

LONG TERM DEVELOPMENT PROGRAM1. Autogenous Grinding (AG)

In the long perspective a two stage autogenous grinding system could be very competitive in the Faro operation. Costs for grinding media and fine crushing plant, together 7,890,000/CAD/year, would be eliminated by using this grinding technique. One could expect the mill power costs to increase approximately 400,000/CAD/year with AG so that will give a net operating cost savings at about 7,500,000/CAD/year. Roughly it can be estimated that an investment in AG would have a pay-off time of less than 2 years. We suggest laboratory tests at Boliden to determine the Faro ore properties regarding AG. (Appendix 6) Obtained results will be reported with preliminary lay-out, investments costs and a progress program.

A very preliminary lay-out for an AG-system in Faro is given in Appendix 5. Furthermore, there are experience in Boliden that some ores respond positively to autogenous grinding from metallurgical point of view and that may also be the case for Faro.

2. Vangorda and Grum deposits

The Vangorda and Grum deposits are characterized by:

- Finer mineralogical structure than the Faro deposit, requiring a finer grind before flotation.
- Big differences in flotation-properties between different ore-types.
- The amount of ore with difficult gangue-minerals are bigger than in Faro-deposit (grafitic baritic).
- These ores are more interesting regarding the precious metal content which is higher.

Because of this the test-program has to be made from the beginning starting with Vangorda ore.

Appendix 6

AUTOGENOUS GRINDING

Test Program

The investigation is started in lab-scale where breakage rate and grindability is determined. This should be made on all main ore types from the Mangorda, Grum and Faro deposits.

1. Grindability test

The test is performed on a screened fraction of the ore and is made in a laboratory-mill and the abrasion-rate is determined.

By the use of experience values, a good prediction of grindability can be obtained.

2. Drop-tests

In this case rock-samples from the ore is dropped from specified heights in a way that comparative results can be obtained.

From these results the breakage-rate function can be derived for different ore-samples.

This also gives an indication on the problem of critical size.

After these two type of tests has been performed a good prediction of the ore-types behavior in autogenous grinding can be made. This will then give the possibility to decide whether to go on with pilot scale testing.

3. Pilot plant test

The design of an autogenous grinding circuit requires pilot plant test to obtain the design-parameters. In this case it would comprise the following:

- The operation of two stage autogenous grinding circuit until stable conditions are obtained.
- Take the milled product to a standard Pb-and Zn-flotation circuit for the recording of metallurgical results.
- Preferably a separate campaign would be performed where metallurgical results on the same ore are established after the use of conventional grinding.

This test-work should be made on a main composite sample from the ore-body.

If you suspect critical size problems you should do separate tests on the hardest ore-type.

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B. Scheduling

AUTOGENOUS GRINDING CIRCUIT LAY-OUT

