



**Royal Oak  
Mines Inc.**

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December 11, 1997

Mr. Ed Collins  
Chief, Environmental Engineering  
Environmental Protection Division  
Environment Canada  
5204 - 50th Avenue  
Yellowknife, N.T.  
X1A 1E2

Dear Mr. Collins,

***Re: Source Emissions Testing on the Giant Mine Roaster Stack, October 1 & 2, 1997***

Please find enclosed, one copy of a report submitted to Royal Oak Mines Inc. by Entech Environmental, of Calgary, on their recent stack testing at the Giant Mine. Entech technicians conducted three tests of approximately two and three-quarter hours duration each, on October 1st and 2nd, of this year. From the field data collected, Entech has made calculations to estimate emission rates of arsenic and sulphur dioxide from the Giant Mine stack.

You will note that the estimated emission rate for arsenic is of a similar order to the last estimate, based on stack testing in September 1995, but is significantly lower than the results of testing in previous years. Relatively low air emission rates for arsenic are expected at this time, due to relatively low levels of arsenic in the mill feed. Also, in the past year, the filter bags in the baghouse have been replaced more frequently than in previous years.

You should note that two of the three tests were interrupted by roaster shut-downs. The roaster operating time during Test No.1, No.2 and No. 3, was 53%, 100% and 82% of the test duration, respectively. The stack testing method requires the collection of one sample each for particulate and gaseous arsenic and sulphur, in order to determine the average concentration of the contaminant in the stack gas during the test. Unfortunately, it is not possible to accurately adjust the calculation of contaminant concentrations in the gas stream, because the roaster will continue to emit arsenic compounds and sulphur dioxide after it has been 'shut-down'. The gas flow velocity in the stack does not change significantly during a roaster shut-down, because this flow is produced by a system of electric fans. You will notice that there is some variation in concentrations and emission rates for both arsenic and SO<sub>2</sub> between the tests. Also note that these measurements do not vary in proportion to the roaster operating time, for the reasons discussed above.

None of the emissions tests were in progress during a bag-house shaking cycle. There are currently just two or three shaking cycles in a 24 hour period, during which emissions of arsenic dust are expected to be higher than during normal operation.

We are presently reviewing all of the available historical data relating to emissions testing, bag-house operation and maintenance, roaster operation, and levels of arsenic and sulphur in the mill feed. We hope to be able to identify the main factors in the relatively low emission rates for arsenic estimated from the last two stack tests.

If you have any questions or concerns regarding this report, please call me, at (867) 669-3729.

Yours sincerely,

A handwritten signature in cursive script that reads "Stephen Schultz". The signature is written in dark ink and is positioned above the typed name and title.

Royal Oak Mines Inc.

Stephen Schultz  
Superintendent of Environmental Services  
NWT Division