

MEMORANDUM

TO: R. L. Haffner FROM: W. Krats *W.K.*
SUBJECT: Alternatives for 5 year plans DATE: July 20, 1973
1974 - 1978

Alternative 1

This option is based upon all mill feed coming from Zone 1 for the next five years. Detailed plans have been prepared which verify the figures which are presented. The grades in this estimate vary from 8.9% to 9.8% Pb & Zn combined on a yearly basis. The all material movement ranges from 8.9 million to 10.5 million Cu Yds per year. Developed ore has been calculated at the end of each plan year and is approximately 6 months mill feed.

Alternative 2

We estimate that we will have approximately 2.6 million tons of ore in low grade stockpiles on January 1, 1974. This alternative introduces the stockpile material in as mill feed in approximately equal quantities during 1974 & 1975 and totally deletes the piles during the period. The overall waste movement is reduced by 4,856,447 Cu Yds relative to the 5 years estimated in Alternate 1.

The all material movement for 1974 has been based upon an annual average of eight shovel shifts per day operation for the year. The work force will likely start high in January and reduce during the year through normal terminations and end up at the desired effective level required for the start of 1975.

Alternative 3

This alternative in addition to consuming the 2.6 million from stockpiles in 1974 & 1975 develops and utilizes 2.9 million tons of mill feed from Zone 2. This area has a stripping ratio of approximately 3:1 for this quantity of mill feed, consequently making it a very attractive area for lowering the mining ratio during a time of high

mining ratios in Zones 1 and 3. It is however a lower grade, approximately 7.5% Pb + Zn, so therefore must be mined over several years, 1975 - 1978 to allow for blending with higher grade material from Zone 1 which will then give us the ability to maintain an acceptable overall mill feed grade.

The 2.9 million tons is based upon a preliminary estimate and mining plan. Significant additional Diamond Drilling is now complete and a more complete and accurate plan will be developed after this information has been interpreted. There is an additional potential of approximately 2 million tons of mill feed that will be better defined during the coming year.

The all material movement in 1974 has been kept at the same level as in alternate 2, and then maintained at essentially that level throughout the five years. This minimizes the quantity of yardage to be moved by the old fleet on a per year basis, and maintains an essentially constant crew over the five years.

Preliminary work indicates that if we did not get more than the 2.9 million tons from Zone 2 the year 1979 would be at the 10,000,000 Cu Yd level and the year 1980 at the 11,000,000 Cu Yd level by continuing to mine from Zone 1 into Zone 3.

This alternative appears most feasible at this time, it maintains the lowest level of material movement and is well within our present equipment capabilities. The developed ore is at a high level during the years 1974 and 1975 when we are reclaiming from stockpile. This allows for setting up a very effective operation for the 15 yd. shovel, because we are able to get away from small mining slices that have traditionally been required to maintain an acceptable level of developed ore in the pit.

General

Attached are two charts, one showing the all material movements by years for each of the three alternatives, the other showing the shovel requirement over these years and alternatives.

5 YEAR PLANS ALTERNATIVE I, II and III

ALTERNATIVE I

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Mill Feed (Tons)	3,390,650	3,650,371	3,660,261	3,665,075	3,669,275
(Cu. Yds.)	1,066,240	1,147,910 ^{1/3}	1,151,020	1,152,540	1,153,860
Waste (Cu. Yds.)	7,891,760	9,207,810 ^{2/1}	9,376,940	9,014,290	9,054,850
Ratio	7.4/1	8.0/1	8.1/1	7.8/1	7.8/1
All Material (Cu. Yds.)	8,958,000	10,355,720 ^{2/3}	10,527,960	10,166,830	10,208,710

ALTERNATIVE II

Mill Feed (Tons)	3,650,000	3,650,000 ✓	3,650,000	3,650,000	3,650,000
(Cu. Yds.)	1,147,797	1,147,797 ✓	1,147,797	1,147,797	1,147,797
Waste (Cu. Yds.)	7,100,000	8,147,301	8,147,301	8,147,301	8,147,301
Ratio	6.2/1	7.1/1	7.1/1	7.1/1	7.1/1
All Material (Cu. Yds.)	8,247,797	9,295,098	9,295,098	9,295,098	9,295,098

ALTERNATIVE III

Mill Feed (Tons)	3,650,000	3,650,000	3,650,000	3,650,000	3,650,000
(Cu. Yds.)	1,147,797	1,147,797	1,147,797	1,147,797	1,147,797
Waste (Cu. Yds.)	7,100,000	7,100,000	7,000,000	7,000,000	6,963,591
Ratio	6.2/1	6.2/1	6.1/1	6.1/1	6.1/1
All Material (Cu. Yds.)	8,247,797	8,247,797	8,147,797	8,147,797	8,111,388

SHOVEL REQUIREMENTS - 5 YEAR PLANS

Basic Criteria:

- 52.14 wks./year
 - 6 days/wk.
 - 3 shifts/day
 - 10 statutory holidays/year
 - 303 working days/year
 - 909 working shifts/year
 - Operational Availability 5 yd. shovels - 88%
 - 15 yd. shovels - 95%
- (Operational Avail. = $\frac{\text{Operating} + \text{Idle}}{\text{Total}}$)

Shovel Shifts Available:

$$\begin{aligned} 15 \text{ Cu. Yd.} & - 909 \times .95 = \underline{864 \text{ shifts/year}} \\ 5 \text{ Cu. Yd.} & - 909 \times .88 = 800 \times 4 \text{ shovels} \\ & = 3200 \text{ shovel shifts/year} \end{aligned}$$

Productivities:

$$\begin{aligned} 5 \text{ Cu. Yd.} & - \text{Waste} & - 2122 \text{ Cu. Yds./Operating Shift} \\ & \text{Ore} & - 1600 \text{ Cu. Yds./Operating Shift} \\ \\ 15 \text{ Cu. Yd.} & - \text{Waste} & - 6018 \text{ Cu. Yds./Operating Shift} \end{aligned}$$

Alternative I:

$$\begin{aligned} 1974 & - 15 \text{ Yd.} & - 864 \text{ Shifts} \\ & 5 \text{ Yd.} & - \underline{1935} \text{ Shifts (60.5\% of Operational Avail.)} \\ & \text{Total} & \underline{3663} \text{ Shifts} \\ & & \underline{2799} \\ \\ 1975 & - 15 \text{ Yd.} & - 864 \text{ Shifts} \\ & 5 \text{ Yd.} & - \underline{2605} \text{ Shifts (81.4\% of Operational Avail.)} \\ & \text{Total} & 3469 \text{ Shifts} \end{aligned}$$

Alternative II:

1974 - 15 Yd. - 864 Shifts
5 Yd. - 1612 Shifts (50.4% of Operational Avail.)
Total 2476 Shifts

1974 - 15 Yd. - 864 Shifts
5 Yd. - 2105 Shifts (67.8% of Operational Avail.)
Total 2969 Shifts

Alternative III:

1974 - 15 Yd. - 864 Shifts
5 Yd. - 1612 Shifts (50.4% of Operational Avail.)
Total 2476 Shifts

1975 - 15 Yd. - 864 Shifts
5 Yd. - 1612 Shifts (50.4% of Operational Avail.)
Total 2476 Shifts

Note:

In each alternative the shovel utilization level of 1975 will continue through to 1978.