Investigate Ways to Maximize O_2 Transfer Efficiency in Gold Leaching

Objective

Cyanide leaching is a key unit operation in the gold industry. Gold recovery, energy and cyanide consumption and, where used, liquid oxygen consumption, are major factors in the overall economics of any gold mill. These parameters are strongly dependent on the method of introducing air or oxygen to the leach system and the method of mixing.

This project will identify the most effective systems of agitation and air/oxygen introduction in the leach system that will result in the lowest operating costs and maximum gold recovery. The study will also generate conclusions on the benefit of using liquid oxygen as an oxidant.

Potential Benefit

In a typical 5000 t/d mill handling a 4 g/t ore, a 1% increase in recovery, possible by improvements in operation of the leach circuit, equates to an increase in recovery of C$1 million/year. Significant reagent and energy savings may also be possible.

Scope of Research Activities

The project would start with a study and analysis of published data and detailed data provided by each sponsor for its gold mills. Plant operating data would include particle size distribution, slurry density, method of air or oxygen injection, agitator details, reagent consumption, etc. Later phases of the study could include adjustment of operating conditions in sponsor's mills to determine the impact of process variables on gold recovery and the consumption of energy and reagents. It is expected that much of the plant investigation work will be performed by mill personnel acting upon instruction from the researcher. As necessary, limited laboratory investigation will be used to generate baseline data to compare with plant data.

The project is to be split into three phases as outlined below.

Phase 1 Literature survey and analysis of data from sponsor's mills.

Phase 2 Laboratory and plant investigations.

Phase 3 Analysis and reporting.

Time Frame

A total project duration of one year is expected.

Phase 1 Two Months

Phase 2 Eight months

Phase 3 Two months

Potential Sponsors

Agnico-Eagle, Barrick Gold, Rio Tinto, Teck, Battle Mountain, Kinross

Budget cost

The following draft budget has been prepared.

Budget cost estimate

Item	Cost C$
Total project budget	$60,000
NSERC Funding	($30,000)
Sponsor Funding	$30,000
CAMIRO Fee (10% of Total Budget)	$6,000
Total cost to sponsors	$36,000
Cost per sponsor (assumes four sponsors)	$9,000

Specific Deliverables

- Quarterly progress reports and a presentation at the end of each Phase.
- Report on analysis of sponsors plant data.
- Final project report.

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