CYPRUS ANVIL MINING CORPORATION INTEROFFICE CORRESPONDENCE

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To B. Davia

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From Rhonda Martel & Sibyl Frei

Date June 2, 1982

Subject: Regrind Testing

Conclusions: *

1) Pb Regrinding: i) 10 Minutes Regrinding (See graph 1)
The Pb grade increased by 3%.
No significant change in Pb recovery.

ii) No Regrinding Stage (See graph 1)
The Pb grade decreased by 4%.
The Pb recovery decreased by 2.5%.

2) Zn Regrinding: i) 10 Minutes Regrinding (See graph 2)
The Zn grade increased by 8%.
No significant change in Zn recovery.

ii) No Regrinding Stage (See graph 2)
The Zn grade decreased by 5%.
No significant change in Zn recovery.

Recommendations: The regrinding stage should be 10 minutes for both Pb and Zn.

* All tests were compared to the standard 5 minute regrind tests.

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Discussion: The primary grinding objective from the rod mill was a P_{80} of 50 μ. This stockpile ore was treated in the same manner as the standard sulphide ore. The same reagent scheme was used for the rougher-scavenger stages throughout the testwork. The reagent scheme for the cleaning did change due to the changes in regrinding time. (See table A)

In the rougher-scavenger stage, the majority of the concentrate came over in the first minute of floating in both the Pb and the Zn. These samples did contain a lot of iron and left the scavenger tails well-cleaned out.

Before the Zn rougher-scavenger stage, some of the pulp from the Pb scavenger tails must be decanted so that the Pb first cleaner tails can be added to the cell. In one case, (a 10 minute Pb regrind) a larger amount of pulp than normal had to be decanted. This was due to a larger Pb first cleaner tails sample.

The regrind was done for 0, 5 (Standard) and 10 minutes respectively for 3 tests. The ball mill was used with 7.3 kg of 3/8 inch balls. The rougher-scavenger sample was put directly into the regrind without filtering. The first standard test was filtered, but we decided to abandon the filtering stage because of the time involved. The sample of Pb rougher-scavenger concentrate took much too long to filter and was difficult to get off of the filter paper. This problem is probably due to the clay-like texture of the sample.

In the cleaning stage, most of the Fe came over in the first cleaner concentrate. By the third cleaner concentrate, most of the Fe had been left behind. The amount of Fe present in the concentrates did change with the regrinding times. For example, there was little or no Fe visually observed during the cleaning when a 10 minute regrinding stage was used. But, on the other hand, when there was no regrinding stage used, a major portion of concentrate pulled over contained Fe. The amounts of Z-11 increased with the finer grinds and decreased when no regrinding stage was done. With coarser regrinds, the more Z-11 added, the more Fe was collected.

The Pb final concentrates and all Pb tails samples were very slow filtering. The zinc samples all filtered very fast.

The Pb concentrates were cyclosized and a P_{80} calculated for each. The longer the regrind was, the smaller the P_{80} size.

Regrind Time (minutes)	Pb Concentrate P_{80} (u)
5 (std.)	34.07
10	28.46
0	39.00**

** This value was interpolated from the cyclosizing results. The P_{80} was actually larger than the cyclosizer could give. There was not enough sample to repeat the size analysis.

Summary of Achieved Grades and Recoveries

(weighted averages)

Line No. on Graph	Heads Assays %Pb	%Zn	Lead (Cum.) %Grade	%Rec	Zinc (Cum.) %Grade	%Rec	Tails Assays %Pb	%Zn
1 (std)	2.67	4.43	38.50	87.33	40.85	83.13	0.26	0.10
2 (10min)	2.94	4.67	41.45	87.07	49.51	82.89	0.22	0.07
3 (0min)	2.86	4.55	34.04	89.03	35.59	83.07	0.21	0.06

Standard Sulphide Ore Procedure
(Rougher-Scavenger)

Grind: 2.0 kg sulphide ore
600 ml H_2O
2.5 kg/T soda ash
100 g/T NaCN
27 minute grind in rod mill
35 g/T Z-11 (added during last two minutes of grind)

Pb Rougher-scavenger:

Pb R_1 & R_2		3 Minutes	2 drops MIBC
Pb S_1 & S_2	10 g/T Z-11	4 Minutes	2 drops MIBC
Pb S_3	10 g/T Z-11	3 Minutes	2 drops MIBC

Conditioning stage:

pH to 11.00 with lime slurry	8 Minutes	
250 g/T $CuSO_4$	1 Minute	
35 g/T Z-11	1 Minute	

Zn Rougher-scavenger:

Zn R_1 & R_2		3 Minutes	1 drop DOW 1012
Zn S_1 & S_2	10 g/T Z-11	4 Minutes	1 drop DOW 1012
Zn S_3	10 g/T Z-11	3 Minutes	1 drop DOW 1012

TABLE A Specific Flotation Test Conditions (Cleaning)

