

MTBE & Groundwater Contamination

MTBE and Human Health

MTBE has been extensively studied and the consensus of opinion is that, when properly handled, MTBE blended gasoline is a safe product.

- The number and extent of scientific tests places MTBE within the top 2 percent of all tested substances.
- The first tests screening health risks were conducted in 1969 and 1972.
- As part of the US EPA's approval for blending MTBE in unleaded gasoline in 1979, additional tests were conducted. They were followed by voluntary industry groups, who sponsored more extensive health studies on metabolism, reproductive function and subchronic inhalation exposure.
- In 1986, the industry established an extensive research programme under the US EPA's oversight and guidelines. This programme was completed in 1992. All the results and reports were submitted to the US EPA.
- The industry has continued voluntary testing to supplement available environmental and toxicological information on MTBE.

Health Research conclusions

Carcinogenicity

MTBE does not accumulate in the body. It does not have pathological effects, nor does it injure the developing offspring or impede reproductive functions. Its effects occur only at high doses not encountered by humans, and, despite extensive testing, there exists no scientific consensus on whether it can cause cancer in a manner relevant to humans.

In the US, the study into the impacts on public health have been substantial since the inception of cleaner burning gasolines. According to one study that modeled the risk of cancer (Spitzer, 1997), a 13% decline in cancer incidence is attributable to the blending of MTBE in summertime gasoline. A 20% reduction in cancer incidence is attributable to the blending of MTBE in wintertime gasoline.

Several independent bodies in Europe and the United States recently concluded that MTBE is not a human carcinogen.

- **Health and Environment Canada's** Priority Substance Assessment Program has concluded that the predicted concentrations of MTBE in the environment in Canada do not constitute a danger to the environment, or to the environment on which human life depends, or to human life or health. MTBE is not considered as 'toxic' according to the definition in Canadian legislation.
- **The European Union Risk Assessment on MTBE** concluded in December 2000 that MTBE is not a human carcinogen.
- **The World Health Organization**, International Agency for Research on Cancer, determined in November 1998 that MTBE is not classifiable as a human carcinogen.
- **The US Department of Health & Human Services**, National Toxicology Program voted in December 1998 not to list MTBE in its 9th "Report on Carcinogens".
- **The US National Research Council** concluded in September 1998 that there was little likelihood that humans would contract kidney tumors from exposure to MTBE.
- California's **Science Advisory Board for Proposition 65**, determined in December 1998 that MTBE could not be considered carcinogenic or a developmental or reproductive toxicant.
- **NESCAUM**, The Northeast States for Coordinated Air Use Management, in October 1998, determined that RFG with MTBE reduced cancer risk by 12% over the 1995-1999 period and anticipated this reduction to grow to 20% beginning in 2000.

Other Health Effects

Acute health effects from exposure to MTBE have also been considered and addressed in a number of studies.

In 1995, the World Health Organisation concluded that it is "unlikely that MTBE alone induces adverse acute health effects in the general population under common exposure conditions." The strong taste and odour of MTBE mean that, even at very low concentrations, its presence makes drinking water unpalatable. The US EPA has recommended an MTBE concentration in drinking water of 20 to 40 ppb or below. These levels preserve the palatability of drinking water and are 20,000 to 100,000 times lower than the lowest concentration that has caused observable health effects in animals.

What Is All The Fuss About MTBE Then?

If the use of MTBE is such an effective tool for improving fuel emissions as a low cost fuel component, then why are there calls for MTBE removal or reduction?

The history of clean fuels has, over the last few years, been predominantly linked with the use of oxygenates as part of vehicular emissions control, of which the major two components are MTBE and ethanol.

Both are effective tools. However, because constraints exist with the use of ethanol, not least in handling and transportation, among other factors, made MTBE use a more popular choice.

In 1998, it was found that MTBE contamination of underground water due to leaking storage tanks became a concern. However, instead of solving the problem of leaking fuel storage tanks, of which the US government had allocated a fund to rectify, MTBE was unfairly identified as the target component for removal.

The US Story

In November 1998, US Environmental Protection Agency Administrator appointed a Blue Ribbon Panel to investigate air quality benefits/water quality concerns for gasoline oxygenates. The Panel:

- Agreed broadly, but not unanimously, that less MTBE should be used in reformulated gasoline (RFG).
- Urged removal of legal requirement for 2wt% oxygen in RFG.

