
Geological setting, geochronological constraints and the nature of mineralization at the Mosquito Hill (Huxter Lane) gold deposit, central Newfoundland

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The Mosquito Hill gold deposit in NTS map area 2D/5 of central Newfoundland was discovered in 1998, through prospecting and sampling of arsenopyrite-bearing quartz-feldspar porphyry float, in extensive till cover, immediately south of the Northwest Gander River. This geologically complex area contains, from NW-SE: Precambrian to Cambrian rocks of the Spruce Brook Formation of the Ganderian Mount Cormack Complex; the Cambrian ophiolitic Coy Pond Complex, and the Cambrian to Ordovician marine sedimentary and volcanic rocks of the Baie D'Espoir Group. Exploration work and ongoing geoscientific investigations indicate that Mosquito Hill mineralization is mainly hosted in non-foliated, quartz-veined and sericite-arsenopyrite-pyrite altered quartz-feldspar ± biotite ± hornblende-bearing, subvolcanic andesite-dacite porphyry (Mosquito Hill porphyry: MHP). The MHP ranges from fine- to coarse-grained and exhibits transitional contacts with compositionally similar crystalline lapilli tuff. The MHP is interleaved with affiliated volcanoclastic tuff, epiclastic sandstone, and grey and black graphitic shale and mudstone of the North Steady Pond Formation of the Baie d'Espoir Group, as well as a number of discrete mélange intervals. Mineralization consists of ≤ 15 % disseminated euhedral arsenopyrite spatially associated with pyrite, and abundant subhedral sericite grains and variable Fe-carbonate. Quartz veining appears to be slightly younger than alteration and highly anomalous gold is associated with abundant arsenopyrite rather than veining. Free gold has not been observed. Industry data have provided an NI 43-101 compliant resource of 11.18 million tonnes averaging 0.546 g/t gold for 196,257 ounces gold and an inferred resource of 38.76 million tonnes averaging 0.457 g/t gold for 569,496 ounces gold (0.3 g/t Au cutoff).

The LAM-ICP-MS U-Pb zircon geochronology for two samples indicates that the MHP crystallized during the interval ca. 508–469 Ma (494 ± 14 and 477 ± 8 Ma); the younger date overlaps, within error, the only other dated felsic volcanogenic rock (Twillick Brook Member, 468 ± 2 Ma), exposed in the easternmost Exploits Subzone. An

intermediate dyke that cross-cuts a portion of the mélange below mylonitized MHP yielded an age of 464 ± 7 Ma, placing a lower limit on the age of the volcanic rocks of the North Steady Pond Formation and demonstrating that some of the mélange must have formed in the Ordovician. Randomly oriented sericite, forming part of the alteration assemblage in the MHP, yielded two identical Devonian ⁴⁰Ar/³⁹Ar plateau ages of 406 ± 2 Ma. As these rocks preserve sub-greenschist facies metamorphic-mineral assemblages, the hydrothermal fluids generating the mineralization at Mosquito Hill must have immediately postdated regional widespread Silurian emplacement of bimodal granitoid intrusions and metamorphism and deformation in the Hermitage flexure to the southwest.