

To

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Date

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From

D. Gregoire

Subject

THIRD QUARTER REVIEW AND 1979 PLAN

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**CYPRUS**

A) PRODUCTION PARAMETERS:

Parameters Used for End of 1978 and Five Year Schedule:

|                          |                               |                       |
|--------------------------|-------------------------------|-----------------------|
| Ore =                    | 10,250 SDT/Day                | 2,928 BCY/Day         |
| Waste =                  | 15 yd. shovels =              | 30,570 BCY/Day        |
|                          | 5 yd. shovels = 4180 - 2928 = | 1,252 BCY/Day         |
| Total Ore Production =   |                               | 2,928 BCY/Day         |
| Total Waste Production = |                               | <u>31,822 BCY/Day</u> |
| Total Production =       |                               | 34,750 BCY/Day        |

Assumptions:

One B-E Shovel in Ore and Waste:

|         |                      |
|---------|----------------------|
| Ore =   | 2,928 BCY/Day        |
| Waste = | <u>1,252 BCY/Day</u> |
| Total = | 4,180 BCY/Day        |

|                               |                       |
|-------------------------------|-----------------------|
| Two 15 yard Shovels in Waste: | 15,285 BCY/Day/Shovel |
| Total =                       | 30,570 BCY/Day        |

Or:

|                                 |                       |
|---------------------------------|-----------------------|
| Three 15 yard Shovels in Waste: | 10,190 BCY/Day/Shovel |
| Total =                         | 30,570 BCY/Day        |

B) MANPOWER REQUIREMENTS:

Supervision:

Chief Engineer  
Senior Mine Engineer  
Mine Geologist  
Temporary Mine Geologist until October, 1979  
Geotechnical Engineer  
Civil Engineer  
Planning Engineer

Total = 7 persons

Non-Supervision:

Surveying Technicians (2)  
Geological Technician  
Draftsman  
Secretary  
Instrument Person  
Surveying Assistant  
Summer Student (3 months)

Total = 8 persons

Manpower Costs:

1) Supervision: 7 persons

|                                    |                |
|------------------------------------|----------------|
| September, 1978 to October, 1979 = | \$16,000/Month |
| October, 1979 to December, 1979* = | \$14,000/Month |

\*Temporary Mine Geologist is terminated

2) Non-Supervision:

Regular Employees = 7 persons

September, 1978 to December, 1979

70 weeks x 40 hr./week x 7 employees x \$12.50/hr. = \$245,000

\$14,000/Month

Summer Student = 1 person

June, 1979 to August, 1979

weeks x 40 hrs./week x 1 employee x \$12.50/hr. = \$7,500

\$2,500/Month

Overtime: September, 1978 to December, 1979

\$1,200/Month

Average for last 12 months

3) Summary:

|                 | 1978     |          |          |          | 1979     |          |          |          |          |          |          |          |          |          |          |          | 1979         |
|-----------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--------------|
|                 | <u>S</u> | <u>O</u> | <u>N</u> | <u>D</u> | <u>J</u> | <u>F</u> | <u>M</u> | <u>A</u> | <u>M</u> | <u>J</u> | <u>J</u> | <u>A</u> | <u>S</u> | <u>O</u> | <u>N</u> | <u>D</u> | <u>Total</u> |
| Supervision     | 14       | 16       | 16       | 16       | 16       | 16       | 16       | 16       | 16       | 16       | 16       | 16       | 16       | 14       | 14       | 14       | 186          |
| Non-Supervision | 14       | 14       | 14       | 14       | 14       | 14       | 14       | 14       | 14       | 14       | 14       | 14       | 14       | 14       | 14       | 14       | 168          |
| Student         | -        | -        | -        | -        | -        | -        | -        | -        | -        | 3        | 3        | 3        | -        | -        | -        | -        | 9            |
| Overtime        | <u>1</u> | <u>1</u> | <u>1</u> | <u>1</u> | <u>1</u> | <u>1</u> | <u>1</u> | <u>1</u> | <u>1</u> | <u>1</u> | <u>1</u> | <u>1</u> | <u>1</u> | <u>1</u> | <u>1</u> | <u>1</u> | <u>12</u>    |
| Total           | 29       | 31       | 31       | 31       | 31       | 31       | 31       | 31       | 31       | 34       | 34       | 34       | 31       | 29       | 29       | 29       | 375          |

