# Vapor Intrusion: Rapid Assessment and Mitigation Implementation in a University Building

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**Background/Objectives.** In a former industrial area located in Brazil, environmental investigations pointed out that one of the buildings, which is a current university, was overlying a dilute chlorinated solvents groundwater plume. Vapor intrusion investigation was conducted to evaluate the risk of CVOCs inhalation for indoor receptors in 20 classrooms already in use. The results of sub-slab sampling collected in vapor ports and indoor air samples confirmed intrusion in some environments. In face of this scenario, the Sanitary Surveillance Agency request the closure of the classrooms with vapor intrusion confirmed for immediate risk elimination. However, this action would have a direct impact on the operation of the university. In order to allow the classrooms use, a rapid SSD pilot test was performed and a mitigation system was implemented in two steps. At first, it was installed an SSD module to attend two pair of classrooms; next, the mechanical and civil works was completed in all the 20 classrooms. In the following months, the gas suction unit and the gas treatment unit were installed. All stages of the project were designed in order to reduce the impacts to occupants. The main objective of the project was reached: mitigate the risk in the classrooms and allow the continuity of university operations.

**Approach/Activities.** To assess vapor intrusion, sampling rounds of indoor air and sub-slab vapor were performed. Permanent sub-slab sampling ports were installed in about 20 classrooms. Sub-slab vapor and indoor air samples were collected according the EPA method TO-17. The analytical data showed concentrations above the reference values (SL-Screening Level, SSTL-site-specific target level) in most of the spaces assessed. Because the building was already in use, a SSD pilot test was performed rapidly and the implementation deployment of the suction infrastructure was started up by the most critical environments.

**Results/Lessons Learned.** The full-scale project was design to optimize the distribution of suction points under the slab considering the floor area and geometry of each classroom. The mitigation system was implemented in a relatively short time and the impacts to the occupants and the existing operation were minimal. After the start of the system operation, a series of campaigns of ambient air sampling were collected in all 20 classrooms of the building. The analytical results of the indoor air samples associated to the negative pressure measurements in the subslab proved the efficiency of the mitigation action. The approach of staring the operation in the most critical environments, was very important to improve the full-scale project, because at the beginning of operation of the partial implemented SSD, it was identified existence of preferential pathways under the slab: underground electric ducting. Because of this finding, design adjustments were made in time to prevent loss of vacuum by preferred routes. Thus, exhaust fans were specified with higher suction flow than the initially calculated based on the pilot test performed. The parameters collected in the pilot test were fundamental for these adjustments, because they allowed to draw a relation of the radius of influence, the exhausting flow, rotation and power of the electric motor.