Learnings from re-orientating the Ernest Henry sublevel cave

E Zhang1, M Spurway2 and M Bouwmeester3

1. Mining Engineer, Evolution Mining, Cloncurry QLD 4824. Email: eddy.zhang@evolutionmining.com

2. Mining Engineer, Evolution Mining, Cloncurry QLD 4824. Email: michael.spurway@evolutionmining.com

3. Mining Engineer, Evolution Mining, Cloncurry QLD 4824. Email: matt.bouwmeester@evolutionmining.com

Keywords: Sublevel cave, mine planning, production engineering, drill and blast

# ABSTRACT

The Ernest Henry Operation (EHO), situated in Queensland, Australia, first commenced commercial production in 1998 as an open pit mine before transitioning to underground mining in 2011. Its primary orebody consists of an inclined Iron Oxide Copper Gold (IOCG) deposit and the mine employs the sublevel caving method for ore extraction, facilitated by a dedicated hoisting shaft with an annual capacity of 6.8 million tonnes. Current mining at EHO reaches 800 meters below surface, with an ongoing feasibility study evaluating a mine extension to over 1100 meters.

The sublevel cave at EHO traditionally follows a longitudinal layout, however the changing shape of the orebody at depth, narrowing from East to West and elongating from North to South has introduced challenges such as reduced ore drives, ventilation issues, ground instability, and excessive tramming distances. To mitigate concerns, a re-orientation to a transverse layout was proposed. After a comprehensive planning process (Savage et al, 2022), a hybrid design at the 1200 level and a full reorientation to the transverse layout on 1175 level and below was implemented.

This paper explores the operational and technical insights garnered throughout the re-orientation of the Ernest Henry sublevel cave. Throughout this transformation, a diverse range of operational challenges were addressed, which include recovering from a heavy rain event, managing complex drill and blast challenges, dynamically responding to seismic activity, prudently managing water-bearing structures, and improving overall loader productivity.

The depth and breadth of these insights highlight the complexity and achievement of re-orientating the SLC. By proactively learning from these experiences, EHO aims to enhance the overall safety and productivity of the operation, maximising its value and ensuring success in the long term.