency, <https://www.epa.gov/superfund/applicable-or-relevant-and-appropriate-requirements-arars> (last visited Mar. 18, 2021).

⁵⁰ *Conceptual Drinking Water Supply Plan*, *supra* note 1, at vi.

⁵¹ *Minnesota’s PFAS Blueprint*, *supra* note 12, at 45.

HBVs have no associated statutory criteria for adoption and, unlike HRLs, are only used in discretionary agency actions and as technical guidance,⁵² such as setting limits for the State’s remediation of the East Metro under the 2018 Settlement with 3M.⁵³ According to MDH’s own statements, “if a chemical has been detected in water, MDH anticipates that HBVs for Minnesota’s groundwater will become HRLs . . . at the time that MDH next amends the Health Risk Limits for Groundwater rule.”⁵⁴ Given that PFBS, PFHxS, PFOS, PFBA and PFOA have all been detected in Minnesota water, the time is ripe for MDH to translate all its HBVs for PFAS to HRLs.

A related concept is Minnesota’s Contaminants of Emerging Concern (“CEC”) Initiative, whereby MDH strives to “take a proactive approach to the protection of drinking water.”⁵⁵ Although this Initiative presumably allows MDH to examine chemicals that “have not been found in Minnesota, but have the potential to enter our waters,” it is unclear what effect the CEC Initiative has.⁵⁶ For example, on October 14, 2020, MDH started a review of PFHxA under the CEC Initiative, providing for a 30 day public comment period.⁵⁷ However, PFHxA “has been detected in ambient groundwater and drinking water in Minnesota,”⁵⁸ which begs the question of why MDH

⁵² *Health-Based Values and Risk Assessment Advice for Water*, Minn. Dep’t of Health, <https://www.health.state.mn.us/communities/environment/risk/guidance/hbvraawater.html#hbv> (last visited Mar. 19, 2021).

⁵³ Conceptual Drinking Water Supply Plan, *supra* note 1, at vi.

⁵⁴ *Health-Based Values and Risk Assessment Advice for Water*, Minn. Dep’t of Health, <https://www.health.state.mn.us/communities/environment/risk/guidance/hbvraawater.html#hbv> (last visited Mar. 19, 2021).

⁵⁵ *Contaminants of Emerging Concern (CEC)*, Minn. Department of Health, <https://www.health.state.mn.us/communities/environment/risk/guidance/dwec/index.html#cecno> (last visited Mar. 19, 2021).

⁵⁶ *Id.*

⁵⁷ *The Minnesota Department of Health has Started a Review of PFHxA*, PFAS Central (Oct. 14, 2020), <https://pfascentral.org/policy/the-minnesota-department-of-health-has-started-a-review-of-pfhxa>.

⁵⁸ *Id.*

is not examining PFHxA for an HRL, or an HBV at minimum. MCEA cannot identify the results of this review and wonders how MDH intends on using the CEC Initiative going forward.⁵⁹

MDH’s use of HRLs to regulate PFAS is a critical tool. Other statutes, such as the Minnesota Environmental Response and Liability Act, are not currently being used to provide needed regulatory teeth to respond to this public health crisis.⁶⁰ HRLs are therefore the primary vehicle to reduce PFAS in the environment to safe levels.

II. REGULATORY HISTORY AND TRENDS OF PFOS, PFBS, AND PFHxS

According to a senior official from the Centers for Disease Control and Prevention, the threat of PFAS in drinking water presents “one of the most seminal public health challenges for the next decades.”⁶¹ Unfortunately, PFAS regulation is still in its infancy. Governments and regulatory bodies, including Minnesota, are doing what they can to catch-up in their efforts to address PFAS contamination. Although PFAS were developed in the early 1900s, governments have only recently taken action to control releases into the environment and to establish guidance for safe ingestion levels.

⁵⁹ Additionally, the MPCA recently announced site-specific water quality for PFOS in Lake Elmo and connected waterbodies, Bde Maka Ska, and Pool 2 of the Mississippi River. *MPCA Announces New Protective Water and Fish Values for PFAS*, Minn. Pollution Control Agency (Oct. 1, 2020), <https://www.pca.state.mn.us/news/mpca-announces-new-protective-water-and-fish-values-pfas>. MCEA is interested to know how establishing new HRLs for PFAS chemicals intersected with updating fish consumption values.

