PRIVATE DRINKING WATER IN CONNECTICUT

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Publication No. 15: MTBE (Methyl tertiary-butyl ether) in Private Drinking Water Wells

The U.S. Environmental Protection Agency (EPA) does not regulate private wells. Private well owners are responsible for the quality of their drinking water. Homeowners with private wells are generally not required to test their drinking water. However, they can use the public drinking water standards as guidelines to ensure drinking water quality. Refer to Publication #23 *Well Drinking Water Standards* for more information.

Currently there is no federal standard set for MTBE in drinking water. In December 1997, the EPA issued a Drinking Water Advisory stating that concentrations of MTBE in the range of 20 to 40 parts per billion (ppb) or below in drinking water will probably not cause unpleasant taste and odor or most people, (recognizing that human sensitivity to taste and odor varies widely). The advisory is a guidance document that recommends keeping concentration below that range. EPA is continuing to study both the potential health effects and the occurrence of MTBE, and it is on a list of contaminants for which EPA is considering setting health standards. The Connecticut Department of Public Health has set an Action Level of 70 ug/L (ppb) for MTBE in private well water. If private drinking water well contains MTBE above this level, the Connecticut Department of Environmental Protection is authorized to provide treatment or bottled water to residents.

MTBE is a volatile organic chemical used as an octane enhancer in gasoline since the late 1970s. MTBE is very soluble in water and small amounts of MTBE in drinking water cause unpleasant taste and odor. EPA considers MTBE a possible human carcinogen. Releases of MTBE to the environment can occur wherever fuel is stored and transferred.

- MTBE contaminates about 20% of private wells in New England.
- Some people notice a turpentine taste and odor at levels exceeding the federal guideline (20 to 40 ppb) and Connecticut's current health advisory is 70 ppb.
- Although there is no enforceable federal standard or consensus on the health effects of exposure to MTBE in drinking water, like other industrial solvents MTBE exposure raise concerns about possible carcinogenicity and other chronic health affects.

Potential Health Effects

The majority of human health-related research conducted to date on MTBE has focused on effects associated with breathing the chemical. When laboratory animals inhaled high concentrations of MTBE, some developed cancers or experienced other non-cancerous health effects. To date, independent expert review groups, who have assessed MTBE inhalation heath risks, have not concluded that MTBE is a carcinogen.

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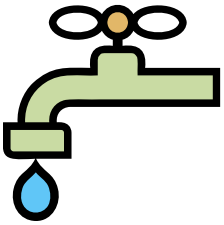
EPA's Office of Water has concluded that available data are not adequate to accurately determine potential health risks of MTBE at low exposure levels in drinking water.

Reports of eye and respiratory irritation from inhaling MTBE around gas stations or in urban traffic have not been confirmed. Such reports may have been from exposure to many ingredients (including MTBE) in gasoline or car exhaust. Several well controlled human laboratory studies have shown that MTBE inhaled by itself has a significant odor but causes very little acute respiratory or nervous system effects.

Breathing small amounts of MTBE for short periods may cause nose and throat irritation. Some people exposed to MTBE while pumping gasoline, driving their cars, or working in gas station have reported having headaches, nausea, dizziness, and mental confusion. However, the actual exposure levels in these cases are unknown. In addition, these symptoms may have been caused by exposure to other chemicals.

Because there are no data on the human health effects of MTBE in drinking water CTDPH revised the MTBE Action Level in 1999 to a level of 70 ug/l. This level is set far below the levels shown to produce adverse effects in animals. As an added precaution the Action Level includes a special 10-fold safety factor to ensure that it addresses the theoretical cancer concern. Exposure above the Action Level decreases the safety margin but does not mean that a health effect is likely. You should not drink water if it is above the Action Level to make sure that you have an adequate margin of safety.



