The mineralogy, paragenesis, and petrogenesis of the polymetallic (Co-Ni-Au-Ag-Bi) veins of the Nictaux Falls Dam occurrence, Annapolis Valley, Nova Scotia, Canada

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Mineralization of the Nictaux Falls Dam occurrence occurs in predominantly fault-hosted quartz veins that crosscut Silurian metasedimentary rocks of the Kentville Formation, close to the contact with the Cloud Lake Pluton of the Late Devonian Southern Mountain Batholith (SMB). Fieldwork and mapping conducted in September 2018 indicates that barren quartz veins post-date the SMB; however, no crosscutting relationships were observed between the mineralized (predominantly cobaltite) veins and the SMB or other lithologies exposed on-site (felsic dykes, diabase sills, and gabbroic intrusions). Mineralization is constrained to the middle of the main fault zone where early, laminated quartz-cobaltite veins occur in quartz breccia veins that contain angular metasedimentary rock clasts. Drag folds were observed at the eastern (unmineralized) end of the fault, suggesting that the fault may have initiated as a ductile shear zone and was reactivated as a brittle fault zone during hydrothermal, mineralizing activity. The far western end of the fault diffusely disappears near the contact with the SMB. Samples were collected from representative areas (mineralized and barren veins, and exposed lithologies) for petrographic thin sections and bulk rock geochemical analysis, in order to characterize their mineralogy and geochemistry. Using field observations, petrographic methods, bulk rock geochemistry and microanalytical techniques (e.g., electron probe microanalysis for major elements and laser ablation inductively coupled plasma mass spectrometry for trace elements and absolute age dating) this project aims to resolve: (i) the mineralogical characteristics and paragenesis (including distribution of Au and relationship to Ni- Co) of mineralization, (ii) the timing of veins with respect to the SMB, and (iii) conditions (PTXt) of vein formation including the age of mineralization and source(s) of metals. [Poster]

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