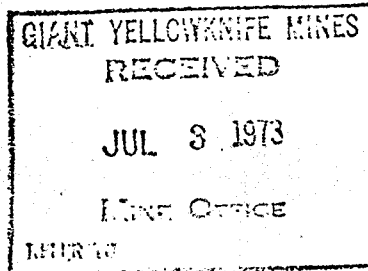




FALCONBRIDGE NICKEL MINES LIMITED

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June 28, 1973

Mr. D.J. Emery,
Mine Manager,
Giant Yellowknife Mines Ltd.,
Yellowknife, N.W.T.

Dear Dave,

I have discussed the problems of tailings disposal at Giant with Mr. P. Raleigh and Mr. L. Price of our General Engineering department. They have had an opportunity to study the plans of the tailings area, and the two reports put out by the Laval University research groups.

Together, we have made some observations and have suggested what we consider to be the most appropriate course of action for you to take. These observations are attached.

The engineering work done so far is very preliminary, but should you agree with the approach, General Engineering are at your disposal, and would be happy to handle all the necessary design and costing work. Their rates are very reasonable!

Thank you very much for your kind comments on the West Zone report.

With sincere regards,

B.A. Ferguson.

cc: D.R. DeLaporte
P.J. Raleigh

GIANT YELLOWKNIFE MINES LTD.

Observations of Tailings Disposal System

1. The present method of operating the tailings disposal system whereby the Tailings Disposal Area No. 1 is drained before freeze-up, and allowed to accumulate ice and frozen tailings through the winter is seriously questioned. This practice prevents settlement of the fine solids and must inhibit elimination of CN, through oxidation, during the winter months.

Agree in principle only - not entirely happy myself

2. The evidence at hand suggests that there is sufficient storage volume available behind dykes Nos. 2 and 3 for holding tailings solids for at least the next year. The critical situation that I personally observed in April was that there is barely sufficient volume to hold the excessive accumulation of ice during the winter caused by the operating method. ~~the~~

Observations made during the Laval studies in 1971 give evidence that the elevation of the settled solids in the vicinity of these dykes was at least 15 feet below the crest at that time. This would give an approximate solids elevation of 6040 feet.

The total storage volume behind the dykes is equivalent to the total water and tailings volume discharged during the period November to April, when no decantation takes place and seepage through the dykes is negligible. Assuming an average discharge rate of 550 tons of solids per day for six months at 20% solids by weight, volume required is 14×10^6 cu. ft. This can be compared to the volume required to store the solids discharged per year, which is of the order of 4×10^6 cu. ft., assuming one ton would occupy 20 cu. ft. after settlement is complete.

the additional month or 2

3. It is strongly recommended that the modus operandi be changed to maintain the maximum possible depth of water at the face of Dyke No. 2 at all times, and provide for continuous decantation to Tailings Area No. 2, both summer and winter. *Dam for storing solids not water.*

With the pond surface kept at maximum elevation, and continuous decantation, ice formation will be limited to five to six feet at the pond surface. The data given in the Laval report suggest that pond temperatures at depth remain above freezing point even in the coldest months so that migration of solids and decantation under the ice can take place.

Don't understand reasoning here. Does he mean ① small area of total acreage will be pond with ice forming 5 to 6 ft cap or ② total acreage going to be pond.

If ① how will you prevent ice - tail layering with remote disch. point if pond near dam.

If ② how will you get that much water in pond.

To implement the recommendation will require an extension to the tailings line approximately 2600 feet so that the tailings can be discharged under the ice during the winter. A suggested routing is shown on the attached plan. The decantation towers should be re-designed so that decantation can take place below ice level. It may be necessary to supply heating to the decantation tower structure.

Discharge of the decantation water should be below ice level in Tailings Area No.2 with continuous decantation at Dyke No.1. The effluent would then freeze downstream and accumulate there during the winter rather than in Area No.1.

4. During the summer months the present tailings discharge point at elev. 6080 is very satisfactory since the coarser solids settle out within a short distance and above the proposed pond elevation. This will continue to conserve storage capacity for the finer solids in the area close to Dyke No.2.

However, during the winter, discharge of the tailings closer to Dyke No.2, as suggested in (3) above, would deposit the coarser fraction there, and use up the available solids storage more quickly. For this reason, separation of the coarser fraction for separate disposal above the pond level should be considered. This can be done by continuous operation of the mine backfill plant. A branch extension of 900 feet from the surface mine backfill line would allow discharge of any excess coarse fill material above the present or future pond elevations.

5. Concern has been expressed regarding the stability of Nos. 2 and 3 Dykes which have now been raised to their maximum elevation. The suggestion has been made that all excess coarse material should be deposited along the face of the dykes to increase their structural strength. This procedure would also improve their seepage characteristics. According to the Laval reports, 50% of the tailings water discharged to the disposal area escapes through the No.2 and No.3 dykes over the period of a year. With the implementation of the suggestion contained in (3) above, this percentage would likely increase.
6. Ultimately it will become necessary to construct a new dyke upstream from the No.2 dyke. A new pond elevation at 6080 would require construction of approximately 2600 feet of dyke up to thirty feet high. A possible location for this dyke and the pond outline is shown on the attached plan.

B.A. Ferguson.

June 28, 1973

BAF:pb