Navy Environmental Health Center

Public Health Fact Sheet
Methyl Tertiary Butyl Ether (MTBE)

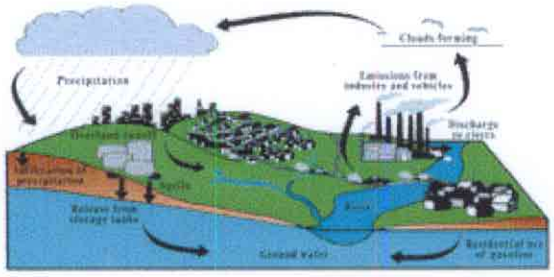
What is methyl tertiary-butyl ether?

Methyl tertiary-butyl either is a man made chemical commonly known as methyl *t*-butyl ether or **MTBE**. It is a clear, colorless liquid with a slight turpentine or mint-like odor. It evaporates quickly in air, dissolves rapidly in water, and burns easily.

MTBE has been used in gasoline since 1979 when it replaced lead as an oxygenate additive to fuel. Oxygenates are added to gasoline to increase the octane rating and to reduce engine knocking. As a result of the 1990 Clean Air Act, many areas around the country now use gasoline which contains higher amounts of oxygenates such as MTBE. This "reformulated" fuel burns cleaner than conventional gasoline.

What happens to MTBE in the environment?

MTBE enters the environment routinely though the release of gasoline vapors during the refueling of cars and trucks. It is also released to the air from industrial sources such as petroleum refineries.



MTBE evaporates easily into air. Rain water washes low levels of MTBE out of the air and onto soil and water. In addition, isolated releases of MTBE occur during gasoline spills or overfills and when underground or aboveground gasoline storage tanks and/or their associated piping and distribution systems leak. MTBE will pass quickly through soil and into water supplies, both under ground or well water and surface water. Once in water MTBE dissolves and spreads quickly. It is known to disperse more rapidly than most components in gasoline.

How are people exposed to MTBE?

MTBE can enter your body when you breath air or drink water that contains it or from absorption through your skin. The most frequent exposure to MTBE for the general population is from breathing gasoline vapors while fueling your car or truck.

Other sources of exposure are breathing workplace air where MTBE is made or shipped and drinking water containing MTBE. MTBE at high concentrations in drinking water sources is caused primarily by leaking underground gasoline storage tanks. For the most part, concentrations of MTBE in ground water and surface water tested at various locations around the country have been low.

Will breathing air containing MTBE effect my health?

The known symptoms of exposure to MTBE include irritation of the eyes, skin, nose, throat and lungs and difficulty concentrating and thinking. In 1992 health concerns related to MTBE in the air were first reported in Fairbanks, Alaska. Approximately 200 residents reported symptoms of exposure to MTBE after it was added to gasoline. Since then there have been only a small number of concerns reported from the use of reformulated gasoline. Health studies have, thus far, been

unable to replicate the symptoms reported in Alaska. Based on this and other research, it appears that most people do not experience health effects after exposure to MTBE at concentrations similar to what is experienced when you fill up your gas tank.

No studies have identified MTBE inhalation as a cancer risk for humans. There are studies which indicate that MTBE inhalation causes cancer in animals.

To further investigate this questions, the EPA under the authority of section 211 of the Clean Air Act is requiring industry to conduct extensive testing to compare the general health and cancer risks between conventional gasoline and reformulated gasoline. Current evidence indicates that the estimated cancer risk from exposure to MTBE-enhanced gasoline is similar to or less than that for conventional gasoline.

Will MTBE in my drinking water make me sick? MTBE has been detected in typically very low concentrations in both ground water and surface water in numerous areas tested around the country. A limited number of areas have higher amounts of MTBE in drinking water due to leaks from gasoline storage tanks and pipelines.

No studies on the effects of drinking water containing MTBE have been conducted on humans. The U.S. EPA and other federal, state, and scientific organizations are conducting on-going research in an attempt to answer this question. Based on the limited information available from studies on laboratory animals consuming MTBE, the EPA and the National Science and Technology Council (NSTC) agree that MTBE consumed in high concentrations is a potential cancer hazard for humans.

There are no federal drinking water standards or monitoring requirements for MTBE. The Safe Drinking Water Act required EPA to publish a Contaminant Candidate List (CCL) which includes compounds which may require regulation, based on their known or suspected presence in public drinking water supplies. MTBE was included on the final CCL in March 1998 as a compound which needs more research before the EPA can determine if regulatory action is needed.

In the interim, EPA has issued a drinking water advisory for MTBE. The advisory recommends a maximum concentration of MTBE in drinking water between 20 and 40 parts per billion (PPB). The EPA has concluded that keeping concentrations in the range of 20 to 40 ppb or lower in water should eliminate unpleasant taste and odor effects for most people. These concentrations are many times lower than the level in which health effects were observed in laboratory animal tests.

After reviewing the toxicological information and other scientific study data available to date, NEHC recommends a level of 40 ppb be used to identify acceptable drinking water sources.

For more information, please contact the Navy Environmental Health Center, Environmental Programs Directorate at (757) 953-0932 or visit the EPA MTBE web site at: www.epa.gov/oms/consumer/fuels/mtbe.