

Fluid inclusion systematics of the polymetallic (Co-Ni-As-Au) veins of the Nictaux Falls Dam occurrence, Annapolis Valley, Nova Scotia, Canada

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A polymetallic (Co-Ni-As-Au) vein system is located in the Nictaux Falls Spillway (44°51'12.5"N, 65°02'01.5"W), Annapolis Valley, Nova Scotia. Variably mineralized, fault-hosted quartz veins occur metasedimentary rocks of the late Silurian Kentville Formation near their contact with the Devonian Cloud Lake Pluton of the South Mountain Batholith. Field work and sampling was conducted in late August 2018, resulting in a collection of representative vein samples as well as field observations of vein form and orientation. Multiple generations of subparallel and crosscutting veins were observed hosted within the main fault zone of the property, an east-west striking brittle-reactivated shear zone. Mineralization (predominately cobaltite, CoAsS) is restricted to early, laminated quartz veins surrounded by a later thick vein of milky white quartz breccia containing clasts of metasedimentary rocks.

Now that suitable vein samples have been obtained, the project will characterize the P-T-X-t characteristics of quartz-hosted fluid inclusion assemblages (FIA) within representative vein styles using (i) hot cathodoluminescence imaging to determine the relative timing (e.g., primary vs. secondary vs. pseudosecondary) of the FIA, (ii) microthermometry to determine minimum entrapment temperatures, bulk salinity, and isochores for P-T modelling, (iii) Raman spectroscopy to identify volatile components within fluids, and (iv) laser ablation inductively-coupled plasma mass spectrometry to quantify major and trace elements (including potentially metals) content in fluids. The results of this study will aim to (i) determine the conditions before, during, and after mineralization, (ii) constrain the source of fluids (e.g., metamorphic vs. magmatic vs. meteoric waters) and metals, and (iii) classify the occurrence through comparison with similar polymetallic deposits worldwide. [Poster]