Consulting Engineering • Testing • Inspection • Analytical Laboratory Services
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ELECTRICAL RESISTIVITY IMAGING

CTL ENGINEERING HAS THE ABILITY TO PROVIDE GEOPHYSICAL TESTING INCLUDING 2D & 3D ELECTRICAL RESISTIVITY AND INDUCED POLARIZATION SURVEYS TO ASSIST IN PERFORMING NON-DESTRUCTIVE SUBSURFACE EXPLORATIONS.

2D & 3D ELECTRICAL RESISTIVITY IMAGING:

Electrical Resistivity Imaging (ERI) is a geophysical technique used to create an image of a specific portion of the Earth's subsurface. ERI may be used to locate and/or identify features, such as karst, voids, buried structures, tanks, differing geology, groundwater sources, burial plots; as well as analyses of volumetric aggregate resources, aquifers, and bedrock features. Imaging is created through the use of geophysical instruments that gather thousands of resistivity measurements via an electrode cable and multiple electrodes.

ERI involves measuring the resistivity of the earth along a single profile or a series of profiles. For each profile, a number of stainless steel electrodes are driven into the ground at evenly spaced intervals. The length of profile, depth of penetration, and resolution determine the electrode spacing, which can be anywhere from a few feet to several hundred feet or more. When increasing electrode spacing, it enables measurements of greater depth; but in contrast, reduces the resolution of the imaging. Resistivity measurements are made by placing a known current (measured in milli-amps) into the ground using two electrodes. The resulting potential (measured in milli-volts) is measured between two other electrodes. By changing relative positions between the potential and current electrodes, different resistivity measurements can be made using different electrode array configurations. Common arrays include Wenner, Schlumberger, pole-dipole, and dipole-dipole.

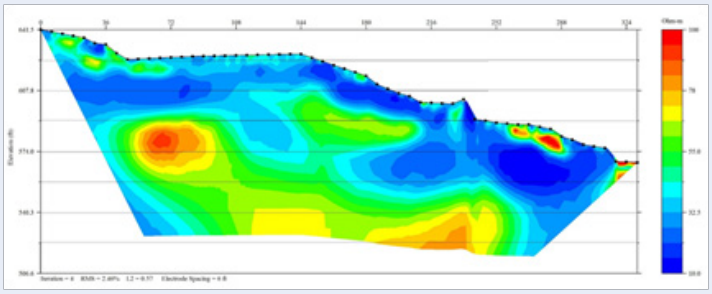
When the electrodes are installed, they're used to build up an image of the subsurface. We can create two or three dimensional resistivity images, depending on the survey conducted. Time-lapsed biological or hydrological events may also be captured. Surveys may be conducted on level ground or rolling hillsides and imaging can be adjusted for the ground topography

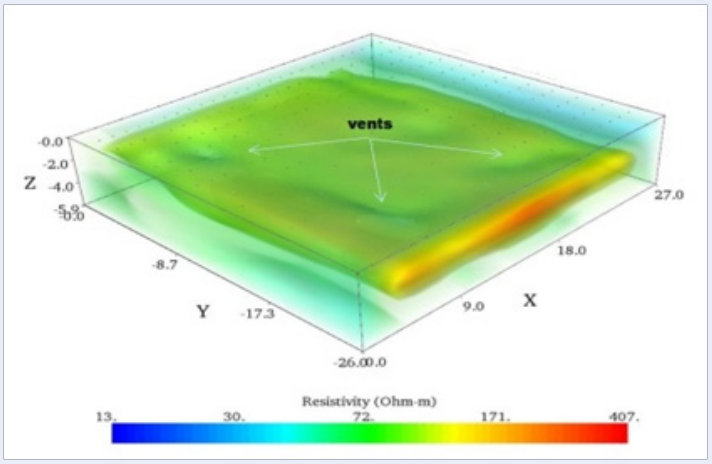
Once the raw apparent resistivity data sets have been acquired, they will be processed using inversion techniques and the data will be examined for anomalous values, invalid data caused by noise, cultural interference, or poor ground contact by the electrode. Once the profiles are inverted and the data sets adjusted, the images are plot for each profile.

INDUCED POLARIZATION:

The Induced Polarization (IP) response reflects the degree to which the subsurface soils are able to store electrical charge. The polarization results from a redistribution of ions along fluid interfaces following application of an electric current. This current is measured and analyzed to help identify mineral components of the subsurface soils and rock. IP can be used to explore for ore, identify clay content and pore fluid composition, as well as to map subsurface contamination.

By providing a more accurate, non-destructive profile of the underlying soils, ERI and IP can provide information that will decrease the risk associated with unknown subsurface conditions and furthermore provide thousands of dollars in materials costs savings.





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