

Healthy Drinking Waters

for

M A S S A C H U S E T T S

Safe and healthy lives in safe and healthy communities

MTBE (methyl-tertiary-butyl ether) in Private Drinking Water Wells

Priate well owners are responsible for the quality of their drinking water. The U.S. Environmental Protection Agency (EPA) does not regulate private wells. Homeowners with private wells are generally not required to test their drinking water, although local Boards of Health or mortgage lenders may require well water testing. While there is also no state requirement to have your well water tested, the Massachusetts Department of Environmental Protection (MassDEP) recommends that all homeowners with private wells do so, and use a state certified testing laboratory. Private well owners can use the public drinking water standards as guidelines to ensure drinking water quality.

Currently there is no 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 for most people, (recognizing that human sensitivity to taste and odor varies widely). 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. In 2000, the MassDEP Office of Re-



©istockphoto.com/Janis Dreosti

search and Standards (ORS) adopted a health-based drinking water guideline of 70 ppb based on their review of the current toxicological data on MTBE.

Summary

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).
- Although there is no enforceable federal standard or consensus on the health effects



Healthy Drinking Waters for Massachusetts

MTBE in Private Drinking Water Wells

of exposures to MTBE in drinking water, like other industrial solvents, MTBE exposures raise concerns about possible carcinogenicity and other chronic health affects.

Potential Health 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 stations 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.

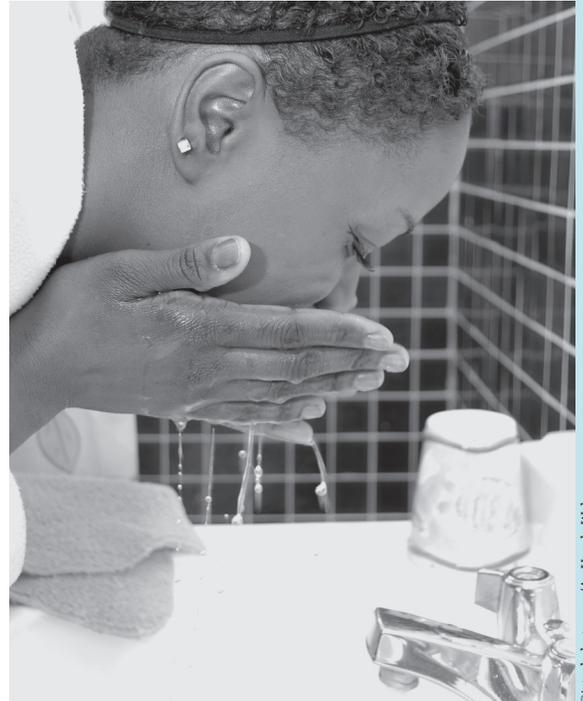
There are no data on the human health effects of MTBE in drinking water. Studies with rats and mice suggest that ingesting high concentrations of MTBE in drinking water may cause gastrointestinal irritation, liver and kidney damage, and nervous system effects. Recent work by EPA and other researchers is expected to help determine more precisely the potential for health effects from MTBE in drinking water. However, the data support the conclusion that MBTE is a potential human carcinogen in high doses.

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 (methyl-tertiary butyl ether) is a member of a group of chemicals commonly known



©istockphoto.com/An Van de Wal

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 gas 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).



©istockphoto.com/Suprijono Suharjoto



©istockphoto.com/Joe Gough

Healthy Drinking Waters for Massachusetts

MTBE in Private Drinking Water Wells

Once MTBE gets into the groundwater, it can persist there for long periods 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 laboratory instructions carefully to avoid contamination and to obtain a good sample. If you notice a turpentine-like smell or fruity, cleaning agent-like smell, arrange to test your water. Typically, the lab will perform a Volatile Organic Compound (VOC) scan.

MTBE levels in drinking water above the 70 parts per billion Massachusetts Drinking Water Guideline will 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).

Reducing Your Exposure to MTBE

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 another option for drinking and cooking.

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. 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 may be needed for flushing

the system, consumable supplies and 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 fact sheet *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 the fact sheet entitled *Drinking Water Wells*.



©istockphoto.com/leva Geneviciene



©istockphoto.com/Rick Lord

Resources

UMass Extension

This fact sheet is one in a series on drinking water wells, testing, protection, common contaminants, and home water treatment methods available on-line at the University of Massachusetts website:

http://www.umass.edu/nrec/watershed_water_quality/watershed_online_docs.html
and Cape Cod Cooperative Extension:
508-375-6699
<http://www.capecodextension.org>

MA Department of Environmental Protection, Division of Environmental Analysis

Offers assistance, information on testing and state certified laboratories: 617-292-5770
For a listing of MassDEP certified private laboratories in Massachusetts:
<http://www.mass.gov/dep/service/compliance/wespub02.htm>

U.S. Environmental Protection Agency, New England Office

Information and education on where drinking water comes from; drinking water testing and national laws; and how to prevent contamination:
<http://www.epa.gov/ne/eco/drinkwater>

US Environmental Protection Agency

For a complete list of primary and secondary drinking water standards:
<http://www.epa.gov/safewater>

MA Department of Conservation and Recreation, Division of Water Supply Protection

Maintains listing of registered well drillers, information on well location and construction: 617-626-1409
<http://www.mass.gov/dcr/waterSupply/welldrill/index.htm>

NSF International

The NSF International has tested and certified treatment systems since 1965. For information on water treatment systems: 800-NSF-MARK (800-673-6275)
<http://www.nsf.org/consumer/>

Water Quality Association

The Water Quality Association is a not-for-profit international trade association representing the household, commercial, industrial, and small community water treatment industry. For information on water quality contaminants and treatment systems:
<http://www.wqa.org>



This publication is adapted from a URI fact sheet by the same name produced by the Rhode Island Department of Health and the University of Rhode Island Cooperative Extension Water Quality Program.

UMass Extension is an equal opportunity provider and employer, United States Department of Agriculture cooperating. Contact your local Extension office for information on disability accommodations or the UMass Extension Director if you have complaints related to discrimination, 413-545-4800.

This project was funded, in part, by a grant from US EPA.

This material is based upon work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under Agreement No. 2004-51130-03108.

06/01/07

