Striving to re-enter the 500 Orebody: Informing project and operational risk with trial development

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ABSTRACT

The 500 orebody (500OB), was mined from 1962 to 1969 in the upper levels of the Mount Isa Copper Operations by sublevel caving and block caving. A deep leaching profile created operational challenges for miners including hot ground and high temperatures caused by oxidation, reactive ground incidents with nitrate-based explosives, ground control difficulties due to the weak rock mass, and irregular cave propagation and flow. Although high grade copper remained, the described challenges, together with potential subsidence impacts on the main shaft, resulted in the mining focus shifting to the 1100 orebody.

Several previous studies have considered the operational challenges presented by the orebody too high, and the project has not progressed. Facing a declining life of mine, and with improved resource confidence from drilling, Glencore's Mount Isa Mines is now undertaking a pre-feasibility study to re-enter the 500 orebody and extract the material below the historic cave. A core activity of the study was to undertake trial development mining into the highly leached zone of the orebody below the planned cave with the intent of testing the effectiveness of various identified controls to manage the hot and reactive conditions, the weak rock mass, and generate cycle time data to validate assumptions.

The trial consisted of 80 metres of development both across and along the bedding strike and included turnouts and intersections to observe performance. Various ground support products, oxidation inhibitors, and stabilisation methods were trialled while gathering atmospheric data to inform ventilation modelling and design. This paper provides a brief history of the operation, challenges, and subsequent study activities for 500 orebody, before describing the scope, method and results from the trial mining activities.