

Vapor Intrusion in an Automobile Manufacturing Plant in Brazil

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Background/Objectives. In an automobile manufacturing plant in Brazil, two areas are under the risk of vapor intrusion: a former paint booth area, where soil and groundwater contamination are confirmed and vapors of perchloroethylene (PCE) accumulated in the sub slab of the building lead to health risk for employees (Area 1); and a former waste disposal area, where a gymnasium and a parking lot were built on an area where methane is generated by anaerobic biodegradation (and accumulated in underground installations - Area 2). The objective of the remediation is to eliminate these risks with the implementation of Sub Slab Depressurization (SSD) systems.

Approach/Activities. In Area 1, the SSD system is designed and partially implemented. The reconstruction of part of the building's floor by the client was the opportunity for the installation of most of the vapor extraction points. The total points are 158, which are distributed in a 13,500 m² area inside the building. The complete implementation and operation of the system is expected for 2019. In Area 2, the SSD system has been operating since December 2016. Three pilot tests were performed before design and implementation, in order to determine the radius of influence (ROI) in the parking lot, gymnasium and surroundings. There are 18 extraction wells in the parking lot and five extraction points in the gymnasium sub slab. The total area is 9,500 m². The principle of the SSD systems is the vapor extraction using vacuum generated by a blower and the treatment of the extracted VOCs by adsorption in activated carbon.

Results/Lessons Learned. In the implementation of the vapor extraction points in Area 1, some technical construction aspects were important to guarantee the efficient extraction of vapors from the sub slab, like the concrete and plastic sealings, the appropriate granulometry of the sand filter around the extraction pipe and also the depth of installation. The operation of the SSD system in Area 2 extracted 2.6 ton of methane after 1.5 years of operation. As a result, the risk in the area is under control. After this period of operation, there are still some remaining areas with methane concentrations, which are associated with high methane production. The elimination of these areas is still a challenge. Also, the rain water that perches the soil is also a barrier for reaching a highly efficient gas extraction.