

Continuous Indoor Air Sampling to Understand Variable Concentrations of Trichloroethene in a Complex Industrial Facility

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Background/Objectives. Semi-annual vapor intrusion sampling has been conducted since 2008 at a complex operating industrial facility with a history of trichloroethene (TCE) use. Sampling using eight-hour Summa canisters had been acceptable for 14 rounds of sampling in a basement until occasional exceedances of the EPA industrial indoor air screening level for TCE began to occur. The addition of air purifying units seemed to solve the problem for two rounds, but after another TCE screening level exceedance a more comprehensive investigation was launched including a two-month continuous indoor air sampling program to understand why there are occasional exceedances and how this information can be used to implement a permanent solution.

Approach/Activities. A gas chromatography/electron capture detector (GC/ECD) was set up in the basement with 16 sampling ports. Tubing was extended down columns and collected from five breathing zone locations and down into ten floor features (e.g., sumps and drains) to sample potential sources of TCE. One port was used for calibration gas. Each location was sampled nine times during a 24-hour day. Sampling was initially conducted for four weeks to establish and understand baseline conditions. Floor features with the highest concentrations were then temporarily covered for three weeks to determine the effects for covering potential sources. After uncovering the floor features, one final week of continuous sampling was used to confirm that air concentrations returned to baseline conditions.

Results/Lessons Learned. When indoor air concentrations are close to a health-based screening level, an eight-hour or 24-hour sample may not be representative enough to provide a complete understanding of building conditions relative to whether or not air concentrations are within compliance. Continuous sampling over the course of two months provided an understanding of the fluctuations and ranges of breathing zone indoor air concentrations as well as VOC concentrations within subfloor sources. When an eight-hour Summa canister sampling event was performed during continuous sampling, the results using each approach were comparable, however, not necessarily representative given the variable conditions. Fluctuations with indoor air concentrations did not correlate with changes in barometric pressure, but increased concentrations did correlate with rain events.