

PFOS and Drinking Water

PFOS

Perfluorooctane sulfonic acid (PFOS) is one of a group of related chemicals known as perfluorochemicals (PFCs). These are also called perfluorinated alkylated substances (PFAS). This group of chemicals is commonly used in non-stick and stain-resistant consumer products, food packaging, fire-fighting foam, and industrial processes.

PFOS has been used in stain-resistant fabrics, fire-fighting foams, food packaging, and as a surfactant in industrial processes. The 3M Company was once a major manufacturer of PFOS and products containing PFOS, but production was phased out in 2002.¹ PFOS production has been phased out nationwide, but continues in other countries. Products containing PFOS may be imported into the United States.

PFOS in Minnesota Waters

The Minnesota Pollution Control Agency (MPCA) detected PFOS in the Mississippi River in the Twin Cities metro area at levels up to 0.15 parts per billion (ppb).² Detections were more common at sites immediately downriver from an industrial facility with historical PFOS use or disposal.

PFOS has been detected in private drinking water wells and public drinking water systems in several parts of Minnesota where known industrial use or disposal of PFOS occurred in the past. PFOS has been detected in sources of public drinking water at levels up to 1.4 ppb.³ MDH and MPCA routinely sample affected areas for PFOS and related chemicals.

MDH Guidance Value

Based on available information, MDH developed a guidance value of 0.027 ppb for PFOS in drinking water. MDH guidance values are developed to protect people who are most vulnerable to the potentially harmful effects of a contaminant. A person drinking water at or below the guidance value would be at little or no risk for harmful health effects.

Potential Health Effects

Epidemiological studies on workers, people living in communities with PFOS in their drinking water, and the general public have not identified specific health effects caused by exposure to PFOS. In some studies, higher levels of PFOS in a person's body were associated with higher cholesterol, changes to liver function, changes in thyroid hormone levels, and reduced immune response.

In laboratory animal studies, effects of PFOS exposure included developmental changes such as decreased body weight, changes in liver function and liver weight, reduced immune response, and decreased thyroid hormone levels.

Potential Exposure to PFOS

Almost everyone is exposed to small amounts of PFOS, but this does not necessarily indicate a risk to your health. Large-scale biomonitoring programs show that PFOS levels in people's blood are declining.⁴

For people living in areas affected by PFC releases or disposal, drinking water may be a major source of exposure. MDH and MPCA have studied a number of sites in Minnesota with known PFC releases. For

more information on those locations, please visit [Perfluorochemicals \(PFCs\) in Minnesota](http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcs/sites.html) (<http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcs/sites.html>). Reverse osmosis and activated carbon filter treatment systems can reduce the levels of PFOS in drinking water in your home. You may choose to use bottled water for drinking and cooking for a short time, but long-term bottled water use will be more expensive than installing a treatment system.

For most people, the main route of exposure to PFOS is through the foods they eat. PFOS can be present on food crops due to environmental exposures and some food packaging may transfer PFOS to packaged food items. PFOS may also be present in the fish people catch and eat. MDH provides guidelines for eating fish, including fish caught in areas affected by PFOS.

PFOS transfers from a mother to infant during pregnancy and to an infant through breastmilk. Breastfeeding provides many health benefits to both a mother and infant. MDH recommends that women currently breastfeeding, and pregnant women who plan to breastfeed, continue to do so. Ingestion of household dust can also be a significant route of exposure, especially for infants and young children.

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 areas of Minnesota, PFOS has moved into groundwater over the course of many years.

Health Risk Assessment Unit

The MDH Health Risk Assessment Unit evaluates the health risks from contaminants in drinking water sources and develops health-based guidance values for drinking water. MDH works in collaboration with the Minnesota Pollution Control Agency and the Minnesota Department of Agriculture to understand the occurrence and environmental effects of contaminants in water.

References

1. US Environmental Protection Agency (EPA). 2017. "Fact Sheet: 2010/2015 PFOA Stewardship Program." Retrieved from <https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/fact-sheet-20102015-pfoa-stewardship-program#mfg>. Accessed April 2017.
2. Minnesota Pollution Control Agency (MPCA). 2013. "Perfluorochemicals in Mississippi River Pool 2: 2012 Update." Retrieved from <https://www.pca.state.mn.us/sites/default/files/c-pfc1-21.pdf>. Accessed April 2017.
3. Minnesota Drinking Water Information System (MNDWIS). 2017. Accessed April 2017.
4. Centers for Disease Control and Prevention (CDC). 2017. "Fourth National Report on Human Exposure to Environmental Chemicals, Updated Tables, January 2017, Volume One." Retrieved from https://www.cdc.gov/exposurereport/pdf/FourthReport_UpdatedTables_Volume1_Jan2017.pdf. Accessed April 2017.

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