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1,4-Dioxane in Drinking Water

1,4-Dioxane is a contaminant that has been found in waters that could be used as drinking water sources in Minnesota. The Minnesota Department of Health (MDH) developed a health-based guidance value for 1,4-dioxane in drinking water.

What is 1,4-dioxane?

1,4-Dioxane is used as a stabilizer for chlorinated solvents such as trichloroethane and trichloroethylene.[1] It can also be an unintended contaminant of chemical ingredients used in consumer products including bubble bath, shampoo, laundry detergent, soap, skin cleanser, adhesives, and antifreeze. Foods may also contain small amounts of 1,4-dioxane from some additives and packaging materials.

Has 1,4-dioxane been found in Minnesota waters?

1,4-Dioxane has been detected in several public water supplies in Minnesota at levels ranging from 0.07 parts per billion (ppb) to 5.5 ppb.[2] These detections occurred as part of the United States Environmental Protection Agency's (U.S. EPA) Unregulated Contaminant Monitoring Rule (UCMR). The UCMR provides the U.S. EPA with data on the occurrence of contaminants in drinking water that are currently not monitored and not regulated.[3]

1,4-dioxane has been detected in several groundwater monitoring wells in areas with known chemical contamination. These wells are only set up to look for chemical contamination and are not a source of drinking water.

What is the MDH guidance value for 1,4-dioxane in drinking water?

Based on available information, MDH developed a guidance value of 1 ppb for 1,4-dioxane in drinking water based on its potential to cause cancer in people.[4]

Can 1,4-dioxane in drinking water affect my health?

The U.S. EPA has classified 1,4-dioxane as a likely human carcinogen.[5] Low level exposure to 1,4-dioxane over a person's lifetime can increase the risk of cancer. Higher exposures over a shorter amount of time can damage cells in the liver, kidney, and respiratory system. This damage limits the ability of those organs to work properly.

At a Glance

1,4-Dioxane is…

- Used to stabilize chlorinated solvents. It is also found in small amounts in personal care products, laundry detergents and food.

1,4-Dioxane enters your body from…

- Consuming contaminated water and food, and using 1,4-dioxane containing products.

Your exposure to 1,4-dioxane can be reduced by….

- Avoiding products that contain PEG, polyethylene, polyethylene glycol, polyoxyethyelene, polyoxynolethylene, and chemicals ending in –eth and -oxynol.

1,4-Dioxane in drinking water is safe if…

The level is lower than the MDH guidance value of 1 ppb.

How am I exposed to 1,4-dioxane?

1,4-Dioxane can get into your body mainly from consuming contaminated water, breathing contaminated air or vapors, and using contaminated cosmetic and/or cleaning products.

How does 1,4-dioxane get into the environment?

1,4-Dioxane gets into the environment from accidental spills of solvents that contain it as a stabilizer.

How long does 1,4-dioxane stay in the environment?

Once it is in water, 1,4-dioxane is likely to stay there and does not break down. This is why it can reach groundwater, surface water, and potentially drinking water. Once 1,4-dioxane is in soil, it will most likely move into the water in the soil instead of attaching to the soil.[1] If 1,4-dioxane is released to air, it is likely to remain in air as a vapor.

What are the potential environmental impacts of 1,4-dioxane?

Based on available laboratory studies, 1,4-dioxane does not appear to be harmful to aquatic plants, fish, or other aquatic animals at levels currently found in the environment. [6]

How can I reduce my exposure and environmental impact?

Reduce your use of products containing 1,4-dioxane. 1,4-Dioxane is not intentionally added to products, so it will not be listed on product labels. Some chemicals that may contain 1,4-dioxane in small amounts that are listed on product labels are:

- PEG
- Polyethylene
- Polyethylene glycol
- Polyoxythylene
- Polyoxynolethylene
- Chemical names ending with - eth or - oxynol

The Contaminants of Emerging Concern (CEC) Program…

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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CLEAN WATER LAND & LEGACY AMENDMENT

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