Trichloroethylene (TCE) Emerging Issues and Vapor Intrusion Rapid Action

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Background /Objectives. Trichloroethylene (TCE) has been a major driver for vapor intrusion (VI) sites since U.S. Environmental Protection Agency (USEPA) published its toxicological re-assessment in 2011. USEPA's approach of basing the non-cancer Reference Concentration (RfC) on multiple toxic endpoints, including developmental toxicity (fetal cardiac malformations), made protection of pregnant women from acute TCE exposures a priority for VI assessments. Though industry and federal agency stakeholders have expressed concerns about research incorporated by USEPA into the developmental-based RfC, it has been used in TCE VI rapid action guidelines issued by a growing number of USEPA regions and state agencies. The rapid action guidelines vary from agency to agency in action levels, types of rapid actions needed, and timeframes for rapid action. Recently published regulatory guidelines are taking an even more stringent approach of arguing that a single day or event of TCE overexposure within the vulnerable three-week period of the first trimester of pregnancy carries an increased risk of fetal cardiac malformations. These rapid action guidelines pose logistical challenges to VI practitioners to be able to rapidly assess, control and communicate the acute risks considered to be present from low-level TCE exposure. Another emerging issue with TCE is the passage of the Frank R. Lautenberg Chemical Safety for the 21st Century Act which, in June 2016 amended the Toxic Substances Control Act (TSCA). TCE used as a cleaning solvent, spot cleaner and solvent in adhesives is one of the first chemicals to undergo a risk evaluation, starting in June 2017, under the amended TSCA. Though it focuses on risks from TCE in products, USEPA has stated that potential exposures from VI will be considered in the risk evaluation. The implications of the TSCA risk evaluation on remediation of TCE VI sites are not yet understood.

Approach/Activities. A systematic evaluation of TCE rapid action guidelines developed by nine state agencies and three USEPA Regions was conducted. Several criteria were considered, including: 1) the hazard quotient used in deriving rapid action levels; 2) averaging times for sampling; 3) rapid response timeframes; 4) duration of the critical window of exposure; and 5) guidelines for implementation – sampling, control methods, and risk communication. In addition, the risk evaluation guidelines prepared for TSCA as amended, along with the recently prepared TCE scoping document, were reviewed to address how the risk evaluation might address developmental toxic risks from acute TCE exposures.

Results/Lessons Learned. Emerging regulatory guidelines are suggestive of relatively quick response actions to TCE VI exposure based on the assumption that a single TCE overexposure may pose a risk to the fetus of a pregnant woman. There is wide variability between agencies in rapid action guidelines with regards to the basis for action levels, response timeframes, control measures and guidelines provided to practitioners on how to implement response actions. The risk evaluation procedures under TSCA provide a greater degree of flexibility in how human health risks are estimated when compared with VI guidelines, though it is too early to determine the applicability of these procedures on managing VI sites. The current regulatory framework emphasizes the need for early rapid response planning in VI assessments when TCE is present in soil or groundwater at a site. Results from the systematic review of current TCE regulatory guidelines will be presented, along with recommendations for early TCE rapid response planning and implementation.