

## **Site Investigation Issues and Analytical Techniques**

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Vapor intrusion has become a major issue within the US Environmental Protection Agency due to the health effects associated with the gas-phase contaminant impacts at residences, schools, offices, and facilities. The Trace Atmospheric Gas Analyzer (TAGA) mobile laboratory has provided analytical data at numerous sites around the country to help identify and resolve vapor intrusion concerns. The TAGA laboratory contains a Perkin-Elmer/Sciex<sup>®</sup> API TAGA IIe, which is a triple quadrupole mass spectrometer. The TAGA is a direct air monitoring instrument capable of detecting, in real time, trace levels of many organic compounds in ambient air. The TAGA can be operated in a stationary or mobile mode. In the stationary mode, the TAGA mass spectrometer/mass spectrometer (MS/MS) system uses a 400-foot Teflon tube to sample indoor air from rooms within and outdoor air adjacent to the potential impacted structures. The TAGA has the unique capability to locate and differentiate lifestyle sources of toxic gases (emissions from solvents, paints, gasoline, etc.) from the outside ambient air and/or emissions from subsurface gases. In the mobile mode, the TAGA can isolate sources that are polluting the outside ambient air by driving along roads and lanes adjacent to structures.

The TAGA mobile laboratory also has an Agilent<sup>®</sup> 7890A gas chromatograph and 5975C mass spectrometer (GC/MS). The GC/MS system can perform volatile organic compound (VOC) analysis of outdoor and indoor ambient air samples or subslab and soil gas samples collected in Tedlar<sup>®</sup> bags. The Tedlar<sup>®</sup> bags can be introduced via an OI 4660 purge and trap sample concentrator or a loop injection 10-port valve. Additionally, an Agilent<sup>®</sup> MicroGC is on board the laboratory. The MicroGC is a gas chromatograph, which has dual columns and thermal conductivity detectors, for the analysis of permanent gases (O<sub>2</sub>, N<sub>2</sub>, CH<sub>4</sub>, CO, and CO<sub>2</sub>). The permanent gas data is particularly informative when investigating vapor intrusion as a result of gaseous migration from landfills.

The field analyses provide many benefits that are not available from a traditional fixed laboratory and standard sampling techniques. The TAGA mobile laboratory provides real-time or near real-time information with known data quality to permit good decision making in the field with the added benefit of considerable cost savings. Utilizing the capabilities associated with the TAGA mobile laboratories has produced data to eliminate many of the ambiguities associated with other vapor intrusion investigation approaches.