

Fact Sheet

1,4-Dioxane—Emerging Contaminant of Concern

General

1,4-Dioxane is a manmade compound primarily used as an industrial solvent or solvent stabilizer that prevents the breakdown of chlorinated solvents during manufacturing processes. Industrial solvents are used in degreasing, electronics, metal finishing, fabric cleaning, pharmaceuticals, herbicides and pesticides, antifreeze, paper manufacturing and many other applications.

1,4-Dioxane is also present in ordinary household products like shampoos (50,000-300,000 ppb), liquid/dishwashing soap (2,000-65,000 ppb), baby lotion (11,000 ppb), hair lotions (47,000-108,000 ppb), bath foam (22,000-41,000 ppb) and other cosmetic products (6,000-160,000 ppb). One source indicates 1,4-dioxane is found in manufactured food additives (at 10,000 ppb level) and also in shrimp, chicken, tomatoes, coffee and some condiments.

1,4-Dioxane and Public Health

Little scientific data is available on the long-term effects of 1,4-dioxane on human health, although the U.S. Environmental Protection Agency (EPA) has listed 1,4-dioxane as a probable human carcinogen. The EPA has not yet established a Federal drinking water standard or maximum contaminant level (MCL) for 1,4-dioxane. California has also not set a MCL, but has set an advisory Action Level (AL) of 3 ppb. An AL reflects calculations for acceptable risks based on best available data. Since there is no Federal standard, the states of Michigan, Maine and Massachusetts have set safety levels at 85 ppb, 70 ppb and 50 ppb, respectively. Due to limited health science data, there is a lack of agreement on the acceptable risk levels of 1,4-dioxane in water. The greatest human threat from 1,4-dioxane has come from worker inhalation exposure at industrial sites.

1,4-Dioxane in water is only a chronic or long-term threat to human health (not an acute or short-term threat). A person must drink 2 liters per day of water over the Action Level of 3 ppb for a period of 70 years in order to generate one additional cancer case out of a million people. (At current cancer rates in the United States, the risk of cancer death is approximately 250,000 in 1 million).

Occurrence and Treatment

1,4-Dioxane is found in groundwater in several locations throughout California from Silicon Valley to the San Gabriel Basin in Southern California. It can also be found in wastewater from household and industrial wastes sources. 1,4-Dioxane is generally not biodegradable and is persistent in groundwater. Effective treatment technology is advanced oxidation in the form of ultraviolet light combined with hydrogen peroxide, which breaks down the compound into mostly carbon dioxide and water.