

Physical properties of Highland Valley Copper (HVC) deposit, BC, Canada

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Low grade deposit has become the new reality in the mineral industry and will be more and more present. As a part of the CMIC “Footprint” projects, the physical properties are studied to clarify a general main question: What is the Highland Valley deposit petrophysic signature, the footprint, and how is it possible to relate to the geophysical surveys. Different methods were used to accomplish this work to a different scale. Laboratory, outcrop and boreholes measurements were realized. The physical properties evaluated were density, porosity, magnetic susceptibility, gamma spectrometry and induced polarization in the frequency domain. From the induced polarization, electrical resistivity and chargeability can be obtained. In parallel with the other properties, the goal is to identify typical signatures for different type of rocks (central, mid and distal zones), which contains no alteration, no mineralization or different type of alteration. The samples on which density, porosity and magnetic susceptibility were measured in laboratory consist of 15 cm long split core. The induced polarization was made using the FUSCH III from Radic Research. Chargeabilities were calculated by inversion following the Cole-Cole model. Core samples were soaked in tap water before measurements and wrapped in plastic pellicle to prevent drying and keep constant water content. In the boreholes logging, the magnetic susceptibility, resistivity, gamma spectrometry and chargeability have been measured. Strip logs from those measurements were made in conjunction with the geochemistry to associate different responses with a specific element content or association of elements. The boreholes were mainly from the Bethlehem zone in the HVC property.