

COPPER FLOTATION 006193

To	Those Listed	Date	July 18, 1983
From	Sibyl Frei	cc:	D. Gregoire R. Visagie

Subject Metallurgical Meeting of July 14, 1983.

Present: M. Nicholson S. Frei
~~J. Levanaho~~ Rhonda Martel
 R. Murarka (absent as on days off) Ron Martel

Minutes:

1. Metallurgical testwork on the HP3000.
 - the quote for programming has been received from J. Marlon-Lambert.
 - the justification from J. Levanaho has been prepared.
 - the payout is approximately one year if there are 4 metallurgical technicians or one year and several months if there are 3 metallurgical technicians.

2. General 2A testwork to date was explained by Jaakko Levanaho.
 - in some production years there will be quite a bit of 2A ore produced from the pit.
 - the difficulty in milling 2A ore is that the graphite in the 2A ore activates insols to float, causing very low Pb grades (down to about 20% Pb).
 - the post flotation process involving 3 additional cleaning stages gives a saleable 60% grade with only 50-60% recovery.
 - the aim now is to get a fair Pb grade with reasonable recovery without having to go through post-flotation or at least make the post-flotation plant cheaper.
 - there is sufficient room in the mill for installation of post-flotation cells but the question is cost.
 - the lab has tried some reagents in open circuit cleaner tests.
 - preliminary gravity separation of Pb from graphite was attempted in the lab but was unsuccessful to this point.
 - we have received some information from outside on the physical separation of Pb from graphite and insols.

Minutes cont'd:

3. Current work on copper flotation with 2BCD ore was discussed.
- Rhonda and Ron Martel said that the collector/promoter tests attempted were not very successful.
 - a very strong collector was used which was possibly not selective enough.
 - of the promoters tested, SPELD 3730, N-30 and 3459 produced the best results.
 - J. Lavanaho reminded us that the tests should only be compared against each other.
 - he noted that these collector/promoter tests were more selective toward Pb than Cu.
 - Rhonda Martel explained the results of some copper locked cycle test attempted.
 - test F-1 with closed cleaners was the best with about a 10% Cu grade even though recovery was still poor.
 - test F-2 with closed cleaners also but at low pH was a very poor test.
 - in all of the locked cycle tests, stability was not reached even after 6 cycles, possibly due to the low Cu feed grades.
 - in these tests, Ag was not found to be associated with Cu, in fact, as Cu recovery went up, the Pb and Ag grades and recoveries in the copper concentrate dropped.
 - J. Lavanaho said that a 10% grade/40% recovery Cu concentrate containing a fair amount of Pb has no value.
 - the concentrate must be over 20% Cu grade, a 23% Cu grade concentrate could be sold and normally a concentrate of 25-27% Cu would be produced for sale.
4. Current work on copper flotation with 2EF ore was discussed.
- J. Lavanaho and Rhonda Martel discussed the copper pre-float work with 2EF ore.
 - test A-8 with 1 kg/tonne Na_2SO_3 and 50/15/5 gm/tonne Z-11 additions was a good test producing a 14.7% Cu grade at 61.8% recovery of Cu with only 3.6% recovery of Pb.
 - test A-11 with 2 kg/tonne Na_2SO_3 and 50/15/5 gm/tonne Z-11 additions was also good with 14.3% Cu grade and 63.7% Cu recovery with only 3.3% Pb recovery.

Minutes cont'd:

- test A-5 was also not too bad using 1 kg/tonne Na_2SO_3 and 50/30/20 gm/tonne Z-11 additions as Cu recovery was 69.4% with a 15.6% Pb recovery.
- using higher Z-11 levels, we get better Cu recovery but the recovery of Pb in the Cu concentrate is high.
- using low Z-11 additions decreases the amount of Pb in the Cu concentrate.
- the 2EF pre-float tests were much better than the 2BCD tests.
- Jaakko Levanaho and Ron Martel discussed the 2EF locked cycle test performed today.
- the test was done with a closed copper circuit and looked good although only about 15 gm of Cu concentrate were produced from a 2 kg feed sample.
- there were quite high circulating loads in the test.
- in the mill some circulating of tails would be necessary.
- it must be noted that if there are problems with circulating load in the lab there would be more difficulties in the mill.

ACTION ITEM: Sibyl will do circulating load calculations from this test and compare the results to the locked cycle tests performed in January and February 1983.

5. Jaakko Levanaho presented some general information on copper flotation.

- It is unlikely that there are mines which produce a Cu concentrate from a 0.1% feed grade.
- as 2BCD ore has such a low feed grade, we may not be able to produce a 2BCD Cu concentrate.
- recent testwork has not been very successful with 2BCD ore.
- 2EF is more likely to produce a Cu concentrate at a 0.2% feed grade and this could possibly be done economically with reagents on hand.
- 2EF ore makes up 55-60% of the remaining ore body whereas 2BCD ore is only about 30%.
- 2H has good economic possibilities for producing a Cu concentrate as it has the highest Cu feed grade (0.34%).
- not sure how easy it would be to produce a Cu concentrate from a blend of ores.

Minutes cont'd:

- of the many Cu tests done in the past at CAMC, the best grade produced was 20.5% Cu with a 53% recovery, however, we do not know what ore type although the calculated feed grade of 0.2% Cu is more than what would result from a blend of 2BCD and 2EF ores.
 - as far as flotation of copper in the mill, there is room in the flotation floor but the dewatering circuit would have to be modified which would be difficult.
 - to date the lab has tried some reagents on hand for Cu/Pb separation, but we have not yet been successful.
 - we are looking at other reagents and treatment schemes but these would involve operational and capital costs.
 - we have asked our suppliers for samples of reagents they make for use in copper flotation for further testwork.
6. Jaakko Levanaho said that they have been talking to all of our suppliers and asking for reagent samples for use in copper flotation.
- we are not restricted to getting reagents from one company.
 - we have called all of our suppliers and some reagents are on their way here and many more are expected.
 - these samples of reagents are normally free.
 - we receive technical information with the samples.
 - only when a company develops a new product do they test the reagent in their own labs and make this information available on request.
7. Upcoming work in the metallurgy lab was outlined by J. Levanaho.
- We have identified further reagents we want to test.
 - we have tried the SPELD promoters that we received.
 - we will try the ORFOM collectors we recently received.
 - more reagents will be coming in which we will try.
 - some ore types have not been tested for Cu flotation.
 - first we will try reagent tests with these ores.

Minutes cont'd:

- we also will do at least one more 2EF locked cycle test and at least one 2H locked cycle test.
- we have more work to do on pre-flotation before going back to post-flotation testing.
- then we will do test on blended ore.
- this type of work starts with Cu rougher tests and then goes from there - everything is empirical.

ACTION ITEM: Now that the method of briquette formation is working, Sibyl will mount a first cleaner tails sample for microscopic examination to see if tetrahedral "free" Ag is present.

8. General:

- with one technician, the test program will go ahead but slowly.
- safety will have to be considered re; one person in the lab .
- Ron and Rhonda Martel are leaving today and were wished all the best.

S. Frei
Sibyl Frei
Sr. Met. Technician