



MARYLAND DEPARTMENT OF THE ENVIRONMENT

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BTEX

WHAT IS BTEX?

BTEX is the abbreviation used for four compounds, often found together, in petroleum products: benzene, toluene, ethylbenzene and xylene. BTEX is found in petroleum products such as diesel fuel, home heating oil and gasoline. Individually Benzene is used in the production of consumer products, such as synthetic rubber, plastics, nylon, insecticides and paints and is also found in cigarettes. Toluene is used as a solvent for paints, coatings, gums, oils, and resins. Ethylbenzene may be present in consumer products such as paints, inks, plastics, and pesticides. Xylenes are used as a solvent in printing, rubber and leather industries.

HOW DOES BTEX ENTER THE GROUNDWATER?

BTEX in groundwater can originate from many sources such as leaks from underground storage tanks, overfills of storage tanks, spills, and landfills. The main source of BTEX contamination is leaks from underground storage tanks. When released, BTEX has the ability to dissolve into water, allowing it to move in the groundwater. Since BTEX can also “stick” to soil particles, these chemicals may move slower than the groundwater. If underground conditions are right, BTEX can degrade biologically. As with any contamination groundwater impacted with BTEX is difficult to remediate; however, filtration through activated carbon is normally very effective in removing BTEX to acceptable levels.

BTEX HEALTH EFFECTS:

Exposure to BTEX can occur by ingestion (consuming water contaminated with BTEX), inhalation (exposure to BTEX present in the air) or absorption through the skin. Inhalation and/or absorption can occur while pumping gasoline or while showering or bathing with contaminated water. Acute exposures to high levels of gasoline and its BTEX components have been associated with skin and sensory irritation, central nervous system depression and negative effects on the respiratory system. These levels are not likely to be achievable from drinking contaminated water, but are more likely from occupational exposures. Prolonged exposure to these compounds has effects on the kidney, liver and blood systems. According to the U.S. Environmental Protection Agency (U.S. EPA), there is sufficient evidence from both human and animal studies to believe that benzene is a human carcinogen. Workers exposed to high levels of benzene in occupational settings were found to have an increase occurrence of leukemia.

BTEX REGULATIONS

The U.S. EPA has established permissible levels for chemical contaminants in drinking water supplied by public water systems. These levels are called Maximum Contaminant Levels (MCLs). To derive these MCLs, the US EPA uses a number of conservative assumptions, thereby ensuring adequate protection of the public. In the case of known or suspected carcinogens, such as benzene, the MCL is calculated based on assumption that the average adult weighs 154 lbs and drinks approximately 2 quarts of water per day over a lifetime (70 years). The MCL is set so that a lifetime exposure to the contaminant at the MCL concentration would result in no more than 1 to 100 (depending on the chemical) excess cases of cancer per million people exposed.

MCL Chemical (ug/liter=ppb)
benzene 5
toluene 1,000
ethylbenzene 700
xylenes (total) 10,000

REDUCING EXPOSURE TO BTEX

Exposure to BTEX should be minimized. To avoid or reduce exposure to BTEX, people should use water supplies having concentrations of these compounds that are below the MCL, and/or apply appropriate water treatment or filtration systems. If necessary, short-term reductions in exposure may be accomplished by using bottled water for food and beverage preparation and avoiding bathing or showering with the contaminated water. With point of use treatment systems, such as activated carbon filtration, it is usually possible to remove sufficient BTEX from water to meet the MCL and thereby minimize health risks. If benzene is present above the MCL, treatment should be applied to all household water because of inhalation hazards. Due to the widespread use of petroleum products containing BTEX it is impossible to completely avoid BTEX exposure. Taking the necessary care and precautions to avoid and/or minimize exposure to BTEX will ensure that individual contact with the chemical remains at non-harmful levels.

More information concerning BTEX in drinking water can be obtained at:

US EPA's Drinking Water Program at 1-800-426-4791 or www.epa.gov

Agency for Toxic Substance and Disease Registry www.atsdr.cdc.gov

Disclaimer

The intent of this fact sheet is to provide the reader a summary of information concerning the mentioned chemicals. Additional research maybe needed for the reader to fully understand the impact these chemicals may have on you as an individual. To fully understand specific site and surrounding environmental conditions, MDE recommends that the reader review any associated case files that are available at MDE through the Public Information Act. This fact sheet is provided for informational purposes only and should not be considered a conclusion by MDE.