

Multiple Lines of Evidence, Including CSIA, to Differentiate an Indoor Source from Vapor Intrusion

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Background/Objectives. A residential community sits downgradient from a former industrial site in southern California where active remediation to address trichloroethene (TCE) in groundwater is ongoing. As a precautionary measure to mitigate potential vapor intrusion, the Department of Toxic Substances Control (DTSC) requested that homes overlying the plume be offered sub-slab depressurization systems (SSDSs). At one homeowner's request, a SSDS was installed shortly after purchasing the home. While historical indoor air quality (IAQ) sampling in that home did not indicate vapor intrusion, IAQ sampling after SSDS installation showed a sudden increase in TCE concentrations in indoor air.

The unhappy homeowner needed an answer - what was the source of the TCE – vapor intrusion, entrainment from the SSDS, and/or an indoor source? An indoor evaluation using portable monitoring equipment failed to provide an answer.

Approach/Activities. Ramboll Environ developed a multiple lines of evidence approach, in conjunction with the regulatory agency and the homeowner that resulted in conclusive determination of the source.

The approach involved multi-depth soil gas sampling around the perimeter of the home; continuous IAQ and sub-slab differential pressure monitoring in multiple rooms inside the home while changing SSDS operation; seven day passive IAQ sampling; continuous weather monitoring; and, compound specific isotope analysis (CSIA) of groundwater, soil gas and indoor air. Using these multiple lines of evidence, Ramboll Environ concluded that the TCE in indoor air was not due to vapor intrusion.

Results/Lessons Learned. This presentation presents a summary of the multiple lines of evidence investigation methods; the real-time implementation of the approved scope of work; the resulting IAQ, sub-slab differential pressure, weather, soil gas, and CSIA results; and, the detailed analysis that resulted in the determination that the TCE in indoor air likely results from a consumer product located within the home.