

## FALCONBRIDGE NICKEL MINES LIMITED

## INTER-OFFICE MEMORANDUM

DATE: March 5, 1979

TO: W.A. Moore

COPIES TO: F.G.T. Pickard, R. Hatch, D.J. Emery

FROM: L.S. Price

SUBJECT: POSSIBLE PILOT PLANT FOR ARSENIC PURIFICATION

Attached are my first thoughts on such a pilot plant. At 1/4 to 1/2 gallon per minute flow the equipment can be kept simple enough to be easily obtained and assembled.

The quantity of residue cake will be large enough to give a good indication of filter performance. A few days of pilot plant operation should provide all the cake required for precious metal recovery tests.

I have spoken on the phone to both R.A. Bergman and R. Hatch regarding the availability of Mr. Hatch and a technician to operate the pilot plant. This concept seems practical, if the timing is soon and the period is short (2-3 weeks).

OBJECTIVES

1. Verify residence time for dissolving and typical % dissolved and solution strength.
2. Test filtration performance.
  - (a) rate per sq. ft.
  - (b) cake thickness, pressure relationship
  - (c) filtrate quality

OBJECTIVES (continued)

3. Provide residue for gold recovery test work.
  - (a) direct cyanide
  - (b) cyanide & carbon
  - (c) float - cyanide
  - (d) roast - cyanide
    - i) direct
    - ii) with carbon.
4. Check crystal size for time, rate of cooling, etc.
5. Verify crystal quality and provide samples if needed by Marketing.

NOTES ON OPERATION OF PROPOSED PILOT PLANT

1. Arsenic Feed

The crude arsenic would be pre-slurried in the batch feed preparation tanks using recycle liquor. This will allow slurry feed to the dissolving tank for ease of control of the very small quantities.

For low grade Con type material the dry solids feed rate for 1/2 g.p.m. throughput is less than 0.35 lbs per minute.

For current Giant material the dry feed rate would be between 0.22 and 0.25 lbs./min.

2. Dissolving

Use live steam injection for heating. (Steam required roughly 1 lb./min.) Residence time can be controlled by feed rate.

3. Filtering

If spare plates and frames for gold press are available, a press for an 8-hour period could be made up using 2 frames and 3 plates clamped together with "C" clamps or similar. If plates and frames are not available, small laboratory pressure filters or home-made filters from 12" or larger pipe can be used. This would require at least 2 units and extra labour for frequent cleaning.

Precoating

Precoat material must be slurried in a small tank then applied with a flow of 1 g.p.m. per square foot minimum.

4. Crystallizing

Flow sheet sketch shows 2 - 45 gallon drums, one air sparge cooling and one with a cooling coil. At 2 hour retention in each (total 4 hours) would need 3 drums for 0.5 g.p.m. flow. One drum is likely adequate for the air sparge cooling regardless of flow. It may be necessary to have two drums with cooling coils. (A second air sparged drum may push temperature low enough to avoid second drum with cooling coils.)

5. Crystal removal

Unless the crystal is very fine and does not drain well this should be an easy task.

Suggest a piece of 150-200 mesh screen fastened in a ring or crude funnel to sit in the top of the 45 gallon solvent surge tank.

A shift's crystal production would only be 1 - 1-1/2 inches of crystal on such a screen.

*LSP*