Characterising the Regolith Profile of the E41 gold deposit, Cowal: Implication for Ore Processing and Mineral Exploration

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ABSTRACT

The processing of regolith or oxide ore can be challenging due to high clay content in the "soft oxide" portion, leading to low gold concentrate yields from the initial comminution processes and the later metallurgical processing methods. In this study, a combined approach of hyperspectral and microanalytical techniques is used to identify clay mineralogy and gold deportment within the regolith, enabling more efficient extraction via selective processing. By correlating the minerals and associated elements with gold using integrated hyperspectral data, as well as extensive microanalytical testing, high-grade gold portions of the ore can be identified without the need for expensive whole rock chemical assays.

The project is being conducted at the E41 low sulfidation alkalic gold deposit at the Cowal Gold Mine. Oxide ore from six diamond drill holes are being analysed using a suite of hyperspectral (SWIR and FTIR) and microanalytical techniques (SEM) to complete a comprehensive clay mineralogy and gold deportment model. By applying FTIR techniques on the pulp from these cores, a statistical model will be developed to correlate the mineralogy and elemental content of the ore with the whole rock assay data. The results of this study will provide a more comprehensive understanding of the clay mineral assemblages and gold deportment within the regolith, with a domain map of common metallurgical and processing characteristics being developed to inform mine planning and processing decisions. Ultimately, this research will aid in the transition of E41 to operation and contribute to the development of efficient and sustainable mining practices in the mining industry.