

6th of May, 1999

Water Resources
Department of Indian Affairs and Northern Development
Yellowknife,
NWT

Attention: Mr. Neill Thompson

Dear Sir:

This letter proposal has been prepared in accordance to telephone conversations and messages received through electronic mail from the Department of Indian Affairs and Northern Development (DIAND) regarding a study of two processing options to determine their applicability to the Giant Yellowknife Mine (Giant) as the means for upgrading the arsenic-rich materials stored in underground stopes and permitting the sale of resulting arsenic trioxide product to wood preservation manufacturers.

The results of this proposed study, intended to be presented in the form of a paper at a conference to be held between June 22nd and June 24th, 1999 in Yellowknife, Canada, will provide the basis upon which to evaluate two options for processing arsenical materials stored at Giant as part of closure and site remediation activities. The two options under consideration within the proposed study will be evaluated as potential means of upgrading the arsenic trioxide content of material currently in the underground mine at Giant to levels consistent with market specifications, potentially permitting the final product to be sold. The proposed study involves an evaluation of the technology developed and adopted at the El Indio Mine and a review of the information and documentation available on the WAROX Process, as provided by Royal Oak Mines.

Presented herein are the tasks, schedule and budget deemed appropriate for achieving the objectives of the proposed study as they are currently understood.

Sincerely,

Serena Domvile
SJ DOMVILE & ASSOCIATES

I. TECHNICAL PROPOSAL

Task 1 - Review of the Process Technology Developed at the El Indio Mine in Chile

Compañía Minera El Indio operates the El Indio Mine, a gold-copper mine located northeast of La Serena in Chile. Gold- and copper-bearing ore is treated through a flotation circuit to produce a concentrate which is then fed to a series of Nichols Herreschoff roasters to remove arsenic through volatilization. Arsenic is captured from roaster off-gas trains as arsenic trioxide through means of electrostatic precipitators and baghouses. Arsenic trioxide product which achieves market specifications through these means is sold under contract to a wood preservative manufacturer in the USA and material of inferior quality (off-spec) is stockpiled on site.

El Indio has developed an on-site process for upgrading off-spec arsenic trioxide. This retreatment process reportedly achieves a saleable arsenic product through sublimation of arsenic trioxide under specially controlled roaster (temperature and redox) conditions.

This first task will involve a trip to site and detailed discussions with Barrick-Chile's engineering staff, both at El Indio and in Santiago. The objective of activities conducted under this task is to assess the processing technology employed by El Indio with respect to its potential applicability to Giant. The potential for employing the process developed at El Indio as a means of upgrading the arsenic trioxide content of materials stored at Giant to meet market specifications will be evaluated under this task. Consideration will be given to the requirement for an operational mill (ongoing supply of sulphide concentrates as roaster feed) versus those of a stand-alone operation (without the need of an operating mill). Four days have been budgeted for this review process.

Task 2 - Review of the WAROX Process

It is assumed that information and documentation on the WAROX Process, provided by Royal Oak Mines, will be made available for review under this task. In addition, the applicability and availability of equipment and resources at Giant relevant to the two processing options under consideration will be assessed through discussions with those currently or previously employed with Royal Oak Mines.

The information on the WAROX Process will be reviewed from the context of its commercial status, demonstrated applicability (quality and specifications of recovered product under specified test campaigns and pilot plant conditions) and the projected need for further research and development prior to its potential implementation at Giant.

This second task is expected to require four days of review, involving close communications with those directly involved with the development of the WAROX Process, such as Ken Morton. Ken Morton will also be a key source of information on the systems available at Giant and relevant to the processing technologies under consideration. It is expected that DIAND will provide contacts (names, telephone numbers and e-mail addresses) within Royal Oak Mines to facilitate this communication and review process.

The product of this review will be a evaluation of the technical and operational readiness of the WAROX Process as a means of upgrading current arsenic product stored at Giant to meet market specifications. This evaluation will consider the applicability of the process according to relevant criteria, such as consistency of product quality in relation to market requirements, additional resource requirements and the necessity for an operational mill and supply of sulphide concentrates versus a stand-alone treatment and reprocessing facility.

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Task 3 – Comparative Assessment of Two Processing Options

This assessment process is expected to require four days to complete, the results of which will be incorporated into the draft report (Task 4, below). This study will not involve a market evaluation for arsenic trioxide. A comparative assessment of the two processing options will be conducted, based on a qualitative assessment of relevant criteria, such as:

- ❖ Comparative “readiness” of these processes for implementation (qualitative estimation of time, development and implementation requirements to facilitate optimization and full-scale commercialization) at Giant both under the conditions of an operating mill and those of a stand-alone reprocessing operation (without an operating mill);
- ❖ Operating requirements (feed stocks, energy, additional equipment, etc.);
- ❖ Demonstrated product quality and consistency with existing market specifications;
- ❖ Consistency and stability of operational and performance data;
- ❖ Requirements for treatment and handling of waste streams or non-saleable by-products;
- ❖ Consistency with existing regulatory criteria. and
- ❖ Overall applicability.