Indications of MTBE

It is possible your water would taste and/or smell like turpentine if MTBE is present at levels at or above 20-40 parts per billion (some people may detect it at even lower levels while others do not notice MTBE until levels reach several hundred parts per billion). People have reported a "fruity" or cleaning agent smell to their water with the presence of MTBE.

Sources of MTBE in Drinking Water

MTBE is a member of a group of chemicals commonly known as fuel oxygenates. Oxygenates are added to fuel to increase oxygen content and to allow the fuel to burn more efficiently. MTBE in gasoline reduces carbon monoxide and ozone levels caused by auto emissions. Although the addition of MTBE to fuels may contribute to cleaner air, MTBE has come under criticism due to its emergence as a drinking water contaminant.

Release of MTBE in the environment can occur wherever fuel is stored and transferred, for example:

- When filling the lawnmower, chainsaw, or other gas-powered machinery.
- Leaking tanks or gas powered engines (lawnmowers, snow blowers, chainsaws, etc)
- Leaking underground storage tanks and pipelines, especially at gasoline service stations.
- Other accidental spills.
- Emissions from marine engines into lakes and reservoirs.
- Air deposition (to a lesser degree)

Once MTBE gets into the groundwater, it can persist there for a long period of time and move with groundwater flow.

Testing for MTBE in Private Drinking Water Wells

To determine if MTBE is present, arrange to test your drinking water at a state certified laboratory. Follow the laboratory's instructions carefully to avoid contamination and to obtain a good sample. Typically, the lab will perform a Volatile Organic Compound (VOC) scan. Contact your local health department to determine if it would be advisable for you to test for MTBE.

Interpreting Test Results

MTBE levels in drinking water above the 40 parts per billion EPA Drinking Water Advisory Level may require either home treatment to lower the concentration of the contaminant from drinking water or accessing an alternate source of water (bottled water or a new well constructed in an uncontaminated aquifer). Residents with MTBE concentrations above the Connecticut Department of Public Health Action Level of 70 ug/L should contact the Connecticut Department of Environmental Protection and inquire about treatment or bottled water.

Corrective Action

Current treatment options for removal of MTBE in drinking water are activated carbon filters and aeration. Other treatment technologies that are still in the experimental stage include oxidation and ultraviolet radiation. Also, an alternate water source, such as buying bottled water, is option for drinking and cooking.

Consult with local health, and/or State health and/or your physician about the need to treat the whole house (point-of-entry) to protect against skin contact and inhalation. Consult with a water treatment professional on appropriate treatment methods for removal. Excessive levels may also create the need to dispose of hazardous waste when changing the treatment system's filter or other components.

For more information on these treatment options, please see Publications:

#1 Activated Carbon Treatment of Drinking Water Systems
#2 Aeration Treatment of Drinking Water Systems

When choosing a treatment method, consider both the initial cost and the operating costs. Operating costs include the energy needed to operate the system, additional water that maybe needed for flushing the system, replaceable media/filters, repairs and general maintenance.

Regardless of the quality of the equipment purchased, it will not operate well unless maintained in accordance with the manufacturer's recommendations. Keep a logbook to record equipment maintenance and repairs. Equipment maintenance may include periodic cleaning and replacement of some components. Also consider any special installation requirements that may add to the equipment cost. For more information, refer to Publication #19 *Questions to Ask When Purchasing Water Treatment Equipment.*

Protection of Private Drinking Water Supplies

You can protect your private well by paying careful attention to what you do in and around your home as well as your neighbor's activities near your well. Regular testing and adopting practices to prevent contamination can help ensure that your well supplies you and your family with good quality drinking water. For more information on well protection see Publication #26 *Private Drinking Water Wells.*

For more information please click on the following links:
EPA Office of Groundwater and Drinking Water
http://www.epa.gov/ogwdw/
EPA New England
http://www.epa.gov/region01/

Adapted from *Healthy Drinking Waters for Rhode Islanders*, University of Rhode Island Cooperative Extension, *April 2003*.