Coiled tubing drilling and real-time sensing — Enabling ‘prospecting drilling’ in the 21st Century?

Minerals keynote paper

Richard Hillis
CEO of the Deep Exploration Technologies CRC
RichardHillis@detcrc.com.au

SUMMARY

New Tier 1 discoveries are critical to maintaining Australia’s mineral resource inventory without continuing decline in the grade of mined resources. Such discoveries are becoming less common because, increasingly, remaining prospective, under-explored areas are obscured by deep, barren cover. Improving the rate of Tier 1 discoveries requires a step change in mineral exploration techniques that may be provided by ‘prospecting drilling’, i.e. extensive drilling programs that map mineral systems beneath cover, enabling geophysical and geochemical vectoring towards deposits during a single drilling campaign. The rationale for ‘prospecting drilling’ is provided (i) a dataset of antimony from the Kalgoorlie district of Western Australia, and; (ii) analysis of hypogene alteration systems of IOCG deposits in South Australia. The technological platform for ‘prospecting drilling’ must include low cost drilling due to the dense subsurface sampling required. This may be provided by transferring coiled tubing (CT) drilling technology, with its continuous drill pipe on a reel, from the oil and gas sector. CT drilling can be complemented by real-time downhole and top-of-hole sensing providing petrophysics, structure/rock fabric, geochemistry and mineralogy. The first manifestation of real-time, downhole sensing is DET CRC’s newly developed autonomous sonde that is deployed by the driller and logs natural gamma radiation as the drill rods are pulled. Experimentation on real-time, top-of-hole sensing (on drill cuttings from diamond cored holes) has successfully demonstrated geochemistry and mineralogy determination with the necessary depth-fidelity. At the target cost of $50/metre, CT drilling could cost-effectively undertake ‘prospecting drilling’ in large, covered provinces such as the IOCG-prospective Gawler Carton of South Australia.