

**Royal Oak Mines Inc**

To: Larry Connell  
CC: Bryan Cross  
From: Kent Morton  
Date: March 7, 1997

Subject: The Use of Mill Tailings to Scrub Sulphur  
Dioxide From Roaster Off Gas

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I just have a few comments and/or queries

From the September 1995 stack test

arsenic conc. 3.15 mg/m<sup>3</sup>, 0.134 kg/h (1,115 kg/yr @ 95% roaster availability)  
sulphur dioxide conc. 30.81 g/m<sup>3</sup>, 1287.5 kg/h (29,355 kg/d @ 95% roaster availability)  
average gas temperature, 77.8°C  
total gas flow rate, 12.52 m<sup>3</sup>/s (26,528 cfm)  
dry gas flow rate, 11.62 m<sup>3</sup>/s (24,621 cfm)  
water concentration, 7.3%

Re: short term action to reduce ground concentrations. What about increasing dilution air at the stack? Even if the cooling effect of the dilution air results in an initial lower volume of gas, just continue to increase the dilution air until the desired SO<sub>2</sub> concentration is achieved.

Re: scrubbing with mill tailings. Should consider what effect scrubbing will have on lime requirement in the ETP?

Treatment of a high volume of dilute gas would require large equipment. A lower volume of a concentrated gas would be easier to handle. If As<sub>2</sub>O<sub>3</sub> purification is done using refining, the gas volume would be about ½ the present volume.

Maybe this is a good time to reconsider recycling gas from the cottrell exhaust back into the first stage roaster (remember the inert gas generator discussions?). We would have a bleed stream of concentrated SO<sub>2</sub> to deal with and perhaps better roaster performance. Combining this with a long brick flue (a la Anaconda and Asarco) or similar heat exchanger for cooling the gas and condensing the arsenic would dispense with the need for adding quench air ahead of the baghouse.

Assuming the results of the bench testwork are encouraging, is there an advantage to running a small scale pilot test using actual tailings and gas streams? A few small pumps and 1" flexible polyethylene pipelines could be used for the slurry and liquid streams. Gas could be drawn off the flue at the point where the opacity meter was once located. A couple of small agitated reaction tanks could be set up fairly quickly. Should the budget be adjusted to include this?