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To

W.N. Wallinger

Date

September 16, 1976

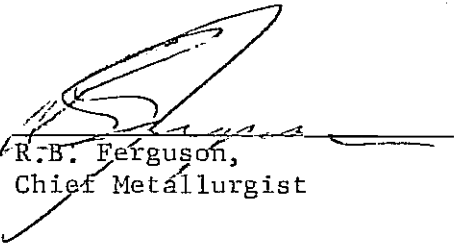
From

R.B. FergusonSubject Production and Metallurgy Forecast for 1977

For most parameters extrapolation based on operating experience was the tool used for these projections.

Technological change is the most significant factor in any forecast. Much is planned for the following year, but has yet to undergo intensive development. The philosophy used in considering technological change was, then, if such changes were already accepted operating practice then their effect was incorporated, otherwise no effect was considered.

Summarizing the detailed forecast following, recoveries are somewhat dismal due to the lowest feed grades ever forecasted, grades are unchanged, bulk production is cut back further, also the lead value has been reduced. Silver values look a little better over the year. Moistures have been increased slightly to conform to most probable results from existing equipment.



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1. THROUGHPUT

Even with an October first startup we will be facing winter with an abysmally inadequate mill maintenance crew. To date for 1976 we have averaged an operating rate of 450.5 S.D.T. per hour. If we can maintain this through 1977 then 10,000 tons per day can be achieved at only 92.5% operating time.

2. LEAD METALLURGY

a) Recoveries

At an average lead of only 3.0%, 2.9 in the first half and 3.1 in the second, the recovery picture is bleak.

Based on year to date experience and feelings of mill operating personnel a weighted average lead scavenger tail for the year of 0.45%Pb falls in the middle of the probability range.

Historical data for 14 months from January 1975 to July 1976 inclusive indicate that rougher recovery to final inventory recovery ratio is 85.44/84.10 or 1.0159.

Final recoveries will then be:

- i) First and second quarters 83.2%
- ii) Third and fourth quarters 84.1%

b) Grades

Lead selective grade will be 66.5% which is determined from the most recent grade recovery curve.

3. ZINC METALLURGY

a) Recoveries

The same rationale was used as for lead recoveries. Zinc scavenger tail at 0.8% and recovery ratios averaged from 17 months for the same period at 85.78/80.06 or 1.0714.

Final recoveries will then be:

- i) First quarter 79.5%
- ii) Second, third and fourth quarters 78.4%

3. ZINC METALLURGY (contd)

b) Grades

Zinc selective grade will be 50.5% which, as with lead grade, is determined from the most recent grade recovery curve.

4. BULK PRODUCTION

The intent of a bulk circuit is to bleed middling particles from the cleaner circuits. In this manner, particles which would not be recoverable at grade in selective concentrates and thus lost are recovered in a lower value Pb-Zn-Fe bulk concentrate.

Cash flow generation per unit of payable metal value in bulk concentrate is substantially less than for metal in selective concentrates. Optimum operation of the bulk circuit, then, should be to ensure that no particles which could be recovered at grade in selective concentrates are allowed to deport to bulk.

General consensus of opinion of the mill operating team maintains that bulk production could be reduced to 150 S.D.T. per day without reducing total metal recovery providing the following minimum circuit changes are made:

- a) Mass flow instrumentation on zinc first cleaner feed pump. This would monitor circulating load in the zinc cleaning circuit which would give ample warning of a serious increase in this volume. Action could then be taken to remove material from the circuit as selective concentrate or as bulk component before serious spills occurred. Estimated cost \$22,143.00.
- b) Modify the froth launders on the roughing sections of zinc retreat, first and second cleaners and on the entire third and fourth cleaners. Modifications to consist of increased width from 8" to 14" and multiple drain points to increase launder slope. This would reduce spill by increasing the capacity to remove the froth during a flooding condition. Estimated cost \$20,000.00.
- c) Modify the zinc cleaner sump so that it discharges spill material only to the zinc rougher feed box. Historically there were four discharge points for sump material:
 - i) Tails - since sump material can be high recoverable metal value this is a wasteful alternative.
 - ii) Bulk - this puts a material to bulk which contains metal values which could be recovered at selective grade, thus it is also a wasteful alternative. Also, this is a component to bulk that is unknown as to volume and grade making quality control difficult.
 - iii) Zinc first cleaner - this alternative causes pH upsets throughout the zinc cleaning circuit with resultant circuit instability.

4. BULK PRODUCTION (cont'd)

- iv) Zinc rougher feed - this route caused the fewest operational problems, but the line loss incurred by the distance from the zinc cleaner sump restricted the pumps capacity to the point where it could not keep up with new spills let alone handle cleanup.

With the proposed modifications it should be possible to reduce zinc cleaner spills to the point where the existing sump capacity could move the material to the zinc rougher feed box.

Metal value of bulk concentrate be:

18.0% Pb down from 18.9% and 29.8% Zn, unchanged.

5. SILVER

Information on silver distribution in the orebody is extremely sketchy. The best available projection for 1977 is an average of 0.81 oz per ton in feed for the year. Department analyses indicate that silver recoveries to lead and bulk concentrates don't appear to have changed much despite the significant reduction in value. The best estimate, then is based on this and is:

13.5 oz/ton in lead selective and
5.4 oz/ton in bulk

It must be stressed that this is an overall average and considerable variation will occur during the year.

6. IRON

- a) In selective zinc - 10.8%
- b) In bulk - decreased, lead value must be replaced by something, thus iron is increased from 15.0 to 15.8%.

7. OPERATING TIME

As discussed in "Throughput" will be 92.5%.

8. MOISTURES

Lead Select	5.8%
Zinc Select	6.3%
Bulk	5.8%

