Targeting Gold Deposits along a Regional Shear Zone: A Case Study from the Archean Golden Pride Deposit in Tanzania

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Regional Setting

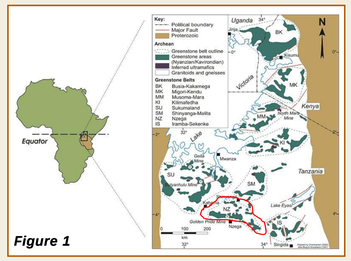


Figure 1

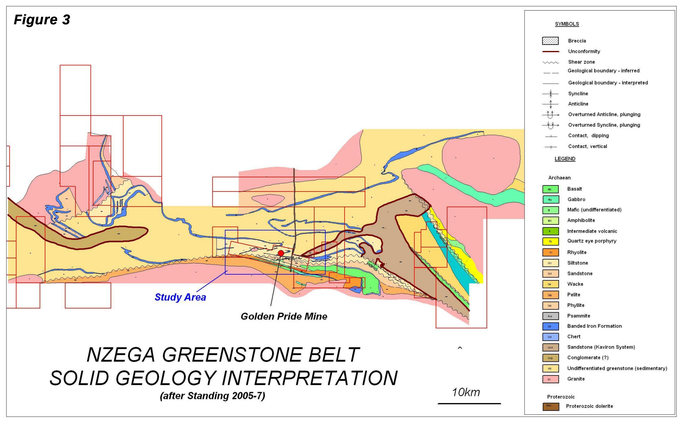
The Golden Pride Gold Mine is located in NW Tanzania within the Nzega Greenstone Belt at the southern end of the Lake Victoria Green-stone Terrane (indicated in red in Figure 1).

The Mine was the first modern mining operation in Tanzania when it started production in 1998. It has produced ~1.5Moz to date and has a planned mine life of another 6 years.

Figure 2: Golden Pride Mine from the air

The Nzega Greenstone Belt dominantly consists rocks belonging to the Nyanzian sequence (as classified by Borg in 1990) and in particular in the Golden Pride area consists of meta-sedimentary rocks of the Upper Nyanzian Sequence (Fig. 3). The Greenstone Belt is transected by a major, regional scale (~150km long) shear zone: the Bulangamirwa Shear Zone, in the hanging wall of which the Golden Pride mineralisation has developed.

Figure 3



The Exploration Problem

Either side of Golden Pride Mine the Bulangamirwa Shear Zone disappears under significant regolith cover and is very poorly defined in airborne magnetics (figure 5). This has strongly impeded the focus of regional exploration.

Resolute designed an innovative programme to characterize the ore deposit alteration and stratigraphy using lithogeochemistry and PIMA analysis. This 'footprint signature' was then used as an exploration model out along strike to delineate the Bulangamirwa Shear Zone under cover and to define 'vectors to ore' based on thermal and chemical indices. Samples were collected from 'bottom of hole' in wide spaced air core drilling (figure 6).

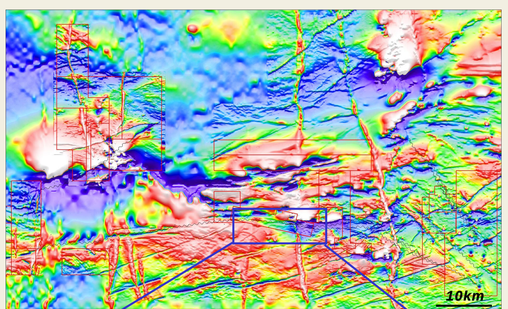


Figure 5: Nzega Belt airborne magnetic (RTP) image

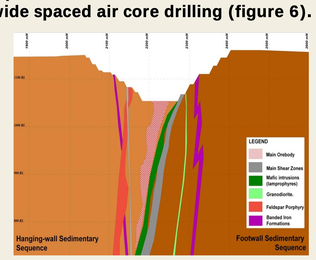


Figure 4: Local mine stratigraphy at Golden Pride . Mineralisation is associated with volcanic lithologies easily differentiated by litho-geochemistry and PIMA.

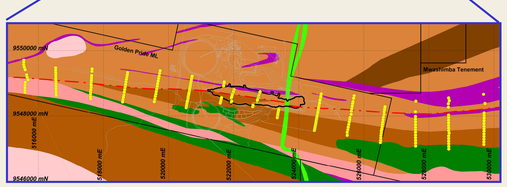


Figure 6: Location of AC holes along 1 km spaced lines east and west of the Golden Pride deposit covering 500m north and south of the expected position of the Bulangamirwa Shear Zone.

