

Disinfection Byproducts (DBPs) in Public Drinking Water

What are disinfection byproducts?

Most drinking water must be treated with disinfectants in order to kill germs. Disinfection byproducts form when disinfectants such as chlorine, chlorine dioxide or ozone react with organic and inorganic substances present in the raw water. The primary organic DBP precursors are derived from terrestrial and aquatic plants. Bromide ion is the main inorganic precursor for disinfection byproducts.

Which disinfection byproducts are regulated?

There are hundreds of different disinfection byproducts that can be formed in drinking water. The type and quantity depend in part on the source water quality, type of disinfectant and distribution system operation. The following disinfection byproducts are regulated with a monitoring requirement and a maximum contaminant level:

- total trihalomethanes (TTHM);
- five haloacetic acids (HAA5);
- bromate; and
- chlorite.

What levels of disinfection byproducts are allowed in drinking water?

There are four maximum contaminant levels for disinfection byproducts: Total trihalomethanes may be present at 0.080 milligrams per liter (mg/L), five haloacetic acids at 0.060 mg/L, bromate at 0.010 mg/L and chlorite at 1.0 mg/L.

How often is monitoring required?

The frequency of monitoring varies depending on the public water system size, source type and type of disinfectant used. Past levels of disinfection byproducts may also result in either an increase or decrease in monitoring. Monitoring can be required daily, monthly, quarterly, annually or once every three years.

What happens when the maximum contaminant level is exceeded?

A maximum contaminant level (MCL) violation is issued to any public water system that exceeds the MCL for one or more disinfection byproducts. Failure to reduce these levels may result in an enforcement action by Ohio EPA. Some public water systems that purchase drinking water from another system, but do not add any additional treatment, are not regulated by current Federal rules for disinfection byproducts. They are likely to be included in the next round of disinfection byproducts rules from U.S. EPA. Ohio EPA has adopted a State rule to address systems that purchase disinfected surface water, but do not add any additional treatment.

What are the health effects of disinfection byproducts?

There have been many studies on the health effects of exposure to disinfection byproducts. Although some studies indicate the potential for both short- and long-term adverse health

effects, others do not. Some potential health effects include cancer, as well as reproductive and developmental disorders. There is still a lot of uncertainty regarding any one individual's risk when exposed to levels of disinfection byproducts above the maximum contaminant level.

Can drinking water be treated to remove disinfection byproducts?

Yes. There are a variety of treatments available to public water systems to reduce the level of disinfection byproducts in drinking water. Treatment is typically one of two types:

- reduction in the levels of compounds that cause disinfection byproducts; or
- the removal of already-formed byproducts;

Home treatment, such as activated carbon, may also be helpful in reducing the levels of disinfection byproducts in your drinking water. Additional information on home treatment units can be obtained through the National Sanitation Foundation's (NSF) web site at www.nsf.org. NSF is an organization that certifies that products have been independently tested for effectiveness according to their manufacturers' claims.

For more information, call Ohio EPA's Division of Drinking and Ground Waters at (614) 644-2752.

