Cyprus Anvil Mining Corporation — Interoffice Correspondence

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To: W.N. Wallinger — Date: September 16, 1976

From: R.B. Ferguson

Subject: 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 absymally inadequate mill maintenance crew. To date for 1976 we have averagedan 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%

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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.

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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. Deportment 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%

Schedule 1

CYPRUS ANVIL MINING CORPORATION

PRODUCTION AND GENERAL ADMINISTRATIVE

1977

	Jan.	Feb.	Mar.	1st Qtr.	Apr.	May	June	2nd Qtr.	1st Half	July	Aug.	Sept.	3rd Qtr.	3rd Qtr. YTD	Oct.	Nov.	Dec.	4th Qtr.	Qtr. REV.	Memo Plan
Feed Grade %																				
Lead	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3.1	3.1	3.1	3.1	3.0	3.1	3.1	3.1	3.1		3.0
Zinc	5.4	5.4	5.4	5.4	5.0	5.0	5.0	5.0	5.2	5.0	5.0	5.0	5.0	5.1	5.0	5.0	5.0	5.0		5.1
Total	8.3	8.3	8.3	8.3	7.9	7.9	7.9	7.9	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1		8.1
Cu. Yds. Moved (000's)																				
Waste & Low Grade																				
Ore																				
Total																				
Tons Milled (000's)	310	280	310	900	300	310	300	910	1810	310	310	300	920	2730	310	300	310	920		3650
Mill Feed (000 lbs)																				
Lead	17980	16240	17980	52200	17400	17980	17400	52780	104980	19220	19220	18600	57040	162020	19220	18600	19220	57040		219060
Zinc	33480	30240	33480	97200	30000	31000	30000	91000	188200	31000	31000	30000	92000	280200	31000	30000	31000	92000		372200
Metal Recovered (000 lbs)																				
Lead Select	13274	11990	13274	38538	12846	13274	12846	38966	77504	14479	14479	14612	43570	120474	14479	14012	14479	42970		163444
Bulk	1685	1522	1685	4892	1631	1685	1631	4947	9839	1685	1685	1631	5001	14840	1685	1631	1685	5001		19841
Total Lead	14959	13512	14959	43430	14477	14959	14477	43913	87343	16164	16164	15643	47971	135314	16164	15643	16164	47971		183285
Zinc Select	23817	21521	23817	69175	20820	21514	20820	63154	132329	21514	21514	20826	63848	196177	21514	20820	21514	63848		260025
Bulk	2790	2520	2790	8100	2700	2790	2700	8190	16290	2790	2790	2700	8280	24570	2790	2700	2790	8280		32850
Total Zinc	26607	24041	26607	77275	23520	24304	23520	71344	148619	24304	24304	23520	72128	220747	24304	23520	24304	72128		292875
Recoveries %																				
Lead Select	73.8	73.8	73.8	73.8	73.8	73.8	73.8	73.8	73.8	76.3	76.3	76.3	76.3	74.3	76.3	76.3	76.3	76.3		74.6
Bulk	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	8.8	8.8	8.8	8.8	9.2	8.8	8.8	8.8	8.8		9.1
Total Lead	83.2	83.2	83.2	83.2	83.2	83.2	83.2	83.2	83.2	84.1	84.1	84.1	84.1	83.5	84.1	84.1	84.1	84.1		83.7
Zinc Select	71.2	71.2	71.2	71.2	69.4	69.4	69.4	69.4	70.3	69.4	69.4	69.4	69.4	70.0	69.4	69.4	69.4	69.4		69.9
Bulk	8.3	8.3	8.3	8.3	9.0	9.0	9.0	9.0	8.7	9.0	9.0	9.0	9.0	8.8	9.0	9.0	9.0	9.0		8.9
Total Zinc	79.5	79.5	79.5	79.5	78.4	78.4	78.4	78.4	79.0	78.4	78.4	78.4	78.4	78.8	78.4	78.4	78.4	78.4		78.7
Concentrate Grades %																				
Select Lead	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5		66.5
Select Zinc	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5		50.5
Bulk – Lead	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0		18.0
Bulk – Zinc	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8		22.8
Silver in Sel. Pb	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5		13.5
Silver in Bulk Pb	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4		5.4
Fe in Sel. Zinc	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8		10.8
Fe in Bulk	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8		15.8

PRODUCTION STATISTICS

1977 FORECAST

	Jan.	Feb.	Mar.	1st Qtr.	Apr.	May	June	2nd Qtr.	1st Half	July	Aug.	Sept.	3rd Qtr.	3rd Qtr. YTD	Oct.	Nov.	Dec.	4th Qtr.	Full Year Qtr. REV.		MEMO Plan
Concentrate Produced (DST)																					
Lead	9980	9015	9980	28975	9659	9980	9969	29298	58273	10886	10886	10535	32307	90580	10886	10535	10886	32307			122887
Zinc	23591	21308	23591	68490	20614	21301	20614	62529	131019	21301	21301	20614	63216	194235	21301	20614	21301	63216			257451
Bulk	4681	4228	4681	13590	4530	4681	4530	13741	27331	4681	4681	4530	13892	41223	4681	4530	4681	13892			55115
Total	38252	34551	38252	111055	34803	35962	34853	105668	216683	36868	36868	35679	109415	326038	36868	35679	36868	109415			435453
Concentrate Produced (DMT)																					
Lead																					
Zinc																					
Bulk																					
Total																					
Marketable Metal (000 lbs.)																					
Select Lead																					
Bulk Lead																					
Total Lead																					
Select Zinc																					
Bulk Zinc																					
Total Zinc																					
Select Silver (oz)																					
Bulk Silver (oz)																					
Total Silver																					
Operating Time %	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5			22.5
Moisture																					
Pb Select	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8			5.8
Zn Select	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3			6.3
Bulk	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8			5.8