

Paper Number: 5179

## **11Brownfield Exploration as a Strategic Initiative to Reviving Non-Operational Gold Mines in the Central Rand**

Swart, M.<sup>1</sup>, Harford, P.<sup>2</sup>, Weise, S.<sup>3</sup> and Schweitzer, J.<sup>3</sup>

<sup>1</sup>PrSciNat, Shango Solutions, [manie@shango.co.za](mailto:manie@shango.co.za).

<sup>2</sup>West Wits Mining Ltd, Australia.

<sup>3</sup>PrSciNat, Shango Solutions.

---

Exploration activities play a key role in extending the life of mine, and factors such as the mounting unit discovery costs for gold have caused mines across the Central Rand Goldfield, South Africa, to progressively slow and cease mining operations. Furthermore, illegal mining across the Rand detrimentally impacts economic and social aspects in the surrounds. Advancements in resource estimation techniques, such as kriging, and data management practices, enabled the refinement of unmined Mineral Resources. This presents immense potential for reviving mining operations, particularly concerning the lower grade, shallower reefs that had been previously neglected.

In April 2015, following the sourcing of a considerable amount of historical trench and face sampling and borehole data, Australian Stock Exchange listed West Wits Mining Limited (WWI) successfully renewed a prospecting right over the decommissioned former Durban Roodepoort Deep (DRD) and Rand Leases gold mines. These mines, which are situated in an area with well-developed infrastructure about 15 km west of Johannesburg city centre, closed unexpectedly in 2001. At the time, the JORC (1997) Code compatible Inferred, Indicated and Measured Resources accessible by underground mining, amounted to 398 800 kg of gold (12.82 Moz) at an average grade of 4.54 g/t. Opencastable resources totalled to 1.69 Moz. These resources were spread over seven reefs (Bird, K9B, K9T, Leader, Main, South and VCR). The pre-resource estimate (equivalent to an Exploration Target) amounted to 4 048 000 kg at a grade of 4.29 g/t. At that time, flooding of the mine had commenced and the water level stood at 1 451 m below surface (mbs). Pumping of water from the DRD compartment void ceased in 2001 and the water level rose steadily. In 2010 all pumping on the Central Rand discontinued and the entire void began to flood. After several delays, the Department of Water Affairs tasked the Trans Caledon Tunnel Authority to institute renewed pumping and partial water treatment at East Rand Proprietary Mines. The water level rose to approximately 180 mbs at DRD, but with the commencement of pumping, it was down to 192 m below surface. The long-term plan is to lower the water level to 400 mbs.

Following acquisition of the right, WWI recalculated the historical DRD (2000) JORC (1997) [1] compatible resources taking into account the changed water level and the updated JORC (2012) [2] code. This resulted in the definition of over 37 000 kg of gold (1 200 000 oz) to a depth of 400 m, at an average grade of 3.45 g/t using a cut-off of 2 g/t. An estimate of the Bird Reef on its own, employing the extensive historical underground face-sampling database, yielded approximately 3 300 kg (107 000 oz) of gold at an average grade of 5.1 g/t, using a cut-off grade of 1 g/t for open pit mining and 2 g/t for the underground areas. Exploration targets were defined for the Main, Main Reef Leader, South, Bird and Kimberley reefs. Employing all historical and current drilling data, an Exploration Target for the Bird Reef was estimated and exceeds the original DRD (2000) JORC (1997) compatible Bird Reef Mineral Resource estimate.

WWI intends to upgrade the defined Exploration Targets to JORC (2012) compatible resources through on-going exploration activities, predominantly drilling and trenching. Thus, considering the ever-changing landscape on the Rand, the creation of jobs and integration of community, technology and data will result in an economically productive environment.

*References:*

[1] The JORC Code (1997) Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Mineral Council of Australia: 43pp

[2] The JORC Code (2012) Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Mineral Council of Australia: 44pp