C) SUPPLIES:

1) Normal Supplies:

Surveying Stakes, Spray Paint, Ribbon, Sampling  
Bags, Surveying Tools, etc. = \$2,000/Month

April, 1979:

Permanent prism to be set up on east wall. \$1,000

2) Extraordinary Supplies:

Storage of Data on Computer Mine Model = \$1,000/Month

3) Summary:

|                 | 1978     |          |          |          | Total | 1979     |          |          |          |          |          |          |          |          |          |          |          | Total |
|-----------------|----------|----------|----------|----------|-------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-------|
|                 | <u>S</u> | <u>O</u> | <u>N</u> | <u>D</u> |       | <u>J</u> | <u>F</u> | <u>M</u> | <u>A</u> | <u>M</u> | <u>J</u> | <u>J</u> | <u>A</u> | <u>S</u> | <u>O</u> | <u>N</u> | <u>D</u> |       |
| Normal Supplies | 2        | 2        | 2        | 2        | 8     | 2        | 2        | 2        | 3        | 2        | 2        | 2        | 2        | 2        | 2        | 2        | 2        | 25    |
| Storage         | -        | -        | 1        | 1        | 2     | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 12    |
| Total           | 2        | 2        | 3        | 3        | 10    | 3        | 3        | 3        | 4        | 3        | 3        | 3        | 3        | 3        | 3        | 3        | 3        | 37    |

Storage cost is the cost of storing bank of data in a memory of the main computer situated in Calgary.



E) DIAMOND DRILLING:

Problem:

Accuracy of grades and tonnages forecast  
Advance knowledge of the ore metallurgy  
Difficulty in getting the blast hole drills for test drilling  
Limitations in the depth a blast hole drill can reach  
Complexity of the orebody which will increase in Zone 3

Solution:

Continuous advance drilling to increase our knowledge of what type of ore and at what grade will be milled in short and long term.

Cost:

1978 - It is recommended that drilling of Zone 1 can be completed in 1978. This will give information on the ore to be milled until the third quarter of 1979.

|                                              |            |
|----------------------------------------------|------------|
| 1,000 feet @ \$24.00/foot =                  | \$24,000   |
| Mobilization and Demobilization =            | 3,400      |
| Camp Costs - 30 Mandays @ \$18.25/Manday , = | <u>600</u> |
| Total                                        | \$28,000   |

Renovations to the <sup>Logging</sup>~~core~~ shack will be necessary to allow for the new core.

1979 - The drilling would be done on the No. 2 deposit during the second quarter of 1979. This would provide information on the ore to be milled until the third quarter of 1980.

|                                            |            |
|--------------------------------------------|------------|
| 1,500 feet @ \$24.00/foot =                | \$36,000   |
| Mobilization and Demobilization =          | 3,300      |
| Camp Costs - 40 Mandays @ \$18.25/Manday = | <u>700</u> |
| Total                                      | \$40,000   |

Note: The cost per foot is assuming that a diamond drilling contractor would do the work - \$22.00/foot 1978 cost.

The possibility of Cyprus Anvil buying its own drill is being looked at, since that advance drilling would be on a continuous basis.

