

The Geochemistry of the Marmoraton Fe Skarn and Associated Syenodiorite Intrusion, Grenville Province, Southern Ontario

S. Mathur¹, E.T.C. Spooner¹

¹Department of Earth Sciences, University of Toronto, Toronto, Ontario

The objective of the project is to analyze the orthomagmatic hydrothermal Fe skarn deposit near Marmora, Hastings County, Ontario. The research will develop an integrated geophysical, geological and geochemical analysis of the Marmora Fe skarn and related syenodiorite. Detailed field mapping and understanding of the intrusion will help determine the exact shape of the intrusion and the skarn shape in the horizontal plane. The methodology of the project will firstly be to analyze the petrology and geochemistry of the Marmora syenodiorite stock. Step two will be analysis of the major and trace element geochemistry of the skarn Fe mineralization with emphasis on sulphide-rich and oxide-rich samples. The samples will be analyzed for the following elements: Fe, Mn, S, As, Bi, P, Cu, Pb, Zn, Ni, Co, Cd, Ti, V, Cr, Mo, W, Sb, Te, REE, Y, Sc, U, Zr, Nb, Th and precious metals (Au, Ag, Pt, Pd). Previous mapping has been done in the region, where the Marmoraton deposit was mined as an open pit for Fe from 1955 to 1978 producing 30 million tons at approximately 37 per cent Fe. Based on other Fe-Au skarn deposits, indicator minerals that will be important to look at are pyrite, pyrrhotite and traces of chalcopyrite (up to 5% in some locations). The final goal of the project is to analyze the Marmoraton deposit for Au, Ag and Pd, and how they are associated with the existing geology, especially the relationship they may or may not have with the Fe skarn. The project will be designed such that the information obtained will help indicate if and where Au, Ag and Pd are enriched. A complete sample set from the waste piles was collected at the Marmoraton site in summer 2014, focusing on samples that were magnetite rich, sulphide rich and mixed assemblages of magnetite and sulphides (20 samples). Felsic, intermediate and mafic syenodiorite samples were also obtained (4 samples). Samples from the tailings (9 samples) were taken for comparative analysis and located DDH core samples (16 samples) from the Marmoraton were obtained from the OGS, Tweed.