***Using Multiple Geophysical Methods to Better Understand Complex Subsurface Conditions at a Superfund Site***

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# Abstract

We conducted a multi-method geophysical investigation at a Superfund site that is underlain by a groundwater plume containing Tetrachloroethylene (PCE), Trichloroethylene (TCE), and daughter products contamination. The area is geologically complex, with Wissahickon Schist and Baltimore Gneiss underlying and Cockeysville Marble which is susceptible to karst. The geophysical investigation was conducted to characterize the top of bedrock to help the client understand possible groundwater and contamination transport pathways.

Four geophysical methods were used to characterize the subsurface conditions at the site, including horizontal-to-vertical spectral ratio (HVSR), multi-channel analysis of surface waves (MASW), electrical resistivity imaging (ERI), and induced polarization (IP). The site is in an urban setting with multiple underground and above ground utilities, and active, open to the public business which complicated data collection. The challenging site conditions made most of these methods difficult to collect, process and interpret. The MASW was collected using extended 2D geophone grids and proved effective at mapping the highly variable top of rock surface. The ERI and IP both added information about the soil variation across the site, and potentially imaged direct effects of the contamination plume. The HVSR was ineffective, likely due to both site noise and the complexity of the top of rock surface. In our presentation we will show how the multiple geophysical methods are combined with extensive borehole information to build a robust site model.