Precious Metal Epithermal Mineralization and Associated Quartz Veining along the Magaguadavic Fault Zone in the Pokiok Batholith, southwestern New Brunswick

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The Pokiok Batholith is located approximately 45 km west of Fredericton and intrudes metasedimentary rocks of the Silurian Burtts Corner Formation of the Kingsclear Group to the east and to the west Cambro-Ordovician Baskahegan Lake Formation rocks of the Woodstock Group. The batholith includes two main components: the Allandale Granite composed of fine-grained, grey muscovite-biotite granite (402 ± 1 Ma, U-Pb zircon) and the multi-phase Hawkshaw Granite consisting of fine- to medium-grained, pink biotite granite and minor muscovite-biotite granite (411 ± 1 to 416 ± 2 Ma, U-Pb zircon). The Magaguadavic Fault is a regional-scale feature that generally strikes north crosscutting the batholiths, while locally defining the boundary between the Hawkshaw and Allandale granites. The fault is a left-lateral fault system which offsets up to 5km. The timing of the fault may be the same as the intrusion of the Allandale granite, but this may just be coincidental. Altered pyrite-sericite-chlorite with gold mineralization and related base-metal mineralization has reportedly been discovered in and around complex quartz veins that are part of the fault zone. Reexamining the quartz veins and the alteration helped to further understand and determine the timing and genesis of the related gold-silver mineralization. The quartz veins textures vary from coarse-grained cockade growth zones to chalcedonic quartz. Resampling that was done was based on the 10 highest mineralized samples as determined by previous assays performed on drill core from the 6 drill holes in the area. The sulfide minerals identified optically and using the SEM are pyrite, chalcopyrite, matildite, galena, sphalerite, and argentite; no native gold was observed, although electrum occurs in the quartz boulders. Chlorite, iron-rich septachlorite (chamosite), and muscovite were also identified by XRD. The other minerals found by XRD were muscovite, quartz, fluorite, clinochlore and microcline. FEG-SEM analyses are helping to identify the form of gold in the samples. The Pearson Product correlation coefficient between Au and Ag in the 10 samples that were reanalyzed (from anomalous drill core chips) is near zero (r = 0.00). The highest correlation found was between Au and Se (r= 0.98), Sb (r= 0.84), Zn (r= 0.73), and Cd (r= 0.63). Also Ag and Bi (r= 0.99), Cu (r= 0.86), S (r= 0.67), and Fe (r= 0.61). Ar-Ar geochronologic analysis, sulfur isotope analysis, and fluid inclusion analyses are currently being done to confirm the timing of faulting, alteration, and the related epithermal mineralization.

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