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To \_\_\_\_\_

From R. Tolbert \_\_\_\_\_

Date October 2, 1982 \_\_\_\_\_

Subject ZONE III NA PHASE TONNAGE AND GRADE ESTIMATIONINTRODUCTION

It became apparent to the Geology Department that there were some discrepancies between the mine model interpolated assays for blocks and actual drill hole assays, during compilation of assay sections in late August.

There were indications of a discrepancy prior to this, just before the shutdown, when blasthole assays were compared to the mine model blocks in the initial bench 3890 of the NA phase.

The predicted mine model tonnage and grade for bench 3890 as compared to the blasthole information is as follows:

	<u>Cut-off</u>	<u>Tonnage (sdt)</u>	<u>Pb+Zn%</u>
3890 bench - Mine model	+4%	142,000	7.3
3890 bench - Blasthole	+4%	70,000	6.4

The most noticeable discrepancy on this and other benches was between the model interpolated block grades of 2A sulphide type, and actual drill hole assays.

Drill hole assays of 2A in the NA phase range from 1.7% to 8.0% Pb+Zn with an unweighted mean of 4.7% Pb+Zn. However the model interpolated block grades of unmixed 2A ran as high as 11.8% Pb+Zn.

At this point in early September:

- A) an initial tonnage and grade comparison was started comparing interpolated block grades based on geologic control and the mine model block grades.
- and B) possible reasons for the discrepancies were examined in order to take corrective measures.

A) TONNAGE AND GRADE COMPARISON

The initial hand interpolated tonnage and grade block comparison at 4% Pb+Zn cutoff reported on September 23, 1982 was based on a calculated 2A tonnage and grade, but due to time constraints, an estimated tonnage and grade of the other ore types (based on three benches completed at that time).

*For the mill it is important to know  
proportioning 3-4% Pb+Zn your figures high!  
or mine low! ?*

**CYPRUS**

(2)

This above comparison showed the geologically controlled interpolated tonnage and grade to indicate a 58% decrease in 2A tonnage and an estimated 20% decrease in the other types, giving a combined reduction in tonnage of 30% as compared to the model at 4% cutoff.

There was also an overall 8% loss of combined Pb/Zn grade resulting entirely from a reduction in 2A sulphide type Pb+Zn grade.

A more accurate planimetered and geologically controlled tonnage and grade was completed on September 30, 1982 and is shown in Table 1.

These figures show a 16% loss of total tonnage at a 4% Pb+Zn cutoff and a slight increase in grade as compared to the mine model figures. Once again the largest discrepancy was in the 2A sulphide type with a 52% decrease in tonnage.

At a 3% Pb+Zn cutoff there was a larger discrepancy in both total tonnage and grade due to the elimination of low grade 2A waste in the geologically controlled interpolation.

#### B) INTERPRETATION OF RESULTS

The above discrepancies are due to a unfavourable combination of several variables of which I will discuss three.

##### 1) 2A Sulphides

A large proportion of the ribbon banded graphitic quartz sulphide (2A) in the NA phase is below 3% Pb+Zn grade. This was correctly assigned into bench blocks as an "ore" type based on geology but incorrectly based on assays.

In the past such a problem was not evidenced and it was not perceived to be a problem in the NA phase at the bench block coding stage.

From examination of the assay sections, just completed, there does not appear to be a large amount of 2A sulphides in the OA phase so this particular problem will be eliminated.

As would be expected geologically, in the higher grade Zone I the 7D phase 2A sulphides are to a large extent above 3% or 4% cutoff and it does not appear that they will cause the same problem encountered in the NA phase.

(3)

In addition, with the planned construction of assay sections and bench plans there will be checks available in future that will reduce the occurrence of similar problems.

2) Structure

The average sheet dip i.e. The general overall trend of lithologies, is approximately  $20^{\circ}$  to the southwest in the NA phase. In the central part of Zone I it is sub horizontal on some sections.

Where the sheet dip is at an angle to the horizontal benches there can be grade interpolation problems i.e. high grade being assigned to low grade ore blocks, especially when no facies control is placed on interpolation as in previous mine models, due to practical constraints.

Recent developments have allowed this problem to be corrected to enable better assigning of grades to blocks.

3) Mintec Modeling Procedures - see P.I. Clarke's memo of October 3, 1982

GEOLOGIC INTERPRETATION

It should be understood that as more pit mapping, blasthole logging and diamond drill hole information is gathered structural and lithologic interpretations can and will be changed that will effect either addition or subtraction to the reserve figures.

The Geology Department is in the process of updating and refining the geologic data base over the next several months to:

- a) determine where areas in the data base require improvement.
- b) provide better reserve estimates for planning purposes.



R. Tolbert - DISTRICT GEOLOGIST

TABLE I  
SUMMARY OF ZONE III NA PHASE TONNAGE AND GRADE COMPARISON  
(BENCHES 3890-3670)

BLOCK MODEL METHOD (MINTEC MODEL F3)

<u>ORE TYPE</u>	<u>CUT OFF</u>	<u>TONNAGE ('000 sdt)</u>	<u>Pb%</u>	<u>Zn%</u>
2A (Unit 7)	+4%	533	2.4	3.9
2B to H (Units 8-11)	+4%	1,513	2.8	4.3
<b>TOTAL</b>	<b>+4%</b>	<b>2,046</b>	<b>2.7</b>	<b>4.2</b>

PLANIMETERED GEOLOGIC BENCH PLAN METHOD (P.G.)

<u>ORE TYPE</u>	<u>CUT OFF</u>	<u>TONNAGE ('000 sdt)</u>	<u>Pb%</u>	<u>Zn%</u>	<u>(%Variance in tonnage F3-PG X 100 F3 )</u>
2A (Unit 7)	+4%	256	2.0	4.0	-52
2B to H (Units 8-11)	+4 %	1,462	3.0	4.6	- 3
<b>TOTAL</b>	<b>+4%</b>	<b>1,718</b>	<b>2.8</b>	<b>4.5</b>	<b>-16</b>

BLOCK MODEL METHOD (MINTEC MODEL F3)

<u>ORE TYPE</u>	<u>CUT OFF</u>	<u>TONNAGE ('000 sdt)</u>	<u>Pb%</u>	<u>Zn%</u>
2A (Unit 7)	+3%	671	2.3	3.6
2B to H (Units 8-11)	+3%	1,627	2.7	4.2
<b>TOTAL</b>	<b>+3%</b>	<b>2,298</b>	<b>2.6</b>	<b>4.0</b>

PLANIMETERED GEOLOGIC BENCH PLAN METHOD (P.G.)

<u>ORE TYPE</u>	<u>CUT OFF</u>	<u>TONNAGE ('000 sdt)</u>	<u>Pb%</u>	<u>Zn%</u>	<u>(% Variance in tonnage F3-PG X 100 F3 )</u>
2A (Unit 7)	+3%	305	1.9	3.7	-54
2B to H (Units 8-11)	+3%	1,468	2.9	4.6	-10
<b>TOTAL</b>	<b>+3%</b>	<b>1,773</b>	<b>2.8</b>	<b>4.4</b>	<b>-23</b>

NOTE:

1. No dilution applied to above figures.
2. Mean facies S.G.'s for deposit used to calculate tonnage.