

CASE HISTORY

Application: **Mining and Minerals**

Technology: **Probe suite (see below), 2000m Winch**

Location: **Zinc-Lead-Silver Mining in County Limerick, Ireland**

Background:

Robertson Geo engineers participated in a scout drilling programme investigating deep zinc-lead-silver mineralisation deposits on the Rathkeale block in the south of Ireland. Zinc is an important mineral for a range of industries, acting as a sacrificial metal which is preferentially eroded versus iron, forming a protective oxide layer. It is also used for cathodic protection and the production of various battery types.

Requirement:

Robertson Geo Services (RGS) were contracted by Aurum Exploration to conduct downhole geophysical surveys on two deep boreholes using a suite of probes.



Equipment:

The following probes were conveyed using a Robertson Geo 2000m Winch: **Full Waveform Triple Sonic:** to determine formation P and S wave velocities. **Magnetic Susceptibility:** to detect ferromagnetic and paramagnetic minerals. **Focussed Electric (Guardlog):** measures focussed formation resistivity. **Dual Focussed Induction:** measures medium and deep focussed formation conductivity.

In addition to the above measurements, natural gamma profiles were recorded by the probes, a key indicator of strata boundaries. All probes underwent calibration and conformance checking prior to deployment on site.

Operations:

Two deep boreholes were logged in two separate visits, with the logging team mobilising from North Wales by ferry to Ireland each time. The first visit followed a week of storms in the area and the logging vehicle needed assistance to access the drill location by the on-site team due to the deep mud. The second visit, characterised by dry weather, meant the engineers could drive easily to the borehole. All equipment and probes were surface tested before operations commenced and depth was referenced to ground level. The drilling had identified several weak zones where borehole collapse was possible. This was mitigated by leaving the drill string in the borehole and only withdrawing it in stages (casing pulls), using the drill casing to protect the weak zones, presenting the engineers with sections of stable open borehole. Overlaps and repeat runs were conducted to provide continuous logs and to confirm data veracity.

Challenges and Solutions:

The main operational challenges were the ground conditions resulting from the weather on the first visit and the potential for borehole collapse from weak zones in the formation on both visits. The multiple probe runs resulting from using casing pulls were subsequently combined in processing to give continuous profiles.

End value to client:

The geophysical borehole logging data collected provided continuous profiles of calibrated data. This could be used to correlate to ore deposits identified through assaying of the core samples and to convert seismic reflection TWTT to depth, as well as identifying strata boundaries.