CHARACTERIZING THE RELATIVE TIMING AND CONDITIONS OF GOLD AND BASE-METAL DEPOSITION IN THE NORTHERN PART OF THE YELLOWKNIFE GREENSTONE BELT, NORTHWEST TERRITORIES, CANADA

Amanda D. Smith

Dr. Kevin L. Shelton Thesis Supervisor

ABSTRACT

A complexity of gold-mineralization styles is recognized in the north end of the Yellowknife greenstone belt (YGB), ~30 km north of Yellowknife. These include volcanogenic massive sulfides, sulfide zones at intersections of shear zones, and quartz veins crosscutting metavolcanic and intrusive rocks. Gold-mineralized areas are hosted in the Kam Group and Banting Group metavolcanic and metasedimentary rocks, which are older and younger, respectively, than rocks that host major ore bodies in Yellowknife. Ore petrology of each group shows early arsenopyrite-pyrite-gold deposition followed by later base-metal sulfide overprinting. Mineralization in the Banting Group is dominated by abundant pyrrhotite, a feature not observed in the Kam Group. This may indicate that chemically unique ore-depositing systems operated within the Kam and Banting Groups. Fluid inclusion, cathodoluminescence and stable isotope studies allow documentation of the nature of multiple fluids that affected these rocks. Data are interpreted to indicate that distinct styles of gold mineralization in the Kam and Banting Groups formed from their own individual hydrothermal systems.