The results of the comparative evaluation will be tabulated for the two processing options under this task and compared to the systems available at Giant. Areas requiring further research or additional investment will be identified. Below are some of the issues considered key to the comparison. These will be refined through the course of the review process.

ISSUE OF COMPARISON	PROCESS /DESIGN SPECIFICATIONS *	EVALUATION OF PROCESSING OPTIONS		
		SOURCE/ QUALITY/ AVAILABILITY OF DATA**	CONSISTENCY WITH SYSTEMS/ CONDITIONS AT GIANT***	ADDITIONAL REQUIREMENTS***
Feed Preparation/ Handling Systems				
Feed Characteristics/Requirements (limiting physical and chemical properties)				
Roaster Design /Configuration				
Temperature Controls				
Redox Controls				
Properties of Roaster Calcines and Process Refractories				
Dust and Particulate Recovery (roaster off-gas train)				
Product Capture/Recovery Systems				
Product Quality/Specifications (% As ₂ O ₃ /consistency with market criteria)				
Maintenance Schedules/Requirements				
Energy Requirements				
Instrumentation/ Process Control				
Environmental/ Industrial Hygiene Controls				
Operating Capacity/Roaster Throughput				
In-Plant Ventilation				
Air Emissions (regulatory compliance)				
Metal Recovery (gold/copper)				
Solid Waste Handling/Management				

* Based on documentation and information provided by El Indio and Royal Oak Mines

** Sources of data or information will be cited.

*** Information on the systems existing at Giant will be solicited from Royal Oak Mines.

***** Additional research or investment requirements will be identified based on the nature/quality of data available, apparent capacity to meet market criteria and/or resources required to implement the process at Giant.

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Task 4 -Draft Summary Report and Presentation Materials

The results of the first three tasks will be prepared initially in draft form to allow for review, revision and re-direction by DIAND, as necessary, to achieve the desired objectives. This draft report will be sent by fax and electronic mail three weeks following receipt of a contract and go-ahead on the project. Preparation of the draft report and presentation materials is expected to require six days to complete.

Task 5 - Final Report and Presentation Materials

Finalization of materials for the conference scheduled in Yellowknife between the 22 and 24 of June, 1999 will commence once revisional comments are received from DIAND on the draft report and presentation materials, under Task 4 above. Preparations of the final report are expected to require three days and finalization of presentation materials an additional one day, or a total of four days.

Task 6 - Presentation of Study Findings

The results of the study will be presented during a 3-day conference to be held in Yellowknife between June 22 and June 24, 1999. Three days have been budgeted for this task.

Task 7 - Meetings/Research

Five days have been budgeted for meetings with DIAND or additional research following the conference. This budget will be refined once requirements are defined by DIAND.

II. SCHEDULE OF ACTIVITIES

A tentative schedule of proposed activities is presented below:

TASK	ACTIVITIES PLANNED	PROPOSED DATE FOR COMMENCEMENT	PROPOSED DATE FOR COMPLETION	RESULTING PRODUCT
1	Review of practices employed at El Indio	May 10, 1999	May 15, 1999	Evaluation of the the technology developed and employed at El Indio
2	Review of the WAROX Process	May 17, 1999	May 22, 1999	Evaluation of the WAROX Process
3	Comparative Assessment of Two Processing Options	May 24, 1999	May 29, 1999	Comparative evaluation of the two processing options
4	Draft Report and Presentation Materials	May 31, 1999	June 5, 1999	Draft report and draft presentation materials
5	Final Report and Presentation Materials	June 7, 1999	June 21, 1999	Final report and presentation materials
6	Presentation of Study Findings	June 22, 1999	June 24, 1999	Presentations in Yellowknife during a 3-day conference
7	Meetings/Research	June 25, 1999	July 1, 1999	Meetings or Additional Research

This schedule assumes that a contract and project go-ahead are received by May 10, 1999 and proposed activities can commence the same week (scheduling of meetings with Barrick-Chile, both in Santiago and at the mine site).

On the basis of the foregoing, travel to Canada is tentatively scheduled between June 14 and 18, 1999 and travel to Yellowknife on the 20th or 21st of June, 1999. This would allow for revisions to the final report and to presentation materials in advance of the conference in Yellowknife. Time has been allowed for meetings or additional research following the conference but will be confirmed through discussion with DIAND.