PROJECT BRIEF

GEOVision geophysical services

RESISTIVITY IMAGE PROFILING AT THE ST. LOUIS AIRPORT SITE

The Project

The St. Louis Airport Site (SLAPS) is one of four sites in St. Louis that are slated for cleanup under the Dept. of Energy's Formerly Utilized Sites Remedial Action Program (FUSRAP). SLAPS was contaminated as a result of activities conducted in the 1940s and 50s as part of the nation's defense program. Before cleanup, each site must be fully characterized to accurately asses the geological and hydrogeological characteristics, and the amount and type of contaminants. The Expedited Site Characterization (ESC) method was pioneered for the Department of Energy by Ames Laboratory of Iowa State University. It emphasizes a planned and concentrated coordination of all characterization steps. The ESC methodology was being demonstrated at SLAPS by the Ames Laboratory, especially its speed, to "serve as an engine for the field evaluation of a broad range of characterization technologies." The Resistivity Image Profiling (RIP) method was selected for demonstration by Agbabian Associates/GEOVision as an innovative, non-intrusive, surface geophysical method for subsurface geophysical characterization.

The Objective

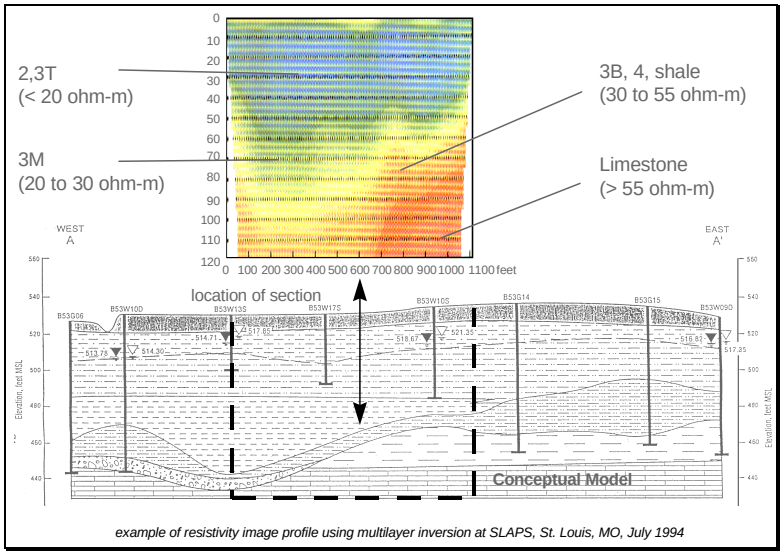
The principal objective of the RIP method at SLAPS was to confirm and/or supplement the geologic and stratigraphic information presently available for the unconsolidated sediments, with particular emphasis on the configuration and continuity of the confining clay unit ("aquitard").

Resistivity Image Profiling

The RIP demonstration at SLAPS utilized an OYO McOHM 21 Model 2116 for the resistivity measurements, and an OYO GeoElectric Scanner Model 2207A for automatic switching between measurement electrodes. Data was collected with 32 electrodes spaced 10 feet apart in a pole-to-pole array. The OYO instruments permitted automatic data collection from one end of the array to the other. The electrodes were then collected, and moved for another acquisition run until a total of 1,090 feet of data were collected. All of the field data was collected in a single day.

Analysis and Results

Post-processing of the measured potential data included noise removal, corrections for topography, remote electrode location and sensitivity adjustment. The 10-foot electrode spacing provided an approximate 120 foot profile depth. A linear filter multi-layer inversion was performed followed by a 2D finite element method (FEM) linear inversion, and finally color contour plotting. The color figure on this page illustrates the results. For applications like this, RIP offers rapid, high resolution, non-intrusive method for characterizing the subsurface resistivity.



example of resistivity image profile using multilayer inversion at SLAPS, St. Louis, MO, July 1994