Cyprus Anvil Minin· Corporation

Inter ·ce Correspondence

F-50

019584

To Attendees
CAMC/Dome Liaison Meeting
February 14, 1983

Copy to file 273

From P. Taggart

Date February 9, 1983

Subject ECONOMICS OF MILLING OXIDE ORE

Four cases were examined to determine the cash flows generated by milling ore from the oxide stockpile. The cases, based upon the A.P.P.M. 84-40 scenario, are shown below in tabular form with the corresponding net cash flows.

	QUANTITY + SOURCE OF MILL FEED (D.M.T. 000)					NET OPERATING CASH FLOWS $(mm)			
	1983		1984						
	Oxide	Sulphide	Oxide	Sulphide	Total Mill Feed	1983	1984	1985	$ENPV_{15}$
1. Milling unscreened oxide 1984	-	-	1284	948	2232	-45.2	-22.0	25.6	-45.0
2. Milling screened oxide 1984	-	-	901	948	1849	-45.2	-26.2	25.6	-48.6
3. Milling unscreened oxide 1983	1284	-	-	948	2232	-34.5	-50.1	25.6	-58.7
4. Milling screened oxide 1983	901	-	-	948	1849	-36.8	-50.1	25.6	-61.0

The following points are worthy of note:

1. The screening of oxide ores is not economically justifiable. The revenues generated by milling the total inventory of this ore are greater than those earned when producing lesser quantities of more valuable concentrates from a screened mill feed.

2. Based upon budgeted prices, an improvement of approximately $10 million could be realized in the projected 1983 cash flows were the oxide pile to be milled this year. A number of factors should be considered in assessing the value of this option; some of the "pros" and "cons" are identified below.

Factors favouring the milling of oxide in 1983.

1. There would be a short term cash flow advantage.

2. There could be unquantifiable social and political benefits to the Company.

3. Operations in 1983 would enable the Company to retain more key management and unionized personnel.

.... 2

Factors favouring the milling of oxide in 1984.

1. The milling of ores at projected 1983 prices minimizes the value of the oxide stockpile.

2. The resumption of milling operations in 1983 could adversely effect negotiations with third parties, eg. the N.C.P.C. and the W.P. and Y.R.

3. Lower metal prices than those used in these calculations mitigate in favour of 1984 milling alternative.

4. Cash flows in 1984 would be adversely effected by treating the oxide in 1983. Discounted cash flow comparisons over the years 1983, 1984 and 1985 favour milling oxide in 1984.

5. There is no advantage from a marketing point of view in the production of concentrates in 1983.

6. The oxidized ores provide a useful source of mill feed which can be treated immediately prior to the commencement of continuous operation processing sulphide ores. During the time oxidized ores are processed both mill and mine departments can "gear-up" for full and continuous operations. Discontinuities caused by milling oxide in 1983 will negate this real advantage in the future.

7. Consideration should be given to milling the oxide stockpile in any event prior to a complete and total shutdown. In this case none of the points apply which favour the delay in the milling of oxidized ores.

LPT/mw

L.P. Taggart
Manager
Feasibility & Development

CASES ON HAND

1. APPM 84 unscreened ot.

2. APPM 84-40 screened ot in 1983

3. APPM 84-40 unscreened ot in 1983.

4. APPM 84 Faro mine life.

6. APPM 85

MBS

17.5
17.5

A Comparison of Screened vs Unscreened Oxide Scenarios Assuming Milling in 1983

	Screened		Unscreened	
Production				
Mine Production (000 m^3)	3661		3661	
Tonnes milled (000 DMT)	901		1,284	
Concentrate produced (000 DMT)	99,167		132,831	
Costs & Revenues	($ M.M.)	$/DMT Milled	($ M.M.)	$/DMT Milled
Production	37.87	42.03	44.40	34.58
Transport & tidewater	9.45	10.49	11.13	8.69
Conversion	22.687	25.18	29.93	23.31
G&A - Faro	11.031	12.24	11.03	8.59
G&A - Vanc.	1.245	1.38	1.25	0.97
Sub-Total	82.29?	91.33	97.74	76.14
Capital	7.85		7.21	
Revenue	53.32	59.18	70.43	55.02
	$537.7 /t conc		530.22 /ton conc	

