

METALLOGENY OF THE BIF-HOSTED LODE GOLD PROSPECTS IN THE BATHURST TERRANE, NORTHEASTERN SLAVE PROVINCE, NUNAVUT

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Banded iron formation (BIF)-hosted lode gold prospects are unusually widespread in the northeastern Slave Province east of Bathurst Inlet. This region is characterized by granites intruding high grade cordierite-sillimanite paragneiss and migmatite. The BIFs are dominantly preserved in nodular cordierite-bearing metagreywacke occurring exterior to sillimanitic paragneiss and migmatite coring the Crazy Bear Metamorphic Complex (CBMC). Chlorite-sericite retrograded mylonitic schist developed at the bounding cordierite-sillimanite isograd attests to updoming following the main regional deformation and granite emplacement event. Post this terminal Archean orogenic overprint, the region was reactivated by graben formation accompanying opening of the Kilohigok Rift. Mild folding of the Proterozoic sediments infilling outliers preserved across the area identifies the effects of the Slave/Churchill collision forming the Thelon Front. As a result of these paleoproterozoic rifting and collisional events, the Archean basement of the Bathurst terrane is more block-faulted than is typical of an Archean shield.

The BIFs occur within restricted stratigraphic intervals and have strike lengths in the order of 1 to 10 km. Silicate facies units dominate, and broad lithological similarities suggest that the individual segments (Hen, Char, Hunt, Bear, and Egg) may signify a unique marker within the regionally extensive metaturbiditic host rock package. Apparent preference for BIFs occurring on the margins of the late Archean CBMC implies preservation of original depositional settings. Deep burial and melting of an interior basin during the late Archean orogenic event culminated in structural doming over the course of unroofing. The gold enrichment is attributed to metamorphic fluidization of the margins of the rising plutonic infrastructure, as reflected in prograde sillimanite-andalusite growth and formation of retrograded mylonitic schist against bordering nodular cordierite schists. Gold is associated with extensive pyrrhotite in the adjacent silicate facies BIFs, and as is evident within the southern extension of the Hen, with zones of silicification in domains of late retrograde chloritization/carbonitization. Although there is local evidence for weathering in the vicinity of Proterozoic outliers, such as northeast of Crescent Lake, this is not considered a significant factor for further upgrading the BIF-hosted gold.

The exploratory work by the NTI/UWO/Shear Minerals partnership was conducted from two camps established on the northeast and southwest corners of the CBMC, from July 13 to 18 and August 14 to 27 respectively. The routine 1:50,000 scale geological mapping and sampling of mineralized sites (about 75 assays outstanding) was GPS-supported. The prograde/retrograde effects shown by gold-enriched BIFs at the cordierite/sillimanite isograd is the focus of a current BSc thesis by Therriault at the University of Western Ontario.