

COMBINED USE OF SURFACE AND BOREHOLE GEOPHYSICAL METHODS TO INFORM REMEDIATION AND MONITORING DESIGN DECISIONS

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The release of petroleum hydrocarbons from underground storage tanks is a common cause for remediation efforts. The total cost and time required to complete the remediation effort for a particular project is directly related to how well the site conditions are understood. This has made the process of developing a quality conceptual site model a critical early step for successful remediation of sites with karst topography or other complex geology. This case history will review how a phased approach of surface based geophysics, strategically placed confirmation borings, and borehole geophysical logging can greatly enhance the understanding of horizontal and vertical contaminant migration, resulting in improved remediation and monitoring design decision making. The first phase included a review of existing site information, e.g., geology maps, boring logs, etc., electromagnetic terrain conductivity mapping, ground penetrating radar imaging, and two-dimensional electrical resistivity imaging. Results provided refined understanding of the bedrock surface, identified potential lateral migration pathways, and guided monitoring well placement. The second phase involved geophysical logging of boreholes to provide insight into vertical migration pathways and to identify optimal screened interval depths for bedrock monitoring well construction. Borehole logging tools included caliper, EM induction, natural gamma, optical televiewer, acoustical televiewer, and heat pulse flow meter probes. This phased approach enables efficient and effective remediation to occur by refining the conceptual site model and guiding remediation and monitoring efforts.