

# High-Resolution Site Characterization at an Industrial Site in Paraná, Brazil

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**Background/Objectives.** The client (Site 1) was notified by the Municipal Environmental Agency of being responsible for the presence of a plume of chlorinated organic solvents in the groundwater at another area (Site 2) located downstream. The monitoring wells located on the border between the sites did not report contamination. The purpose of the study was to confirm if the contamination came from Site 1.

**Approach/Activities.** To find out whether the contamination came from Site 1, HRSC tools were used along with standard methods of investigation. Twenty-four (24) MiHPT drillings were performed, in line, following the border between the sites in order to have a dense vertical screening of the lithology, permeability and contamination. Two (2) Low level MiHPT drilling were performed, one at each end of this line, where the concentrations were lower. Direct push drillings were performed for soil and lithology description, aiming a better understanding and correlation of the High Resolution investigation results. Groundwater samples were collected via HPT-GWS, to quantify the contamination reported at the MiHPT logs. According to all these results, monitoring wells were installed at pre-determined depths and locations, and groundwater samples were collected and sent to the lab.

**Results/Lessons Learned.** MiHPT logs showed two main layers, the first one of higher relative permeability, that goes from the surface level down to 12 meters of depth. It was interpreted as a sandy-clay eluvium. Below that, there was a zone of very low permeability, composed by clay, containing high permeability sandy lenses and layers, varying from centimeters to one meter of thickness. That pattern was observed until the bottom of the drillings. MiHPT's detectors reported contamination starting at a depth of 16 meters and essentially correlated to these sandy lenses that occurs in the second layer. Analytical results of groundwater indicated concentrations of PCE, TCE, 1,2-DCE, 1,1-DCE and 1,1-DCA above the screening level. It was also found that the screen of the three (3) monitoring wells that existed in the area before this study were located on the first layer, or at the low permeability clay of the second layer, and that was the reason it wasn't reporting any contamination.