



**Royal Oak  
Mines Inc.**

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March 25, 1996

Mr. Jim Sparling  
Air Quality Specialist  
Environmental Protection Division  
Renewable Resources  
Government of the N.W.T.  
600, 5102 - 50 th Ave.  
Yellowknife, Northwest Territories  
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Dear Mr. Sparling;

**RE: INCREASE IN STACK HEIGHT - COST ESTIMATES**

At an information meeting held with representatives from your Department, the Department of Energy Mines and Resources, and our company it was decided that we work together to obtain a cost estimate for increasing the stack height.

The results of the dispersion model runs show that under the current operating conditions and with an increased height of between 275 - 300 feet that there will be a significant reduction in ambient sulphur dioxide ground concentrations. The dispersion results also indicate that this can be achieved with no increase in temperature and without any increase in fan blower requirements. Therefore, the costs attributed to this reduction, are primarily related to stack height.

It should be noted that these dispersion runs were undertaken using an average sulphur dioxide emission rate of 41.4 tons/day. This average was obtained from mass balance data submitted by Royal Oak from results achieved in 1990 and 1994. Royal Oak is quite confident that this number provides a good representation of what volumes exit the stack per day. There will be days when this number is higher but other days when this number is lower, hence the reason why this number was used in the dispersion runs. The range of emission rate is considered to be between 30 and 50 tons/day.

The Dillon Mechanical Feasibility study provided a cost estimate for a new 300 foot stack FOB delivery to Yellowknife to be in the range of \$1.25 - \$1.5 million dollars. In a letter submitted by Mr. Dave Anthony dated October 17, 1995, he provided a number of \$1.9 million dollars for the construction of a 300 foot stack. This estimate takes into account a 20% contingency plus downtime occurring when the stack is switched over from the old to the new.



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The costs for a 300 foot stack are based on an actual steel stack, complete with liner and concrete foundations. With the stack typically consisting of a number of straight sections of stack separated by cones that would reduce the diameter as the stack got higher.

In summary, it appears from the dispersion modelling conducted and from the Mechanical Feasibility study undertaken that a 275 - 300 foot stack would seem the most cost effective solution at this point in time to significantly reduce the ground concentrations of sulphur dioxide.

We trust that this information is useful in addressing certain questions raised at several meetings that pertained to the improvements of air quality in the Yellowknife area. Should you have further questions, please feel free to contact the undersigned at (403) 669-3729.

Yours sincerely;

Erik Madsen  
Superintendent Environmental Services  
NWT Division

c.c. Mr. Graham Nicholls - Deputy Minister EMPR