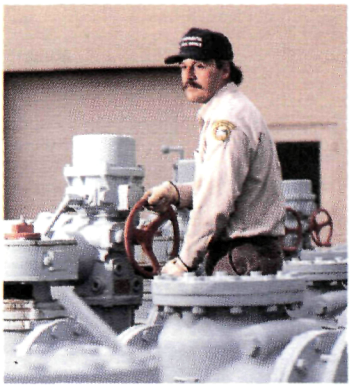
California struggles with presence of MTBE in public drinking water wells

New concern about health effects from the presence of the fuel oxygenate methyl *tert*-butyl ether (MTBE) in groundwater has led to the introduction of a bill in the California legislature to ban the sale of MTBE-containing gasoline until health studies prove it is harmless. The rush to legislate is under way even as EPA and California state scientists agree that little is known about the additives' effect on human health.

California, which has the worst smog problems in the nation, moved ahead of the federal Clean Air Act program in 1996 by requiring oxygenated fuels—developed by using more stringent gasoline specifications than those in the federal fuel program—to be sold throughout the state. The California EPA stands behind the fuel's health benefits. Over the past year, the "cleaner burning" gasoline has reduced ozone-forming emissions from vehicles by 15%, said Allan Hirsch, California Air Resources Board spokesperson. "Cal/EPA still feels that MTBE is . . . providing real air quality benefits, and there is no justification to ban it," Hirsch said.

However, a spill of MTBE-containing gasoline in Santa Monica, Calif., in 1996, which resulted in the contamination of two well fields and concentration levels as high as 610 parts per billion (ppb), raised concerns about the safety of the additive. Four bills have been introduced in the state legislature this year. The bills range from a call for more health effects studies to a one-year moratorium introduced by Sen. Richard Mountjoy (R-San Gabriel).

MTBE, an oxygen-bearing compound first added to gasoline in the 1970s, is one of two oxygenates required for use in 1992 under the Clean Air Act program for areas that exceed federal carbon monoxide standards in the winter. Approximately 15 states use the fuel to meet the requirements. MTBE, unlike other toxic compounds in gasoline, moves quickly through the soil, is highly soluble, and does not biodegrade easily. Available cleanup technologies are costly.



An underground spill of reformulated fuel shut down 80% of drinking water supplies Santa Monica, Calif. (Courtesy City of Santa Monica)

Current health studies on the oxygenate are inconclusive, and EPA has designated it as a probable or possible human carcinogen (*ES&T*, April 1997, p. 176A). A report issued by the California EPA in April found that very little was known about the health effects from exposure through drinking water and called for further research on the systemic, reproductive, and developmental effects of exposure to MTBE. The cancer risk from inhalation in California, according to the report, is estimated to be one to two lifetime cancer cases per million people exposed, compared with the overall reduction in the estimated lifetime cancer risk of about 60 per million from the use of the state's oxygenated fuel.

Despite the air board's backing of MTBE, in February California water agencies began collecting data on MTBE concentrations in water supplies for the Department of Health Services. Thus far, tests on 1663 drinking water wells have shown that only 8, or 0.5%, exceeded the state's interim health advisory of 35 ppb.

The concern over MTBE in water is so new that EPA has not set a drinking water standard, although this fall the oxygenate will be on a proposed list of contaminants for regulation under the Safe Drinking Water Act, according to Maria Gomez-Taylor in EPA's Office of Science and Technology. In response to state water agency concerns over the existence of MTBE in some nonprimary water sources, EPA last December issued a draft nonregulatory health advisory of 70 ppb.

Although the California EPA report showed an odor threshold for MTBE as low as 15 ppb in drinking water, the state's water utilities are not backing a legislative moratorium. One reason is that although MTBE has been detected in wells in the state and across the country, most of the wells are not primary drinking water sources, said Lisa Lien Mager, spokesperson for the Association of California Water Agencies. Following a March symposium on MTBE, the association concluded there are "definite health benefits to air quality" from the use of fuel containing MTBE, Mager said.
—CATHERINE M. COONEY

Does MTBE biodegrade?

Scientists at the ACS national meeting in April agreed that MTBE is extremely slow to degrade in water, but few were able to flatly conclude that it does not biodegrade. "No one has any real definite evidence that [MTBE] degrades in situ," said Anne Happel of Lawrence Livermore National Laboratory, who is analyzing MTBE plumes at California's leaking underground storage tank sites. She added, however, that no proof does not mean it is not happening.

Results reported by Mario Schirmer of the University of Waterloo showed that MTBE concentrations in groundwater samples taken 8 years after MTBE had been injected into a shallow sand aquifer were lower than concentrations gathered at 16 months. The findings suggest that "mass loss of MTBE may have occurred, perhaps due to biodegradation," Shirmer said.

Others offered evidence that the certain cultures help MTBE to attenuate. Robert Cowan of Rutgers University and D.C. Mosteller of Camp, Dresser & McKee, in separate presentations, reported that certain cultures that can live off MTBE will help it break down, but which culture actually causes the chemical to attenuate, and whether the culture lives in the natural environment, is unclear. —C.M.C.