

*Copies to PZ, PJR, LSP, TD,
FGTP, R Bergman & WGM* ✓

Notes of a Meeting
In Toronto
Re Arsenic Pilot Plant
May 22, 1979

Present were: PZ, PJR, TD, DZ, LSP, R. Bergman, R. Hatch and DJE.

The meeting started with a general discussion of the crystallization problems. It was felt that there was not enough seed material and that the rate of cooling and take-off of crystals was not correct.

For the purpose of the meeting it was decided that we should discuss progress of the pilot plant work, follow-up on the pilot plant work, transportation of the product, marketing considerations, and approval of the Giant Directors.

1) Pilot Plant Work

Ron Hatch went over the pilot plant work. Initial problems were in the filtration and crystallization. The work was started on April 10th and on the 26th Bely, and later Hatch went up to Yellowknife to assist. By the time they left there was good crystallization being obtained in 25 gallon tanks. In the initial work the saturation was 42 grams/litre but this was not high enough and it was determined that something in the order of 70 grams/litre was required. It was noted that a recycle was required and there was need for work on liquid/solid separation. Hatch noted that the filter had been replaced with a thickener. There is some difference of opinion as to whether there should be filtering. Mine staff feels that they can get by with a thickener, whereas Hatch feels filtering or a centrifuge would be needed. There was also mention of a polishing filter being required. LSP suggested that the underflow of the thickener could be centrifuged.

There was some discussion of heat loss in the thickener. Also the matter of temperature control in the thickener would be critical. Someone suggested use of a heating coil.

It was noted that dissolution is extremely fast--about 15 minutes. Initially the pilot plant had a mixing tank and then a leach tank. Later the mixing tank was taken out. The matter of handling cottrell dust in the circuit will delay development of the process. It was suggested that the treatment of cottrell dust be kept as a separate study.

There was some discussion of stirrer requirement for leaching. Also some discussion on cool-down and a figure of two hours was mentioned. The scale-up factor was discussed. A commercial unit such as is being investigated by Connell of Giant staff is a good idea.

Bergman discussed the quality. Marketing is looking at .02% iron.

Hatch noted that there was some requirement for tightening up with the environmental aspects and also a tightening up on water-balance.

2) Follow-up on Pilot Plant Work

Mr. Bergman gave a list of things he thought should be done before going to commercial operation.

- a. Need for continuous pilot plant operation to determine what scale or build-up problems might develop, and also what consistency of product could be made. In this regard Bergman stated that you would need a person to supervise the work with a necessary chemical or hydrometallurgical background. It would also require some additional equipment such as stirrers and pumps. There would also be a requirement for test filters for engineering purposes. The trace element build-up could be determined at the lab. The iron could probably be removed easily but may require more filtration.
- b. A dissolution rate of baghouse dust had to be established and this would have to be determined through sample tests in the leach tank.
- c. The liquid/solid separation would have to be studied further. There may be a polishing filter required. A hot backwash on the initially conceived filter may get away from the necessity of a thickener which loses heat and uses energy.
- d. There would be a study required as to what can be done with the thickener residue which will be high in arsenic. This creates a problem that might be solved by going the initial route of using filters. Bergman suggested that the initial problem with the filters might have been due to glazing of the filters by crystals of arsenic coming out of solution.

It was noted that it may be possible to shoot the residue into the roaster but it was mentioned that this could cause problems too--the roaster suffering due to lack of fuel in the feed. It might work alright for the baghouse residue but it might not work for other material treated.

- e. Solution heating should be further studied as you may be getting build-up on the nozzles of the burners.
- f. Water evaporation and working conditions would have to be studied.
- g. Vapour problems have to be resolved.

After Bergman's presentation there was a general discussion. Desanti asked why not use the Boliden process. Raleigh called Boliden to see if there were any results on our material which had been given them for test purposes. There had been no results available at the time of his call. Raleigh noted that getting gold out of residue had to be studied. Most agreed that it was "MMD's" that were now required (mere mechanical details). There was further discussion on filtration and it was felt that it was probably a matter of

technique rather than the fact that the material couldn't be filtered. All agreed that it needs a man full time to complete the work. The names of Archibald and Foster were put forth. It was suggested that another month of work was required to complete the research. I indicated the necessity of coming to a conclusion on the matter otherwise we would have to start preparing underground storage for arsenic disposal.

It was pointed out that speed could cause redundancies in the plant design. Cooling and crystallization seem to be the most important part of the process to be resolved. Raleigh suggested going with the original flow sheet of the lab and getting into production early. Zaharuk indicated that he still liked the idea of the thickener. Bergman stated that we should be going through the flow sheet step-by-step to get engineering data required for the scale-up.

3) Marketing

Desanti indicated that the pilot plant still has to put out enough product for the trucking studies and also for buyers to test. Raleigh suggested that we get a consultant to do test work on samples and that we would not require the 20 tons initially indicated for truck tests.

There was some discussion on sale of current baghouse material to FMC to avoid the squeeze on underground storage. Desanti will investigate. Marketing would also require 5 to 10 pounds of sample for each possible buyer, that is a total of approximately 100 pounds of pilot plant material to send out.

4) Approvals

With regard to presentation to Water Board, it was the general feeling of the meeting that something should be presented but nothing in any great detail. I suggested that LSP draft up something that he could send up to W. A. Moore or bring with him on his way to Keno a little later this summer.

I indicated it would be very difficult for me to approach the Giant Board for approval of the expenditure if we didn't have some sort of clearance in writing from the Government.

5) Miscellaneous

It was agreed that consultive work would still be available from the lab. It was suggested that the gold recovery should be investigated and possibly Larry Connell could handle this if there were someone else brought in to run the pilot plant. Recovery of Sb should also be considered.

It was agreed that there would be a meeting June 4th of all concerned plus Larry Connell who will be returning from the States. Archibald will be asked to the meeting to comment on the flow sheet and at the meeting the participants would come up with a plan as to where we go from here in the pilot plant work.

It was noted that the arsenic stored underground at Giant appears to be frozen only below the discharge point and it should be recoverable fairly simply through a vacuum system.

The question was raised as to whether Con had come back to us yet with a proposal. It was indicated that nothing had been heard yet by W. A. Moore.

A handwritten signature in black ink, appearing to read 'D. J. Emery', with a stylized, cursive script.

D. J. Emery

/vb