

Structural History of the Ridout Deformation Zone in relation to Gold Mineralization within the Côté Gold deposit, Ontario

J. Smith¹, B. Lafrance¹, D. Kontak¹

¹Mineral Exploration Research Centre, Department of Earth Sciences, Laurentian University, Sudbury, ON, Canada

Abstract

The Côté Gold deposit is a low-grade high-tonnage Au (-Cu) deposit located in the southeast limb of the Swayze Greenstone Belt, Abitibi Subprovince. The deposit occurs in the Chester Intrusive Complex consisting of tonalite, diorite and a magmatic-hydrothermal breccia body. Historically mined orogenic-style E-W trending, gold-bearing, quartz-carbonate ± sulphide ± muscovite ± tourmaline veins occur ~3 km east of the Côté Gold deposit. The E-W striking veins are present at surface as quartz-carbonate ± sulphide ± Au veins exposed on many outcrops across the Côté Gold property. The veins are generally surrounded by silica-sericite ± sulphide alteration haloes. Three deformation events affected the Chester Intrusive Complex. The first deformation event (D1) is expressed by a sinistral, north-side up, E-W trending shear zone with a strong S1 foliation. During D2, S1 was crenulated during reversal of slip along the shear zone. This produced an S2 crenulation cleavage expressed as a mylonitic foliation in other parallel E-W-trending shear zones. Dextral reactivation occurred during D3, which produced an S3 foliation oriented anticlockwise to the margins of the shear zones. Similar structures exist along the Ridout Deformation Zone (RDZ). The RDZ is a 600 m wide high-strain zone located ~2.5 kilometers from the deposit characterized by a strong composite S1-S2 overprinted by dextral shear bands and Z-shaped F3 folds with an axial planar S3 cleavage, which formed during dextral reactivation of the RDZ. The E-W-trending veins at the Côté Gold deposit are cut by a lamprophyre dike, which is sheared along D2 shear zones. This suggests that the veins predate deformation and the development of the RDZ and may have formed shortly after the emplacement of the Chester Intrusive Complex. Future work will focus on determining the origin of the E-W quartz veins in relation to the deposit and investigate the possibility of early structural control on these veins.