GEOPHYSICAL INVESTIGATIONS FOR ENHANCEMENT OF SITE CHARACTERIZATION AND REMEDIATION PLANNING

Mike Law, DMT Geosciences Ltd, Calgary, AB, Canada
Jane Dawson, DMT Geosciences Ltd, Vancouver, BC, Canada

Geophysical investigations can be a powerful tool to explore and delineate physical properties of the subsurface. In the planning stage of remediation and reclamation, geophysics provides valuable guidance for borehole location, soil sampling, and delineating. Electromagnetic (EM) surveys are the most used preliminary geophysical methods to explore the terrain conductivity at a site of interest, but other methods, such as pseudo-3D imaging can provide high-value horizontal and vertical delineation at much greater depths, without many of the drawbacks and limitations of EM surveys.

This study focuses on a collaboration project between DMT Geosciences Ltd and two other consulting firms focused on historical oil and gas sites located in southern Alberta, where geophysics and previous soil sampling information was combined to inform a complex Phase II Environmental Site Assessment. Two sites are highlighted: one site with complex topography that relied heavily on geophysics for preliminary delineation of salt impact; a second site illustrates how pseudo-3D resistivity imaging captured salt impact that extended to depth, well beyond where EM surveys failed to delineate the true extents of impact.

This project demonstrates the effectiveness of strong collaboration between multiple consulting firms. Phase II borehole sampling from the environmental firm is compared with the most recent geophysical results to identify contours of resistivity / conductivity that suggest environmental significance for remediation planning. Both geophysical and borehole data previously acquired by other firms were incorporated into this study in order to best inform the most recent field-work and ensure the best possible assessment and remediation strategy is performed.