

SEG 2024 Conference: Sustainable Mineral Exploration and Development

The Bushveld Complex and Its Mineralization, South Africa

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The Complex was first shown on a map in the late 1860's although the first use of the term Bushveld Complex was in 1901. The Complex is made up of five limbs, is up to nine km thick, and covers an area of at least 90,000 km². The Complex is divided into a Marginal Zone, a Lower Zone, a Critical Zone—so called in the 1930's as this was where all the chromium and platinum group element (PGE) ores occurred—and an Upper Zone. Layers dip 8° to 27° towards the centre of the Complex. Recently, ultramafic intrusions below the Marginal Zone have been identified.

In 2011, when PTM drilled north of the Hout River shear zone where the Complex was thought to terminate, a thick succession of Bushveld rocks were intersected including two zones of mineralization: an upper T zone and a lower F zone. What is unique about this Waterberg project Tier 1 deposit is that the upper T reef occurs at 130-m depth at the interface between the Main Zone and the Upper Zone, hosted in a variety of lithologies, whereas the F “reef” occurs in ultramafic rocks and is shallowest at 180-m depth.

The Bushveld Complex also has the world's second largest output of vanadium from magnetite layers of the Upper Zone. There are ~21 of these layers, and the vanadium content decreases upwards, so it is the lower magnetite layers that are the most economic. What is poorly appreciated is that the Bushveld is a world-class producer of gabbro and granite dimension stone, andalusite from its metamorphic aureole, and fluorite from a granite pipe. Cassiterite mineralisation from the granites has been important in the past with potential also for future extraction.