⁶⁰ Jennifer Bjorhus, *With PFAS Everywhere, Minnesota Calls for Big New Crackdown on the ‘Forever Chemicals’*, Star Trib. (Feb. 10, 2021), <https://www.startribune.com/with-pfas-everywhere-minnesota-calls-for-big-new-crackdown-on-the-forever-chemicals/600021420/?refresh=true> (reporting that the PFAS blueprint “calls for clearly designating the entire class of man-made chemicals called PFAS as a ‘hazardous substance’ in state law. . . require[ing] companies to disclose any PFAS they use to regulators.”).

⁶¹ Pat Rizzuto, David Schultz, & Sylvia Carignan, *CDC Sounds Alarm on Chemical Contamination in Drinking Water*, Bloomberg Law (Oct. 17, 2017), https://www.bloomberglaw.com/document/X5939JJ0000000?bna_news_filter=environment-and-energy&jcsearch=BNA%25200000015f2afd07fa35feffe4d90000#jcite.

The response at the federal level has been slow, jeopardizing the safety of countless individuals and forcing states devise their own solutions.⁶² Because the federal government does not “require toxicity research before compounds enter commerce,” continual toxicity assessments are necessary.⁶³ The EPA recently announced its intent to establish drinking water standards for PFOA and PFOS,⁶⁴ which would represent—if successful—the federal government’s first regulatory standards for PFAS.⁶⁵ Although some feel encouraged that we will now “see a different administration with respect to PFAS,”⁶⁶ time is of the essence and experience tells us that federal PFAS regulation is anything but a foregone conclusion.⁶⁷ In the absence of the federal government, states have entered the void, in varying degree, to regulate PFAS chemicals. Currently, there is a “patchwork of inadequate legislation” existing to regulate PFAS.⁶⁸ If we are to respond effectively to the challenges PFAS presents, it may need to be of our own accord.

⁶² *A Persistent Problem*, *supra* note 25.

⁶³

Minnesota’s PFAS Blueprint at 45 Minn. Pollution Control Agency (Feb. 2021), <https://www.pca.state.mn.us/waste/minnesotas-pfas-blueprint>.

⁶⁴ *EPA Takes Action to Address PFAS in Drinking Water*, U.S. Evtl. Protection Agency (Feb. 22, 2021), <https://www.epa.gov/newsreleases/epa-takes-action-address-pfas-drinking-water>.

⁶⁵ *A Persistent Problem*, *supra* note 25.

⁶⁶ Michelle Stocker, *Wisconsin Environmental Experts Expect Different Approach to PFAS Under Biden*, *The Capital Times* (Feb. 25, 2021), https://madison.com/ct/news/local/govt-and-politics/wisconsin-environmental-experts-expect-different-approach-to-pfas-under-biden/article_c5645ceb-3136-535e-ae5f-5757dd6e6471.html.

⁶⁷ See Glenn G. Lammi, *Consequences Must be Carefully Assessed Before PFAS are Pushed into the Superfund Quagmire*, *Forbes* (Sept. 26, 2019), <https://www.forbes.com/sites/wlf/2019/09/26/consequences-must-be-carefully-assessed-before-pfas-is-pushed-into-the-superfund-quagmire/?sh=624c8d316c37>.

⁶⁸ Erin Brockovich, *Plummeting Sperm Counts, Shrinking Penises: Toxic Chemical Threaten Humanity*, *The Guardian* (Mar. 18, 2021), <https://www.theguardian.com/commentisfree/2021/mar/18/toxic-chemicals-health-humanity-erin-brokovich>.

A. Minnesota's PFAS Regulatory History.

Minnesota's historical use of using HRLs and HBVs is outlined in the charts and discussion below. The use of HBVs is indicated in red text, while the use of HRLs is indicated in green text.

1. PFOS.



Minnesota first began regulating PFOS in drinking water in 2002 when MDH established an HBV of 1,000 ppt.⁶⁹ In setting this level, MDH necessarily relied upon the peer reviewed data available at the time, which was rather undeveloped. Seven years later, MDH established a much lower HRL of 300 ppt.⁷⁰ MDH revisited its assessment in 2017, when it lowered the HBV to 27 ppt.⁷¹ Finally, in 2018, MDH set the existing HBV of 15 ppt, which represents a 99% decrease from the first HBV MDH set less than two decades earlier.⁷² This extreme adjustment is illustrative of how rapidly the science has evolved. Outside of a 2020 “re-evaluation that used three recent

⁶⁹ *Toxicological Summary for Perflourooctane Sulfonate (PFOS)*, Minn. Dep’t of Health (Aug. 2020), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfos.pdf>.

