

ABSTRACT

Venetia Mine is the largest diamond mine for the De Beers Group of Companies (DBGC) in South Africa contributing approximately 80% of revenue for the company. The Venetia Kimberlite Cluster (VKC) comprises of 13 pipes and one dyke, of these K01, K02, and K03 are mined productively while the satellite bodies that are intersected during waste stripping and push backs are stockpiled separately.

The current open pit operation will come to an end in 2022, whereupon the K01 and K02 ore bodies will be mined from underground. Shaft sinking and development of underground infrastructure is underway, and it is envisaged that the change over from open pit to underground will be effected in 2022.

There are two challenges facing the company that may result in a production hiatus in 2019 and 2022. The first challenge relates to failure to open kimberlite ore in the Cut4 south push back by 2019 and the second one is failure to seamlessly change from open pit to underground in 2022 when the open pit reaches its Life of Mine (LoM).

The backlog of waste stripping in the Cut4 south and technical challenges faced in the implementation and execution of the Canadian Shaft Sinking method at Venetia Mine have both pointed to periods where there will be less ore mined thus resulting in less carats recovered. In order to cushion for these scenarios, the economic viability of K04 satellite pipe was investigated by conducting a Whittle optimum pit selection of the pipe to mine the ore. This was previously excluded by the current pit design.

The strategy for K04 optimum pit selection was based on net present value (NPV), revenue factors, stripping ratios, and the life of the mine. This strategy was employed when analysing 13 pits from scenario 2. The selection process identified pit 9 as an optimum pit. It must be noted that this pit inventory does not add significant numbers of carats to the overall carat profile to lift the valley of despair in 2019 and 2022 but will contribute some NPV of ZAR13.2 million over a period of 6 years.

K04 project will contribute 402 thousand carats against 1.5 million carats required to fill the hiatus gap, hence does not support a sound business case for Venetia Mine. It is therefore recommended that DBCM deploy a different strategy to reduce the impact of the carat shortfall in 2019 and 2022.

Some recommendations include reducing mining activities in the north of the pit and focus more on accelerating waste stripping in the south in order to expose ore sooner. Cost saving initiatives such as reducing operating costs and postponing some capital projects that are deemed not urgent will go a long way in the reducing the financial impact in 2019 and 2022.