

KEYNOTE LECTURE: ERT time-lapse monitoring of a full-scale coal tar remediation

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In this work we evaluate the ERT time lapse monitoring as a complementary method to monitor the first full-scale application of Self-sustaining Treatment for Active Remediation (STAR) smouldering technology in real-time. A shallow treatment region (with ignition point at 2.4 meters below ground surface) was evaluated at an industrial site with coal tar contamination, and resistivity surveys were conducted before, during and after treatment to provide insight into the spatial extent of the STAR smouldering reaction, groundwater and gas mobility, influence of air flow and the capture zone of vapor extraction system. This research presents a proof-of-concept that ERT can be used to complement the conventional data set collected during application of STAR technology at remediation sites. Qualitative analysis of differential ERT images improves the understanding of the effect of STAR in the subsurface, in terms of the extraction system capture zone, air and groundwater mobility, and spatial extent of the smouldering reaction, when compared to analysing a conventional dataset (e.g. temperature, gas, in-situ boreholes). Geophysical data analysis helps to better understand and correlate data to physical processes. The results presented here are promising for future coupling of ERT to in-situ STAR applications especially in the case that the ERT measurements are deployed in a full 3D mode.

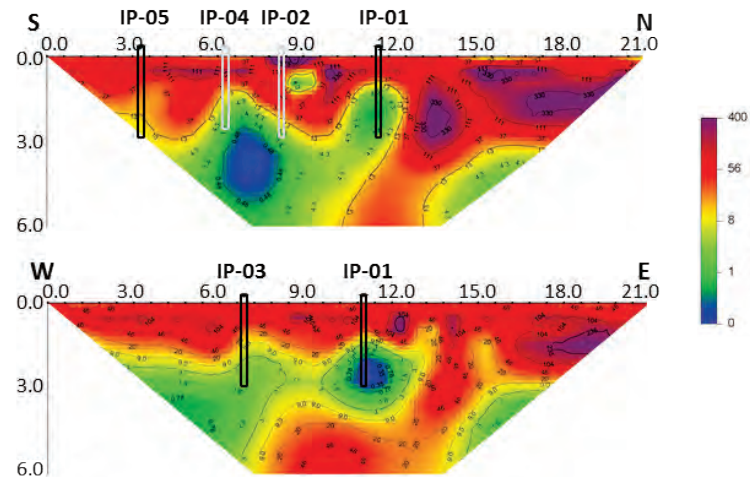


Figure: (a) Photo of ERT line (blue cable) installed on site. (b) S-N and W-E cross sections of ERT background independent inversion.