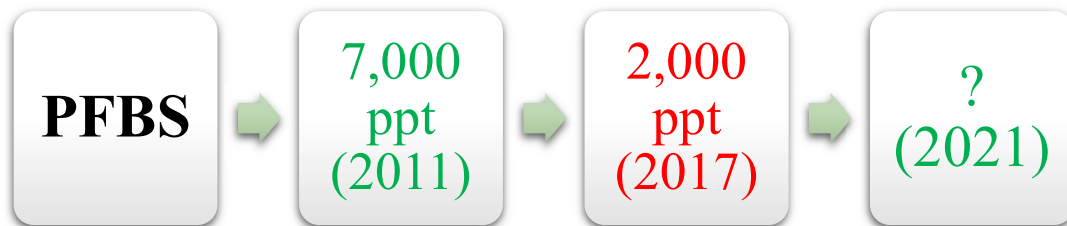
⁷⁰ *Toxicological Summary for Perflourooctane Sulfonate (PFOS)*, Minn. Dep’t of Health (May 5, 2009), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfos2010.pdf>.

⁷¹ *Id.*

⁷² *Id.*

state and federal comprehensive reviews” that did not change the HBV value nor the HRL value, MDH has not revised its HRL for PFOS since 2009, nor its HBV for PFOS since 2018.⁷³ PFOS has been detected in public drinking water sources at levels up to 1400 ppt and in the Mississippi River at levels up to 15 ppt.⁷⁴ It has also been detected in drinking water supplies throughout the East Metro.⁷⁵

2. PFBS.



MDH first began regulating PFBS in 2011, when it established an HRL of 7,000 ppt.⁷⁶ In 2017, MDH dramatically lowered its toxicity assessment, using an HBV, rather than an HRL, setting a level of 2,000 ppt after incorporating recently published toxicological studies for short-

⁷³ *Id.*; *Toxicological Summary for Perflourooctane Sulfonate (PFOS)*, Minn. Dep’t of Health (Aug. 2020), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfos.pdf>.

⁷⁴ *PFOS and Groundwater*, Minn. Dep’t of Health (Apr. 2019), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfosinfo.pdf>.

⁷⁵ James Kelly & Karla Peterson, *Perfluorochemicals (PFCs) in the East Metro*, Minn. Dep’t of Health 11-12 (Aug. 21-22, 2018), <https://3msettlement.state.mn.us/sites/default/files/PFCs%20in%20the%20East%20Metro.pdf>.

⁷⁶ *Toxicological Summary for Perflourobutane Sulfonate (PFBS)*, Minn. Dep’t of Health (Mar. 21, 2011), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfbs.pdf>.

term guidance derivation.⁷⁷ PFBS has been detected in public drinking water sources at levels up to 300 ppt.⁷⁸

3. *PFHxS.*



MDH established the current HBV of 47 ppt for PFHxS in 2019 a decade after it determined “there was insufficient data” at that point to establish a health value.⁷⁹ PFHxS has been detected in public drinking water sources at levels up to 570 ppt and Twin Cities metro area lakes at levels up to 150 ppt.⁸⁰

4. *Takeaways from MDH’s previous regulation of PFAS.*

There are two main takeaways from MDH’s previous PFAs regulation. First, MDH has consistently and significantly reduced its toxicity assessments for PFAS chemicals, setting levels

⁷⁷ *Toxicological Summary for Perflourobutane Sulfonate (PFBS)*, Minn. Dep’t of Health (Aug. 2020), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfbssummary.pdf>.

⁷⁸ *PFBS and Drinking Water*, Minn. Dep’t of Health (Dec. 2017), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfbsinfo.pdf>.

⁷⁹ *Toxicological Summary for Perflourohexane Sulfonate (PFHxS)*, Minn. Dep’t of Health (Aug. 2020), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfhxs.pdf>.

