

## Evaluation of Vapor Intrusion Risk from a Shallow Chlorinated Solvent Plume, Former Naval Air Warfare Center Warminster

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**Background/Objectives.** A vapor intrusion (VI) evaluation was performed at Area C at the former Naval Air Warfare Center (NAWC) Warminster, Pennsylvania, to evaluate the potential VI risk from shallow groundwater containing tetrachloroethylene (PCE), consistent with a recommendation from the most recent five-year review. Of primary concern was the potential VI risk to two commercial buildings situated on the edge of the groundwater plume, which serve as a cancer support center and associated daycare center. A groundwater extraction and treatment system is currently operating to prevent downgradient migration of PCE. In the vicinity of the buildings, residual soils (silty loam) overlie highly weathered bedrock that is encountered at approximately 5 to 10 ft below ground surface (bgs), with a depth to groundwater ranging from 10 to 20 ft bgs. Vertical groundwater profiling indicated shallow PCE concentrations below 1 mg/L, with deeper PCE concentrations at a maximum of 7.1 mg/L.

**Approach/Activities.** A screening-level VI evaluation was initially performed to evaluate the potential for VI into the buildings by comparing risk-based screening values for PCE in groundwater against existing groundwater concentrations of PCE at Area C. Two sets of generic risk-based screening values were obtained (United States Environmental Protection Agency Vapor Intrusion Screening Level [VISL] and the New Jersey Department of Environmental Protection level), and a third risk-based screening value was developed based on site-specific information using the U.S. EPA Johnson & Ettinger model for groundwater. Results of the evaluation showed that all of the dissolved PCE concentrations measured in profiled wells were below the conservative risk-based screening values, indicating a low potential for VI into two buildings at Area C. Upon agency review of the initial screening-level evaluation, collection of supplemental VI data was requested to further evaluate the potential exposure and risk associated with VI in the two buildings. Accordingly, two VI sampling events were performed in Area C according to detailed procedures outlined in an approved sampling and analysis plan. The initial sampling event was performed in June 2015, which entailed collecting indoor air and subslab vapor samples from the two buildings of concern along with an outdoor ambient air sample. The second VI sampling event was performed during the heating season in March 2016 to evaluate the potential for VI temporal variability. This sampling event included the collection of two indoor air samples and a subslab vapor sample from the cancer support center building, and an outdoor ambient air sample.

**Results/Lessons Learned.** The results from the two VI sampling events showed that no chlorinated VOCs were detected above their respective commercial VISLs in any of the air samples collected. The results of the VI sampling suggest that inhalation exposure to occupants of the buildings is not a concern. It should be noted that all of the VI sampling was conducted while a radon mitigation system was operating in the cancer support center; therefore, continued operation of the radon mitigation system is recommended to ensure occupant protectiveness.