77.70
66.65

1. ~~Value of screen~~ Higher volumes of lesser quality concentrates more than offset higher value / t of conc derived from screened ore

2

Prod Costs

	Screened	Unscreened	
INT.			
D+B lab	484	484	
D+B supp	2398	2398	
L+H lab	3550	3573	
L+H fuel + lube	2683	2512	
L+H other	906	893	
Total Mine	10021	9860	<161> 20¢/t
Mech.			
labour	4937	5122	
supplies	5210	5230	
~~other~~	57	57	
sub-total	10204	10409	
TOTAL	20225	20269	15.79
MILL			
op lab	2106	2500	
op supp crushing	75	117	
grind	1635	2336	
flot	2849	5445	
other	566	652	
rep lab	1656	2082	
supplies	1394	1923	
Total mill	10282	15055	
Power	4805	6507	200,000 cap. $132,000 pt
Gal.	2306	2304	
Env.	264	204	
Skagway.	2596 $ / tonne	2496.	$ / tonne
Variable Trans & Skag.	6853 — 69.10	8656	26% 65.17
Total Prod.	47320	55547	

c = mining costs
y = total variable

~~tpd x x + tonnes x y = 20269.~~

~~tpd~~ x x   tonnes x y + c = 20269

tonnes x x + variable + c = 20225

	Screened $	%	Unscreened $	
1993 Prices				
[illegible] 60% [illegible]	389.55		388.55	
2 [illegible]		378.37		37[illegible]
4 [illegible] 103	161.60		161.60	
	551.15	378.37	551.55	37[illegible]
[illegible]	17.60	176.18	176.41	17[illegible]
NSR	377.15	184.37	374.[illegible]	3[illegible]
Cost 1.33	143.09	139.97	143.69	13[illegible]
Transportation [illegible]	24.00	84.00	84.[illegible]	8[illegible]
FOB [illegible] Co Blend	199.08	155.87	278.[illegible]	1[illegible]
Daily Production Rate	350	72.4[illegible]	318.3	6[illegible]
Daily [illegible]	132.961	113.70	120.49	11[illegible]
Operation Days	84.5	84.5	130	1[illegible]
Total Revenue	11,235	9,563	15,119	15[illegible]
		20,798	30,737	
Total Costs [illegible]		14,365	22,752	
Net [illegible]		6433	7987	

(1554)

350 x 16 = 5600 x 84.5 = 473200 [illegible]

318.3 x 16 = 5093 x 130 = 662084

188,884 x 10.10 x 1.23 = (2346)

3/3

1984 Price Forecasts

Pb + 11¢

Zn + 14¢

Ag + [illegible]

Inputs for Accounts Values

Lead Concentrate — Pb @ 60% [illegible] 1384 [illegible] 830 [illegible] 105

Ag 16 [illegible] 16

[illegible] 121

Con 1149

Zinc Con — Zn @ 48% [illegible] 97.4

[illegible] 100.0

@ 49% [illegible] 184.00

	Screened		Unscreened	
	Pb	Zn	Pb	Zn
FOB Mine	528.69	255.07	528.69	278.3
Daily Conc.	350	729.5	35.3	694
Daily Revenue	18510	18650	18676	18714
Production Days	84.5	84.5	130	130
Total Revenue 000	15642	15730	21885	24[illegible]
	31372		46[illegible]85	

Variable Costs @ 108% [illegible] — 15514 — 24570

Net [illegible] — 15858 — 21715

5857

CYPRUS ANVIL MINING CORPORATION   INTER OFFICE CORRESPONDENCE

To	L.P. TAGGART	FILE: E-2-314
From	R. MURARKA	
Date	JANUARY 31, 1983	
Subject	COARSE LEAD FLOTATION	

I would like to make the following comments, if I may, on the KRAL report dated November 30, 1982:

1. In test #28 only 100 g/t of NaCN was added to the first stage of grinding. Also the finishing pH was too low (6.8). It is known that pH of 9 to 10 during grinding is optimum for CN- ion availabilty.

