

Applications of the Navy Quantitative Decision Framework at Military Buildings

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Background/Objectives. The United States Environmental Protection Agency's (USEPA's) 2012 data analysis of residential buildings, which developed vapor intrusion (VI) inclusion distances and attenuation factors, is currently used as VI guidance, while recognizing that industrial buildings behave differently with respect to VI potential. The Navy and Jacobs have assembled a specific database for military buildings, with data for chlorinated volatile organic compounds (CVOCs) in indoor air, subslab soil gas, and/or groundwater, gathered from 150 sampling zones in 49 buildings at 12 installations. These data were used to quantitatively evaluate how variations in building construction, subsurface characteristics, and source strength impact VI potential at industrial buildings. A quantitative ranking system was then developed to facilitate prioritizing VI potential at industrial buildings, based on site and building characteristics, that enables a phased investigation approach focusing on buildings with the highest VI potential, significantly reducing investigation costs. The ranking system can also increase defensibility of conclusions during VI assessments, improving risk management and long-term stewardship decisions. This presentation provides an overview of the VI quantitative decision framework and a case study on its application, to aid project teams and regulators in identifying areas with the highest VI potential and refining the assessment approach.

Approach/Activities. The VI quantitative decision framework was applied at a large Navy site with 98 buildings overlying chlorinated groundwater affected by petroleum hydrocarbons. Preliminary prioritization focused on available information, including distance to primary release points, current and historical building activities, groundwater data, and soil gas data. Supplemental methods assessed potential for petroleum VI and utility preferential pathway VI.

Results/Lesson Learned. A total of 41 buildings were recommended for additional evaluation for potential VI, including 19 commercial buildings and 22 Navy housing buildings. Preliminary prioritization analysis results show a relatively narrow range in prioritization scores compared to the scoring system's theoretical minimum and maximum. This limited range in scoring is the result of limitations in site information. The first phase of the VI evaluation will involve detailed building surveys to reduce prioritization scoring uncertainty. Following the first phase of the VI assessment, the prioritization will be further refined using the building survey information to guide additional investigation activities and focus on the areas with the greater potential for VI.