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Mt Wright – Geotechnical Learnings from a Sub Level Shrink

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ABSTRACT

The Mt Wright Underground Mine is located near the town of Ravenswood in North Queensland and is operated by Carpentaria Gold – a wholly owned subsidiary of Resolute Mining Limited.

The implantation of the world's first Sub Level Shrinkage (SLS) mine from a traditional Sub Level Open Stoping operation has proven to be a geotechnical challenge which has required tailored solutions to overcome unique issues. This paper will be broken into two distinct sections that will outline;

1. A brief overview of the mining method and how the decision to implement SLS method was made,

2. How the SLS is managed and key geotechnical learnings.

The story of the world's first SLS originated from the need of a bulk mining method to ensure the viability of Mt. Wright into the future. Traditional bulk mining methods such as; Block or Sub Level Caving were ruled out quite early due to the low natural 'cavability' of the orebody and existing major infrastructure (Decline, Ventilation Rises and Egresses) being located within 20m of the orebody. The first section of the paper will outline the key geotechnical information that helped decide the SLS method in addition to how continuous backfill influenced the design.

The second section is intended to address issues that the geotechnical engineers encountered since the inception of the SLS. The feature topics of this section are ground stress and the oxidising rock mass. Both of these topics played a major part in ground support design and greatly limited what support elements that could be used. However, it is stress alone that has had the biggest influence on mining production. As like most bulk mining methods, Mt. Wright had success when the production front was running parallel to the stress (production front being 'shadowed' from the stress). This was until a design change, forced by a splitting ore body resulting in this shadowing effect becoming harder to achieve. This in turn made the production cycle longer and targets harder to achieve, particularly with an increase in site specific safety controls that are unique to Mt. Wright.