CYPRUS ANVIL MINI CORPORATION INTERO. CE CORRESPONDENCE

019877

To

From J. Purkis

Date October 1, 1982

Subject REPORT ON EFFECTS OF REDUCED TONNAGE AND GRADE ON PLANS 407A & 408

## 1.0 INTRODUCTION

This report decribes the effects of tonnage and grade reductions on Plans 407A and 408.

Two hypothetical TEST CASES were developed to analyze these effects as final numbers from Geology were not available. It was decided, though, that order of magnitude numbers were required as soon as possible due to the effect these reductions may have on imminent decisions.

The two test cases used are described in Appendix I - memo of September 24, 1982.

Test Case I contains both large tonnage and grade reductions while Test Case II contains moderate tonnage and small grade reductions.

One must be careful not to over react to the sensitivities as they assume no changes to the mine plans would occur. In reality one would modify plans and schedules so as to minimize the impact of tonnage/grade reductions in the short term. In the long term though one will have to absorb the reductions in reduced returns on the district.

## 2.0 DESCRIPTIONS OF EFFECTS

### 2.1 Plan 407-A - Simultaneous Mine/Mill startup on April 1, 1983.

#### 2.1.1 TEST CASE I

| PHASE | TONNAGE CHANGE (tonnes) | GRADE CHANGE %Pb | %Zn | Ag(g/t) |
|---|---|---|---|---|
| NA | (531,000) | (.2) | (0) | (3.3) |
| OA | (280,000) | (.2) | (0) | (3.3) |
| 7D | (120,000) | (.2) | (0) | (1.5) |
| PA | (139,000) | (.3) | (0) | (3.3) |
| UB | 0 | (.2) | (0) | (1.5) |

Scheduling Effects - assume

a) cannot increase total stripping rates above 46,000 BCY/day projected.

b) can increase rates marginally on individual phases.

c) introduce losses in terms of ore gaps rather than mill feed rate reductions.

then effect would be

a) Ore gap - NA - OA - 1 month in 1st Quarter 1984 - loss of 309,000t.

b) Ore gap - OA - 7D - 1 month in 2nd Quarter 1984 - loss of 335,000t.

c) Ore gap PA - UB - 38 days in 2nd Quarter 1985 - loss of 426,000t.

Financial Effects - assume

a) Mill does not layoff manpower during gap periods.

b) Metallurgy is not improved due to less 2A ore [illegible] in Mill Feed.

c) Mining costs not reduced due to less ore haul.

d) No change to G & A items.

The following numbers have been examined to determine the net cash flow effect.

a) Lower mill operating costs during ore gap period (except labour).

b) Lower Transportation costs due to less tonnes concentrate.

c) Change in Revenues.

For Financial Effects Summary - see Table I.

2.1.2 TEST CASE II

| PHASE | TONNAGE CHANGE (tonnes) | GRADE CHANGE %Pb | %Zn | Ag(g/t) |
|---|---|---|---|---|
| NA | (265,000) | (.1) | (0) | (1.7) |
| OA | ( 70,000) | (.1) | (0) | (1.7) |
| 7D | (120,000) | (.2) | (0) | (1.5) |
| PA | ( 69,000) | (.1) | (0) | (1.7) |
| UB | 0 | (.2) | (0) | (1.5) |

Scheduling effects assume - same as Test Case I

then effects would be

a) Ore gap OA - 7D - 1 month in 2nd Quarter 1984 - loss of 335,000t.

b) Ore gap PA - UB - 17 days in 1st Quarter 1985 - loss of 189,000t.

Financial Effects - assume - same as Test Case I.

- Effects shown in Table I.

2.2 PLAN 408

- Mine startup April 1, 1983
- Mill startup October 1, 1983

2.2.1 TEST CASE I

Tonnage and grade losses same as in 2.1.1.

Scheduling effects - One will compensate for the tonnage loss by increasing stripping by +5,000 BCY/day from October, 1983 through October, 1985.

2.2.2 TEST CASE II

Tonnage and grade losses same as 2.1.2.

Scheduling effects - To compensate for tonnage loss stripping rate would increase by +2,500 BCY/day from October 1983 through December 1984 and by +2,000 BCY/day from January 1985 through October 1985.

34$ Pb
45¢ Zn



2.2.3 FINANCIAL EFFECTS

These are summarized in Table I. The losses in revenue due to grade reductions are the same as for 407-A but occur at different periods in time. The cost of increased stripping has geen estimated at $3.50/BCY (unescalated).

2.3 Summary of Financial Effects of Tonnage/Grade Reductions.

2.3.1 To show these effects the changes in Net Operating Cash annually have been determined and presented in Tables 1 and 2.