Stage Of Test	g/Tonne					pH	Time (min)
	Soda Ash	NaCN	Lime	$CuSO_4$	Z-11		
Pb Regrind	500	25	-	-	-	10.0-10.2	5
Pb CC_1	<100	-	-	-	35.0	10.0-10.2	5
Pb CC_2	<100	-	-	-	20.0	10.0-10.2	4
Pb CC_3	<100	-	-	-	7.5	10.0-10.2	3
Zn Regrind	-	-	400	150	-	11.0	5
Zn CC_1	-	-	slurry	-	22.5	10.9-11.1	5
Zn CC_2	-	-	slurry	-	7.5	11.4-11.6	4
Zn CC_3	-	-	slurry	-	5.0	11.8-12.0	3
Pb Regrind	500	25	-	-	-	10.0-10.2	10
Pb CC_1	<100	-	-	-	40.0	10.0-10.2	5
Pb CC_2	<100	-	-	-	20.0	10.0-10.2	4
Pb CC_3	<100	-	-	-	7.5	10.0-10.2	3
Zn Regrind	-	-	400	150	-	11.0	10
Zn CC_1	-	-	slurry	-	40.0	10.9-11.1	5
Zn CC_2	-	-	slurry	-	17.5	11.4-11.6	4
Zn CC_3	-	-	slurry	-	7.5	11.8-12.0	3
Pb Regrind	500	25	-	-	-	10.0-10.2	0
Pb CC_1	<100	-	-	-	30.0	10.0-10.2	5
Pb CC_2	<100	-	-	-	17.5	10.0-10.2	4
Pb CC_3	<100	-	-	-	5.0	10.0-10.2	3
Zn Regrind	-	-	400	150	-	11.0	0
Zn CC_1	-	-	slurry	-	22.5	10.9-11.1	5
Zn CC_2	-	-	slurry	-	7.5	11.4-11.6	4
Zn CC_3	-	-	slurry	-	-	11.8-12.0	3

N. B. MIBC was added to the Pb cct as needed. DOW 1012 was added to the Zn cct as needed.

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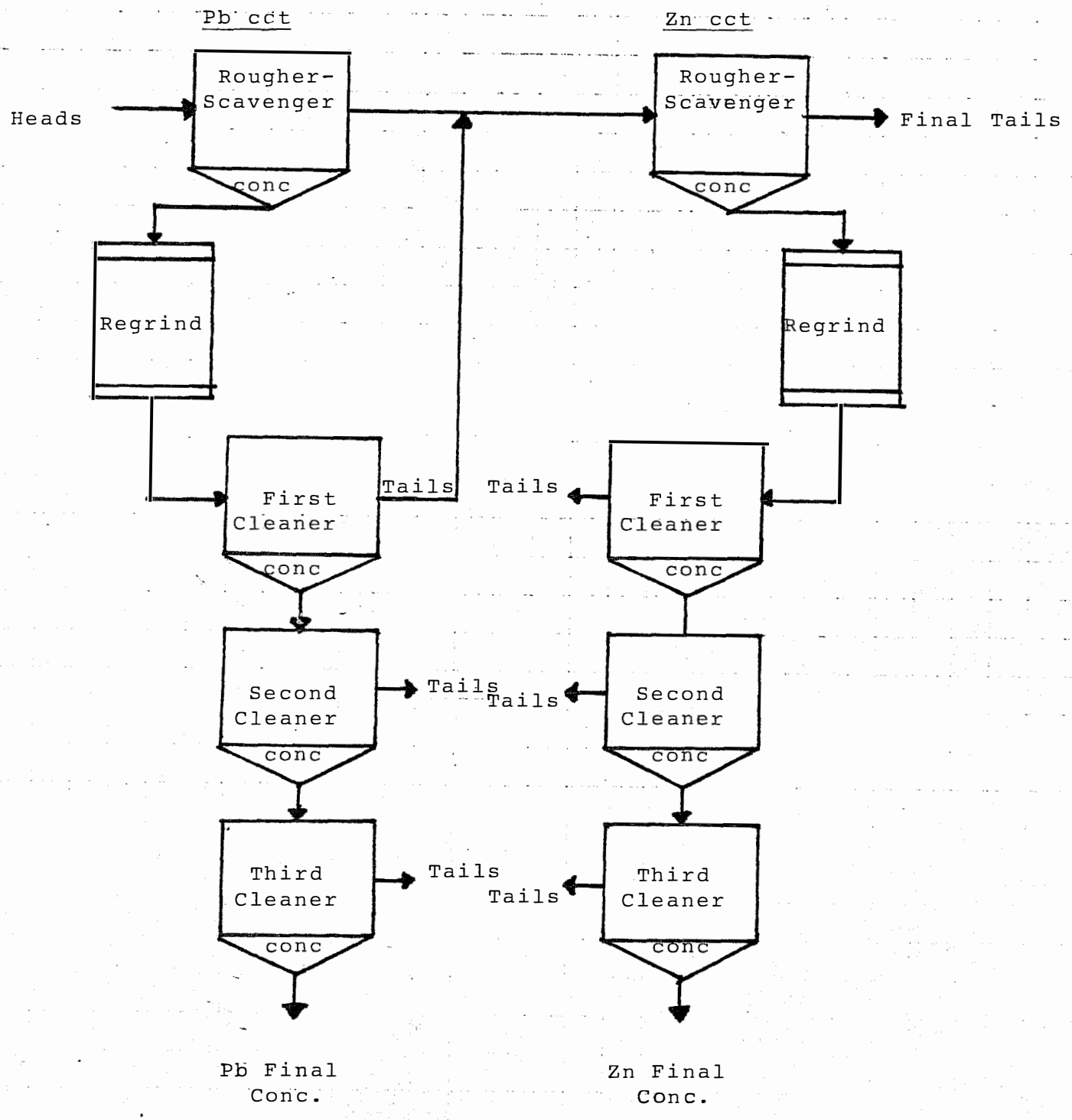
Cleaner Test Flowsheet



