

Continuous Improvements in Mine Geology at Kanmantoo

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ABSTRACT

Hillgrove Resources (HGO) commenced open pit mining in 2011 and implemented an industry standard blast hole samples, ordinary kriging grade control block out method. Reconciliation against mine and mill showed this process to result in significant mis-classification of ore and waste. At the Mining Geology Conference in 2017 the Company presented the results of introducing a more appropriate grade control process for the style of geology. Since the implementation of the new process in March 2016 the mine to mill reconciliation has averaged +3% Cu metal. With confidence in the grade control practices and the elimination of fighting mine vs mill 'spot-fires', focus has been able to turn to continuous improvements.

In mid-2017 the concept of utilising portable x-ray fluorescence (pXRF) for blast hole sample assaying was investigated. Despite a clear benefit to costs, the accuracy and reliability of the pXRF assaying method on blast hole cuttings is often a concern for grade control purposes. However, after ensuring the correct calibration of the pXRF process for the Kanmantoo mineralisation through various trials, the company has successfully implemented a pXRF grade control process and reduced costs by over \$1m p.a. The geology department has since experienced continued excellent mine vs mill reconciliation.

In early 2018 the Company investigated the causes of the empirical observation that historical sulphide waste dumps were not generating any Acid Mine Drainage (AMD). Test-work showed that pyrrhotite and almandine, common minerals in Kanmantoo waste rock, had beneficial impacts on acid generation capacity and neutralisation capacity respectively, and it was found that common AMD testing methods undervalued the effect of these minerals. Rigorous test work resulted in Non-Acid Forming (NAF) waste rock at the Kanmantoo mine being re-classified as <0.6% wt% sulphur, compared to the previous <0.3% S. This is a significant result allowing a substantial increase in NAF rock volumes for rehabilitation purposes.

This paper will provide summaries of the continuous improvements able to be investigated and then implemented as a result of having a reliable grade control process.