   Since all NaCN in plant operation is added to the rod mill, similar practice should be used in the lab test (see attached figure).

2. Total Z-11 used in test #27 was 70 g/t as compared to 120 g/t in test #28.

3. In normal flotation lab test, pH conditioning should only be done before the first stage of flotation as is the case in plant operaion.

4. In coarse lead flotation lab test, different splits of Z-11 addition to different stages may give different results.

R. MURARKA,
METALLURGIST.

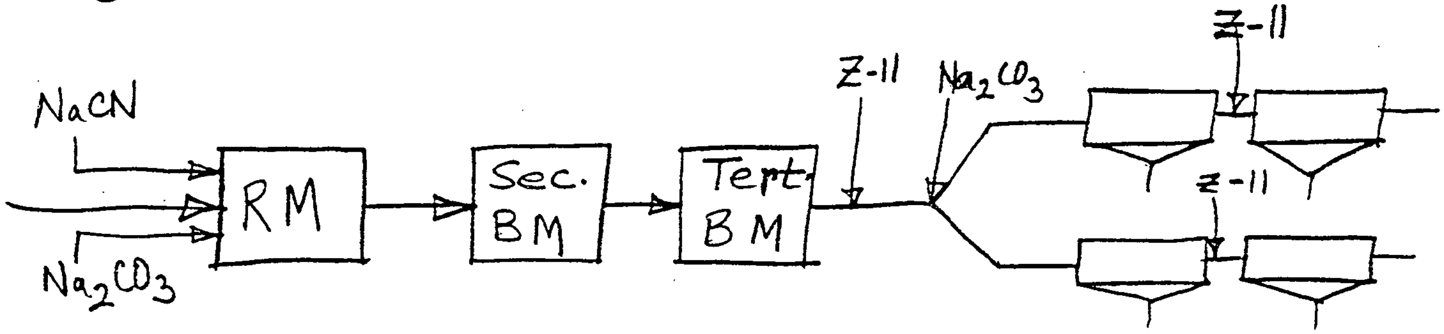
RM/df

Arctic Star Printing

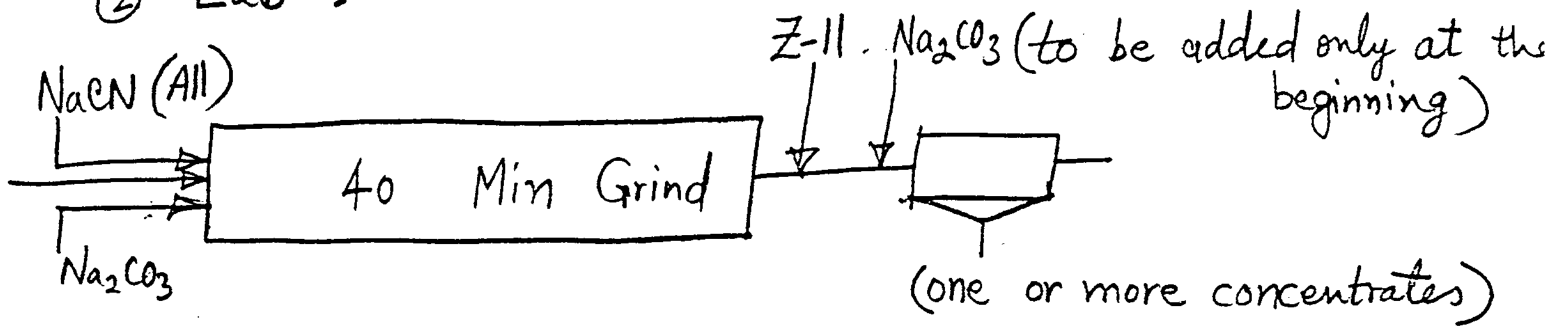
CYPRUS

Normal Flotation

① Plant:

