

## Vapor Intrusion – Unwanted VOCs

**By: Steve Froelicher, Ph.D., Senior Chemist at Prism Analytical Technologies, Inc.**

Vapor intrusion occurs when volatile compounds migrate from contaminated groundwater or soil into the indoor air of a home or business via sub-slab intrusion through cracks in the building's foundation. Vapor intrusion usually occurs in areas where there has been an accidental chemical spill, illegal waste dumping, or historical waste storage collection, the latter where early methods of waste storage have since been deemed environmentally unsafe. Many of these locations have been categorized as Superfund sites by the Environmental Protection Agency. The Agency for Toxic Substances and Disease Registry provides maps for each state of toxic substance contamination at known waste disposal locations. The maps can be found at this link:

<http://www.atsdr.cdc.gov/substances/SubstanceMap.asp>. Over two hundred substances can be accessed by clicking on the drop-down menu titled "Select a Substance". There is also a drop-down menu for choosing a state.

Many chemicals can be involved in vapor intrusion. Some chemicals are more volatile than others and have varying abilities to decompose in the soil. For instance, a chlorinated solvent such as tetrachloroethylene (PERC, CAS# 127-18-4), which is used for dry cleaning and metal degreasing, decomposes very slowly in the soil and therefore is susceptible to soil migration and vapor intrusion. In contrast, petroleum hydrocarbons from fuel spills or other contamination sources decompose more rapidly in soil and are usually less of a problem.

The challenge for VOC analysis of indoor air is to determine whether vapor intrusion is actually a contributing factor. For instance, from the example above, tetrachloroethylene is frequently detected in residual amounts in indoor air from clothing that has been recently dry cleaned. Therefore, when assessing the potential impact of vapor intrusion, it is essential to consider all possible sources for VOCs in indoor air.