Refiners' Oxygenate of Choice

Under the 1990 Clean Air Act Amendments, refiners were allowed to choose from a variety of oxygenates in order to meet the 2.0% oxygen requirement for RFG. Currently in the US, roughly 85% of RFG contains MTBE and roughly 15% contains ethanol. Since 1990, MTBE has emerged as the refiner's oxygenate of choice because of its ability to:

- a) Extend the gasoline supply,
- b) Provide a lead-free high octane blend stock,
- c) Provide a sulfur-free high octane blend stock for low sulfur gasoline blending,
- d) Help reduce future refinery capital expenditures,
- e) Make gasoline cleaner by reducing tailpipe emissions,
- f) Improve engine performance,
- g) Fit into the refiner's existing logistical distribution system, and
- h) Be readily available worldwide.

Oxygenates Market Competition

The 1990 Clean Air Act Amendments and an apparent refiner preference for MTBE have sparked considerable market competition between ethanol and MTBE. The ethanol industry has engaged in significant efforts to promote it as a substitute for MTBE. Yet today, MTBE continues to be the primary oxygenate in US gasoline.

Leaking Underground Gasoline Storage Tanks and MTBE Proposed Phase-outs

In 1988, federal laws were passed to require most of the nation's gasoline storage tanks to be replaced, protected from corrosion, and monitored for leaks no later than December 31, 1998. Federal and state regulators have reported that many tanks did not meet the 1998 deadline. However, since 1998, states and US EPA have intensified efforts to identify and repair or replace leaking gasoline storage tanks.

Product leaks from faulty gasoline storage tanks have resulted in detections of gasoline constituents such as benzene and MTBE in surface and groundwater. MTBE detections have been unfairly blamed on its use in gasoline rather than faulty tank systems. During the last five years, several states including California and some Northeastern states have experienced problems with gasoline leaking from noncompliant gasoline tanks and have called for phase-outs of MTBE.

State actions and efforts by EPA and other regulators to address MTBE detections from gasoline leaks have incorrectly focused Congress on phasing-out MTBE rather than on correcting the problem of leaking gasoline. An example of this is the proposed phase-out of MTBE contained in the US Senate Energy bill currently being debated.

In comparison, the US House of Representatives passed a bill, H. R. 4, last summer that did not restrict MTBE's use in gasoline. Instead the bill focused on the real problem of gasoline leaking from faulty gasoline tanks and included authorization for funds to correct faulty systems and clean up gasoline spills.

US Legislative Update on MTBE: Where do we stand now?

A Note by John Kneiss (OFA)

"The current situation in the US can be characterized as follows:

THE U.S. HAS NOT ENACTED A BAN ON THE BLENDING OF MTBE INTO MOTOR GASOLINE.

While various states have passed individual laws that preclude or limit MTBE use, most are in corn-belt areas, or inconsequential states that essentially do not have gasolines blended with MTBE.

Only three states with such legislation are of significance - California, New York and Connecticut - and none of the effective for these laws has come due. Importantly, the laws of California and New York are under challenge (OFA has sued them), and the cases are still pending and in progress.

Price and Supply Issues

There has been considerable retail petrol cost increases being experienced in California of late - despite the loud wailing by the fuel-ethanol industry that it's "not their fault", which the media, and probably most of the public is just not buying for now.

A large portion of the California refining industry in the state is transitioning to fuel-ethanol blending in CARB spec gasoline - and experiencing difficulties in meeting

supply needs. Thus the substantial run-up in pricing under basic economic principles where continued strong demand is overwhelming perceived (and in some cases real) supply limitations.

From a consumption standpoint, based on U.S. government statistics (Dept. of Energy, Energy Information Administration), the use of MTBE remained quite strong throughout 2002, and even recent use (last couple of months) has shown typical seasonal use of MTBE

At this point, clearly the momentum is AGAINST any ban language becoming enacted - unfortunately, it is far too early to handicap or predict the outcome of federal legislation."

At the same time the US MTBE ban is facing legal challenges making its application more complicated.

- Methanex, a Canadian methanol producer, invoked the North American Free Trade Agreement (NAFTA) against the US as a legal challenge on MTBE ban. The company seeks to overturn the California MTBE ban and claims US \$ 970 million for compensating the ban would cause to its business.
- The US Oxygenated Fuels Association (OFA) is suing the State of California, arguing the MTBE ban violates US law. The OFA suit is based upon the fact that the federal Clean Air Act has established uniform requirements for gasoline that contradict California's MTBE ban. OFA is asking for complete scientific review of data.

It still remains unclear whether the US EPA (Environment Protection agency) will regulate MTBE.

According to Washington based OFA (Oxygenated Fuels Association), the California MTBE phase out was based on politics rather than science. It is important to underline that the US has not yet made a final decision regarding the use of MTBE throughout the country.

