Defining the surficial geochemical 'footprint' of buried Cu-Mo porphyry mineralization at the Highland Valley Copper deposits, south-central British Columbia

RL Chouinard, PA Winterburn, RG Lee

Mineral Deposit Research Unit, Earth, Ocean and Atmospheric Sciences Department, University of British Columbia, Vancouver, British Columbia

The Highland Valley Copper (HVC) Cu-Mo porphyry deposits in south-central British Columbia are the focus of the CMIC-NSERC 'Footprints' Project's Porphyry Copper Subproject. The deposits at HVC include five primary clusters of porphyry-style mineralization, which vary in production state from active to undeveloped. The J.A. and Highmont South targets are comprised of two mineralized areas within the main clusters that are both undeveloped and buried under glacial and pre-glacial cover. Surficial geochemical analyses at these two target sites aim to fully characterize the mineralogical and chemical changes manifested in the surficial environment after glacial dispersal and soil development over mineralized bedrock. These analyses will be complemented by groundwater sample collection and a geophysical self potential (SP) survey. Surface regolith mapping and sample collection was undertaken along multi-line transects that cross zones of known mineralization and extend into the background lithology to determine the spatial expression of the alteration halo in the overburden. Vertical metal transfer from bedrock mineralization to the surface, as well as anthropogenic influence from past and ongoing mining operations, is measured using geochemical signals from mineralized fragments in the transported glacial cover. Multi-element inorganic and organic geochemistry on soil samples at commercial facilities identifies true anomalies generated from mineralization and discriminates them from false positives. Previous work at Highmont South indicated a positive response to mineralization through 5-6m of glacial cover. Methods defined through the analysis of Highmont South will be applied to the J.A. target, which sits under much thicker (150-300m) glacial and fluvial-lacustrine cover. The robust, multi-parameter analyses of the J.A. and Highmont South targets aim to develop effective surficial geochemical exploration models that will be transferable in the search for other buried Cu porphyry mineralization. CMIC-NSERC Exploration Footprints Network Contribution #069.