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CONTRASTING STYLES OF ALKALIC PORPHYRY COPPER-GOLD MINERALIZATION IN THE IRON MASK BATHOLITH, KAMLOOPS, BRITISH COLUMBIA

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Porphyry Cu-Au mineralization occurs in several zones within the earliest Jurassic Iron Mask batholith. These zones include the Pothook, Crescent, Ajax East, Ajax West, Afton, DM and Big Onion deposits, all but the last two of which haveproduced ore. The geological controls on mineralization in the first four of these zones were investigated through drillcore logging, detailed open pit mapping and reconnaissance mapping of outcrops around the open pits. These data reveal that several styles of alkalic porphyry Cu-Au mineralization hosted in several different geological environments are represented within these zones.

A variety of rock types host mineralization in the batholith. In the Crescent and DM zones, Cu-Au mineralization occurs along the contact between the Pothook diorite and the Cherry Creek monzonite, two phases of the Iron Mask batholith. Mineralization in the Ajax East and West zones occurs along the contact between a third phase of the batholith, the Sugarloaf diorite, and an agmatitic intrusion breccia (*i.e.*, Hybrid diorite) with Pothook diorite matrix and Nicola volcanic clasts that underwent variable degrees of assimilation. Cu-Au mineralization in the Pothook zone occurs at the batholith margin in Pothook diorite, Cherry Creek monzonite, Sugarloaf diorite dykes and Nicola volcanics.

Styles of hypogene mineralization within the batholith also vary. In the Ajax East and Ajax West zones, a pervasive and fracture-controlled albitic alteration assemblage of sodic feldspar±diopside is strongly associated with Cu-Au mineralization composed of chalcopyrite and lesser pyrite. In contrast, a fracture-controlled potassic alteration assemblage composed of biotite-potassium feldspar±quartz± epidote±magnetite is associated with mineralization within the Crescent zone. Here, chalcopyrite also is more abundant than pyrite. Finally, a hydrothermal breccia composed of milled clasts of Nicola volcanic and all three intrusive phases, and a matrix of rock flour occurs in the Pothook zone. The matrix and associated veins contain a pyrite-chlorite-magnetite±specular hematite alteration assemblage that hosts the pyrite and lesser chalcopyrite and bornite mineralization.

The different intrusive hosts to these porphyry Cu-Au zones, and the various styles of hydrothermal alteration/mineralization contained therein, indicate that several Cu-Au mineralization events occurred in the Iron Mask batholith. Exploration programs designed to search for these mineralization styles must be fully cognizant of their features and controls to be successful.