Red Chris Flotation Circuit Expansion – From Piloting to Full Scale

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ABSTRACT

The original flotation circuit at Red Chris Mine included bulk rougher flotation using conventional tank cells, followed by cleaner flotation consisting of two columns. In the original design of the cleaning circuit, the two columns were operated in series: The concentrate from the first column were sent to the second, smaller column to further upgrade to final concentrate-grade. As mining operations advanced, ore mineralogy has exhibited increased variability, necessitating a more robust cleaning circuit, especially to accommodate higher head grades. To address this requirement, a third column was piloted on-site to verify metallurgical performance across various configuration options. Following successful piloting, a third column was integrated into the circuit, and commissioning was completed in June 2021.

In parallel with the cleaning circuit expansion, efforts were directed towards improving the performance of the rougher flotation circuit. A benchmarking exercise revealed the potential for improved recovery of sulphide minerals through increasing rougher flotation residence time. This finding was further validated by the subsequent Orebody Knowledge (ODK) program, which confirmed enhanced recovery rates on a laboratory scale. In addition to inherent limitations in residence time, the rougher circuit often needs to be reconfigured, converting the last two flotation cells from bulk rougher flotation to pyrite flotation duty to generate non-acid generating (NAG) tails. This reconfiguration further reduces available residence time and negatively impacts rougher recovery, as evidenced by plant data. To extend residence time and alleviate capacity constraints, the implementation of StackCells ® was explored through piloting, owing to their compact design that aligns with the available plant space. Based on the piloting results, full-scale StackCells ® were installed as pre-roughers and commissioned in July 2022.

This paper discusses the journey of the flotation circuit expansion at Red Chris, detailing the progress from piloting programs to full-scale implementation.