

MEMORANDUM

TO: S. McAlpine
CC: K. Blower, G. Halverson
FROM: K. Morton
DATE: April 25, 1990
SUBJECT: HI-TEMP FILTER TEST - PROGRESS REPORT

Introduction

Development of a process to produce a high quality arsenic trioxide product while recovering gold contained in the crude feed has been successfully completed. Exceptionally high quality arsenic has been consistently produced at RPC's arsenic fuming pilot plant, and 100% of the gold contained in the feed has been collected for recovery in a separate process. All that remains is to determine the optimum porosity of the hi-temp sintered metal filter used to remove contaminants from the gas stream and to test the filter residue for cyanidation recovery of gold.

Unfortunately the funding available to complete the project is limited and in late 1989 assistance was requested through CANMET's Mineral Development Agreement with GNWT. The project was estimated at \$100,000 and was awarded a grant of \$75,000, to be spread over two years. RPC's estimate to perform the work was too high and it was decided to complete the testing at Giant, in a small pilot plant using the gas stream from the existing roaster. Ron Hatch, a consulting engineer with experience in arsenic purification at Giant was engaged to assist in the work.

Summary

Since work began on this project in February 1990, the detailed plant flowsheet has been designed, purchased equipment has been received, some fabrication has been done, phase one has been completed, the final report has been distributed, and the NTAP authorities have been invoiced for their share of the expenses. The company has now been given verbal authorization to proceed with the remainder of the project.

In addition, the scope of the project has been redefined and the plant will now draw the feedstream from ahead of the cottrell for the purpose of testing the possibility of replacing the cottrells with sintered metal filters. Originally it was planned to draw the feedstream from downstream of the cottrells to more accurately simulate the gas stream from a fuming reactor using baghouse dust as a feedstock. Varied dust loadings were to be tested by metering cottrell dust into the gas stream via a precision screw feeder.

Discussion

Due to a limitation on government funding for the project in the 1989 fiscal year, the project was designed around four phases; filter design and installation, plant setup, plant operation, and reporting. The cost of phase one, which was to be completed during the 1989 fiscal year, was estimated at \$37,500, but actual expenditures were only \$30,870, largely because most of the equipment was not delivered in time for installation in the plant. The government's share of phase one is \$23,152 and they have been invoiced this amount. Equipment purchased for the project includes a heating jacket for the hi-temp filter, a metering screw feeder, a cone hopper for the cold baghouse, a rotary vacuum blower to draw gas through the system, and a gear pump to provide glycol coolant to the vacuum blower bearings. Instrumentation includes three pressure differential gauges, a gas flowmeter, and temperature measuring equipment. Three sets of sintered metal filters, each having a different porosity, have been ordered for the test.

Three manufacturers of sintered metal filters have provided test filters for the plant. The Mott filters are nominal 2 micron, the Fluid Dynamics filters are nominal .3 micron, and the Pall filters are nominal 10 micron (as recommended by P. Johnson of Pall). The greater open area for the Fluid Dynamics sintered fabric filter media apparently provides superior filtration at a clean pressure drop (2.8" wg/sq.ft of filter area) lower than that of the Mott media (6" wg/sq.ft of filter area), even though the openings are much smaller. If this claim can be substantiated in the pilot plant, and if the filter media is durable enough to do the job, very substantial capital and operating savings can result by selecting Fluid Dynamics filters.

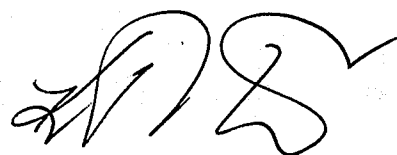
Since the scope of the project has been changed, it has been necessary to relocate the plant to the roaster building, on the main floor almost beneath the first stage roaster. This location permits a gas stream to be drawn from the overhead flue and the structural steel in the area can double as framing if the plant is to be enclosed in the future, especially if a pilot roaster is added. The cold baghouse, the rotary blower, the heat exchanger, and the glycol circulating pump will be located outside. The only equipment inside will be the high temperature filter, the condenser, the monitoring instrumentation, and the control valves. If winter operation is desired, there is space available to move all of the equipment inside.

Schedule

It is expected that the equipment will be installed by the end of May and that pilot testing can begin early in June. One item of essential equipment, the electric heating jacket for the hi-temp filter, will not be ready until mid-May, though the rest of the plant installation should be almost completed by then. Only basic instrumentation is intended for the plant, at least for the time being, and installation of pressure gauges, thermocouples and flowmeters will be quite straightforward once the process equipment is in place.

The operation of the plant is expected to be of two to three weeks duration beginning in early June, with interpretation of results and a

draft of the report being available early in July. So far there has been no detailed planning done regarding manning of the plant during operation. It is assumed that the work will be done using Giant's own forces, though close supervision may be required. Since the plant will be strictly on manual control, it will be necessary for operators to continuously monitor the variables and to maintain operating conditions within design parameters. If close control is not maintained, if operating conditions are not properly recorded, and if sampling is done incorrectly or haphazardly, the resulting data will be of little value.

A handwritten signature in dark ink, appearing to be 'KM' or 'KMorton', with a stylized, cursive script.

Kent Morton