1,4-Dioxane | 2019 Cycle 10

Substance Overview

1,4-Dioxane is a clear liquid that mixes easily with water.\(^1\) It is used as a solvent in the manufacture of other chemicals and as a laboratory reagent. It can also be found as a contaminant in cosmetics, detergents, and shampoos and is a byproduct of the manufacture of some common plastics. Some pesticides used to treat crops also contain 1,4-dioxane.

Recommendations

The current NR140 Groundwater Quality Public Health Enforcement Standard for 1,4-dioxane of 3 micrograms per liter (µg/L) is based on EPA’s cancer slope factor from the 1990s.

DHS recommends lowering the enforcement standard to 0.35 µg/L. The recommended standard is based on the United States Environmental Protection Agency’s cancer slope factor for 1,4-dioxane.\(^2\)

DHS recommends that the preventive action limit for 1,4-dioxane be set at 10% of the enforcement standard because the 1,4-dioxane has been shown to have carcinogenic, mutagenic, and teratogenic effects in animals.

Health Effects

At high levels or long-term exposure, 1,4-dioxane can cause severe kidney and liver effects.\(^1\) Animals that drank water with high levels of 1,4-dioxane for a long time developed cancer in the liver and nasal passages.

Because of these effects, EPA has classified 1,4-dioxane as a likely human carcinogen.\(^2\) Recent studies have shown that 1,4-dioxane may be mutagenic.\(^3,4\) Limited data in animals suggest that 1,4-dioxane may be teratogenic.\(^5\) 1,4-dioxane has not been shown to have interactive effects.\(^1\)
References

1. ATSDR. Toxicological profile for 1,4 dioxane. In: Registry AFTSaD, ed. Atlanta, GA2012.

2. USEPA. Toxicological review of 1,4-Dioxane (with inhalation update) Washington, DC2013. EPA-635/R-11/003-F.


This document is a summary of the Scientific Support Document for the Cycle 10 Recommended Groundwater Standard for this substance. The recommendations in this summary were developed in accordance with Chapter 160, Wis. Stats.