Summary:

|                        | 1978     |          |          |          | Total    | 1979     |          |          |          |          |          |          |          |          |          |          |          | Total |
|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-------|
|                        | <u>S</u> | <u>O</u> | <u>N</u> | <u>D</u> |          | <u>J</u> | <u>F</u> | <u>M</u> | <u>A</u> | <u>M</u> | <u>J</u> | <u>J</u> | <u>A</u> | <u>S</u> | <u>O</u> | <u>N</u> | <u>D</u> |       |
| Advance Drilling       | -        | 12       | 16       | -        | 28       | -        | -        | -        | 10       | 30       | -        | -        | -        | -        | -        | -        | -        | 40    |
| Core Shack Renovations | -        | -        | <u>2</u> | -        | <u>2</u> | -        | -        | -        | -        | -        | -        | -        | -        | -        | -        | -        | -        | -     |
| Total                  | -        | 12       | 18       | -        | 30       | -        | -        | -        | 10       | 30       | -        | -        | -        | -        | -        | -        | -        | 40    |

F) OTHER COSTS:

Gasoline (10% of total mine is charged to the  
Engineering Department)

Taxis

Conferences

Seminars

Surveys away from Minesite - Carmacks  
Townsite

\$1,000/Month

Summary:

| 1978     |          |          |          | <u>Total</u> | 1979     |          |          |          |          |          |          |          |          |          |          |          | <u>Total</u> |
|----------|----------|----------|----------|--------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--------------|
| <u>S</u> | <u>O</u> | <u>N</u> | <u>D</u> |              | <u>J</u> | <u>F</u> | <u>M</u> | <u>A</u> | <u>M</u> | <u>J</u> | <u>J</u> | <u>A</u> | <u>S</u> | <u>O</u> | <u>N</u> | <u>D</u> |              |
| 2        | 1        | 1        | 2        | 6            | 1        | 1        | 2        | 1        | 1        | 2        | 1        | 1        | 2        | 1        | 1        | 2        | 16           |

1978

[illegible]

1979

[illegible]

[illegible]

CYPRUS ANVIL MINING CORPORATION

ENGINEERING DEPARTMENT

1978

THIRD QUARTER REVIEW

|                                       | Jan. | Feb. | Mar. | 1st.<br>Qtr. | Apr. | May | June | 2nd.<br>Qtr. | 1st.<br>Half | July | Aug. | Sept. | 3rd.<br>Qtr. | 3rd.<br>Qtr.<br>YTD | Oct. | Nov. | Dec. | 4th.<br>Qtr. | Full Year<br>Fcast. | Year<br>Plan |
|---------------------------------------|------|------|------|--------------|------|-----|------|--------------|--------------|------|------|-------|--------------|---------------------|------|------|------|--------------|---------------------|--------------|
| <u>Controllable Costs:</u>            |      |      |      |              |      |     |      |              |              |      |      |       |              |                     |      |      |      |              |                     |              |
| Salaries                              | 27   | 28   | 34   | 89           | 25   | 27  | 32   | 84           | 173          | 33   | 31   | 29    | 93           | 266                 | 31   | 31   | 31   | 93           | 359                 | 335          |
| Supplies                              | 1    | 1    | 1    | 3            | 2    | 1   | -    | 3            | 6            | 1    | -    | 2     | 3            | 9                   | 2    | 3    | 3    | 8            | 17                  | 20           |
| Outside Services                      | 1    | (1)  | 2    | 2            | -    | -   | 1    | 1            | 3            | -    | 1    | 8     | 9            | 12                  | 8    | 8    | 8    | 24           | 36                  | 38           |
| Other                                 | 2    | 2    | 1    | 5            | 1    | 1   | 1    | 3            | 8            | -    | 1    | 2     | 3            | 11                  | 1    | 1    | 2    | 4            | 15                  | 17           |
| Diamond Drilling                      | -    | -    | -    | -            | -    | -   | -    | -            | -            | 19   | -    | -     | 19           | 19                  | 12   | 18   | -    | 30           | 49                  | 50           |
| TOTAL<br>ENGINEERING DEPARTMENT COSTS | 31   | 30   | 38   | 99           | 28   | 29  | 34   | 91           | 190          | 53   | 33   | 41    | 127          | 317                 | 54   | 61   | 44   | 159          | 476                 | 460          |

