

Long-Term Passive VOC Sampling Validation under Time-Varying Conditions at a Vapor Intrusion Study House

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Background/Objectives. The use of passive diffusive-adsorptive samplers as an alternative vapor intrusion (VI) assessment tool has been developing over the past few years. A number of studies show that passive samplers can produce results comparable to conventional sampling methods under well-controlled steady concentration conditions. The objective of this study is to examine the accuracy of time-weighted passive sampling results under field conditions with significantly time-varying concentrations. This research is being conducted in a well-known VI study house with a known history of orders-of-magnitude indoor air TCE concentration variations, and well-established active and real-time sampling tools.

Approach/Activities. Three different types of passive samplers are deployed in the lower-level of the study house for 1-week, 3-week and 4-week sampling periods. Daily active sampling with sorbent tubes for 24-h periods is also being conducted (EPA TO-17). Triplicate passive sampler analyses are being compared to the results from the 24-h active sampling method. During the sampling, Indoor air VOC concentrations are being manipulated with time via building depressurization.

Results/Lessons Learned. Four 3-week periods have been sampled, during which 24-h average indoor air TCE concentrations varied over three-orders-of-magnitude (0.01 – 6.9 ppb_v). The averaged differences between active time-weighted 24-h samples and the three passive sampler types are 12%, 66% and 51%. The comparison results for one and four week sampling periods are in progress and will be presented.