

Vinyl Chloride and Drinking Water

Summary

Vinyl chloride is a chemical used to make polyvinyl chloride (PVC). PVC is used in a variety of common plastic products. Vinyl chloride moves easily through soil and can enter groundwater. This is especially likely to happen near landfills. Vinyl chloride has been detected in Minnesota groundwater, surface water, and drinking water. People can come into contact with vinyl chloride by drinking water with vinyl chloride in it or by breathing vinyl chloride when it moves from soil or water into air. Exposure to vinyl chloride can increase a person's risk of cancer.

Vinyl Chloride

Vinyl chloride is an industrial chemical used in the production of polyvinyl chloride (PVC). PVC is used to make a variety of plastic products such as pipes, wire and cable coatings, and packaging materials.^{1,2}

Vinyl Chloride in Minnesota Waters

Since 2000, vinyl chloride has been detected in Minnesota groundwater in at least 104 monitoring sites, most of which are near landfills.³ Detections have ranged from 0.06 to 22,000 parts per billion (ppb). Over the same time, vinyl chloride has been detected in 51 surface water sites at levels between 0.01 ppb and 13.1 ppb.³ Vinyl chloride has been detected in public drinking water systems at levels between 0.2 ppb and 8.4 ppb.⁴ Federal standards require public water systems with vinyl chloride levels above 2 ppb to take action that reduces levels of vinyl chloride in drinking water.

MDH Guidance Value

Based on available information, MDH developed a health-based guidance value of 0.2 ppb for vinyl chloride in drinking water. A person drinking water at or below the guidance value would have little or no risk of health effects.

Potential Health Effects

Vinyl chloride is a known human carcinogen. Low level exposure to vinyl chloride over a person's lifetime can increase the risk of cancer in the liver, blood vessels, kidney, stomach, and skin.

Potential Exposure to Vinyl Chloride

People can come in to contact with vinyl chloride if their drinking water is contaminated. Because vinyl chloride easily moves into the air, people can also be exposed by breathing it in when it is released from soil or water.

Vinyl Chloride in the Environment

Vinyl chloride enters the environment if it leaches from landfills, if it is spilled or released from industrial sites, or when related chemicals break down.⁵ In Minnesota, most vinyl chloride has entered the environment after past releases or disposal of common, widely used chemicals. Vinyl chloride moves easily and quickly through soil into groundwater. Vinyl chloride is very volatile, meaning it easily moves into the air as a gas, from soil or water or during production processes. Once in soil or groundwater, it can take months for vinyl chloride to break down.^{1,5}

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. Hazardous Substances Data Bank (HSDB). 2016. Searched for "Vinyl Chloride". Retrieved from <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm> Accessed August 3, 2016.
2. National Cancer Institute. 2015. Vinyl Chloride. Retrieved from <http://www.cancer.gov/about-cancer/causes-prevention/risk/substances/vinyl-chloride>. Accessed September 6, 2016.
3. Minnesota Pollution Control Agency (MPCA). 2016. Data from EQulS sent to MDH per request.
4. Minnesota Drinking Water Information System (MNDWIS). 2016. Accessed by MDH staff July 2016.
5. ATSDR. 2006. Public Health Statement for Vinyl Chloride. Retrieved from <https://www.atsdr.cdc.gov/phs/phs.asp?id=280&tid=51>. Accessed August 3, 2016.

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September 2016

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