

***Investigate Fine Particle
Flotation***

Objective

It is well known that fine mineral particles (say <20 micrometres) are generally difficult to recover by froth flotation. The reasons for this are not well understood and there is scope for improvements in flotation methods for fine-grained and finely ground ores.

In the proposed research project, specific mechanisms that can cause difficulty in fines flotation will be examined in an attempt to improve metal recovery and mineral selectivity. Key mechanisms that could be studied include surface chemistry, entrainment, entrapment, reagent attachment, bubble attachment and other fundamental aspects of the flotation process as it applies to fine particle processing. Operating data from sponsors plants will be reviewed.

Potential Benefit

Using zinc flotation as an example, an increase in zinc concentrate grade by 1% (say from 52.5% to 53.5%) and an increase in zinc recovery by 3% (say from 80% to 83%) might be possible given a better understanding of fine particle flotation. In a concentrator processing 5 000 t/d of ore containing 10% zinc, such increases would realize an additional C\$7 million/year in sales income highlighting the potential return from this project.

Scope of Research Activities

The project would commence with a literature survey. This would be followed by laboratory examination of selected aspects of the general problem of fine particle flotation. Samples and operating data from sponsors' plants would be studied as part of the program.

The project is to be split into two main phases as outlined below. The laboratory work would be divided into various sub-tasks dealing with specific aspects of the program.

Phase 1 Literature survey and analysis.

Phase 2 Laboratory investigation of selected mechanisms and analysis of operating data from sponsor plants

Time Frame

A total duration of approximately three years is expected distributed as follows:

Phase 1 Three Months

Phase 2 Three years

Potential Sponsors

Agnico-Eagle, Aur Resources, Barrick Gold, INCO, Minnovex, Noranda, Outokumpu, Rio Tinto, Teck

Budget cost

The following draft budget has been prepared.

Budget cost estimate

<i>Item</i>	<i>Cost C\$</i>
Total project budget	\$400,000
NSERC Funding	(\$200,000)
Sponsor Funding	\$200,000
CAMIRO Fee (10% of Total Budget)	\$40,000
Total Cost to sponsors	\$240,000
Cost per sponsor (assumes six sponsors)	\$40,000
Annual cost per sponsor	\$13,333/a

Specific Deliverables

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

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