COVER SHEET - FACSIMILE TRANSMISSION

Northwest Territories

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MESSAGE:

With Dave Anthony away, I need somebody else in your company to review the attached. This is an Executive Summary that I have drafted for inclusion with Dillon's Air Dispersion Modelling report when it is made available to the public. If you have any comments could you please provide them before tomorrow noon.

Jim Sparling

EXECUTIVE SUMMARY

This air dispersion modelling report is the result of a project jointly undertaken by the Department of Renewable Resources and Royal Oak Mines. Sulphur dioxide and arsenic emissions from Royal Oak's Giant Yellowknife Gold Mine roaster stack cause air pollution in the area. The dispersion modelling project was undertaken to better understand how emissions are carried by the wind away from the mine and to provide a planning tool to assess potential measures which could be taken at the mine to reduce the air pollution.

Dispersion models predict air pollution levels in an area using local background information such as stack emission data, wind and other weather measurements. A dispersion model is a set of mathematical relationships, based on scientific principles, that relate chemical emissions to the resulting air pollution levels. The great number of calculations made by these models require the use of a computer. The state-of-the-art model used in this project was originally developed by the United States Environmental Protection Agency. Air dispersion models are broadly accepted by air quality regulatory agencies across North America as an essential component of air quality management.

The background information used in this project included information from previous roaster stack emission rate tests and stack height and diameter. Adjacent building locations and dimensions as well as local topography were considered. Meteorological data collected at the Yellowknife airport by the Atmospheric Environment Service in 1991, 1992 and 1993 was used. Once this data was incorporated into the model, predictions for sulphur dioxide and arsenic were compared to actual air pollution monitoring data collected by Renewable Resources in downtown Yellowknife to ensure that the model was providing accurate predictions.

The computer model predicted that sulphur dioxide emission rates from the Giant Yellowknife Mine roaster stack would have to be reduced 90 to 95% of current rates to prevent exceeding the NWT standard for air pollution. Alternatively, changes could be made to the roaster stack such as raising the stack height, gas exit temperature or velocity so that sulphur dioxide emissions are dispersed (mixed) into the wind more quickly. With better dispersion, air pollution levels can be lowered but a larger area would receive levels of pollution. The model predicted that some changes to the roaster stack could come close to eliminating exceedances of the NWT standard for sulphur dioxide. Similar computer predictions regarding better dispersion of arsenic were not conducted.