

DISCOVERY CHALLENGES WITH DEEPER ORE BODIES.

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ABSTRACT: A significantly improved discovery performance is required of the World's mineral exploration teams if the present inventory of identified economic mineral resources is not to be seriously depleted as the demand for mineral commodities rapidly escalates over the coming decades, as seems likely. Unfortunately, most of the supposedly 'easy-to-make' discoveries of, for example, very large copper, gold-copper, and gold ore bodies have almost certainly been made, and future discoveries of these types are undoubtedly going to be much less 'obvious', prior to discovery, than in the past.

To satisfy the reserve-replacement challenge, the mineral exploration industry will need to target and discover very large ore bodies that can be mined using very large-scale (mass), open pit and underground mining techniques. Increasingly in mature exploration terranes, and possibly elsewhere in less explored areas, these deposits will be located in the 'deep earth' environment, where mining will be conducted at depths below surface down to about 1500 m, presently; but probably extending to 3000 m over time, as mass underground mining technologies advance. Inevitably, the depth to the top of some of these ore bodies will be beyond the economic capacity for open pit mining, even with 'ultra-deep' open pits, and 'super-cave' underground mines of an order-of-magnitude larger scale than any present cave mine will be required.

There is no obvious reason to expect that deposits of this type will not be discovered, provided the mining and exploration industry has an enlightened approach to the challenge. The discovery histories of the Cadiaporphry gold-copper deposits in Australia demonstrate that the challenges of successfully exploring in the 'deep earth' environment are not insurmountable. They also provides insights that can be used to guide future successful exploration, as do the 'business' approaches to discovery practised by successful mining companies in the past; but which are being subsumed at present by the increasing corporate desire to manage, rather than lead, discovery. Few mining company boards, CEOs and senior managers understand the discovery process in mineral exploration and have the capacity and skill to facilitate discovery; exceptions occur, but they are not common.