

PFOA and Drinking Water

PFOA

Perfluorooctanoic acid (PFOA) 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.

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

PFOA in Minnesota Waters

The Minnesota Pollution Control Agency (MPCA) has detected PFOA in the Mississippi River in the Twin Cities metro area at levels up to 0.22 parts per billion (ppb).² Detections were more common at sites immediately downriver from an industrial facility with historical PFOA use or disposal.

PFOA 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 PFOA occurred in the past. PFOA has been detected in sources of public drinking water at levels up to 1 ppb.³ MDH and MPCA routinely sample affected areas for PFOA and related chemicals.

MDH Guidance Value

Based on available information, MDH developed a guidance value of 0.035 ppb for PFOA 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

Scientists are still studying whether PFOA causes health problems in workers, people living in communities with PFOA in their drinking water, and the general public. In some studies, higher levels of PFOA in a person's body were associated with higher cholesterol, changes to liver function, reduced immune response, thyroid disease, and increased kidney and testicular cancer.

In laboratory animal studies, effects of PFOA exposure included developmental changes such as delayed bone growth, delayed mammary gland development, and accelerated male sexual development. Other effects of PFOA exposure included changes to the liver, reduced immune response, and increased kidney weight. Increased incidence of Leydig cell tumors in the testes of male rats has been reported, but it is unclear whether this type of tumor is relevant to humans. At this time, MDH considers the existing data to be inadequate to assess the carcinogenic potential of PFOA.

Potential Exposure to PFOA

Almost everyone is exposed to small amounts of PFOA, but this does not necessarily indicate a risk to your health. Large-scale biomonitoring programs show that PFOA levels in people's blood are declining.⁴ For most people, the main route of exposure to PFOA is through the foods they eat. PFOA can be present on food crops due to environmental exposures and some food packaging may transfer PFOA to packaged food items. Ingestion of household dust can also be a significant route of exposure, especially for infants and young children.

For people living in areas affected by PFC releases or disposal, drinking water may be a major source of exposure to PFOA. 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 PFOA 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.

PFOA transfers from a mother to infant during pregnancy, to an infant through breastmilk, and to an infant when contaminated water is used to mix formula. Breastfeeding is important for the short and long term health of both a mother and infant. MDH recommends that women currently breastfeeding, and pregnant women who plan to breastfeed, continue to do so. Exclusive breastfeeding is recommended by doctors and other health professionals. If formula is used by those living in affected areas, it should be prepared only with treated or bottled water.

PFOA in the Environment

PFOA use has declined in recent years, so new releases of PFOA into the environment are rare. PFOA is persistent in the environment, meaning it does not break down easily in soil or water. How PFOA moves through soil is dependent on the makeup of the soil and its chemistry. In several large areas of Minnesota, PFOA 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

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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 by MDH staff 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.