

De-risking the Castelo de Sonhos paleo-placer gold deposit

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Castelo de Sonhos (CDS) is a gold paleo-placer deposit in southern Pará state, Brazil, in which gold grains settled into the gravel beds of an alluvial fan that subsequently underwent low-grade metamorphism. Because the gold was transported by streams and rivers from the location where it was eroded from primary deposits, the gold in the CDS deposit is all essentially free, and some of it is coarse (>100 microns). Gravity recoveries are very high, 70-80% in preliminary metallurgical test work.

The exploration program for CDS has experienced a problem common to coarse deposits with high gravity recoveries: conventional fire assays from split core often show high variability between duplicate assays. This lack of precision creates greater uncertainty in resource estimates, not only because the variance of nearby samples is always high, but also because noise in the primary assays makes it difficult to identify geological domains and to correctly wireframe the deposit.

TriStar Gold has addressed these problems in two different ways. First, it has moved to the Leachwell assay protocol, an aggressive acid leach procedure in which the sample has a mass much larger than the aliquots in a conventional fire assay. The switch to larger samples reduces the problems caused by the difficulty of homogenizing and splitting several kilograms of material from a drill hole down to the 30-50g typically analyzed in a conventional fire assay.

The second innovation in TriStar's exploration program is the introduction of optical televiewer technology (OTV). Although the primary motivation for OTV at Castelo de Sonhos was that it provides high-resolution imagery that can alleviate the lack of physical core in reverse-circulation drill holes, the clear secondary benefit of the OTV data is that it has improved the definition of local directions of maximum continuity. When high variability in the assay data makes it difficult to wireframe individual gold reefs, good modeling of the stratigraphy helps to improve the reliability and geological realism of block models. OTV provides a wealth of down-hole data on bedding directions and paleo-current directions that can be incorporated into improved grade interpolation procedures.

This talk presents and discusses TriStar's QA/QC studies that led to the decision to switch to Leachwell assays, and shows how OTV data were used to improve grade estimates in a deposit that has strong directional anisotropy that is masked by noisy data.

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