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TO: Mr. R. L. Haffner

FROM: H. Lyall Ames

Subject: Visit Anvil Mill, August 6 - 8, 1974

c.c.: Messrs. N. G. Cornish, P. Taggart and P. J. Brown ✓

The most serious flotation problem for the past month has been a low grade selective lead concentrate (62.6% Pb for July and 64.3% for the first four days of August). Zinc recovery has also been below normal but I am inclined to agree with the Anvil staff that this should correct itself as the many new operators gain experience. Unfortunately from my point of view the metallurgy changed for the better a day or so before I arrived (lead concentrate grade 67.88% Pb on August 6 and the zinc results were about normal). However there remains a serious problem with the lead cleaning circuitry or reagents that causes surges of low grade concentrate noticeably harmful to the overall average. We discussed a number of ideas which hopefully might improve their operation and all of these are now under advisement and will be investigated in a priority dictated by current operating conditions, the simplicity and cost of the changes and manpower availability.

1. RATIO OF FIRST TO SECOND LEAD CLEANERS

All the concentrate from the 26-cell first lead cleaner bank is sent directly to the 7-cell second cleaner bank. This unbalanced condition overloads the second cleaners. However I do not think that it is advisable to restart the second row of these cleaners which have been down since the strike. I think that the answer lies with the first cleaner operation. Suggested ideas for trial are.

(1) Use only one row of first cleaners.

(2) Shut down the scavenging sections of both first cleaner rows.

(3) Recycle the scavenging concentrates to its own first section (particularly if the other two extraneous products are removed as suggested below). } preferable

2. FIRST LEAD CLEANER FEED

The basic problem with the first cleaner stage is caused by the large tonnage of feed to it. In addition to its main purpose of upgrading the rougher concentrate it receives directly (1) the second cleaner tailing which is a large tonnage and (2) the concentrate from the lead retreatment circuit. As can be expected and demonstrated in the laboratory these latter two products cannot be upgraded as easily nor to nearly the same extent as the rougher concentrate. The result is too low a grade concentrate for the second cleaners to treat satisfactorily and ultimately a sub-normal final grade. The optimum method of

treatment can only be fully developed by extensive mill testing. Some methods suggested for trial are.

(1) If necessary to return one or more of these products to the first cleaner it would likely be better to send it to the cyclone feed pumps rather than dircetly to the cells as it is now. I understand that this will be changed in a day or so.

Yes done.

(2) The retreat concentrate and possibly the cleaner scavenger concentrate might be returned all the way back to the roughing circuit, particularly if the mill test now underway shows that the lead regrinding and cleaning can be done in a soda ash - cyanide pulp instead of lime.

Could do: To barite circuit - squeegee valves on 3a cement pump discharge

(3) The second cleaner tailing with or without the other two products might be reground in a separate ball mill and then either treated in an entirely different circuit or returned to some point ealier in the flowsheet.

3. SODA ASH

As an expedient measure when sodium sulphite is required to maintain general flotation differential it is added through the No.2 rod mill soda ash feeder. Under these conditions no soda ash is fed to this mill and also no sodium sulphite goes to the other two rod mills. This is not good practice and in some way should be corrected. As an experiment the sulphite might be tried all or in part to No. 4 ball mill, or slurried and pumped to all the rod mills. All the initial cyanide should be fed directly into the rod mills with the soda ash.

When soda ash is available all these lines will be used. (Pump ?)

4. LEAD REGRINDING ALKALI MODIFIER

Laboratory tests have indicated that soda ash with cyanide is less critical for a satisfactory pH than is lime in lead cleaning. Accordingly a mill test is now being carried out using soda ash (1.5 lb. per minute) instead of lime to the lead regrinding mill. A small amount of lime is still being used intermittently on the third cleaner. Hopefully this can ultimately be replaced entirely with the soda ash-cyanide combination and result in a more stable operation. I thnk that the 1000 cc per minute of cyanide which was being used when I left might be too much. I suggested about 700 cc together with more soda ash might be better.

Test - must have more power. New slurry system will be available by mid month.

5. LEAD RETREAT TAILING

For some time now the tailing from the lead retreatment circuit (which is actually only an extension of the first cleaners) has been routed directly to the zinc circuit. This is similar to the retreatment section of the Anvil zinc flowsheet and that of the lead flowsheet of the T. G. S. plant at Ecstall, and also that planned for Tara. This procedure should help the second and third cleaner operation but so far anyway does not appear to have had any effect adverse or otherwise. I think that it should be continued however unless on occasion too much lead reports into the zinc circuit.

Set up a standard level for retreat tailing 2.0 - 3.0%

6. LEAD-ROUGHER SCAVENGER CIRCUIT

Currently the concentrate from all the 5-cell middle section of the 15-cell rougher-scavenger rows joins the rougher concentrate (from the first 4 cells) and is pumped directly for cleaning by regrinding and flotation. This is not usual mill practice and I suggested that while there was a lead grade problem it might be better to recycle at least some of these middle cell concentrates.

7. LABORATORY TESTING

Considerable laboratory test work has been carried out during the past few months in an attempt to develop a method for improving the lead cleaner efficiency in the mill. Two basic approaches appear encouraging. (1) substituting soda ash and cyanide for lime (see paragraph 4) and (2) reginding some or all of the products feeding the first cleaners ie. rougher concentrate, second cleaner tailing, retreatement concentrate and possibly the scavenger froth from the first cleaner itself. This work has been discussed in some detail with the metallurgical staff and I have emphasized the necessity of checking repeatedly any tests that indicate better than normal metallurgy. I think that tests 7112 and 7113 are examples of this type of test.

H. L. Ames Con.Eng.