

**MEMORANDUM**

**To:** John Stard  
Mine Manager - Giant

**Date:** April 18, 1996

**From:** Erik Madsen  
Superintendent Environmental Services

**c.c.** Phil MacIntyre - Mill Superintendent  
Mary Goldman - Mill Metallurgist  
Larry Connell - Kirkland

**Subject:** GIANT POND WATER: TEST WORK RESULTS - INCO SO<sub>2</sub> PROCESS

Attached please find the test work report prepared by INCO regarding the treatment of Giant Mine tailings pond water using the INCO SO<sub>2</sub> / Air cyanide destruction process. While the INCO representative was on site to test Colomac water, it was decided to test both the minewater as well as the pond water at Giant in order to determine the effectiveness of this process as well as comparing potential cost savings in switching from Hydrogen Peroxide to Metabisulphite.

The report prepared basically concentrates on the treatment of tailings pond water and does not provide discussion on treating the minewater for recycling in the mill. As indicated in their covering letter and from the test work results, there is an opportunity for a considerable cost savings on reagents when switching from Hydrogen Peroxide to Metabisulphite. There would be an initial capital cost in converting the plant over but INCO feels this would be quickly amortized by the operating cost savings.

The test work results do show that this process is not extremely affected by cold temperatures while Hydrogen Peroxide is. Therefore, there may be the potential to operate the effluent treatment plant for a longer period of time throughout the year (a few extra months then we usually do), which would then negate the need for a treatment system for minewater. Basically, if you have one plant which can treat the amount of water required to reduce dam construction and maintain freeboard limits, then why construct another plant between the shaft and the mill.

Currently, our water licence requires the cyanide in the treated effluent to be below 0.8 mg/L prior to being released to the environment. Yet it is understood that even trace amounts of cyanide in the minewater will affect gold recovery. The minewater tested by INCO had cyanide levels between 1 - 2 ppm which is very close to the discharge limit but still at a level that would affect gold recovery if recycled in the mill. As well, our current licence allows us to discharge treated minewater directly to Baker Creek if it meets discharge limits. In order to do this, we would have to treat the minewater for arsenic which would mean the construction and operation

of a ferric/lime precipitation plant. Therefore the capital costs and operating costs of constructing a new plant for lowering the cyanide levels to where it could be recycled in the mill or to treat and release to acceptable levels to Baker Creek may not make economic sense.

INCO has indicated that they would be willing to come to site this summer/fall and test their product on a full test scale basis near the end of the decant season. Conversions to the plant could then be conducted and the plant could operate using the  $\text{SO}_2$  process starting the spring of 1997.

In summary, efforts should be concentrated on the existing plant, investigating conversions that would make it more cost efficient and enable the plant to operate for extended periods of time (colder months) throughout the year. This may be achieved by converting to the  $\text{SO}_2$  system however, there maybe other systems/conversions that may even result in further cost savings (ie the "Silox" process). I have been informed that the Vezina Mine in Quebec, owned by Cambior has converted from conventional Hydrogen Peroxide to this "Silox" process ( a combination of silicate and peroxide) at a very low capital cost and it has resulted in a considerable savings in operating costs.

  
Erik Madsen