⁸⁰ *PFHxS and Groundwater*, Minn. Dep’t of Health (Apr. 2019), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfhxsinfo.pdf>.

more protective that reflect the developing science that continues to show PFAS is dangerous at extremely low levels. Second, MDH has relied upon HBVs in place of HRLs for several years, despite the fact that they are statutorily obligated to reassess HRLs every four years.⁸¹ This overreliance on HBVs is problematic because “MDH does not use guidance values to regulate water quality”⁸² and HBVs are intended to be used “between rule-making cycles,”⁸³ rather than ten or more years. Additionally, an exceedance does not trigger any regulatory action. Unless an agency decides to step in, drinking water supplies that exceed an HBV may continue to be used. Further, the HBVs are presently set at much lower levels than HRLs, which is a tacit admission that the existing HRLs are inadequate.

B. Other States Have Similarly Reacted To Developing Science By Continually Lowering Their Tolerance Limits For PFAS.

The downward trajectory of PFAS toxicity assessments is not unique to Minnesota. Over the past decade, several states have also continued to update their health standards for various PFAS compounds. In examining the current leading health standards across the country, it is clear that Minnesota has room to improve, particularly as it relates to PFBS, PFHxS, and PFOS. MDH cannot continue its previous trend of overreliance on HBVs; incorporating new studies and evidence only in HBVs does a disservice to Minnesota and Minn. Stat. § 103H.201, subd. 3(a). Since MDH last established HRLs for PFBS and PFOS more than ten years ago, the science has rapidly developed. Here, Minnesota has the opportunity to be a leader and a responsibility to protect its citizens.

⁸¹ Minn. Stat. § 103H.201, subd. 3(a).
⁸²

PFOS and Groundwater, Minn. Dep’t of Health (Apr. 2019), <https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/pfosinfo.pdf>.

⁸³ Conceptual Drinking Water Supply Plan, *supra* note 1, at vi.

In August 2020, Michigan adopted a regulatory limit for PFBS at 420 ppt, less than ¼ of the current HRL in Minnesota.⁸⁴ Although it does not appear any other states have established limits for PFBS, in establishing Michigan’s standard, state agencies “conducted a year-long review of current scientific and health data about PFAS and consulted several academic, environmental and business stakeholders.”⁸⁵ Of particular concern, research from Michigan demonstrates that “PFBS is expected to travel faster and further than other PFAS released from a particular source.”⁸⁶

With respect to PFHxS, at least three states have more protective standards than Minnesota: Massachusetts, New Hampshire, and Vermont.⁸⁷ All three states have standards less than ½ of the current HRL in Minnesota. The Massachusetts and Vermont standards were established as coordinated efforts, setting limits that factor in the composition of various PFAS compounds to set a total PFAS limit.⁸⁸ On the other hand, New Hampshire developed a specific standard for PFHxS which is the most protective in the country.⁸⁹ In announcing this standard, New Hampshire pointed out that their limits were adopted “[u]sing the most recent and best science available.”⁹⁰ Notably,

⁸⁴ *Michigan Adopts Strict PFAS in Drinking Water Standards*, State of Michigan (July 22, 2020), <https://www.michigan.gov/som/0,4669,7-192-47796-534660--,00.html>.

⁸⁵ *Id.*

⁸⁶ *Perfluorobutane Sulfonic Acid (PFBS) Chemistry, Production, Used, and Environmental Fate in Michigan*, AECOM (Sept. 23, 2019), https://www.michigan.gov/documents/pfasresponse/Perfluorobutane_Sulfonic_Acid_PFBS_Chemistry_Production_Uses_and_Environmental_Fate_704238_7.pdf.

⁸⁷ *Per- and Polyfluoroalkyl Substances (PFAS)*, ASDWA, <https://www.asdwa.org/pfas/> (last visited Mar. 18, 2021).

⁸⁸ *Final PFAS Maximum Contaminant Level (MCL) and Updates*, Mass. Dep’t of Env’tl. Protection (Sept. 24, 2020), <https://www.mass.gov/doc/final-pfas-maximum-contaminant-level-mcl-and-updates/download>; *Per and Polyfluoroalkyl Substances (PFAS)*, Vt. Dep’t of Env’tl. Conservation, <https://dec.vermont.gov/water/drinking-water/water-quality-monitoring/pfas> (last visited Mar. 18, 2021).

