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MATTAGAMI LAKE MINES LIMITED

Matagami, Que.

INTER-OFFICE MEMORANDUM

FROM K.V Konigsmann

TO R.L. Coleman

DATE April 8, 1976

COPY TO B.P. Wallace

SUBJECT Current Status of Beneficiation Testwork on Vangorda Grum Ores.

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<u>Samples received</u>

Several samples from the Grum deposit have been submitted for metallurgical testings. They have been classified as types A, B and C. There have been at least three types of sample B

- one sample referred to in a Progress Report #2 of Lakefield Research, dated Dec. 30, 1975, project #L.R. 1869 (B_1)
- a bulk sample treated in the Lakefield Research pilot plant and described in Progress Report No. 1, project L.R. 1868 (B_2). Laboratory testing at Mattagami Lake commenced on a crushed portion of the latter which was available from Lakefield.
- A third sample B_3 was received at Mattagami Lake on March 19, 1976. Laboratory work is in progress.

The B samples represent the most importatnt tonnage of ore reserves, they are also most difficult to treat, all comments in this memo refer therefore to results obtained with them. The more favourable results achieved with samples "A" will be discussed elsewhere.

Ore Characteristics (B_2 & B_3)

Metal contents range	Ag	3	oz/t
	Pb	7-9	%
	Zn	10-16	%
	Cu	0.1	%
The oxide content is significant			
approx.	Pb_{ox}	1	%
	Zn_{ox}	0.3	%

Specific gravity is close to 4.0, iron sulphides being the dominant gangue material. The acid generating potential of the ore is high. Five pounds per ton of soda ash are required to maintain a pH 9.0 during grinding.

Sample B_3 was received at Mattagami coarse enough (6" to 10" pieces) to allow visual examination of rock characteristics. Presence of clay-like mylonite was noted, in one instance in a layer of 1/2 inch thickness. Under a magnifying glass most pieces show a good number of stained fissures. When hit with a hammer, the ore breaks easily along apparent leach planes. In sum, one faces a fine grained, heavy sulphide which has been subjected to leach- oxidation and deposition of secondary minerals.

Such characteristics seem to explain why this ore presents such an extraordinary challenge to mineral beneficiation.

Results of flotation tests. (B_2 & B_3 ores)

General

The test results obtained so far at Noranda, Lakefield Research, and Mattagami have been "interesting" but have accummulated mostly negative information. From an economic point of view, none seem acceptable. Recoveries are low, and products are of such poor quality that they are hardly marketable.

With the results on hand it would be impossible to lay out a tentative flow-sheet for a concentrator.

Tests were carried out along "normal" procedure:

- produce a lead concentrate by rougher and cleaner flotation
- combine various lead tailings
- float a zinc concentrate by roughing and cleaning.

Research will continue along this line, but the probability of success does not appear high.

We are currently commencing a test series in which three concentrates will be produced, lead, zinc, and bulk. It is realized that the latter are difficult to sell, but unmanageable circulating loads of middlings have to be reduced.

Leach techniques (Sherritt Gordon) might have to be investigated at a later date.

Specific difficulties encountered

The selectivity in all circuits is poor.

In lead rougher flotation zinc and pyrite float freely, and it matters little which types and what quantities of depressants are used. Usually lead rougher concentrates contain

Pb rgh concentrate		Metal distribution (%MF)	
Pb	Zn	Pb	ZN
20%	20%	90%	55%

The rougher product can be upgraded into a saleable lead concentrate

Pb concentrate			Metal distribution (%MF)		
Ag	Pb	Zn	Ag	Pb	Zn
20 oz/t	45-50%	15-20%	60%	65%	15%

The lead cleaner tailings contain

Pb Clnr Tailings		Metal distribution (%MF)	
Pb	Zn	Pb	Zn
6-10%	20-25%	25%	40%

This product creates a major difficulty

- the lead cleaner circuits have to be floated hard to keep lead loss low, this creates high circulating loads in the lead cleaners
- the tailings contain far too much zinc to be discarded. By adding this pulp to the lead rougher tailings, zinc flotation is adversely affected by the great quantity of floatable lead.

Zinc flotation out of lead rougher tailings alone is relatively easy and produces a clean product.

Pb rgh tailings		Metal distribution (%MF)	
Pb	Zn	Pb	Zn
1.5%	12%	10%	45%

Zinc concentrate		Metal distribution (%MF)	
Pb	Zn	Pb	Zn
2.5	53+%	3%	35-40%

In a new test series, referred to above, a zinc concentrate will be floated out of the lead rougher tailings only. A bulk concentrate will be produced from the lead cleaner tailings. Tests employing reverse flotation (B.M.&S. technique) are scheduled.

Appended is a progress report on results obtained with ore from the Lakefield Research bulk sample (B_2). Also included are the preliminary results of a four cycle test (VAN-46) with the recently received ore (B_3).

K. Koenigsmann