TABLE 1: ANNUAL NET OPERATING CASH COMPARISON ($ X $10^6$)

| | 1982 | 1983 | 1984 | 1985 | 1986 | 0%Discount 5 yr | 15%Discount 5 yr |
|---|---|---|---|---|---|---|---|
| PLAN 407-A | | | | | | | |
| -Original | (34.5) | (42.7) | ( 0.8) | +22.1 | +63.4 | +7.5 | (21.5) |
| -Test Case II | (34.5) | (44.0) | ( 7.5) | +14.6 | +56.4 | (15.0) | (36.6) |
| -Test Case I | (34.5) | (45.2) | (11.3) | +11.2 | +56.4 | (23.4) | (42.7) |
| PLAN 408 | | | | | | | |
| -Original | (34.5) | (68.0) | +40.0 | +35.0 | +61.0 | +33.5 | ( 5.5) |
| -Test Case II | (34.5) | (68.8) | +40.0 | +28.0 | +64.0 | +11.6 | (20.3) |
| -Test Case I | (34.5) | (69.6) | +27.7 | +21.8 | +54.0 | ( 0.6) | (28.9) |

TABLE 2: RELATIVE DIFFERENCES OF EFFECT BETWEEN PLANS 407-A and 408

| | PLAN 407-A 5year 0% discount | PLAN 407-A 5 year 15% discount | PLAN 408 5 year 0% discount | PLAN 408 5 year 15% discount |
|---|---|---|---|---|
| Test Case I - Original | (30.9) | (21.2) | (34.1) | (23.4) |
| Test Case II - Original | (22.5) | (15.1) | (21.9) | (14.8) |

## 3.0 Conclusions and Recommendations

3.1 The effect of tonnage/grade reductions on Plans 407-A and 408 are similar over a 5 year period.

3.2 The magnitude of the reduced cash flow is for

Test Case I - 30 to 35 million dollars over 4 years.
Test Case II - 21 to 23 million dollars over 4 years.

3.3 Losses of this nature would significantly reduce the rate of return on the district. ie: it may still be possible to pay back the debt but minimal return on equity (old or new) would occur for a sequential district development plan. This assumes all other parameters used would not change.

3.4 It is recommended that before we proceed further a new set of plans be developed. It is felt that other options are available that would offer a better return on the district than the original 407-A and 408 plans even with tonnage/grade reductions applied.

3.5 It is absolutely necessary to apply "risk analysis" methods to future plans. The effect of a 2¢ change in lead and zinc prices is greater than the effects of Test Case I tonnage/grade reductions. The probability of Test Case I occurrring is extremely small yet the probability of a $\pm$ 2¢ change in prices is probably very high.

Therefore it would be wrong to make a decision without having studied other factors that may increase or decrease.

# APPENDIX I

APPENDIX I

CYPRUS ANVIL MIN' G CORPORATION INTER FICE CORRESPONDENCE

To R. McCallum
J. Carrington

From J. Purkis

Date September 24, 1982

Subject RE: EFFECTS OF REDUCED TONNAGE AND GRADE ON PHASES NA, OA, PA & 7D

The work done by R. Tolbert and J. Kier which has indicated that tonnage and grades could be much lower on Phases NA, OA, PA, and 7D than previously predicted would have significant negative impact on the results of plans presently being analysed to justify the mine start-up.

The concensus in Engineering which until now has been totally responsible for tonnage/grade predictions is that the above mentioned work of R. Tolbert and J. Kier is too conservative and in some cases incorrect. The result of the investigation that will take place next week (September 27 to October 1) will be a tonnage/grade estimate that can be considered correct and acceptable for future use in scheduling and financial analysis.

Since answers to the scheduling and financial impact are desired now one can only look at some examples that cover the range of possibilities that may occur.

The following examples will be analyzed as how they will affect plans 407-37D and 408-47D:

| | PHASE | TONNAGE | GRADE Pb | GRADE Zn | GRADE Ag |
|---|---|---|---|---|---|
| TEST CASE I | NA | -30% | -15% | -5% | -15% |
| | OA | -20% | -15% | -5% | -15% |
| | PA | -10% | -15% | -5% | -15% |
| | 7D | - 5% | -10% | -5% | -10% |
| TEST CASE II | NA | -15% | -10% | -5% | -10% |
| | OA | - 5% | -10% | -5% | -10% |
| | PA | - 5% | -10% | -5% | -10% |
| | 7D | - 5% | -10% | -5% | -10% |

Note: Normal Reductions used on Tonnage - -10%
Grade - -5%

TEST CASE I - This case is a projection of R. Tolbert/J. Kier type numbers.

TEST CASE II - This is an Engineering estimate of what we feel is potentially a real eventuality. ie: Could happen within the accuracy of any tonnage/grade prediction using the data and methods we have used over the past 3 years.

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To obtain real comparisons it is necessary to look at relative impact between cases in time. To do this one must compare cases that have been escalated and then discounted to present value. A 4 year analysis should cover the significant impact period.

Please advise if this is sufficient and or if other analysis is desired.

J. Purkis - CHIEF ENGINEER

JP/df