⁸⁹ *NHDES Submits Final Rulemaking Proposal for PFOA, PFOS, PFHxS, and PFNA*, N.H. Dep’t of Env’tl. Servs. (June 28, 2019), <https://www4.des.state.nh.us/nh-pfas-investigation/?p=1044>.

⁹⁰ *Id.*

all three of these PFHxS standards were adopted within the last two years, indicating that they better reflect where recent research stands.

As previously mentioned, PFOS is one of the better understood PFAS compounds. Minnesota's current HRL of 300 ppt is severely behind its own HBV developments and the other states that have established standards for PFOS. Minnesota's most recent PFOS HBV of 15 ppt is similar to where other states have established regulatory limits.⁹¹ In July 2020, New York announced a standard of 10 ppt, the most protective in the country.⁹² This standard was promoted by New York's Drinking Water Quality Council, "comprised of academic scientists, engineers, public water system professionals, and experts from the New York State Departments of Health and Environmental Conservation," who "followed the available science regarding potential health impacts."⁹³ Similarly, in June 2020, New Jersey released a PFOS standard of 13 ppt, after several water quality experts "reviewed numerous health studies."⁹⁴

Many states, including Minnesota, have continued to make their PFAS standards more protective, and of the states who have acted recently, it is clear that they are establishing even more protective limits. Establishing significantly more protective HRLs for PFBS, PFHxS, and PFOS

⁹¹ *Per- and Polyfluoroalkyl Substances (PFAS)*, ASDWA, <https://www.asdwa.org/pfas/> (last visited Mar. 18, 2021) (noting the following state limits: New York (10 ppt), New Jersey (13 ppt), New Hampshire (15 ppt), Michigan (16 ppt), Massachusetts (20 ppt), Vermont (20 ppt).

⁹² *Governor Cuomo Announces First in the Nation Drinking Water Standard for Emerging Contaminant 1,4-Dioxane*, State of New York (July 30, 2020), <https://www.governor.ny.gov/news/governor-cuomo-announces-first-nation-drinking-water-standard-emerging-contaminant-14-dioxane>.

⁹³ *Id.*

⁹⁴ *Affirming National Leadership Role, New Jersey Publishes Formal Stringent Drinking Water Standards for PFOA and PFOS*, N.J. Dep't of Env'tl. Protection (June 1, 2020), https://www.nj.gov/dep/newsrel/2020/20_0025.htm#:~:text=In%202018%2C%20New%20Jersey%20became,for%20perfluorononanoic%20acid%2C%20or%20PFNA.&text=To%20date%2C%20New%20Hampshire%20and,drinking%20water%20standards%20for%20PFAS.

would be both consistent with the approach of other states and reflective of the rapidly developing science.

III. DEVELOPING SCIENTIFIC RESEARCH ON PFBS, PFHxS, AND PFOS

The science is still developing on the human health risks associated with consuming PFAS.⁹⁵ This is unsurprising, as most academic research of PFASs did not commence until the early 2000s.⁹⁶ But what we do know is startling. The battery of known health complications linked to PFAS consumption include thyroid disease,⁹⁷ kidney cancer,⁹⁸ hypercholesterolemia,⁹⁹ and more.¹⁰⁰ Minnesota's own risk assessments for PFAS demonstrate "many toxic effects, impacting multiple organ systems."¹⁰¹ Sensitive populations are especially at risk. High prenatal exposure to PFAS via the placenta is associated with low birth weight.¹⁰² PFAS exposure in children is

⁹⁵ *Minnesota's PFAS Blueprint*, supra note 12, at 42 ("The scientific literature regarding PFAS toxicity and occurrence is evolving rapidly; MDH is conducting ongoing literature searches to identify if new data warrant revising existing risk assessments. This is a significant effort."). Notably, in 2017 the Environmental Protection Agency identified PFOS and PFOA, two of the most researched PFAS compounds, as an "emerging concern," further evincing how little we truly understand the impact these chemicals have on human health. *Technical Fact Sheet – PFOS and PFOA*, U.S. Env'tl. Protection Agency (Nov. 2017), https://www.epa.gov/sites/production/files/2017-12/documents/ffrofactsheet_contaminants_pfos_pfoa_11-20-17_508_0.pdf.

