

Paper Number: 4933

THE GEOLOGICAL SETTING OF THE MERENSKY REEF AND ITS RELEVANCE TO MINING OPERATIONS – ROYAL BAFOKENG PLATINUM, STYLDRIFT

Vermeulen, G.J.¹ Du Plessis, G.P.²

¹Royal Bafokeng Platinum, The Pivot, 1 Monte Casino Boulevard, Fourways, Email jacov@bafokengplatinum.co.za

²Earthlab Technical Division, 7 Taylor Road, 968 Casabella Estate, Honeydew Manor.

The Merensky Reef of Royal Bafokeng Platinum (RBPlat) is located in the Northwest Province, 30 kilometers northwest of the town of Rustenburg in the Republic of South Africa. RBPlat owns the mineral rights equal to 67% (undivided) on the farms of Boschkopie 104 JQ (Boschkoppie), Styldrift 90 JQ (Styldrift) and some adjoining portions of the farm Frischgewaagd 96 JQ.

The Merensky Reef is a narrow tabular ore body interbedded in the Rustenburg Layered Suite (RLS) of the Bushveld Complex's Upper Critical Zone. The depositional environment(s) of the economical Merensky Reef present within the mining lease area primarily determined the dip, dip direction and planarity of this orebody being developed and mined. During and concurrent with the reef deposition and mineralisation, the associated stratigraphic sequences of the geological succession underwent structural deformation affecting the continuity of the reef and its immediate and far away hanging-walls and footwalls. Trends in the physical characteristics including the stratigraphy of the geological succession and styles of mineralisation were recognized and mapped, which enabled the classification of different reef types into significant areas of similarity. The division of the mining lease area into 7 unique geological facies, which are also modelled as geostatistical domains, forms an integral part of the resource estimation process.

Locally the Merensky Reef occurs within the regional transition from the Rustenburg to the Swartklip facies situated on the farm Styldrift. The 7 local Merensky Reef facies constitute from west to east: Abutment Reef, Terrace Reef, Central Reef, Transition Reef, Normal Reef, Normal Thick Reef and Main Reef. The regional facies transition is evident in marked differences in the physical nature of the reef types, discontinuities in the footwall sequence of the geological succession, marked differences in the footwall lithological thicknesses and variations in the style of mineralisation. The following geological observations mark the regional facies transition:

- Marked difference in the thickness of Merensky, Bottom to Top Reef Contact.
- The start of where the Rustenburg facies transition into the Swartklip facies is marked by the occurrence of the FW1 Upper sequence below the Normal, Normal Thick and Main Reef facies. The planarity of the reef improves with the FW1 Upper sequence (thick poikilitic anorthosite) present, and associated decrease in the frequency of potholes occurrences.
- Negligible mineralisation in the immediate footwall is typical of the Swartklip Facies.

- Shift in mineralisation distribution from footwall dominant to only in or around the Top Reef Contact (Main Reef).
- Marked difference in the thickness from FW6 to the Bottom Contact of the Merensky Reef; the presence of FW1 Upper marks this thickening of the immediate footwalls.
- Marked difference in the thickness from the Upper Group Number 2 (UG2) chromitite seam to FW10.

Due to the consistent approach of exploration and mining geology, the collation of fresh geological data into an environment of pro-active interpretation, develops our understanding of the physical nature of the Merensky Reef, which in turn allow to put the most effective mining model around the reef for optimal extraction of the economical minerals present.

