Government policies continued

Currently, there is no federal drinking water standard for 1,4-Dioxane, however some states, such as Florida, Maine, and Michigan have established their own enforceable 1,4-Dioxane drinking water standards that range from 50 to 85 micrograms/liter (parts per billion (ppb)).

Want to learn more about 1,4-Dioxane?

- US Department of Labor, Occupational Safety & Health Administration
  www.osha.gov/SLTC/healthguidelines/dioxane/index.html
- Agency for Toxic Substances and Disease Registry
- Agency for Toxic Substances and Disease Registry
- US Environmental Protection Agency
  www.epa.gov/opptintr/chemfact/dioxa-sd.txt
  www.epa.gov/tnn/atw/hlthef/dioxane.html#ref7
  www.epa.gov/waterscience/criteria/drinking/dw_standards.html#organics
  www.clu-in.org/contaminantfocus/default.focus/sec/1,4-Dioxane/cat/Policy_and_Guidance/
- National Institute of Environmental Health
  ntp.niehs.nih.gov/ntp/roc/eleventh/profiles/s080diox.pdf

What is 1,4-Dioxane?

1,4-Dioxane is a synthetic organic chemical compound. It is a colorless, clear, flammable liquid and has a mild ether-like odor. Often referred to as just dioxane, it dissolves in water at all concentrations. 1,4-Dioxane is used as:

- Solvent – a liquid that can dissolve oily and greasy substances and is used in vapor degreasers.
- Stabilizer for other solvents – 1,4-Dioxane prevents other solvents from degrading. Dioxane is used primarily as a stabilizer for chlorinated solvents like trichloroethylene (TCE). About 90% of the dioxane produced is used to stabilize TCE.

1,4-Dioxane is also produced (by-product) during the manufacturing of some chemicals used in cosmetics, detergents, and shampoos. The following ingredients PEG, polyethylene, polyethylene glycol or polyoxyethylene, listed on the product label, may also contain 1,4-Dioxane. 1,4-Dioxane may be present in food packaged in materials that contain this chemical, or in food from crops treated with pesticide chemicals that also contain 1,4-dioxane.

How is 1,4-Dioxane present in our environment?

1,4-Dioxane can be released into the air, water and soil at places it is produced, or used as a solvent or stabilizer. 1,4-Dioxane has similar evaporation properties to water. Therefore, it can be present in air as a vapor or mist. 1,4-Dioxane does not sorb to soil and can move from soil to groundwater and contaminate it. Mixed in water, 1,4-Dioxane does not readily decompose or degrade.
1,4-Dioxane and Your Health

How does 1,4-Dioxane affect our health?

The following factors determine harmful effects and the type and degree of those health effects:

- **Dose:** How much dioxane you are exposed to?
- **Duration:** How long you have been exposed to 1,4-Dioxane?
- **Exposure Route:** Drinking/eating (ingestion), breathing (inhalation), or absorbed through the skin (dermal contact)
- **Genetic susceptibility:** Family traits
- **Individual characteristics:** Age, general health, and lifestyle

1,4-Dioxane exposure occurs by absorption through the skin, through inhalation, and through ingestion. Studies in animals have shown that breathing 1,4-Dioxane vapors, drinking 1,4-Dioxane contaminated water, or having skin contact with 1,4-Dioxane affects mainly the liver and kidneys.

1,4-Dioxane is a health concern because laboratory animals that were exposed to high levels of 1,4-Dioxane during most of their lives developed liver or nasal cancer, along with other adverse health effects.

The levels of 1,4-Dioxane used in studies with experimental animals are much higher than the levels the general public might be exposed to through contact, consumer products (including food) or what is found in the environment.

Few studies are available that provide information about the effects of 1,4-Dioxane in humans. Deaths have been reported due to severe accidental exposure to high concentrations of 1,4-Dioxane vapors. Controlled exposure of people to 1,4-Dioxane in air for time periods ranging from a few minutes to six hours resulted in eye, nose, and throat irritation. For example, volunteers exposed to air levels of this chemical as low as 50 parts per million (ppm) for six hours showed evidence of eye irritation.

How can I reduce 1,4-Dioxane exposure in my home?

**Reducing skin exposure**
To avoid skin contact with 1,4-Dioxane, choose cosmetic, detergent, and shampoo products that do not contain the ingredients listed on the previous page under “What is 1,4-Dioxane?”

**Reducing drinking and inhalation exposure**
When tap water is contaminated with 1,4-Dioxane, drinking, bathing or showering, are your main routes of exposure to this chemical. The best way to prevent potential health problems related to 1,4-Dioxane exposure is to reduce exposure to contaminated tap water. The only way to know if your drinking or tap water contains 1,4-Dioxane is to contact your local water provider and/or have your water tested. If you own a water source or have a private well, you can take a water sample to a state certified laboratory. In Arizona call 602-364-0728 for a list of state certified laboratories.

**What are the government policies concerning 1,4-Dioxane?**

Due to the occurrence of cancer in experimental animals exposed to 1,4-Dioxane, the International Agency for Research on Cancer and U.S. Department of Health and Human Services has determined that 1,4-dioxane is possibly a substance that can cause cancer in humans. The Occupational Safety and Health Administration has established a workplace exposure limit for 1,4-Dioxane of 360 milligrams per cubic meter (mg/m3) or 100 ppm for an 8-hour workday, 40 hours per week.

The US Environmental Protection Agency (USEPA) has established that 1,4-Dioxane is a probable human carcinogen and created several health advisories. The USEPA health advisories are recommendations for short-term exposure (1-10 days) for young children (0-2 years, 0-22 pounds). These advisories are recommendations, but cannot be enforced by the law. They are available at: [www.epa.gov/waterscience/criteria/drinking/dwstandards.html](http://www.epa.gov/waterscience/criteria/drinking/dwstandards.html).