PROJECT BACKGROUND AND QUESTIONS

The Callie world class gold deposit is held by Newmont Mining Corporation in the Northern Territory (Australia). It is mainly a vein-hosted deposit described as an orogenic gold deposit by Menagh and Wygralak (2007) and contains significant high-grade gold intercepts (commonly return intervals around 200 g/t). Previous studies have shed light on different aspects of the Callie mineralisation however the fundamental understanding of this deposit remains unclear. Some questions are still unanswered and are addressed in this study.

- How do mineralisation and alteration relate to the structural framework of the deposit?
- Are there several mineralisation events involved in the deposit formation?
- What is the characteristic mineralisation alteration footprint?

In this study we integrate small scale mineral parageneses and alteration descriptions to the broader structural framework of the Dead Bullfork deposit (DBD) mining camp. We present the preliminary results toward a better understanding of the controls on high-grade gold mineralisation at Callie.

STRUCTURAL CONTROL

The DBS gold camp consists of five deposits hosted within the highly deformed sequence of sandstones, siltstones, carbonaceous siltstones, silty shales, chert, and rare volcanics rocks (Bagas et al. 2014; Lamberti et al. 2006). The stratigraphy is summarized in the columns below (modified after Bagas et al. 2016). The units flagged in red correspond to the host units of the vein-hosted type of mineralization and the units flagged in blue correspond to the host rocks to the disseminated sulphide mineralization type.

LITHOSTRATIGRAPHIC CONTROL

The deposits of the DBS gold camp are hosted in the Dead Bullfork Formation which is a 1 km thick sequence of sandstones, siltstones, carbonaceous siltstones, silty shales, chert, and rare volcanics rocks (Bagas et al. 2014; Lamberti et al. 2006). The stratigraphy is summarized in the columns below (modified after Bagas et al. 2016). The units flagged in red correspond to the host units of the vein-hosted type of mineralization and the units flagged in blue correspond to the host rocks to the disseminated sulphide mineralization type.

MINERALISATION STYLES

Two styles of gold mineralisation are mined at DBS. Both mineralisation types are related to the same hydrothermal event however they differ depending on the host rocks. Finally brecciated alteration are more prone to host high-grade vein-hosted gold whereas iron-rich sediments will undergo sulphidation and gold will precipitate with the sulphides as summarised in the diagram below.

References

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