Graph 1

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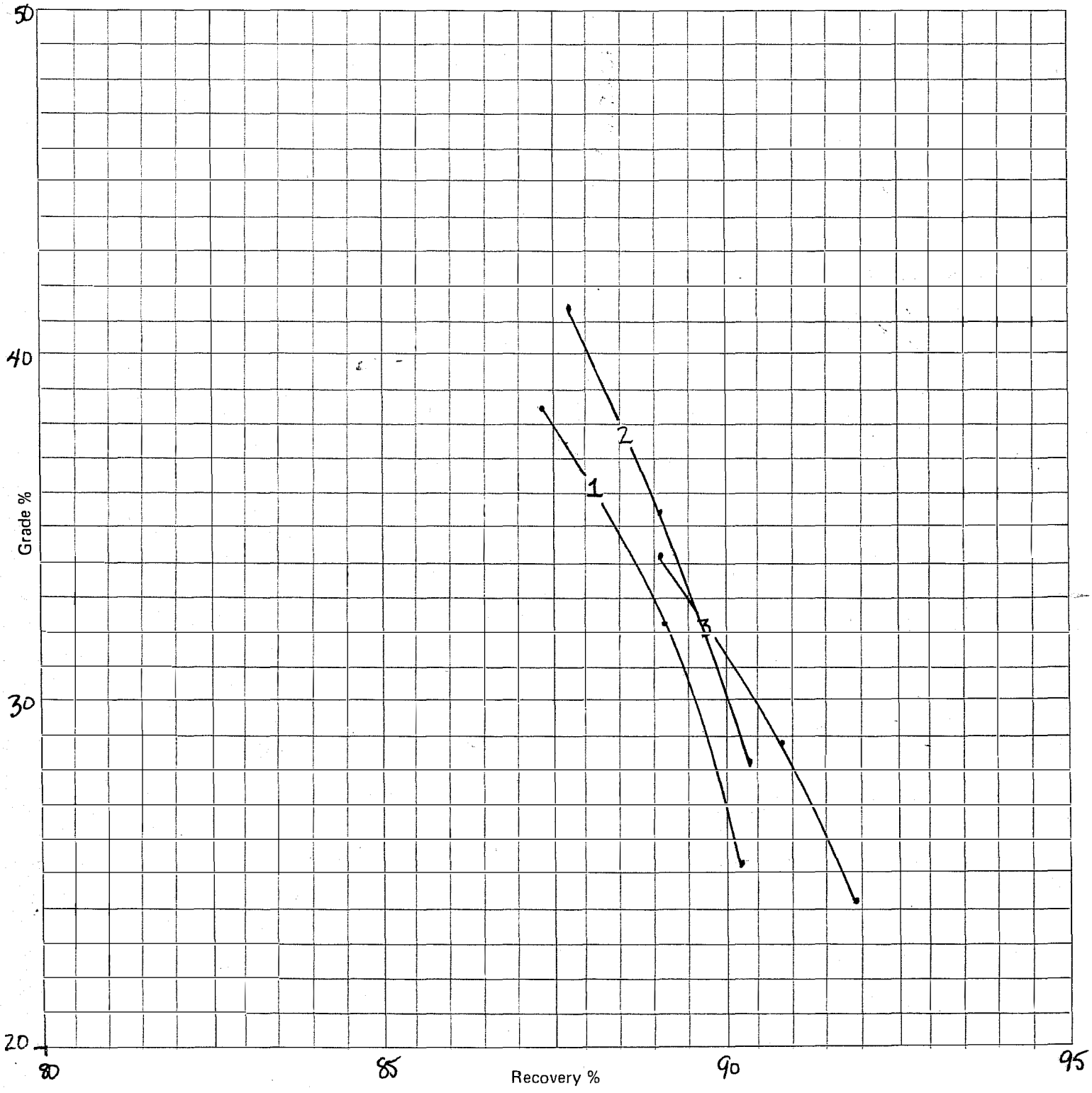
METALLURGICAL TEST REPORT

Grade-Recovery Curve

-1- Standard - 5 min Rgd.
-2- 10 min Rgd
-3- No Rgd.

Pb in the Pb Conc.
(Cleaner tests)



Graph 2

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METALLURGICAL TEST REPORT

Grade-Recovery Curve

-1- Standard - 5 min Rgd.
-2- 10 min Rgd.
-3- No Rgd.

Zn in the Zn Conc.
(Cleaner tests)