

# 1,4-Dioxane in Private Wells - Gem Lake and the White Bear Area

8/24/2021

Recent private well sampling in Gem Lake has detected the chemical 1,4-dioxane above the Minnesota Department of Health (MDH) drinking water guidance value.

## What is 1,4-dioxane?

The main use of 1,4-dioxane was as a stabilizer for the chlorinated solvent 1,1,1-trichloroethane (often used for industrial purposes). 1,4-dioxane can also be an unintended contaminant in the production of certain products, including some cleaners, detergents, adhesives, inks, automotive fluids, etc. Groundwater contaminated with 1,4-dioxane is largely caused by the historical use and disposal of chlorinated solvents.

## How can I be exposed to 1,4-dioxane?

Drinking contaminated water is the primary way people are exposed. Minor sources of exposure are food prepared with contaminated water and incidental ingestion and inhalation of water vapor during showering. Absorption through the skin is also thought to be insignificant.

## MDH Health Risk Limits

Minnesota Department of Health (MDH) uses Health Risk Limits (HRLs) to protect people's health from drinking water contaminants. The table below shows three HRL values for 1,4-dioxane set by MDH, for differing time frames and possible health endpoints they are based on.

The 1,4-dioxane HRL of 1 part per billion (ppb) represents an amount of a contaminant that poses little or no health risk to those drinking the water daily for a lifetime, including sensitive or highly exposed people.

### MDH Health Risk Limits for 1,4-Dioxane

Duration	HRL (ppb) *	Health Endpoint
Subchronic (>30 days up to 10% of a lifetime)	300	Liver, kidney, and respiratory systems
Chronic (>10% of a lifetime)	100	Liver, kidney, and respiratory systems
Lifetime (0-70 years)	1	Cancer

\*HRLs are shown in units of parts per billion (ppb). This is the same as micrograms per liter ( $\mu\text{g/L}$ ).

## Potential Health Effects

Concentrations detected in well water in Gem Lake are just above the HRL of 1 ppb and present a very low health risk. Information about the health effects of 1,4-dioxane comes mainly from studies of laboratory animals. 1,4-Dioxane is considered a likely human carcinogen, based on studies of animals exposed to very high amounts. There are currently no human studies that show a direct link between exposure to 1,4-dioxane and cancer. The HRL of 1 ppb is based on a negligible cancer risk of one additional cancer in 100,000 people consuming the water on a daily basis for a lifetime.

## Frequently Asked Questions

### Is there more cancer in Gem Lake because of this contamination?

We would not expect to see an increase in cancer in the community from the exposures found. In addition, MDH completed an analysis of the data from the Minnesota Cancer Reporting System in 2019 and overall cancer rates in the Water Gremlin study area (which encompassed Gem Lake) were virtually identical to cancer rates in the seven-county Twin Cities Metro area.

### Should I get tested for exposure to 1,4-dioxane? Should I see my doctor?

1,4-dioxane breaks down in the body and eliminated quickly – on the order of hours to days. Tests to measure 1,4-dioxane or metabolites are not readily available to physicians. MDH advises that there is no need to go to the doctor solely because of this exposure in drinking water. There are no recommendations for any increased screening for cancer or other health effects.

### Is it okay for my dogs/cats to drink the well water?

Dogs and cats are expected to have similar health risks as people.

### Can I water my garden vegetables with my well water?

It is possible that plants watered with well water may be a very minor source of exposure, but this has not been well studied.

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