

A study of precious-metal mineral distribution in local haloes around Cu-rich stringers, MD3 zone, Morrison Deposit, Sudbury, Ontario

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The Morrison deposit, owned by KGHM in Sudbury, Ontario, hosts a series of Fe-Ni-Cu-S contact-type ores and Cu-Fe-Ni-PGE footwall veins, located in the North Range of the Sudbury Igneous Complex. Hosted within the deposit, precious metal minerals (PMM) are distributed proximal to the Cu-rich veins, about 700 m thick, with mineralization being predominately constrained in an envelope up to five feet around the veins. Estimated grades using the kriging technique has successfully worked for Ag and PGE (Pt, Pd), but has underestimated Au by about 50% of what is actually recovered. This study is investigating the types (e.g., Au, Ag, Pt, Pd), nature of their occurrence (locked or liberated) and changes in the distribution of the PMM away from the vein, with depth, in the MD3 zone of the Morrison deposit, which will help create a proper metal budget. In addition, Au mineralization and ways in which the kriging technique can be adapted will be explored. A total of 31 samples from different levels of the MD3 zone of the deposit have been collected from within the vein and in intervals of 1, 3 and 5 feet away from the vein. The samples have been put into polished thin sections and have been studied with both reflected light and SEM microscopies to obtain basic mineralogical and chemical data of the PMM. Various PMM have been detected within the veins, with the main minerals being, hessite (Ag_2Te), merenskyite ($(\text{Pd,Pt})(\text{Te,Bi})_2$) and moncheite ($(\text{Pt,Pd})(\text{Te,Bi})_2$) but are absent in the 1, 3 and 5 feet samples. The appearance of Au-bearing minerals in polished thin sections has not been found. The samples have been subsequently crushed, separated using the Wilfley table, magnetism, heavy liquids and sieved, then mounted in epoxy plugs for mineral-chemical and image analyses.