Performance Study

No.: 22-015A

60%
Reduction in energy consumption

50%
Reduction in footprint

60%
Reduction in CO_2e

5-8%
Improved recovery

10%
Increase in throughput

Commodity
Copper and Molybdenum

Technology
REFLUX™ Flotation Cell

Application
Flotation Rougher and Cleaner Circuits

Study type
Site Pilot Tests

Country
Australia and North America

How a single REFLUX™ Flotation Cell could replace up to 10 conventional flotation cells

Pilot testing of the REFLUX™ Flotation Cell (RFC) in copper and molybdenum applications has demonstrated the potential to reduce energy consumption by 60%, CO_2e emissions by 60%, and plant footprint by 50%, compared to traditional mechanical flotation cells. The technology also delivered significant process benefits that result in improved recovery and throughput.

The existing mechanical rougher bank at an Australian copper mine delivered combined residence time of 9 minutes. Concentrate of 28-30% Cu was consistently achieved at 80% recovery. To evaluate performance of the RFC technology, we installed a small scale RFC100 pilot skid at site.

Testing demonstrated that a 5%-8% recovery improvement and 10% increase in throughput could be realised to produce on-spec concentrate in excess of 28% Cu. This is possible without additional cleaning of the rougher flotation product. Flotation volume could therefore be reduced by up to tenfold compared to conventional rougher systems, translating into substantially lower CAPEX.

RFC systems also do not require direct power input, since power consumption is limited to transfer pumping of slurry and wash water. This delivered a power saving ranging up to 60% with consequent savings in CO_2e emissions.

A second pilot-scale test took place at a North American molybdenum mine, where a slipstream of second column feed was treated in the RFC unit. The RFC proved capable of achieving target grade of 51.5% Mo in a single cleaning stage. In contrast, the existing cleaner circuit comprises multiple cleaning stages and suffers poor performance due to gradual build-up of circulating loads.

These pilot studies show RFC units can deliver improved recoveries, grades and throughputs, in a much smaller footprint, compared to traditional cleaner circuits. This is achieved while also lowering energy consumption and so reducing the carbon footprint of the cleaning process.

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