

Perfluorooctane Sulfonic Acid (PFOS) and Water

Perfluorooctane sulfonic acid (PFOS) is one of a group of related chemicals known as perfluorinated alkylated substances (PFAS). This group is commonly used in non-stick and stain-resistant consumer products, food packaging, fire-fighting foam, and industrial processes. The 3M Company was once a major manufacturer of PFOS and products containing PFOS, but production was phased out in 2002. PFOS production has been phased out nationwide but continues in other countries.

The Minnesota Department of Health (MDH) Risk Assessment Unit evaluates health risks for contaminants in drinking water and develops health-based guidance values for groundwater. The toxicological summary for PFOS can be found at the MDH Human Health-Based Water Guidance Table website.¹ MDH maintains a PFAS webpage with a range of related information that is regularly updated, including the history of PFAS, PFAS monitoring, and how to reduce exposure to PFAS.² MDH works in collaboration with the Minnesota Pollution Control Agency (MPCA) and the Minnesota Department of Agriculture (MDA) to understand the occurrence and environmental effects of these contaminants.

PFOS in Minnesota Waters

PFOS has been detected in Minnesota surface water and groundwater for more than 20 years. MDH recently completed a major effort to collect and test water samples from 920 community water supplies (CWS) around the state, representing 99% of the state's CWS users. PFOS has been detected in ~5% of CWS statewide, with a maximum concentration of 0.025 micrograms per liter ($\mu\text{g/L}$). One microgram per liter is the same as one part per billion (ppb). In 2022, MDH released the Interactive Dashboard for PFAS Testing in Drinking Water³, an online tool that shows the status and results of this statewide PFAS testing program.

MDH and MPCA have measured PFOS levels in private wells, mostly in areas known to have been contaminated in the past. PFOS levels in private wells in the East Metro region of the Twin Cities can be viewed through an interactive map on the MPCA website.⁴

MDH Guidance Value

Based on available information, MDH developed a noncancer guidance value of 0.0023 ppb for PFOS in drinking water. This is equivalent to 2.3 parts per trillion (ppt; also 2.3 nanograms per liter [ng/L]). MDH does not use guidance values to regulate water quality, but they may be useful for situations in which no regulations exist. MDH develops guidance values to protect people who are most highly exposed and people who are most sensitive to the potentially harmful effects of a contaminant, including pregnant people, fetuses, infants, and children. A person drinking water at or below the guidance value would be at little or no risk for harmful health effects.

Potential Health Effects

In epidemiology studies, PFOS has been associated with lower birth weights, decreased antibodies in young children, and increased cholesterol in adults. People with questions about their personal health should consult with a physician.

In general, there is agreement between the noncancer effects observed in epidemiology studies and controlled laboratory animal studies. There is not a clear association between PFOS exposure and cancer in

epidemiology studies; however, a laboratory study in rats suggests long-term PFOS exposure may increase the risk of developing liver cancer.

Potential Exposure to PFOS

Although almost everyone is exposed to small amounts of PFOS, large-scale biomonitoring programs show that PFOS levels in people's blood are declining. For most Minnesotans, the majority of PFOS exposure comes from non-drinking water sources. These can include eating fish caught from water contaminated by PFOS, eating food packaged in material that contains PFAS, using some consumer products treated with PFAS such as stain resistant carpeting and water-repellent clothing, and others.

Drinking water can be a major route of exposure in areas where there has been substantial PFOS contamination of groundwater and surface water. Effective treatments exist to remove PFOS from drinking water. Information on how to reduce PFAS exposures from all sources can be found on MDH's website.²

PFOS can also pass from mother to infant during pregnancy and during breastfeeding. Breastfeeding is a healthy activity for both baby and parent. If you have concerns about possible risks from PFOS during breastfeeding, consult with your physician.

PFOS in the Environment

PFOS use has declined in recent years, so new releases of PFOS into the environment are rare. PFOS is persistent in the environment, meaning it does not break down easily in soil or water. How PFOS moves through soil is dependent on the makeup of the soil and its chemistry. In several large areas of Minnesota, PFOS has moved into groundwater over the course of many years. Information on PFAS in the environment can be found on MDH's website.²

References

1. Minnesota Department of Health (MDH). (December 2023). Human Health-Based Water Guidance Table. "Toxicological Summary for: PFOS."
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2. Minnesota Department of Health (December 2023). Per-and Polyfluoroalkyl Substances (PFAS).
<https://www.health.state.mn.us/communities/environment/hazardous/topics/pfcs.html>
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4. Minnesota Pollution Control Agency (MPCA). Well Sampling in the East Metro.
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