Defining the Deposit Signature

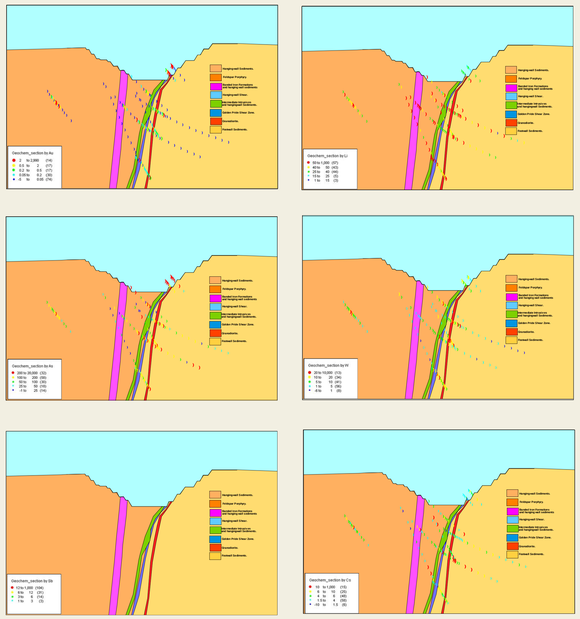


Figure 7: Pathfinder element signatures associated with the footprint of the Golden Pride deposit: individual elements plotted over simplified mine stratigraphy are coloured dark blue = 0 – 50th percentile; pale blue = 50 – 75th percentile; green = 75 to 88th percentile; yellow = 88 to 98th percentile; red = 98 to 100th percentile.

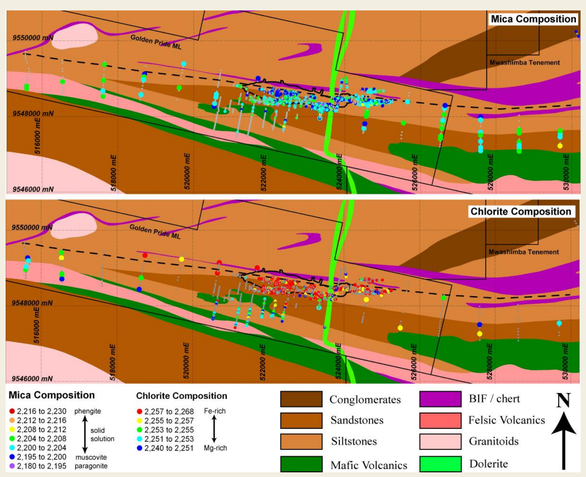
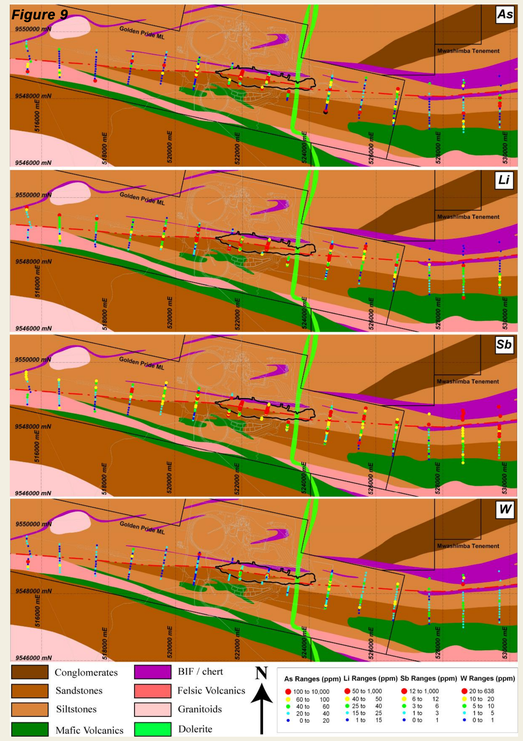


Figure 8: PIMA alteration signature obtained from the Golden Pride deposit and AC exploration program indicating Fe-rich chlorite alteration and solid-solution mica associated with alteration related to hydrothermal activity along the Bulangamirwa Shear Zone.

Repositioning the Shear Zone

Figure 9: A Regional geochemical index based on pathfinder elements defined at Golden Pride allows reinterpretation of the position of the Bulangamirwa Shear Zone. The previously interpreted position of the shear zone is shown in red. The reinterpreted position is several hundred metres to the north based on As and Sb signature.

Figure 9



Using the Signature for regional Exploration

Figures 10 and 11 respectively indicate where gold was intersected (and how this compares with targets generated (in orange) from using pathfinder elements signatures using a simple ranking matrix (red and purple are highly anomalous based on a number of pathfinder elements).

Figure 10

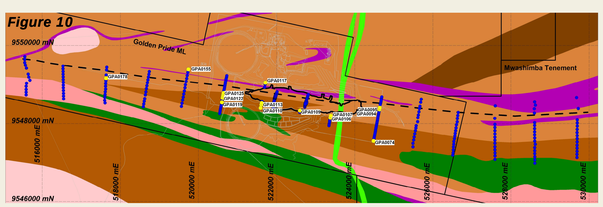


Figure 11