

Tetrahydrofuran and Drinking Water

Tetrahydrofuran is an organic compound that has been found in groundwater in Minnesota. The Minnesota Department of Health (MDH) has developed a health-based guidance value for tetrahydrofuran in drinking water. Based on this new guidance, compared to levels currently found in drinking water, MDH does not expect tetrahydrofuran in drinking water to harm the health of Minnesotans.

Summary

Tetrahydrofuran is used to make a variety of products, like plastics and rubbers. Many people come in contact with tetrahydrofuran on a regular basis because it is used in common items like adhesives and PVC pipes. Tetrahydrofuran enters the environment and water through the waste created by manufacturing processes. Tetrahydrofuran does not break down easily in groundwater and can remain in groundwater at high concentrations. Tetrahydrofuran has been detected in a small sample of Minnesota drinking water at levels below MDH guidance.

Tetrahydrofuran

Tetrahydrofuran is a solvent used for making rubber, resins, plastics, dyes, lacquers, spandex, PVC pipe, adhesives, and food storage and packaging materials. As of 2004, the world produces about 200,000 tons of tetrahydrofuran each year.¹

Tetrahydrofuran in Minnesota Waters

Since 2004, eight water utilities in Minnesota have detected tetrahydrofuran in the drinking water they supply. The levels ranged from 0 to 130 parts per billion (ppb).² The Minnesota Pollution Control Agency has detected tetrahydrofuran in monitoring wells at closed landfill sites throughout the state. When it is detected, concentrations in the last ten years have averaged 292 ppb.³

MDH Guidance Value

The US Environmental Protection Agency (EPA) evaluated the health effects of tetrahydrofuran in 2012.⁴ MDH used information from this review and other available information to develop a guidance value of 600 ppb for tetrahydrofuran in drinking water. A person drinking water at or below the guidance value would have little or no risk of health effects.⁵

Potential Exposure to Tetrahydrofuran

People can be exposed to tetrahydrofuran through the air they breathe, food they eat, water they drink, or through touching products that have tetrahydrofuran in them. Many people come in contact with tetrahydrofuran on a regular basis because it is used in common items like adhesives and PVC pipes. People who work somewhere that uses or produces tetrahydrofuran can inhale tetrahydrofuran from the air or get it on their skin.⁶

Potential Health Effects

Studies on laboratory animals indicate that exposure to tetrahydrofuran can result in decreased body weight in offspring and may result in kidney effects over time⁵. Animals that breathe in tetrahydrofuran exhibited

additional effects, including effects on the central nervous system and respiratory irritation. There is limited evidence from laboratory animal studies that tetrahydrofuran may cause cancer.⁴ Workers regularly exposed to tetrahydrofuran may experience throat irritation, coughing, dizziness, and headaches.⁶

Tetrahydrofuran in the Environment

Tetrahydrofuran enters the environment through the waste streams of manufacturers who use tetrahydrofuran to make their products and from the normal disposal of consumer and industrial products containing tetrahydrofuran. Tetrahydrofuran moves easily through soil but also releases into the air and breaks down quickly.

Tetrahydrofuran is less concentrated in surface water because it moves easily from water to air and can biodegrade under certain conditions. Groundwater can have relatively high concentrations of tetrahydrofuran because the compound does not break down as easily in groundwater and does not easily move from groundwater to soil and rock. Tetrahydrofuran is not expected to build up in tissues of fish or other wildlife.⁶

Potential Environmental Impacts of Tetrahydrofuran

Information about the occurrence of tetrahydrofuran in surface waters is limited. Because tetrahydrofuran is volatile, any releases to surface water would be of short duration and the risk of exposure to aquatic organisms minimal. Limited studies of the effects of tetrahydrofuran on aquatic organisms indicate they occur at concentrations considerably above those found in Minnesota groundwater.

CEC Program

The MDH Contaminants of Emerging Concern Program (CEC) evaluates health risks from contaminants in drinking water and develops drinking water guidance. 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.

References

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