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March 12, 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
X1A 3S8

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.

Also included are minutes of the meeting held on February 29, 1996. It is requested that these minutes be held "confidential" between our company, and your Departments of Renewable Resources and Energy Mines & Petroleum.

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

***** Confidential*****

MINUTES OF MEETING - FEBRUARY 29, 1996
INFORMATION MEETING - SULPHUR DIOXIDE EMISSIONS - GIANT

In Attendance:

Sadek El-Alfy - Vice President Operations: Royal Oak
John Stard - Mine Manager: Giant
Phil MacIntyre - Mill Superintendent: Giant
Erik Madsen - Environmental Superintendent: Giant
Joe Handley - Deputy Minister: Renewable Resources
Graham Nicholls - Deputy Minister: Energy, Mines & Petroleum
Emery Paquin - Director: Environment Protection Division
Jim Sparling - Air Quality Specialist: Environment Protection Division
Mike Cunningham - Director: Energy, Mines & Petroleum

A meeting was requested by the two GNWT Departments to meet with Royal Oak representatives in order to obtain an update on where Royal Oak stood on the issue of sulphur dioxide emissions. As well, the GNWT wanted to provide Royal Oak with an update on "draft" regulations they were preparing.

Joe Handley stated that the public and other interest groups want something to be done about emissions. He indicated that this has been a heated issue over the last few years. Renewable Resources are looking at coming out with "draft" regulations for sulphur dioxide emissions in the near future. The GNWT wants to work with Royal Oak to ensure that some action is undertaken to reduce levels, knowing that what ever is done will never please all parties involved.

Sadek El-Alfy outlined the current situation at the Giant Mine. Basically have 3 -5 year life remaining. Explained that Royal Oak was presently undertaking an aggressive exploration program not only on site but in the surrounding areas of Yellowknife (ie Mirage Islands). It was indicated that Nicholas Lake may be brought into production as early as 1997/98.

The discussion of introducing an autoclave to the site was questioned. Sadek clearly stated that an autoclave is a large scale event, very costly, and that the current reserves cannot justify an autoclave. He did however indicate that should a "new - large" orebody be found, an autoclave would seriously be looked at.

The discussion then turned to the dispersion modelling work that had been jointly funded between Renewable Resources and Royal Oak. Jim Sparling then indicated from the model runs conducted that it appears that a stack between 275 - 300 feet will greatly reduce the ambient sulphur dioxide ground concentrations. This reduction also did not require extra heat nor increased blower fans. Therefore, the costs would basically be around \$1.5 million. It was indicated that these numbers came from the Dillon Mechanical Feasibility Report - Royal Oak commissioned.

Graham Nicholls questioned the numbers that Erik Madsen had earlier discussed with him, stating that they were in the range of \$4.0 million dollars. It was indicated by Erik Madsen that this cost was discussed prior to the final dispersion model runs being obtained. As well, the \$4 million was basically based on the worst case scenario. Which would be a 400 foot stack, larger fan blowers required as well increased temperature, requiring a heater, and annual propane costs.

Sadek then questioned the fact that Environment Canada was reviewing arsenic emissions and possibly developing regulations. He was concerned that Royal Oak would build a 275 foot stack which would be acceptable to the GNWT but not acceptable to Environment Canada. Explained we would rather want to shop at "one store" and ensure that we have pleased both parties.

Emery Paquin explained that they are working with Environment Canada and are receiving regular updates on where they stand with the arsenic issue. Supposedly they are going to release a report on arsenic by the end of March if all goes well.

Erik Madsen questioned that Environment Canada usually does not develop Regulations that are site specific to one area of Canada - they are usually nation wide. In this case, they are looking at Regulations that would be site specific to the roaster at the Giant Mine, something that should be applied Canada wide. Canada wide Regulations require consultation in every province and territory, which would take years to complete.

The discussion then turned to the "draft" regulations being developed by the GNWT. It was explained that once the draft is completed (whether it be weeks or months) that it will go out for consultation (other government agencies, industry, and public). Joe Handley made the comment that should the arsenic emission rate not be an issue that they would proclaim the sulphur dioxide regulation once the consultation process is over. They would then give Royal Oak a deadline - period of time to meet new Regulation.

Erik Madsen questioned as to what limits would be used in the "draft" regulation and what these limits were based on. Emery Paquin indicated that they feel that they have a good understanding on what the current levels are being released from the mass balance numbers they received from Royal Oak. Erik Madsen then mentioned that Royal Oak was looking at purchasing a continuous sulphur dioxide monitor.

Joe Handley indicated it would be nice to continue working with Royal Oak to prepare an action plan to reduce emissions. He stated that it is apparent that the public wants something done, it is also recognized that with current reserves an autoclave is out of the question. Turning to dispersion (raising of the stack or building a new stack) as the best option at the moment. Mike Cunningham questioned if this dispersion would be acceptable to the two O's (Chris O'Brien and Kevin O'Reilly). Joe Handley reiterated what he said earlier, whatever is done, it will never please everyone.

Sadek stated that Royal Oak will know the results of their extensive exploration program by mid 1997 and will have an idea if there is a "new ore body".

In the meantime Erik Madsen and Jim Sparling are to work together to clarify the costs required for the stack height increases in order to reduce ambient sulphur dioxide ground concentration levels. It appears that a height of between 275 - 300 feet will produce these reductions.

A handwritten signature in cursive script, appearing to read "Erik Madsen". The signature is written in dark ink and is positioned above the printed name.

Erik Madsen

March 11, 1996