

Self Potential (SP) and Direct Current (DC) Electrical Methods for Leak Detection

Gannett Fleming's Quantum Geophysics Division (Quantum) utilizes SP and DC electrical methods to locate leaks. SP is especially useful in locating leaks in buried water lines and earthen structures, such as dams and levees. Because of the ionic nature of water, moving water creates a small electrical current that can be detected using porous-pot electrodes and a high-impedance volt meter.

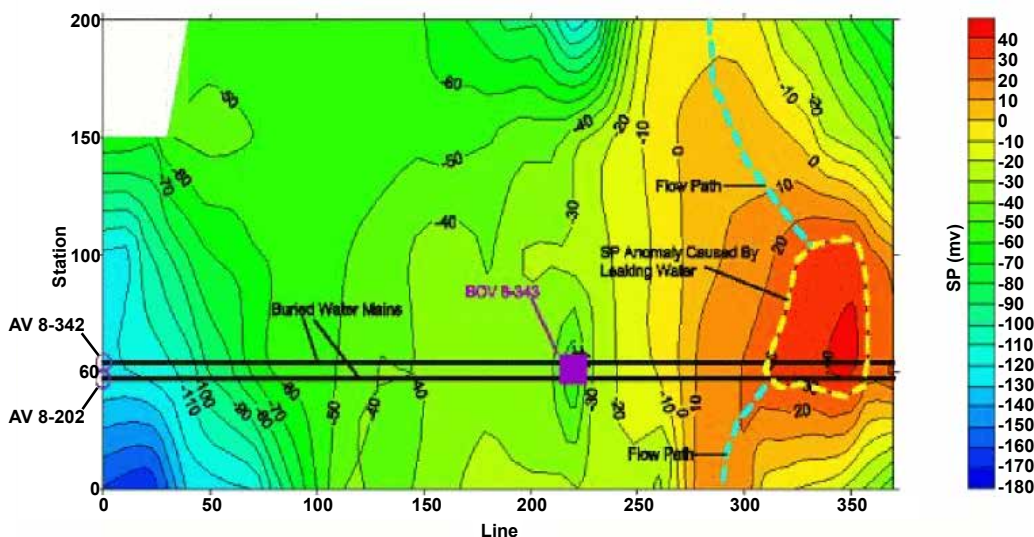
DC electricity is used to identify leaks in liners and geomembranes. If fluids are present within the secondary containment system, a 12-volt, deep-cycle, marine battery provides sufficient current.

To test the integrity of a liner (e.g., comply with permit requirements or upon installation), Quantum utilizes a power supply that outputs upwards of 200 volts at two amps. The meter and test electrodes are mounted on a floating platform and swathed side-to-side, monitoring the meter for sudden changes in signal amplitude. The maximum response, which is the greatest potential difference, occurs when the test leads are oriented perpendicular to the equipotential field lines associated with the break in the liner.



Other Applications:

- Map geothermal resources
- Map underground fires
- Identify mineral resources
- Evaluate karst
- Determine preferential flow paths.



This SP contour map shows an anomaly (high SP measurements) caused by water leaking from a buried 36-inch water line at a major reservoir. The dashed light blue lines indicate the path of water movement.