

## MEMORANDUM

TO: S. El-Alfy  
CC: S. McAlpine, K. Blower  
FROM: K. Morton  
DATE: September 14, 1988  
SUBJECT: VISIT TO RPC, SEPT. 13, 1988

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### Introduction

Although RPC's testwork to date shows that high purity product can be produced from recently stored or current production feedstocks of baghouse dust, two problems still remain; high antimony concentrations in the product when using feedstock from an earlier era and production of fine, dusty product through flash condensation.

Though we are unsure what antimony specification will be required by most customers, we recognize that Sb concentrations exceeding 0.2% are not likely to be found in a superior quality product. We also recognize that if we wish to capture 15 to 20% of the North American market, we will have to offer high quality product at a competitive prices. It is therefore essential that the causes for Sb reporting to the final product be determined and a solution found.

For this purpose, the metallurgical engineering firm of Jan Reimers and Associates has been asked to provide consulting services and to direct their efforts particularly to the Sb problem.. Their representative, Dix Snelgrove accompanied me to RPC for the purpose of reviewing results to date and advising on additional pilot testing of procedures designed for elimination of Sb from the product.

A meeting with RPC personnel was held in RPC's Fredericton plant on Sept. 13, 1988 and lasted the whole day. Present at the meeting were M. Chalkley, R. Gilders, D. Desjardins and Kyo Jibiki of RPC, D. Snelgrove of Reimers, and K. Morton of Giant. Jibiki, Desjardins and Snelgrove are quite strong in the field of process chemistry and, through discussion were often able to propose explanations for some of the phenomena observed during lab and pilot testing. I now feel that we have some understanding of the problems we are facing and are in a good position to find a solution.

### From the Discussions

Using electron microprobe analysis it was determined that antimony does not occur in the feed as discrete particles but more likely as a solid solution combined with arsenic oxide particles. Apparently, all stable SbO species require temperature in excess of 1500 deg C before they will

vaporize and it is extremely unlikely that an unstable species could survive under roasting conditions. therefore it is probable that the Sb that is reporting to the final product exists as a submicron particle that passes through the hot baghouse, the fabric being unable to capture particles below 1 micron in diameter. As the particles pass through the condenser, they provide nucleation sites for arsenic trioxide condensation and are thus captured as nuclei of arsenic trioxide crystals in the cold baghouse.

In order to test this theory, the pilot plant will resume operation on the evening of Sept 14 and will run for approximately 72 hours. During this period, 10% of the gas stream downstream of the hot baghouse will be drawn off through a series of borosilicate filters with pore sizes of .5 and .3 microns. The volume of gas will be measured and the final As<sub>2</sub>O<sub>3</sub> product from this stream will be analyzed. The filter product will be analyzed both quantitatively and qualitatively and the resulting data should confirm or deny the theory. Feed for the test will be from B2-35 stope which grades 2.74% Sb. Feeding problems with this material have been solved by blending with 25% sand, which will be drawn off from the bed overflow.

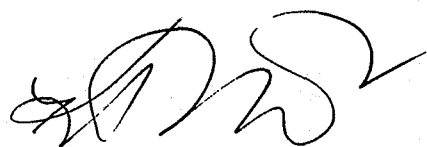
If the SbO exists as a particulate, it may be possible to collect it using an electrostatic precipitator between the HBH and the condenser. If so, the high purity SbO collected will be an additional source of revenue for the project. If SbO exists as a vapour, it is possible that condensation will produce a stable SbO species that will not fume off at low temperatures and a second fuming step may solve the problem.

Chemical additives to the roasting process may have some applicability in eliminating Sb as well, and at least one lab test has given encouraging results, though higher operating costs and perhaps other complications could be expected

### Product Size

Though testwork to increase product particle size was briefly discussed, it was not included in the initial test program and, except for the possibility of conducting a test involving recycle of a portion of purified product to provide nucleation sites during condensation, no further testing is planned. D. Snelgrove has been asked to spend some time on this matter and may have some advice for us shortly. It is also possible that we will want to conduct further tests after we have visited other plants and observed their procedures for solving this problem.

In the meantime agglomeration testwork will be done by Ferro-Tech next Monday, Sept. 19 and samples of pelletized and compacted product will be sent to clients directly from Ferro-Tech.

A handwritten signature in dark ink, appearing to be 'D. Snelgrove', is located in the bottom right corner of the page.