Investigation and Remediation

MTBE – Beware the False Positive

by Blayne Hartman

What is the official EPA method for measuring MTBE in soil and water samples? Actually, there is no official method. And herein lies the potential problem with reported MTBE results.

Increased concern over the presence of MTBE in the environment by the regulatory community has created a demand for MTBE analyses from soil and water samples collected from LUST sites. Because no official EPA method exists, laboratories have modified a variety of EPA methods to analyze for MTBE. The most commonly used methods are EPA 8020, 8240, and 8260. While results provided by these methods may be fine, both regulators and consultants need to be aware that there are critical differences among these methods which, if not understood, could lead to the incorrect interpretation of reported MTBE values.

EPA Method 8020 is a gas chromatography (GC) method that uses a photoionization detector (PID). The method is designed to detect aromatic hydrocarbons, the most commonly targeted compounds of which are benzene, toluene, ethylbenzene, and xylenes (BTEX). MTBE can also be detected by this method. MTBE elutes, or passes through the detector, earlier in the analytical run than the BTEX compounds, which means that it takes no additional time to analyze a sample for MTBE. As a consequence, some laboratories have included MTBE in their 8020 analytical runs for little to no extra charge. But as the saying goes: "Beware the free lunch."

Because of pricing pressures, many analytical laboratories have compressed the "run time" for 8020 from 20 minutes to less than 10 minutes. This reduced run time increases the potential for compounds to co-elute (i.e., pass through the detector together) and be misidentified. This problem can be especially significant for MTBE because several alkane compounds elute close to MTBE and are present in gasoline in large quantities. The result is false positives—over reported MTBE values that result from the co-elution of the alkanes. This problem is greatest for soil vapor and soil samples, but it can be significant for groundwater samples as well.

EPA methods 8240 and 8260 are gas chromatography methods that use a mass selective detector (GC-MS). These detectors differ from other typical GC detectors because they have the ability to identify compounds based on their masses. This means that MTBE can be recognized and quantified individually, even if other compounds are co-eluting with it. Thus, MTBE values from these methods tend to be more reliable and false positives should not occur. This analysis, however, is more expensive than an 8020 analysis.

The solution? Use a combination of these methods to ensure valid results and minimize costs. Nondetect MTBE values reported by method 8020 should be fine. MTBE values from samples with low gasoline values (<5000 ug/l and 100 mg/kg) are more likely to be reliable because low values of the co-eluting alkanes are also likely. As gasoline values increase, so does the potential for over-reported MTBE values. Depending on site-specific goals, it is advisable to confirm a subset of the MTBE results reported by method 8020 by one of the GC-MS methods. ■

Blayne Hartman, Ph.D., is Vice President and Technical Director of TEG, Inc. in Solana Beach, California. For more information, contact Blayne by e-mail at bh@tegenv.com.