The Quality of Our Nation’s Waters

Volatile Organic Compounds in the Nation’s Ground Water and Drinking-Water Supply Wells

by

John S. Zogorski

U.S. Department of the Interior
U.S. Geological Survey
National Water-Quality Assessment (NAWQA) Program
Products containing VOCs have many uses in industry, commerce and households.

- Engine fueling
- Automotive painting
- Paint stripping
Purpose of assessment

To characterize the occurrence and distribution of VOCs in ambient ground water and drinking-water supply wells across the Nation
Scope of assessment

This assessment represents an evaluation of VOC data collected or compiled during NAWQA’s first decade.

55 VOCs were selected for assessment.
Water-supply system

Ambient ground water

Water captured by supply wells

Treatment → Drinking water
VOC concentrations in aquifers

- Detected, above 1 ppb
- Detected, below 1 ppb
- Not detected
Chloroform was the most frequently detected VOC in aquifer samples.
PCE and TCE were also frequently detected in aquifer samples.
MTBE was the third most frequently detected VOC in aquifer samples.
Domestic wells and Public wells
concentrations below MCLs and HBSLs
concentrations greater than MCLs

Domestic wells

Public wells

DETECTION FREQUENCY, IN PERCENT
### VOCs with concentrations greater than MCLs

<table>
<thead>
<tr>
<th>Group</th>
<th>Compound</th>
<th>Well type</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Domestic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fumigants</td>
<td>DBCP</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,2-Dichloropropane</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EDB</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solvents</td>
<td>TCE</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PCE</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Methylene chloride</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Chemical production</td>
<td>1,1-Dichloroethene</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vinyl chloride</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
Summary comments

• Widespread occurrence of VOCs
• Concentrations seldom of potential concern
• Large number of vulnerable aquifers
Additional ongoing activities

- Water quality of domestic wells
- Source water of large community water systems
- Movement of contaminants to public wells
- Trends of gasoline oxygenates