Geological Setting

Bafokeng Rasimone Platinum Mine (BRPM) is situated in the western limb of the Rustenburg Layered Suite (RLS) of the Bushveld Igneous Complex (Figure 1). The RLS is probably the largest mafic-ultramafic complex in the world and covers an area of 65 000 km² (Cawthorn et al., 2000). The complex is host to the world’s richest platinum group element ore bodies, namely the Merensky Reef and UG2. The Bafokeng Rasimone Platinum Mine (BRPM) mining lease area is found 30 km NW of Rustenburg on the Boschkopje farm. It is situated in a particularly interesting position because in this mine there is a transition from the Rustenburg to the Swartklip Facies and it is also found 10 km south of the Pilanesberg Complex which forms a topographic feature.

SIMPLIFIED GEOLOGICAL MAP OF THE BUSHEVLD COMPLEX

![Geological map of the Bushveld Complex showing the different limbs of the Complex. BRPM is highlighted in red in the map.](image1.png)

Methodology

THE FOLLOWING TASKS HAVE BEEN DEFINED:

- Collect samples from BRPM
- Photograph the samples prior to further processing
- Petrographic descriptions (hand samples, thin sections and analytical methods)
- Analyse for the mineral properties and bulk rock geochemistry using different analytical methods such as Electron Microprobe, X-Ray Diffraction (XRD) and X-Ray Fluorescence (XRF)

The Merensky Reef

The Merensky Reef has been described by Underwood and Walters (1969) to form the basal portion of a cyclic unit starting with the footwall norite that is overlain by the Bottom Reef Chromitite (Figure 2). This is succeeded by the pegmatoidal feldspathic pyroxenite and the Top Reef Chromitite layer. Above the Top Reef Chromitite the hanging wall consists of feldspathic pyroxenite. The bottom chromitite layer is 5-15 mm thick while the top chromitite layer is 20 mm thick (Vijjoen et al., 1969). The Merensky Reef as a unit has an average thickness of 20 centimeters.

![Photomicrographs (PPL-XP pairs) showing the transition from the Bottom Reef Chromitite (a-b) into the Pegmatoidal Pyroxenite (c-d). FOV = 3mm.](image3.png)

There is normal facies Merensky Reef and pothole facies Merensky Reef. Pothole facies occurs when the reef rolls down into its underlying stratigraphy. There are also potholes in which the reef disappears completely, these are termed ‘catastrophic potholes’. Around the potholes the reef becomes thinner up to a point where only the bottom chromitite layer remains. The abutment facies type is found in the NW block at BRPM, in this facies the reef is only developed in pockets or depressions.

![Shows the local stratigraphy and the nomenclature utilised at BRPM](image4.png)

REFERENCES