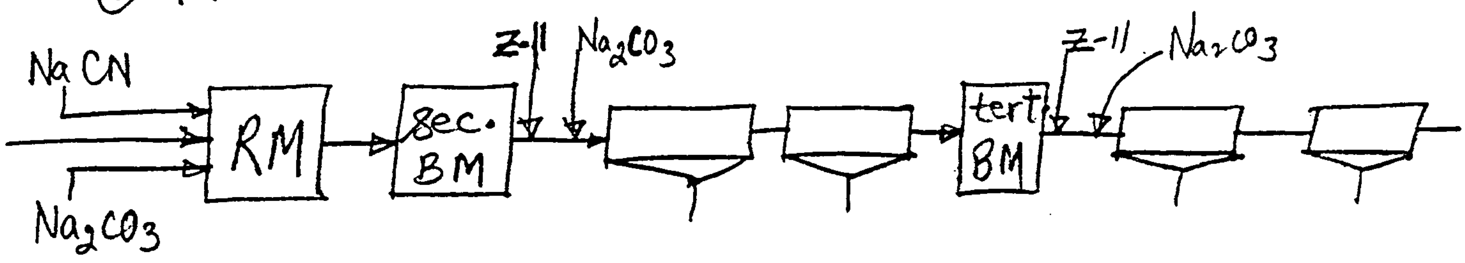


② Lab:

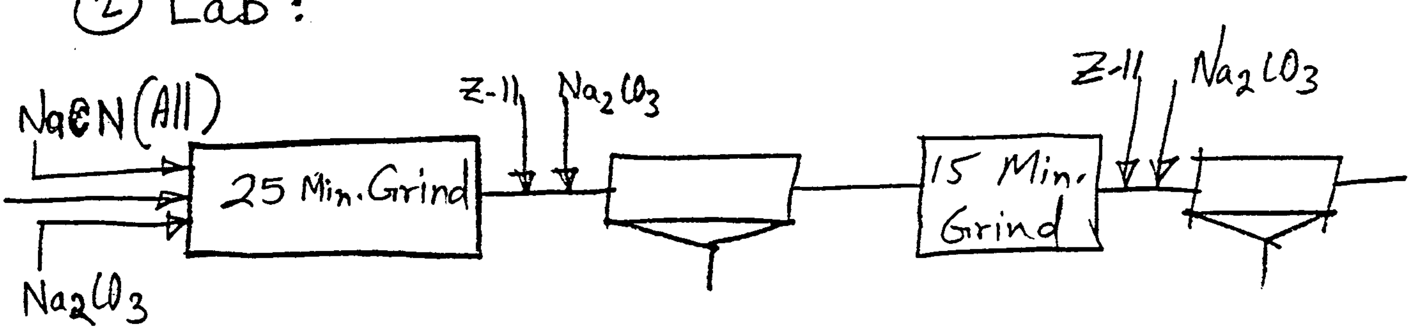


Coarse Lead Flotation

① Plant:



② Lab:



