

1,1,1-Trichloroethane and Drinking Water

Summary

1,1,1-Trichloroethane (1,1,1-TCA) is a human-made chemical that had many household and industrial uses in the past, but has been largely phased out of use. 1,1,1-TCA has been detected in Minnesota groundwater and surface water at levels below the guidance value developed by MDH. Drinking water is unlikely to be a main source of contact with 1,1,1-TCA. Minnesotans are not likely to experience health effects from the levels of 1,1,1-TCA found in the environment.

1,1,1-TCA

In the past, 1,1,1-TCA was used to remove oil and grease and was an ingredient in household spot cleaners, glues, and aerosol sprays.¹ Amendments to the Clean Air Act and Montreal Protocol led to the phase out of 1,1,1-TCA in household products by 2002.² Now, the chemical is mainly used to help make certain types of refrigerants.² 1,1,1-TCA may still be entering the waste stream and landfills by leaching out of products made before 2002.

1,1,1-TCA in Minnesota Waters

1,1,1-TCA has been detected in Minnesota groundwater and surface water. The highest levels of 1,1,1-TCA have been found in water near landfills, with levels ranging from 1.5 to 150,000 parts per billion (ppb).³ About 3 percent of groundwater near landfills had detectable levels of 1,1,1-TCA.³ From 2000-2015, Minnesota Pollution Control Agency detected 1,1,1-TCA in about 0.4 percent of ambient groundwater samples.³ The highest level of 1,1,1-TCA detected was 13 ppb. The US Environmental Protection Agency has developed a Maximum Contaminant Level (MCL) for 1,1,1-TCA of 200 ppb, but 1,1,1-TCA has not been detected in Minnesota public water supplies.⁴

MDH Guidance Value

Based on available information, MDH developed a guidance value of 5,000 ppb for 1,1,1-TCA in drinking water. A person drinking water at or below the guidance value would have little or no risk for health effects.

Potential Exposure to 1,1,1-TCA

You can be exposed to 1,1,1-TCA by drinking contaminated water. However, a more common exposure to 1,1,1-TCA is from breathing it in. 1,1,1-TCA dissolves in water and evaporates from water or soil into the air. You can be exposed to 1,1,1-TCA that enters the air when contaminated water is used for showering, washing clothes and dishes, or other household activities.

People with contaminated wells who want to reduce levels of 1,1,1-TCA in the home can filter their drinking water and should run fans or open windows when showering or bathing, running a dishwasher, or doing laundry.

Potential Health Effects

The health effects of brief exposures via ingestion of 1,1,1-TCA are unknown. Longer-term animal studies show that 1,1,1-TCA can cause decreased body weight, decreased liver weight, and a decrease in sperm concentration at high doses.

Using 1,1,1-TCA Safely

1,1,1-TCA is no longer used in consumer products. If you have household cleaning products from before 2002, check and see if 1,1,1-TCA is in the product. For more information on safely using, storing, and disposing products that may be hazardous, visit the Minnesota Pollution Control's "Hazards in Your Home" website at: <https://www.pca.state.mn.us/living-green/hazards-your-home>.

1,1,1-TCA in the Environment

1,1,1-TCA entered the environment when products with 1,1,1-TCA in them were used. Today, the chemical mainly enters the environment through leaching out of landfills that have products with 1,1,1-TCA in them. It is more common for 1,1,1-TCA to release into the air than into the ground or water. Once in the air, 1,1,1-TCA can remain for five or more years and interact with the ozone layer. When 1,1,1-TCA releases in soil, it moves quickly into water and does not attach to the soil.

Health Risk Assessment Unit

The MDH Health Risk Assessment Unit evaluates the health risks from contaminants in groundwater. 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. Agency for Toxic Substances and Disease Registry (ATSDR). 2006. [Public Health Statement for 1,1,1-Trichlorethane](http://www.atsdr.cdc.gov/PHS/PHS.asp?id=430&tid=76) (<http://www.atsdr.cdc.gov/PHS/PHS.asp?id=430&tid=76>). Accessed July 2016.
2. ATSDR. 2006. [Toxicological Profile for 1,1,1-Trichlorethane](http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=432&tid=76) (<http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=432&tid=76>). Accessed July 2016.
3. Minnesota Pollution Control Agency. 2016. 1,1,1-TCA data from the EQulS system, years 2000-2015.
4. Minnesota Drinking Water Information System (MNDWIS). 2016. Accessed by MDH staff September 2016.

Minnesota Department of Health
Health Risk Assessment Unit
PO Box 64975, St. Paul MN 55164
651-201-4899
health.risk@state.mn.us

September 2016

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