

# Initial Findings: National Survey of MTBE, Other Ether Oxygenates, and Other VOCs in Community Drinking-Water Sources

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## Survey's Main Purpose and Scope

- Determine the occurrence, concentration, and seasonal variation of methyl *tert*-butyl ether (MTBE), other ether oxygenates, and other volatile organic compounds (VOCs) in community water system (CWS) source water prior to treatment.
- Randomly select and sample 954 source-water sites in the United States and Puerto Rico (fig. 1) considering:
  - two source-water categories (surface water and ground water);
  - five CWS-size categories based on population served; and
  - number of CWSs and population served by each source-size category.
- Analyze for MTBE, 3 other ether oxygenates, and 62 additional VOCs.

## Frequency of Occurrence of MTBE (reporting level of 0.2 micrograms per liter)

- MTBE was detected:
  - in 24 States;
  - in about 9 percent of all source-water sites sampled;
  - five times more frequently in MTBE high-use areas than in other areas;
  - generally more frequently in surface-water sources (about 14 percent) than in ground-water sources (about 5 percent); and
  - more frequently in large and very large CWSs (fig. 2).

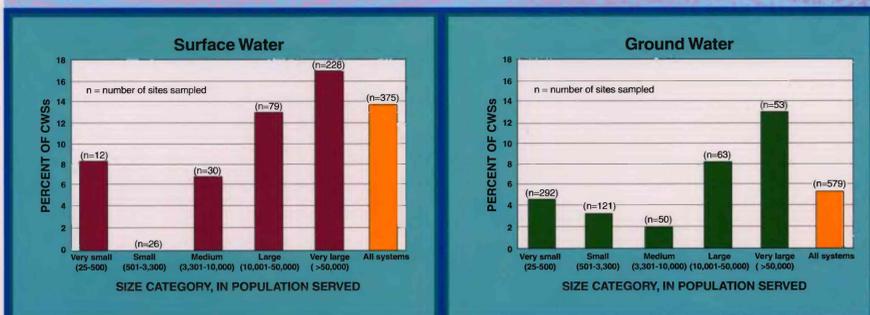


Figure 2. Detection frequency of MTBE by CWS-size categories for surface- and ground-water sources.



Figure 1. Map showing source-water sampling sites in the United States and Puerto Rico.

## Concentrations of MTBE and Other VOCs

- MTBE concentrations were almost always less than the U.S. Environmental Protection Agency's (USEPA) taste and odor advisory of 20-40 micrograms per liter ( $\mu\text{g/L}$ ) and the lowest taste and odor-advisory level set by a State (California,  $5 \mu\text{g/L}$ ) (fig. 3).
- Other VOCs also were found at low levels. Less than 1 percent of the source-water sites had a concentration that exceeded USEPA's Maximum Contaminant Levels or Health Advisories.

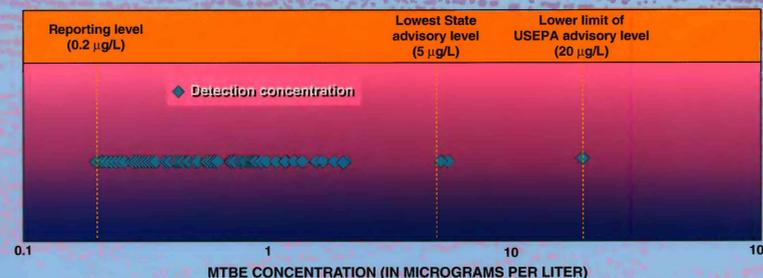


Figure 3. Concentration of MTBE detections and the lowest State and USEPA taste and odor advisories.

## Frequency of Occurrence of MTBE Compared to Other VOCs (reporting level of 0.2 micrograms per liter)

- One or more VOCs were detected at about one-fourth of the CWS source-water sites sampled.
- The most frequently detected VOCs in surface-water sources were chloroform and MTBE (about 14 percent each) (fig. 4).
- Chloroform was detected about two times more frequently than MTBE in ground-water sources (fig. 4).
- MTBE accounted for two-thirds of all detections of gasoline compounds; however, MTBE seldom was detected with gasoline hydrocarbons.
- Other ether oxygenates, including *tert*-amyl methyl ether (TAME), diisopropyl ether (DIPE), and ethyl *tert*-butyl ether (ETBE), rarely were detected.

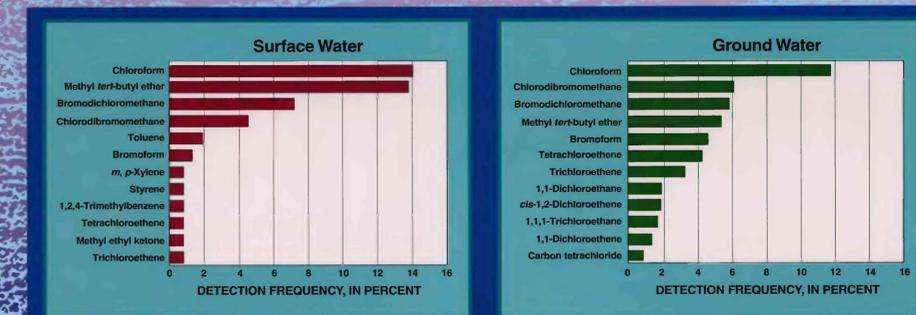


Figure 4. Detection frequency of MTBE and other commonly detected VOCs in CWS surface- and ground-water sources.



U.S. Geological Survey employee sampling surface water at Lake Rampart, Colorado.



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For relevant publications and additional information, visit the USGS VOC National Synthesis web site at URL: <http://water.usgs.gov/nawqa/vocs>

Open-File Report 01-399  
 Rapid City, South Dakota  
 2001

Prepared in cooperation with:

- Metropolitan Water District of Southern California
- Oregon Graduate Institute of Science and Engineering, Oregon Health and Science University
- American Water Works Association Research Foundation