

Optimizing Vapor Intrusion Response Actions in a Large Active Military Manufacturing Building

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Background/Objectives. Trichloroethylene (TCE) was identified in down-gradient groundwater monitoring wells at Building 8 on the Corpus Christi Army Depot (CCAD). CCAD is an Army tenant command on the Corpus Christi Naval Air Station, conducting mission-critical military manufacturing; Building 8 covers nearly 1 million square feet. The US Navy, as site owner, refined the conceptual site model (CSM) through indoor field investigation and found that less than 10% of Building 8 overlies sources of TCE in vadose zone soil and shallow groundwater. The Navy elected to mitigate both the vapor intrusion (VI) pathway and the subsurface TCE sources beneath active manufacturing and office space using a combination of targeted sub-slab venting, and soil and groundwater treatment; however, implementing and optimizing these mitigation measures requires navigating complex stakeholder relationships, manufacturing schedules, and security constraints. In addition, the size and constructed complexity of Building 8 add multiple challenges beyond the classical 1-D VI-CSM for a single-family home. In this presentation, the authors will discuss the approach to mitigate TCE VI and to treat sources below active manufacturing spaces given the operational and structural complexities.

Approach/Activities. The Navy elected to mitigate the VI pathway and to shrink or eliminate shallow sources of TCE beneath the building. Mitigation includes predesign investigations, treatability studies and pilot testing sub-slab venting, soil vapor extraction (SVE), *in situ* chemical oxidation and bioremediation. Conceptualizing soil gas source geometry (e.g., TCE in shallow soils vs. at the water table) and pathway entry points (e.g., soil gas migration through block walls, foundation cracks or preferential pathways) are critical to scoping the predesign investigation, to designing the systems and minimizing disturbance to manufacturing. The venting system predesign investigation will shed more light on source geometry and therefore, on targeting the SVE pilot location and run modes, and similarly on locating and scaling groundwater treatment tests to the degree of desired effectiveness.

Results/Lessons Learned. Data from current investigations offer significant insights into source geometry based on measured TCE concentrations in soil gas, supported by Henry's Law partitioning modeling. Concentrations of cis-1,2-dichloroethene in soil gas and indoor air also provide strong evidence for areas where groundwater sources are more significant than soil sources. Also, targeted screening by field photoionization detector have revealed TCE migration paths in selected block walls and other constructed floor features. By April 2018, predesign data, a revised VI-CSM and preliminary system designs will be available.