

A formation density tool to measure formations from within reverse circulation drilling rods

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ABSTRACT

Wireline density measurements in mining exploration and development are one of the most important measurements made. Amongst other uses, a good density measurement is used in many sectors of the mining industry for reserve estimation. Currently density is primarily measured in an open hole, using a compensated density tool. In cases where a field is prone to hole collapse due to unstable ground conditions, large portions of the resource may go unmeasured; and in active mine situations, geologists can be wary of running density tools in open hole due to the potential of losing the tool and the associated radioactive source in the ground, thereby causing complications in mine development. Whilst conventional logging tools can be adapted to provide an environmentally corrected density measurement through single wall drill rods they cannot be adapted for measuring inside Reverse Circulation (RC) drilling rods for a number of reasons.

In this paper we will discuss the successful development and field trials of a density tool and environmental corrections to enable a density measurement to be made through RC rods. As with open-hole density measurements, quality control is important; the paper examines how environmental factors affect the measurement and how quality control cut-offs can be applied.

The success of the tool has implications for the planning of resource definition programs as more data can be recovered in areas with unstable ground conditions and the loss in hole risk associated with radioactive sources prohibits density tools being run in an open hole environment.