

**GEOLOGY OF THE CHETWYND GOLD DEPOSIT, NEWFOUNDLAND<sup>1</sup>**

*Alan Yule  
Department of Geology, Dalhousie University  
Halifax, Nova Scotia, B3H 3J5*

The host rocks of the Chetwynd gold deposit can be separated into two distinct lithological packages: a southern sequence dominated by Cambrian quartz grits and mafic and felsic volcanic rocks, which includes various gabbroic and grandodiroitic sills, and a northern sequence of Lower-Middle

Ordovician (542 Ma) felsic volcanic rocks and various conglomeratic units, which includes a number of Early Silurian (420 Ma) granitic Hawk's Nest Pond Porphyry sills. The 499 Ma Roti Bay Granite intrudes the base of the southern sequence, and the Late Devonian (372 Ma) Chetwynd Granite

truncates all units to the northeast.

The Chetwynd area has experienced at least three phases of deformation. D1 has affected all rocks, except the Chetwynd Granite, resulting in the formation of a strong NE-SW striking, steeply south-dipping structural grain. Many of the lithologies have been isoclinally folded and transposed, and mylonite has formed in numerous discrete NE-SW striking shear zones. D2 is a much weaker, N-S striking, steeply dipping crenulation cleavage, and D3 has produced numerous brittle, vertical faults parallel to the NE-SW shear foliation. Abundant NE-SW cross-fractures, with apparently no significant displacement, are also present in all units.

The mineralized/altered zone is approximately 250 m wide and is asymmetrically zoned in terms of alteration and metals, from a high-aluminum, quartz-sericite-andalusite southern margin, to a silicified, Cu-Au-Fe mineralized medial zone, to an

intensely silicified, pyritized northern margin. Pyrite, and lesser chalcopyrite and bornite, are commonly observed forming a braided pattern parallel to the NE-SW shear foliation. The ore zone has been intensely deformed, and intruded by at least two generations of mafic dykes. The earliest phase of these dykes has been hydrothermally altered (and mineralized?).

Field relations suggest that the northern and southern sequences of rocks are in fault contact along a large mylonite zone north of the mineralized/altered zone. Therefore, the Chetwynd gold deposit is hosted by the upper portion of the older (Cambrian) southern sequence of metasediments and metavolcanics, and mineralization is probably unrelated to the felsic magmatism of the north.

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