Oil and Gas Journal recently published an article on MTBE (Volume 99, Issue 9, Feb 26, 2001) in which the health risks of MTBE were examined. This article discussed commonly discussed MTBE health questions into language understandable by the average person. An extract from this O&GJ report appears below:

"Former EPA Administrator Carol Browner created a special blue-ribbon panel in 1998 to investigate concerns about oxygenates in gasoline. This panel reported that 5-10% of communities in areas using MTBE in gasoline have found detectable amounts of MTBE in community drinking water. EPA's limit for MTBE in drinking water is 20-40 ppb. Only about 1% of these detections have shown levels of MTBE above 20 ppb.

In the US, the average person consumes about 1 quart/day of water (in addition to another 1.5 quarts ingested in foods and drinks) and lives about 75 years. A quart of water per day for 75 years means the average person drinks about 27,375 quarts of water in a lifetime. At 20 ppb, a person's lifetime consumption of MTBE would be 0.01752 oz. If this lifetime quantity of MTBE were added all at once to a dry martini, an informed college student would probably drink it on a dare and suffer no harm."

Senator Murkowski's Request for a Technical Analysis of the Senate Energy Bill by the Energy Information Administration (EIA)

In response to Senator Murkowski's request the EIA provided an analysis of the cost of the Senate Energy bill currently being debated. EIA concluded that if passed, the bill would result in U.S. annual average gasoline prices that are about 4 cents per gallon (real dollars) higher,

and average RFG prices that are between 9.0 and 10.5 cents per gallon higher, after the MTBE phase-out in 2006. The higher prices reflect the loss of volume, oxygen, and octane associated with the MTBE phase-out. EIA stated,

"Ethanol can only partially compensate for these blending qualities and is more expensive to use than MTBE. " An increase of 4 cents/gallon for conventional gasoline and 10.5 cents/gallon for RFG is approximately \$8 billion/year more in production costs. There is a potential for gasoline prices to be much higher for consumers at the pump."

An important comment was made by the Oxygenated Fuels Association to the US EPA:

MTBE's Threat to Groundwater Should Be Reevaluated

We believe that the Agency's view of the threat posed by MTBE to groundwater resources needs to be updated. Recent data from the U.S. Geologic Survey and others indicate that the MTBE groundwater contamination threat was severely overstated in earlier analyses, including the Agency's 1999 Blue Ribbon Panel on Oxygenates (BRP) review. We believe that MTBE groundwater impacts in state detection reports are exaggerated and diminishing. The presence of MTBE in groundwater continues to be been directly linked to underground gasoline storage tanks (USTs) leaking for an extended period of time – even years in some instances.

A recently released report by the General Accounting Office (GAO) confirms that Leaking USTs are typically due to inadequate or non-existent inspection, weak enforcement of regulatory requirements, and failure to maintain sound operational and maintenance practices.

Policymakers, the press and the public were led to believe that future increased "contamination" rates would threaten the nation's drinking water supplies and that current detections were "just the tip of the iceberg." In fact, recent findings from the U.S. Geological Survey (USGS) are showing that there never was an "iceberg."

According to USGS:

"Our studies also suggest that MTBE levels do not appear to be increasing over time and are almost always below levels of concern from aesthetic and public health standpoints. The few locations in our database with high concentrations of MTBE may be associated with leaking underground storage tanks."

USGS findings demonstrate that MTBE detects have rarely exceeded a level deemed unsafe. The vast majority of MTBE detections have been at concentrations below five parts per billion (ppb) – far below the EPA Consumer Advisory for MTBE that sets a suggested standard for prolonged exposure of 20 to 40 ppb to avoid unpleasant taste and odor, according to USGS. "The health threat posed to water supplies is small compared to other water-related issues," according to the USGS.

Furthermore, data from several states that use federal reformulated gasoline (RFG) appears to confirm that MTBE does not pose a significant threat to public health or water sources.

With nearly 85-90% of UST owners and operators currently in compliance with federal UST requirements, the collective focus, as highlighted in the GAO report, should be toward properly enforcing the UST program to ensure that systems are properly operated and maintained. UST upgrade initiatives have helped control releases of gasoline into the environment as both the frequency and magnitude of reported MTBE detections appear to be declining. The alleged threat to the nation's groundwater supplies has never materialized, if it ever truly existed in the first place. OFA firmly believes that EPA's assessment of future fuel options should not explicitly limit MTBE use based on incomplete assessments of water quality data presented in the current report.