

## Applications

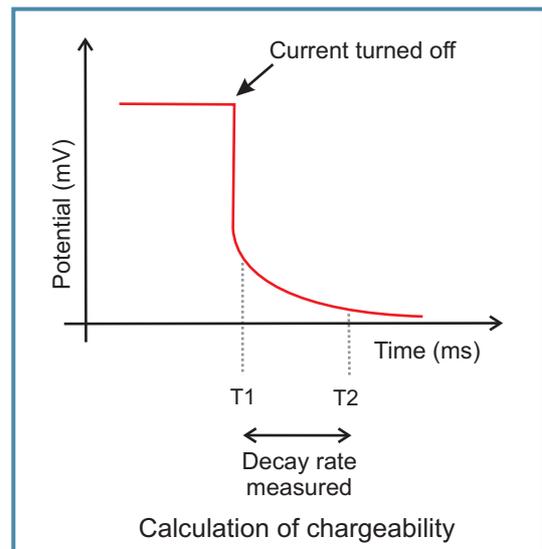
- ✓ Landfill Investigation
- ✓ Mapping and monitoring leachate plumes
- ✓ Mapping and monitoring of groundwater pollution
- ✓ Determination of depth to bedrock
- ✓ Locating sinkholes / cave systems
- ✓ Stratigraphic mapping
- ✓ Locating buried channels
- ✓ Mapping buried dykes and other ore bodies
- ✓ Locating fissures, faults and mineshafts
- ✓ Buried foundation mapping
- ✓ Time-lapse infiltration studies
- ✓ Assessment of aquifer heterogeneity

## Basic Theory

Induced polarisation (IP) imaging is a complementary technique to electrical resistivity imaging and is concerned with the capacitance of the subsurface. The subsurface has the ability to both dissipate (resistance) and store (capacitance) the energy associated with an electric current flowing through it. Resistivity imaging measures how much energy is dissipated by the subsurface, whilst IP imaging measures how much energy is stored.

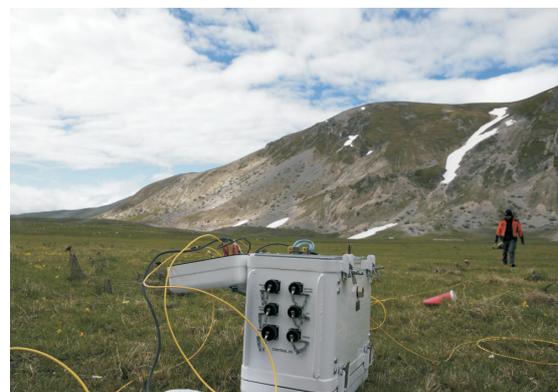
The capacitive action of the subsurface is evaluated by determining its chargeability. When a current is passed through the subsurface, a small charge is stored and the subsurface becomes charged. When the current is turned off, this charge decays with time and this decay is seen in the recorded potentials. By measuring the rate of this decay it is possible to calculate the chargeability of the subsurface.

Two materials that possess the same resistivity might possess contrasting chargeabilities. As such, IP imaging can provide additional discrimination of subsurface materials.



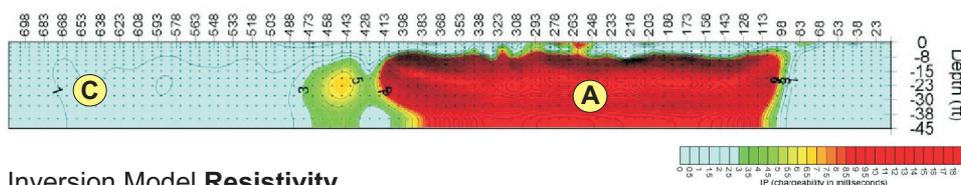
## Data collection and presentation

The equipment used in IP surveys is similar to that used for electrical resistivity, with measurements being made of both the resistivity and chargeability of the subsurface. The survey typically comprises a number of ground electrodes in deployed an array connected to a computer controlled multi-channel receiver as shown **right**. Data from IP surveys is commonly presented as one cross-section for resistivity and one for chargeability. The data example **below** shows data from a resistivity/IP line across a buried landfill site. In this example the delineation of the landfill boundary from the IP survey is much more defined.

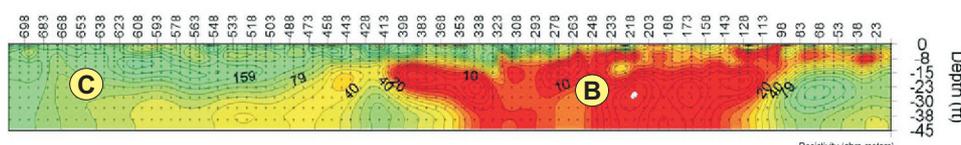


Deployment of electrical imaging equipment

### Inversion Model IP



### Inversion Model Resistivity



### Features

- A** Well defined elevated IP response mapping extent of landfill waste
- B** Broad low resistivity anomaly correlates to IP data
- C** Undisturbed ground