CYPRUS ANVIL MINING CORPORATION

ENGINEERING DEPARTMENT

1979 PLAN

|                                       | Jan. | Feb. | Mar. | 1st.<br>Qtr. | Apr. | May | June | 2nd.<br>Qtr. | 1st.<br>Half | July | Aug. | Sept. | 3rd.<br>Qtr. | 3rd.<br>Qtr.<br>YTD | Oct. | Nov. | Dec. | 4th.<br>Qtr. | Full<br>Fcst. | Year<br>Plan |
|---------------------------------------|------|------|------|--------------|------|-----|------|--------------|--------------|------|------|-------|--------------|---------------------|------|------|------|--------------|---------------|--------------|
| <u>Controllable Costs:</u>            |      |      |      |              |      |     |      |              |              |      |      |       |              |                     |      |      |      |              |               |              |
| Salaries                              | 31   | 31   | 31   | 93           | 31   | 31  | 34   | 96           | 189          | 34   | 34   | 31    | 99           | 288                 | 29   | 29   | 29   | 87           | 375           | 359          |
| Supplies                              | 3    | 3    | 3    | 9            | 4    | 3   | 3    | 10           | 19           | 3    | 3    | 3     | 9            | 28                  | 3    | 3    | 3    | 9            | 37            | 17           |
| Outside Services                      | 5    | 5    | 8    | 18           | 5    | 5   | 5    | 15           | 33           | 5    | 5    | 5     | 15           | 48                  | 5    | 5    | 5    | 15           | 63            | 36           |
| Other                                 | 1    | 1    | 2    | 4            | 1    | 1   | 2    | 4            | 8            | 1    | 1    | 2     | 4            | 12                  | 1    | 1    | 2    | 4            | 16            | 15           |
| Diamond Drilling                      | -    | -    | -    | -            | 10   | 30  | -    | 40           | 40           | -    | -    | -     | -            | 40                  | -    | -    | -    | -            | 40            | 43           |
| TOTAL<br>ENGINEERING DEPARTMENT COSTS | 40   | 40   | 44   | 124          | 51   | 70  | 44   | 165          | 289          | 43   | 43   | 41    | 127          | 416                 | 38   | 38   | 39   | 115          | 531           | 470          |



J) DETAILS ON THE SCHEDULE:

Ore Continuity:

The first critical period happens at the end of Phase V ore in November, 1980, when Phase VI ore must be exposed to ensure continuity of supply to the mill. In effect, there is no overlap between the two phases.

Gap in 1983:

There is no gap shown on the schedule in 1983, however, it is unrealistic to schedule three 15 yard shovels to work on a 250 foot wide bench. In fact, a gap of 90 days should be shown.

The mining of Zone 2 is scheduled to start in June, 1979.

The oxidized stockpile is scheduled to be mined in 1982.

# K) COMPUTERIZATION OF THE ORE MODEL:

## Time Table:

### September, 1978:

1. Complete outstanding re-assaying of Zone 3 samples and re-assaying of samples from part of Zone 1. Re-assaying in Zone 1 has been limited to Phase VI and later phases.
2. Continue preparation of DDH data into presentable format.
3. Continue to have DDH keypunched and loaded to magnetic tape files.
4. Continue drawing Zone 3/Zone 1 geological sections.
5. Start coding topography into computer format.

### October, 1978:

1. Continue preparation of DDH data.
2. Continue keypunching and loading of DDH data.
3. Continue drawing Zone 3/Zone 1 geological sections and produce geological bench plans.
4. Start coding geological bench plans into computer format.
5. Finish coding topography.
6. Calculation of Zone 3/Zone 1 bench assay composites by computer.
7. Label composites as to predominant rock type.

### November, 1978:

1. Compilation of frequency distribution of composites by computer.
2. Develop grade interpolation technique (comparison with a mined out area of Zone 1).
3. Compilation of frequency distribution of block grades by different interpolation techniques for comparison.
4. Interpolate grade values into Zone 3/Zone 1 blocks.
5. Print bench plans of Zone 3/Zone 1.
6. Start organizing Zone 2 samples for re-assaying. ✓
7. Install computer terminal, diskette and digitizer.

