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Future exploitation of the north leader conglomerate at no: 5 shaft of Blyvooruitzicht gold mine, South Africa

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Blyvooruitzicht Gold Mine (BGM) has been established within the west wits line of the Witwatersrand basin. There are three renowned auriferous horizons at BGM such as North Leader (NL), Carbon Leader (CL) and Middelvlei (MR). Massive gold exploitations have been conducted from CL and MR using both long wall and scattered mining methods respectively. As for NL conglomerate, no mining activities have taken place as yet and this was impeded by the findings from previous studies that had shown that gold grades were generally less than 0.5 g/t. Recent studies were conducted on NL based on drill holes and development sampling and the results have revealed great potentials that warrant future exploitation. BGM employed scattered mining method for stope areas with erratic gold values such as those of the Middelvlei reef. The introduction of scattered mining method has resulted in unacceptably high stress levels and Energy Release Rates (ERR) at BGM. BGM called for a more amenable mining method due to highly inconsistent gold grades as well as the presence of multiple geological anomalies. The purpose of the study was to establish a mining method suitable for exploitation of the NL conglomerate, considering the erratic nature of the reef. The methods used were diamond drilling, core logging, core sampling, development sampling (bulk sampling), fire assay and inverse distance of power using Datamine Studio 3.21. Results from the study conducted showed erratic trend with high gold values being in association with carbon seams and fine pyrite. Sequential grid mining method was suggested for exploitation of this ore body due to erratic nature of the grades as well as the safety of this method. The proposed mining method is envisaged to provide regional support on stabilizing pillars and to serve as bracket pillars to support major geological structures, hence keeping ERR and Average Pillar Support (APS) within allowable levels.

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