Instrument to Discriminate Between Different Mineral Concentrates

Objective

Where different mineral concentrates use common processing facilities, e.g., a pipeline or filter plant, there is the possibility of inadvertent cross-contamination through human error or equipment failure. There is a need for an inexpensive instrument to automatically distinguish between concentrates in order to prevent such problems.

The key objective of this project is to develop an instrument to continuously measure the infra-red reflectivity or some other property of a concentrate. Preferably, the measurement will be made on the concentrate in a free-falling slurry stream or presented by some other easily-produced method. The instrument is to transmit a standard signal which can be used to identify the type of concentrate and, if necessary, trigger a logic sequence (e.g. alarm).

The resolution of the instrument should be at least sufficient to distinguish between chalcopyrite, bornite, galena and sphalerite concentrates. Closer resolution may be of benefit to some potential sponsors, e.g, discrimination between high-iron and low-iron zinc concentrates.

Potential Benefit

A single occurrence of serious cross-contamination of, for example, copper and zinc concentrates could result in hundreds of thousands of dollars lost in unsaleable product. The proposed instrument could immediately signal the presence of the wrong material entering a stock tank, invoking corrective action before the situation became serious.

Scope of Research Activities

The project is to be split into three phases. Successful completion of each phase triggers the next phase.

Phase 1 Literature survey and collection of concentrate samples from sponsors.

Phase 2 Design and build laboratory devices to measure the infrared reflectivity (or other property) of concentrates and test their responses to each material provided using various possible methods of presentation .

Phase 3 Produce and demonstrate a prototype, industrial-grade version of the instrument and negotiate an arrangement with an equipment supplier for custom-basis manufacture and provision of spare parts for the device.

Time Frame

A total project duration of six months is expected as indicated below:

Phase 1 One Month

Phase 2 Two Months

Phase 3 Three Months

Potential Sponsors

Agnico-Eagle, Noranda, Cominco, Outokumpu, Rio Algom, Rio Tinto, Teck, Antamina

Budget cost

The following draft budget has been prepared.

Budget cost estimate

Item	Cost C$
Phase 1 Literature survey	$2,000
Phase 2 Testing	$13,000
Phase 3 Demonstrate prototype, arrange manufacture	$35,000
Total	$50,000
CAMIRO Fee (10% of Total Budget)	$5,000
Total Cost to sponsors	$55,000
Cost per sponsor (assumes five sponsors)	$11,000

Specific Deliverables

- Quarterly progress reports and a presentation at the end of each Phase.
- Prototype industrial instrument.
- Commercial arrangement for custom manufacture.

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