Thermal Source Remediation of VOCs at a Residential Condominium in São Paulo, Brazil

Giovanna Setti, Cristiane Rodrigues, ***Ana Paula Queiroz*** (ana.queiroz@waterloo.com.br), and Thiago Borba (Waterloo Brasil Ltda., São Paulo, Brazil)
Paulo Lima (Hidrodinamica, São Paulo, Brazil)
Davi Damasi (Doxor, São Paulo, Brazil)

Background/Objectives. The site of interest is a residential condominium with four buildings with 23 stories and a total of 320 apartments located in São Paulo, Brazil. The site was originally occupied, for more than 40 years, by an electronic components industry that used chlorinated solvents. The residential condominium was built without fully achieving remediation goals and vapor intrusion was an issue at the enclosed parking lot. Besides the enclosed parking lot vapor intrusion was also identified at down gradient residences, neighbor of the site.

Approach/Activities. An area of approximately 210 square meters, inside the condominium garage, was identified as the area with the secondary source of PCE, TCE, DCE and VC. Previous bioremediation had been performed using molasses as a biostimulant. Even after Bioremediation concentrations of PCE were up to 90.000 µg/Land a total mass of 3.250 kg was present in the aquifer. An impact in fractured rock was also identified at concentrations as high as 10.000 µg/L of PCE.

The secondary source remediation technique was elected based on effectiveness and timeframe of remediation due to the existence of exposure pathways for residents. Seventeen ERH (electric resistance heating) electrodes were installed up to 9 meters deep and a soil vapor extraction barrier was installed between the condominium and the down gradient residences. The remediation goal was to eliminate on site and off site indoor inhalation achieving a maximum concentration of 300 µg/L of PCE in groundwater at the treated area.

Results/Lessons Learned. After 4 months of operation of the system concentrations of PCE at the source zone were at a maximum of 250 µg/L. A removal of mass of VOCs occurred and the remediation goal was considered as achieved. The next steps at the site are to investigate and if necessary remediate fractured rock impacts.