

FALCONBRIDGE NICKEL MINES LIMITED

INTER-OFFICE MEMORANDUM

DATE: December 4, 1979

TO: L. Connell-B. Cross

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FROM: F.G.T. Pickard

SUBJECT: Questions Regarding Your Report "Purification and Recovery of Arsenious Oxide from Roaster Dusts",
November 1979

As you are probably aware it has been decided to stop testwork on the high pressure leach approach to production of purified arsenic trioxide. The pressure leach approach would reduce the capital cost of a plant to \$1,600,000 from \$2,200,000 required for atmospheric leaching and reduce operating costs by less than 1 center per pound. The major disadvantages to the high pressure leach approach are associated with the delays which will be encountered in developing, piloting, designing and installing equipment for this process. Optimistic estimates indicate that a minimum of two years will be involved in working out a satisfactory process, piloting it and designing a plant. In addition, there may be problems with the Japanese patent and the high pressure plant may require stationary eningeers as operators.

Consideration is presently also being given to a fuming process which has been proposed by J. Durka-P. Raleigh. Capital and operating costs for this concept are currently being developed.

I reserve comment until these preliminary studies are completed.

A number of questions must still be satisfactorily answered before approval can be obtained to proceed with an atmospheric leaching plant. In your report average product purity is quoted for batches 54-123, a period where you state, "Steady state conditions were maintained on a fairly reasonable basis" (page 56). Average product assays for this period compared with product specifications were:

	Crystals Produced		Required (?) Specifications
	Average	Range	
% As ₂ O ₃	99.43	96.06-100.55	98% min.
% Fe	0.021	.01-.05	0.020 max.
% Sb	0.237	.03-.72	0.20 max.

Examination of the preceding average data and Table 3.4.1 in the subject report raises the following questions:

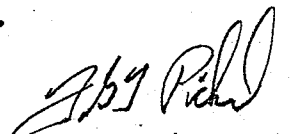
1. Iron assays were reported to the nearest one-hundreth. Is it possible that the average iron assay has a significant error because of rounding? (If most assays were say, .015 to .019% Fe and rounded off to .020 then the average assay would be overstated while if most assays were .020 to .024% Fe and rounded off to .020, then the average assay would be understated.) Is it possible to prepare a composite from the crystals collected from each batch? This composite could then be assayed by different labs to check the actual levels of all its constituent elements. (Consider also a composite including only batches produced when operations were being satisfactorily controlled.)
2. Can you correlate high Fe and/or high Sb assays with off specification operating conditions such as too high or too low pH's and temperatures? If there is such a correlation the assays during the periods when these unstable conditions were encountered should not be included in the averages. What happensto the averages if this is the case?
3. During cycles 95 to 123 the crystals assayed 99.62% As_2O_3 , 0.014% Fe and 0.197% Sb. Is there anything unique about operations during this period which resulted in production of high purity crystals?
4. The composition of the baghouse dust treated varies as follows:

% As_2O_3	81.44 to 96.73
% Fe	0.41 to 3.51
% Sb	0.13 to 0.70

If crystal assays from production when operating conditions were not standard are eliminated, is there any correlation between feed and product assays? (Does a high iron feed produce a high iron crystal?)

Further analysis of pilot plant operating data is essential to try to explain why the quality of the product varied over such a wide range. Analysis of the data to answer the preceding questions should provide some indication as to why the product quality varied. Such analysis will probably raise additional questions. It is recommended that the mass of pilot plant data should be re-examined to see if it is possible to accurately predict what one can expect to happen in a well-controlled commercial plant. This evaluation is essential if approval is to be obtained for a commercial plant. It is also possible that additional pilot planting may be required on baghouse dust to investigate certain variables.

FGTP:ks


F.G.T. Pickard.