UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JAN 18, 2000

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

MEMORANDUM

SUBJECT: Monitoring and Reporting of MTBE and Other Oxygenates at UST Release Sites

FROM: Sammy Ng, Acting Director
Office of Underground Storage Tanks

TO: Regional UST Program Managers, Regions 1-10
State UST/LUST Program Managers

I am writing to strongly urge and recommend all state UST/LUST program managers immediately begin monitoring and reporting of methyl tertiary butyl ether (MTBE) and other oxygenates in groundwater at all underground storage tank (UST) release sites nationwide. If you detect MTBE or other oxygenates during monitoring at sites, EPA strongly advises that states take immediate and aggressive remedial action to address the contamination. To promote nationwide consistency, I am also advocating that EPA staff follow this approach for sites where EPA is undertaking or overseeing corrective actions such as sites in Indian Country.

Background

As you are well aware, U.S. EPA Administrator Carol Browner in November 1998 appointed a Blue Ribbon Panel on Oxygenates in Gasoline to investigate air quality benefits and water quality concerns associated with oxygenates in gasoline. In July 1999, the Blue Ribbon Panel provided the Administrator with findings and recommendations, and provided suggested actions for a number of programs in EPA, including the UST program. One particular recommendation in the prevention area suggested that EPA "require monitoring and reporting of MTBE and other ethers in groundwater at all UST release sites".

In the past, EPA has worked cooperatively with the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) and other organizations to provide states with various opportunities and forums (such as the annual national UST conference) to raise states' awareness of the MTBE issue. Additionally, EPA has recommended that states routinely analyze at sites for MTBE and encouraged states to take proactive steps in assessing their sites for MTBE. To date, approximately 25 states have established cleanup levels for MTBE in

groundwater; EPA encourages those other states which have not yet done so, to take similar action and establish cleanup levels.

Monitoring and Reporting Are Appropriate Actions

Provisions of the Clean Air Act require the use of oxygenates in fuel. These oxygenated fuels are also referred to as reformulated gasoline (RFG) or oxy-fuels. MTBE is merely one of many possible oxygenates that may be present in petroleum fuels. While MTBE has received most of the publicity recently, it is by no means the only chemical of concern for which you should be monitoring and reporting. For example, the oxygenate TBA is both a degradation product of MTBE and a fuel additive in its own right; it is also potentially more toxic than MTBE. You should also carefully consider assessing for other oxygenates (that include, but are not limited to, TAME, DIPE, ETBE, ethanol, and methanol).

For many years, MTBE has been recognized as a potential human carcinogen. Even though studies to establish an exposure limit are still incomplete, EPA's Office of Water (OW) issued a drinking water advisory for MTBE in December 1997. This advisory specifies a range of 20-40 micrograms per liter, which should be low enough to both protect human health and eliminate objectionable taste and odor in drinking water. Because of the many steps involved in establishing a regulation that sets the drinking water standard to control the level of contaminants (such as MTBE) in drinking water, OW believes it could take approximately 10 years for EPA to issue a regulation determining the maximum contaminant level for MTBE.

Even though the use of gasoline containing MTBE or other oxygenates of any type is required in relatively few areas of the country, it is possible that it may be present in other areas as well. It is reasonable to assume that, even though your state does not require the use of oxygenated fuels, those types of fuels are, or most probably have been, sold and used in your state. In fact, MTBE has been found in some fuels (for example, heating oil) in which it was never intended to be used.

MTBE and other oxygenates behave differently in the environment than do the aromatic hydrocarbons, such as benzene, toluene, ethylbenzene, and xylene (BTEX). Therefore, conventional or traditional site characterization strategies and techniques designed to assess BTEX plumes may fail to detect MTBE plumes. MTBE is significantly less biodegradeable than is BTEX, and MTBE does not sorb to aquifer material. As a result, MTBE moves farther and faster than does BTEX. Plumes tend to move deeper into aquifers as they move away from the source. Because MTBE plumes move farther from the source, MTBE may occur deeper in aquifers than does BTEX. Wells with short screens installed across the water table may fail to sample MTBE plumes. Conversely, wells with long screens may yield greatly diluted samples that mask the presence of MTBE and other contaminants.

To adequately characterize an MTBE plume, the focus must be on identifying its three-dimensional characteristics. Monitoring wells should be "nested" (that is, several wells installed

close together with narrow screened intervals). The vertical distribution of hydraulic conductivity should be determined before a nest of permanent monitoring wells are installed at a new location. This can be done by examining core samples, by pressure dissipation tests with a cone penetrometer, or by miniature specific capacity tests in temporary push wells. The screens of permanent monitoring wells should be installed across the depth intervals with the highest hydraulic conductivity. If plumes appear to dive into the aquifer as they move down gradient of the source, the deepest well in the cluster should either be free of MTBE contamination, or be screened in material with low hydraulic conductivity that acts as an effective confining layer for the plume.

Because the potential area of the MTBE plume is much larger than for BTEX, there's an increased probability of encountering preferential migration pathways, such as sand stringers, fractures, and utility conduits. These pathways should be identified as they may provide avenues for plume migration that are either in unanticipated directions or at greatly increased rates over what is commonly expected based on ambient conditions. Monitoring well networks should be organized in transects that are perpendicular to ground water flow. Well spacing in the transects should be relatively closely spaced to minimize the possibility of the MTBE plume migrating across the transect undetected.

As with most work to identify and solve a problem, the earlier you identify the problem, the easier the solution may be. That scenario exists with monitoring and identifying MTBE contamination. If you identify the presence of MTBE in the early stages, remediating the site may be less costly and less complex than if you learn of (and remediate) the contamination at later stages.

Recommended Action and Next Steps

The MTBE problem is a national issue, even though we do not currently know the magnitude of the problem. Few states currently perform routine sampling and monitoring; there is too little information sharing and networking about the problem. EPA and states together need to make a concerted effort to share experiences and learn from each other. Currently there is little existing information as to the effectiveness of technologies for groundwater remediation and drinking water treatment. EPA is encouraging states which have that information to share it via the Internet with other states. Using Internet web sites can be a simple and cost-effective means for sharing information. The MTBE problem also emphasizes the need for long-term management strategies and land-use planning. A graphical information system (GIS) is a flexible and useful personal computer and Internet tool that states can use as they strive to better protect public water supplies from UST releases.

OUST is encouraging state UST/LUST programs to: begin (and for those states already doing so, continue) to monitor and report MTBE and other oxygenates in groundwater at all UST release sites; aggressively remediate sites where MTBE is found; and coordinate information sharing using their respective web sites. OUST will take the lead to link the information from

states' web sites and provide graphics which depict states' activities on the MTBE section of OUST's homepage (http://www.epa.gov/oust/mtbe/). This effort will serve as a clearinghouse for MTBE information. Our combined sharing efforts will provide appropriate, correct information to interested and affected parties and, as a result, should help offset misconceptions about this important issue. It will also improve public understanding and appreciation of activities underway by EPA and states to protect human health and the environment from all chemicals of concern.

In the near future, OUST will develop an optional form you may use (if you so choose) as a guide to help you gather and share your state's information about MTBE on your web site. We will share that form with you as soon as it is available. If you have policy questions about work OUST is undertaking regarding MTBE, please call me at 703-603-9900. For other MTBE information, talk with Hal White (703-630-7177) for technical questions and information sharing inquiries or Steve McNeely (703-603-7164) to discuss how MTBE fits into risk based decision making (RBDM) programs.

cc: Tim Fields
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