

THE VIANA OREBODY, WORLD-CLASS CUIABÁ GOLD MINE, QUADRILÁTERO FERRÍFERO, BRAZIL: A PROMISING PERSPECTIVE FOR AN OLD DISCOVERY WITH A NEW FACE AT DEEPER LEVELS

Daniel Tonini Peterle ^{1, 2}; Lydia Maria Lobato ^{2, 3}; Stanislav Ulrich ²; Suellen Olívia Cândida Pinto ^{1, 2}; Mariana Gazire Lemos ²; Ricardo Mabub ²

¹ Universidade Federal de Minas Gerais; ² AngloGold Ashanti; ³ HydroFluid&Minerals

The Cuiabá world-class gold deposit is in Sabará, approximately 40 km away from the capital city Belo Horizonte, Minas Gerais state. It occurs in the north portion of the Quadrilátero Ferrífero, associated with the Nova Lima Group, an Archean greenstone-belt sequence of the Rio das Velhas Supergroup. The AngloGold Ashanti, current owner of the mine, has reported historical production exceeding 6 Moz. Currently, the mine is being developed at Level 23 (> 1,450 m depth), with an annual production of around 205 KOz. The lithostratigraphic sequence consists of metavolcanics (andesite and basalt), metavolcaniclastic and metasedimentary (dominantly banded iron formation-BIF ± ferruginous and carbonaceous chert; pelitic and carbonaceous pelites) rocks. The structural geology of the deposit is controlled by the refolded Cuiabá fold, which has an inverted northern flank and a normal southern flank. Both flanks are subparallel to the homogeneously developed axial planar schistosity. Three styles of mineralization are identified, and result from intense structurally-controlled hydrothermal alteration: a) predominant stratabound replacement of BIF by pyrite, pyrrhotite and less arsenopyrite; b) disseminated sulfides related to hydrothermal halos; c) shear-related, sulfide-bearing smoky quartz veins. There are five main orebodies, related to replacement of carbon-rich carbonate (siderite) by sulfides in BIF, and three secondary orebodies, dominated by sulfide-bearing smoky quartz veins and sericitic phyllites with disseminated sulfides, primarily hosted in metavolcanic rocks. Viana is one of these secondary orebodies, showing a, b and c mineralization styles. It is located in the normal limb and surrounded by the metabasalt (tholeiite) unit. It was discovered in 1899 and exploited until 1940, with mining activities being interrupted due to narrowing of the ore and collapse of developments. Production data show that approximately 1 ton of gold was mined with grades around 20 g/tAu, with a significant amount of visible gold. Drilling campaigns and mapping, conducted below Level 17 (>1,150 meters) in 2020, identified a potential mineralized zone in their hangingwall. This shear-controlled corridor, dominated by BIF ± carbonaceous chert and tholeiite, surrounded by carbonaceous phyllite, has been correlated with the "historic Viana". It consists of an ENE-WSW-trending, hydrothermal horizon with quartz veining, pyrrhotite and pyrite, with lesser proportions of arsenopyrite, dipping towards SSE. The average gold grades in the modeled orebody ranges from 3 to 15 g/tAu, with an average thickness varying between 2 and 10 meters. Ongoing studies at depth show the ore to be increasingly homogeneous displaying a typical massive sulfide characteristic. Despite extensive studies conducted over the years, the exploration of Viana represents a promising perspective. It holds substantial potential to enhance the life-of-mine

and generate new exploration targets, mainly considering its association with BIF at depth, which lacked in shallower levels.