December, 1978:

1. Check bench plans.
2. Calculate Zone 3/Zone 1 mine reserve inventory by bench (using current mine design).
3. Prepare Zone 2 DDH data. ✓
4. Prepare Zone 2 geological sections.
5. Start re-assaying Zone 2 samples. ✓

January, 1979:

1. Ongoing work on Zone 3 model.
2. Start keypunching and loading Zone 2 DDH data.—
3. Draw Zone 2 geological sections. —
4. Produce geological bench plans of Zone 2.
5. Code Zone 2 bench plans into computer format.
6. Continue re-assaying Zone 2 samples.

February, 1979:

1. Code Zone 2 topography.
2. Continue preparation and loading of Zone 2 DDH and in situ data.
3. Continue re-assaying Zone 2 samples.
4. Prepare First Quarter Plan.

March, 1979:

1. First Quarter Review.
2. Complete model of Zone 2.
3. Start new ultimate pit designs.

# L) LEAD/ZINC PREDICTIONS:

Using data for the nine month period, November, 1977 to July, 1978 inclusive, back analysis was done to compare the current tonnage and grade model with mill reported heads.

A comparison between mine model and mill reported heads takes into account two different sources of "error." An error attributable to deficiencies in the model would include: poor original assays, incorrect grade interpolation, difficulty in projecting lithologies between drill holes, etc. The other source of error is unavoidable dilution in mining activity in certain situations.

To determine the extent of these two sources of error, comparisons are given between model and blasthole assays, and blasthole assays versus mill reported heads.

Results are summarized in the following tables:

## TONNAGE AND GRADE COMPARISONS

NOVEMBER, 1977 - JULY, 1978

| <u>Source*</u>        | <u>Tons (000's)</u> | <u>% Pb</u> | <u>% Zn</u> | <u>Comb.</u> |
|-----------------------|---------------------|-------------|-------------|--------------|
| Mine Model            | 2,895               | 2.94        | 5.24        | 8.18         |
| Blasthole Assays      | 2,764               | 2.81        | 4.85        | 7.66         |
| Metallurgical Balance | 2,743               | 2.63        | 4.68        | 7.31         |
| Calculated Balance    | 2,743               | 2.83        | 4.69        | 7.52         |

\* Data Source - Monthly ore comparisons compiled by the Engineering Department.

The following table gives the variances of Pb and Zn for the various sources:

## VARIANCE

|       | <u>Model<br/>vs. Blast Assays</u> | <u>Blast Assays<br/>vs. Met. Bal.</u> | <u>Blast Assays<br/>vs. Calc.</u> | <u>Model<br/>vs. Met.</u> | <u>Model<br/>vs. Calc.</u> |
|-------|-----------------------------------|---------------------------------------|-----------------------------------|---------------------------|----------------------------|
| % Pb  | -4%                               | -6%                                   | +1%                               | -11%                      | -4%                        |
| % Zn  | -7%                               | -3%                                   | +3%                               | -11%                      | -11%                       |
| Comb. | -6%                               | -5%                                   | +2%                               | -11%                      | -8%                        |

For purposes of short to medium term schedules, the ideal situation would be to have a zero variance between the model and mill reported heads. With the exception of upgrading the model (in progress), adjustments to predicted feed grades are suggested from the data.

A combined variance of -8% between mine model and calculated mill heads is composed of -6% variance between model and blast assays and a -2% variance between blast assays and calculated mill heads. The data suggest 75% of the error is model related and 25% due to mining dilution. A straight percentage reduction is attempted since a statistical study to derive maximum grades per tonnage block is not manually feasible with the current model.

Since the data was compiled by month and not by bench, this precludes anything but a preliminary conclusion at this time. The method of comparison is, at best, a first step, since compiling by bench is the better alternative. Time did not permit a bench by bench comparison.

Based on the foregoing discussion, it is recommended that for the Third Quarter, 1978, and for 1979, a reduction of lead by 4% and zinc by 7% be used. A 7% reduction for zinc is proposed, since this gives the lead-zinc reduction a ratio of 0.57, comparable to the Pb/Zn ratio for the period examined.