

### **Gold-Sulphide Mineralization within Sheared, Subvertical Banded Iron Formation, Jaspilite and Dolomite, Pickstone-Peerless Mine, Chegutu Greenstone Belt, Zimbabwe**

**Caitlin Jones**<sup>1</sup>, Corné Koegelenberg<sup>1,2</sup>, Jonathan Gloyn-Jones<sup>1</sup>, Steven Duma<sup>3</sup>

<sup>1</sup>Tect Geological Consulting, Somerset West, South Africa, <sup>2</sup>Department of Earth Sciences, Stellenbosch University, Stellenbosch, South Africa, <sup>3</sup>Dallaglio Investments, 121 Borrowdale Road, Gunhill, Harare, Zimbabwe

Pickstone-Peerless Mine is located 120 km southwest of Harare within the Chegutu Greenstone Belt which forms part of the broader Midlands Greenstone Belt of Zimbabwe. Detailed surface and underground litho-structural mapping and downstream 3D geomodelling of the mineralized BIF package (BIF, jaspilite and dolomite) and surrounding wallrocks (variable chlorite-carbonate-talc schists and lesser black shale) allowed for a robust structural interpretation of gold-quartz-sulphide mineralization and shearing within the east-west trending, steeply-dipping tabular deposit. The mine exploits three discrete open pits, namely the Pickstone, Peerless and Duchess orebodies, with Pickstone being the largest, exhibiting a maximum known down plunge and strike extent of 700 m and 1800 m, respectively. The rheologically competent Pickstone BIF package is laterally continuous but exhibits a locally pronounced pinch-and-swell boudin geometry. Swells (boudins) contain chaotic stockworks and boxwork breccia textures, indicative of relatively higher fluid throughput, alteration (silicification) and auriferous mineralization (pyrite-chalcopyrite±arsenopyrite massive sulphide loads and sheeted stringers). Where the BIF package pinches and shearing increases, mineralization is only present within isolated sulphide stringers, along with a noticeable increase in talc content within the enveloping schists. Additionally, underground mapping revealed that the lithological packages have undergone both sinistral strike-slip and top-to-the-north dip-slip kinematics. This, along with the pinch-and-swell geometry of the units, can be attributed to forming under subhorizontal north-south directed shortening as well as vertical and east-west horizontal extension. Generally, ductile strain localization is ubiquitous within the relatively less competent enveloping schists while more brittle deformation and, in turn, increased permeability and subsequent mineralization, are localized within the adjacent more competent BIF package, as strain is localized as a function of contrasting rheological properties. Overall, gold mineralization at Pickstone-Peerless Mine highlights the importance of (1) lithologically driven strain heterogeneity (structural control) and hydrothermal fluid throughput in an (2) overall BIF stratigraphy (litho-chemical control).