Defining the 'Footprint' at the Highland Valley Copper deposits, BC; an overview of the CMIC-NSERC porphyry Cu subproject

R Lee[1], G Lesage[1], C Hart[1], M D'Angelo[2], P Hollings[2], K Byrne[3], S Gleeson[3], C Grenon[4], M Chouteau[4]

[1]MDRU-EOS UBC, Vancouver, BC, rlee@eos.ubc.ca; [2]Lakehead University, Thunder Bay, ON; [3]University of Alberta, Edmonton, AB; [4]École Polytechnique, Montreal, QB

A multi-disciplinary collaborative and integrated approach has been initiated in order to quantify and identify the distal footprint of a large tonnage copper ore-system. Part of the Canada Mining Innovation Council (CMIC) 'Footprint' project, this program consists of two Ph.D. studies and three M.Sc. studies, as well as several separate academic and industry sponsored research projects at the Teck Resources Limited (Teck) majority-owned and operated Highland Valley Copper operations (HVC) located in south-central British Columbia. The HVC deposits comprise multiple historic, producing, and undeveloped economic ore-centers. These centers differ in their respective alteration halos and include the buried J.A. deposit providing an ideal location to test new techniques and refine exploration methods to determine the spatial limit of ore producing fluids in the bedrock and through overlying glacial cover. Historical geophysical and geochemical studies of the deposit are limited by dated methodologies and area of coverage due to land access and ground cover. New surface mapping and sample collection along with new geophysical surveys will be conducted on a district to regional scale and will be compiled with historic data sets. All samples will undergo extensive rock-property measurements including full lithogeochemical analysis, modal mineralogy and mineral chemistry, alteration characterization, gamma-spectroscopy and petrophysical property measurements that will be compared with the geophysical signature of the rocks. Extending the study beyond the current known limits of the deposits and integrating the various rock-properties with geophysical and surficial studies will allow for the formation of a multi-dimensional model of the regional HVC footprint. The final model will help to develop and implement the best methods for future exploration of porphyry Cu(Mo) ore deposits.