

Methyl tert-Butyl Ether (MTBE) and Drinking Water

MTBE 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 MTBE in drinking water and, based on this value, does not expect levels of MTBE in drinking water to harm Minnesotans.

What is Methyl tert-Butyl Ether (MTBE)?

Methyl tert-Butyl Ether (MTBE) is a man-made chemical that raises the oxygen content of gasoline, allowing it to burn more cleanly in vehicles. MTBE's use in Minnesota was limited compared to some U.S. states and was declining by the late 1990s. MTBE was banned as a gasoline additive in Minnesota in 2005.

Has MTBE been found in Minnesota waters?

MTBE has been found in groundwater by the Minnesota Pollution Control Agency (MPCA) at sites where petroleum products were spilled or leaked into the ground. MTBE was found in the groundwater at about one fourth of the 3,600 petroleum release sites the MPCA investigated. The maximum level of MTBE found was 360 ppm (parts per million). Some of the detections were in private drinking water wells, though the concentration was lower in these wells.

There have been two detections of MTBE reported in two Minnesota public drinking water supply systems during the past ten years, with the most recent detection occurring about 7 years ago. Both detections were lower than 8 ppb (parts per billion). MTBE has a disagreeable taste and odor at levels around 20 - 40 ppb.

Monitoring by MPCA shows no detections of MTBE in Minnesota surface water. The surface water data were collected over 10 years and included the time period prior to the ban of MTBE in 2005.

What is the MDH guidance value for MTBE in drinking water?

MDH developed water guidance for MTBE in 1999 and new guidance in 2013. The new guidance value is 60 ppb based on its potential to cause cancer in animals. A person drinking water containing MTBE in concentrations at or below 60 ppb would have little to no risks of health effects from MTBE.

At a Glance

MTBE is a gasoline additive no longer used in Minnesota.



MTBE enters your body from...

- Breathing it in when it is in the air.
- Drinking contaminated water.

MTBE is in the environment from...

- Spills during shipping and handling.
- Evaporation into the air from soil.
- Evaporation into the air from contaminated groundwater that reaches the surface or is used in households for showering or other purposes.

MTBE in drinking water is safe if...

The level is at the MDH guidance value of 60 ppb or lower.

How am I exposed to MTBE?

MTBE dissolves in water easily and evaporates from water or soil into air.¹ You could be exposed to MTBE by drinking contaminated water. You could also be exposed to MTBE that enters the air when contaminated water is used for showering, washing clothes and dishes, or other household activities.

Can MTBE in drinking water affect my health?

Short-term health effects from high levels of MTBE in water could include nervous system effects, dizziness, headaches, nausea, and throat irritation. Kidney and liver effects, including cancer, have been seen in laboratory animals given high doses of MTBE over long periods of time. MTBE causes cancer in animals but there is not enough information to determine if it causes cancer in humans.

Because MTBE has a disagreeable taste and odor, it is likely that at levels as low as 20 - 40 ppb people would be able to smell and taste it. It is unlikely that water contaminated above 20 ppb would be consumed by people due to taste and odor.²

How does MTBE get into the environment and how long does it stay in the environment?

When it was used in gasoline in Minnesota, MTBE usually got into the environment from spills or leaking gasoline tanks or pipelines, as well as evaporating into the air during refueling at gas stations. Some industrial operations also released MTBE.

Spilled or leaked MTBE often moves from soil into groundwater or surface water. It dissolves in water easily and moves very quickly in the groundwater. While it can evaporate into the air from surface water, MTBE does not break down rapidly in groundwater. Once in groundwater, it can stay for a long time, up to months or years.

What are the potential environmental impacts of MTBE?

Studies show that MTBE may interfere with normal development, reproduction and endocrine system function in fish. The presence of MTBE, in combination with other pollutants such as pesticides, may increase the harm done to fish and other animals living in lakes and streams. However, MTBE is no longer used in gasoline and MTBE has not been found in Minnesota surface water. Therefore, MTBE is unlikely to impact fish and other wildlife living in Minnesota waters.

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The Health Risk Assessment Unit...

Evaluates the health risks from contaminants in groundwater. 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 in water.

References

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2. U. S. Environmental Protection Agency. 1997. http://water.epa.gov/action/advisories/drinking/upload/2005_05_06_criteria_drinking_mtbe.pdf