⁹⁶ Elsie M. Sunderland et al., *A Review of the Pathways of Human Exposure to Poly- and Perfluoroalkyl Substances and Present Understanding of Health Effects*, 29(2) J. Expo. Sci. Env'tl. Epidemiology 131-47 (2019), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6380916/>.

⁹⁷ Bevin E. Blake et al., *Associations Between Longitudinal Serum Perfluoroalkyl Substance (PFAS) Levels and Measures of Thyroid Hormone, Kidney Function, and Body Mass Index in the Fernald Community Cohort*, 242(A) Env'tl. Pollution 894-904 (Nov. 2018), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6309414/>.

⁹⁸ *Probable Link Evaluation for Chronic Kidney Disease*, C8 Sci. Panel (Oct. 29, 2012), http://www.c8sciencepanel.org/pdfs/Probable_Link_C8_Kidney_29Oct2012.pdf.

⁹⁹ *Probable Link Evaluation for heart disease*, C8 Sci. Panel (Oct. 29, 2012), http://www.c8sciencepanel.org/pdfs/Probable_Link_C8_Heart_Disease_29Oct2012.pdf.

¹⁰⁰ *Toxicological Profile for Perfluoroalkyls: Draft for Public Comment Chapter 2* at 5, U.S. Agency for Toxic Substances and Disease Registry (May 2009), <https://www.atsdr.cdc.gov/toxprofiles/tp200-c2.pdf>.

¹⁰¹ *Minnesota's PFAS Blueprint*, supra note 12, at 42.

¹⁰² Eleni Papadopoulou et al., *Exposure of Norwegian Toddlers to Perfluoroalkyl Substances*, Env'tl. Int'l (July 2016), https://www.researchgate.net/profile/Eleni_Lila_Papadopoulou/publicati

associated with lower bone mineral density.¹⁰³ And PFAS consumption is associated with elevated incidence of developmental, autoimmune, and kidney disorders among children under eighteen years of age.¹⁰⁴

Moreover, many PFAS bioaccumulate in humans, meaning “they have a long residence time in living things and can be transferred through food chains.”¹⁰⁵ Exposure to these chemicals is irreversible, and as individuals continue ingesting PFAS, even in trace amounts, “the level of PFAS in their bodies may increase to the point where they suffer from adverse health effects.”¹⁰⁶ The established science is clear: PFAS contamination is a public health crisis that deserves a robust response.

There are many recent publications documenting new or developed understandings of the toxicity of PFAS as it relates to immune system dysfunction.¹⁰⁷ Just this week, it was reported that

on/305624668_Exposure_of_Norwegian_toddlers_to_perfluoroalkyl_substances_PFAS_The_association_with_breastfeeding_and_maternal_PFAS_concentrations/links/59c0c482a6fdcca8e572b0ad/Exposure-of-Norwegian-toddlers-to-perfluoroalkyl-substances-PFAS-The-association-with-breastfeeding-and-maternal-PFAS-concentrations.pdf.

¹⁰³ Charles W. Schmidt, *Reduced Bone Mineral Density in Children*, 128(4) *Envtl. Health Perspectives* (Apr. 2020), <https://ehp.niehs.nih.gov/doi/pdf/10.1289/EHP6519>.

¹⁰⁴ Bindu Panikkar et al., *Making the Invisible Visible*, *Environmental Health* (2019), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6717361/>.

¹⁰⁵ Jacob Hildebrand, Noelle-Nadia Filali, & Sydney Widell, *Proactive Prediction: Mapping PFAS Risk in Dane County*, Univ. of Wis. Undergraduate Colloquium (Dec. 16, 2019), <https://minds.wisconsin.edu/bitstream/handle/1793/80359/Hildebrand%20Filali%20Widell.pdf?sequence=1>.

¹⁰⁶ *Basic Information on PFAS*, U.S. Env'tl. Protection Agency, <https://www.epa.gov/pfas/basic-information-pfas> (last visited Dec. 4, 2020).

