

Gold mineralization in the Central Zone of the Dome Stock at the Hasaga project, Red Lake, Ontario

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Premier Gold Mine's Hasaga project is located in Red Lake, Ontario. Gold production in Red Lake began in the 1930's with the past producing Hasaga, Gold Shore, and Buffalo mines located on the Hasaga project. The Red Lake camp has become widely known for the exceptional grades mined from the Campbell-Red Lake deposit located in Balmertown, approximately 11 kilometers northeast of the Red Lake core. Premier has discovered significant gold mineralization in the Dome Stock, a 2718 Ma. granodioritic intrusion. The current study examines the Central Zone, which is crosscut by a north-northwest trending gabbroic dyke known as the Laverty dyke. Detailed mapping of an outcrop in the Central Zone has identified two vein sets striking west-northwest and south-southeast, both dipping sub-vertically with the former vein set more prominent. Millimeter wide brittle-ductile "line" faults trending southwest-northeast and dipping sub-vertically offset these veins. A phyllic-altered protomylonite or "shear" domain and a potassic altered stockwork domain have been recognized in the granodiorite through mapping and petrography. Free gold occurs in both the granodiorite and the Laverty dyke. Within the granodiorite, two styles of gold mineralization are present: 1) in quartz ± carbonate ± tourmaline ± biotite ± epidote ± pyrite ± chalcopyrite veins gold is associated with tourmaline and epidote, where both gold and tourmaline appear to be syn- to late-epidote; and 2) in the wall rock gold is associated with potassic alteration consisting of biotite ± chlorite ± sericite ± K-feldspar ± epidote ± magnetite ± pyrite ± chalcopyrite. In both cases gold appears intimately associated with chalcopyrite ± pyrite. In the Laverty dyke gold is associated with replacement of plagioclase by olive-green to brown biotite ± chlorite ± sericite ± carbonate ± quartz. The biotite are fluorine-rich, with approximately 0.5 wt. % fluorine, and slightly magnesium-rich, with a molar Mg/(Mg + Fe) ratio of 0.60. Element mapping of euhedral to subhedral pyrite grains has identified prominent cobalt zonation with varying amounts of either nickel or arsenic. This contrasts gold at the Campbell-Red Lake mine, which is associated with arsenopyrite-rich silicification and a Mg-rich biotite-carbonate alteration. The styles of gold at the Hasaga project and the Campbell-Red Lake mine are clearly different, which suggests that the mineralizing events may also be different.