

MTBE (methyl tertiary-butyl ether)

- used as fuel oxygenate and octane enhancer; added to gasoline since 1990 in winter (11-14.8%) and since 1996 all year; in 1995, 8 billion kg MTBE were added to fuel, 80% in CA; US production in 1995: 21 billion kg.
- projected air quality benefits: 15% reduction in ozone precursors; 11% reduction in CO; 50% reduction in benzene emission.

MTBE is very soluble in water (50 g/L), it volatilizes slowly, is persistent in groundwater and a possible human carcinogen.

Estimated release into the environment in 1993:

atmosphere: 1,672,597 kg/year

water: 41,873 kg/year

underground: 4,267 kg/year

- no estimates exist on car emissions, nor on atmospheric redeposition in surface water and soil. MTBE has a strong tendency to partition into the water phase. There is little sorption to sediments and little bioaccumulation. MTBE is not easily biodegraded.

Half life:

- air: 3-4 days
- water: hours - days (flowing surface water); days - weeks (standing surface water); months - years (groundwater)
- breakdown products: TBF (toxic, half life: 1000-10,000 yrs.), TBA, acetone, formaldehyde, acetic acid

Major sources of MTBE pollution:

- leaking underground fuel storage tanks
- 2-stroke engines associated with recreational boats and personal watercraft (jetskis)
- potentially: urban runoff and precipitation

USGS monitoring study:

MTBE was the 7th most frequent VOC in municipal storm water. Concentrations were highest in winter time. In Sacramento, MTBE was detected in almost 100% of samples. In a small urban stream, MTBE was the 4th most frequent VOC (up to 3 ug/L). MTBE has been detected in groundwater in 20 out of 41 states monitored, and approx. 25% of wells in urban areas were contaminated (20-30 ug/L, Metrop. Water District).

In 1996, the City of Santa Monica had to close major drinking water wells because of MTBE.

MTBE was detected in Lake Tahoe down to 100 m depth.

MTBE cannot be removed with existing water treatment technology.

- EPA health advisory: 20-200 ug/L, detection limit: 0.2 ug/L
- California state action level: 35 ug/L
- LC50 for fish: on the order of 300-500 mg/L (acute tests)
- LC50 for shrimp (*Mysidopsis bahia*): 37-50 mg/L (acute)

So far, very little toxicity data is available on sublethal effect (e.g. reproduction).
Data on MTBE in Delta water is not available.