¹⁰⁷ CM Bulka et al., *Associations of Exposure to Perfluoroalkyl Substances Individually and in Mixtures with Persistent Infections: Recent Findings from NHANES 1999-2016*, *Envtl. Pollution* (Jan. 29, 2021), <https://europepmc.org/article/med/33578314>; Phillippe Grandjean et al., *Severity of COVID-19 at Elevated Exposure to Perfluorinated Alkylates*, *PLoS One* 15(12), <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0244815>.

chemicals like PFAS may forebode the loss of humanity's ability to reproduce.¹⁰⁸ There is also new evidence on DNA methylation that suggests effects on prenatal programming.¹⁰⁹ Recent studies on PFOS suggest that PFOS has significantly negative impacts on learning and memory¹¹⁰ and heart development.¹¹¹ A recent study on PFBS and PFHxS demonstrates that they disrupt stem cell development.¹¹² A recent study on PFHxS analyzed its effects on brain development.¹¹³

Although there is certainly much we do not yet know about PFAS, what we do know is alarming. Further, as more research continues, it will likely reveal that PFAS are more dangerous than previously understood, as experience has demonstrated. Setting new and significantly more protective HRLs for PFBS, PFHxS, and PFOS will provide a substantial improvement to the health and well-being of all Minnesotans; however, the science is rapidly progressing, and Minnesota will necessarily have to reassess the toxicity for all PFAS moving forward. We simply do not know

¹⁰⁸ Erin Brockovich, *Plummeting Sperm Counts, Shrinking Penises: Toxic Chemical Threaten Humanity*, The Guardian (Mar. 18, 2021), <https://www.theguardian.com/commentisfree/2021/mar/18/toxic-chemicals-health-humanity-erin-brockovich>.

¹⁰⁹ Sonia L. Robinson et al., *Perfluorooctanoic Acid (PFOA) or Perfluorooctane Sulfonate (PFOS) and DNA Methylation in Newborn Dried Blood Spots in the Upstate KIDS Cohort*, *Envtl. Research* (Mar. 2021), <https://pubmed.ncbi.nlm.nih.gov/33387539/>; Anne P. Starling et al., *Prenatal Exposure to Per- and Polyfluoroalkyl Substances, Umbilical Cord Blood DNA Methylation and Cardio-Metabolic Indicators in Newborns: The Healthy Start Study*, *Envtl. Health Perspectives* (Dec. 2020), <https://pubmed.ncbi.nlm.nih.gov/33356526/>.

¹¹⁰ Abdallah Mshaty et al., *Neurotoxic Effects of Lactational Exposure to Perfluorooctane Sulfonate on Learning and Memory in Adult Male Mouse*, 145 *Food & Chem. Toxicology* (Nov. 2020), <https://www.sciencedirect.com/science/article/abs/pii/S0278691520306001>.

¹¹¹ Ren Zhou et al., *Combined Effects of BPA and PFOS on Fetal Cardiac Development: In Vitro and In Vivo Experiments*, 80 *Envtl. Toxicology & Pharmacology* (Nov. 2020), <https://www.sciencedirect.com/science/article/pii/S1382668920301101>.

¹¹² Shuyu Liu, *The Short-Chain Perfluorinated Compounds PFBS, PFHxS, PFBA, and PFHxA Disrupt Human Mesenchymal Stem Cell Self-Renewal and Adipogenic Differentiation*, 88 *J. Envtl. Sciences* 187-99 (Feb. 2020), <https://www.sciencedirect.com/science/article/abs/pii/S1001074219307314>.

¹¹³ Louise Ramhoj et al., *Evaluating Thyroid Hormone Disruption: Investigations of Long-Term Neurodevelopmental Effects in Rats After Perinatal Exposure to Perfluorohexane Sulfonate (PFHxS)*, *Scientific Reports* (Feb. 14, 2020), <https://www.nature.com/articles/s41598-020-59354-z>.

what we do not know, and any toxicity assessment must strategically build in measures for precaution.

CONCLUSION

PFAS pose a fundamental threat to human health. Action is needed now to ensure this growing public health crisis does not overwhelm Minnesota's drinking water supplies in the coming years. MCEA appreciates MDH's effort to make current HRLs for three PFAS compounds; this is a vital step towards ensuring the state's drinking water supplies remain safe to consume. But more work needs to be done. MDH should take this opportunity to revisit its guidance levels for all currently known PFAS, and follow its statutory obligation to update PFAS HRLs every four years. Minnesotans demand its state agencies react swiftly and strongly to contaminants threatening our drinking water. MCEA expects MDH—and all other state regulators—to allocate the money and expertise needed to solve this problem. MCEA looks forward to continued engagement with MDH as it advances towards establishing updated HRLs.

Respectfully submitted,

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