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METALLURGICAL TEST REPORT

Coarse Oxide Ore Testing. Sample of Jan 13, 1983

Grade-Recovery Curve

Test No.: Weighted Averages - Pb

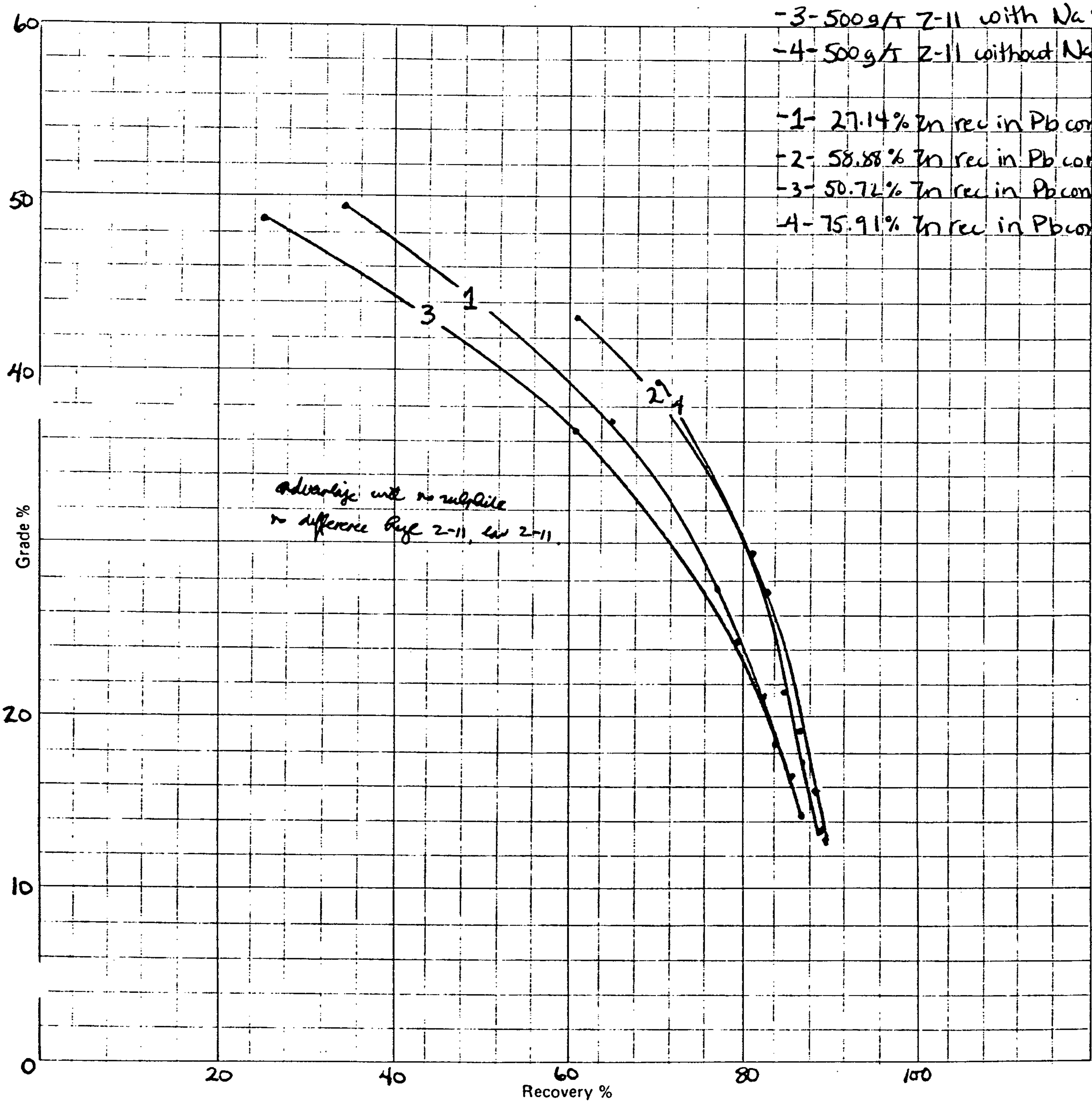
Objective: To optimize treatment Cost

Reagents: Z-11 and Sodium Sulphite

Date: January, 1983

Key:
-1- 300g/t Z-11 with Na_2SO_3
-2- 300 g/t Z-11 without Na_2SO
-3- 500g/t Z-11 with $NaSO_3$
-4- 500g/t Z-11 without Na_2SO

-1- 27.14% Zn rec in Pb conc
-2- 58.88% Zn rec in Pb conc
-3- 50.72% Zn rec in Pb conc.
-4- 75.91% Zn rec in Pb conc.



Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Coarse Oxide Ore Testing - Sample of Jan 13, 1983

Grade-Recovery Curve

Test No.: Weighted Averages - Zn

Objective: To optomize treatment cost

Reagents: Z-11 and Sodium Sulphite.

Date: January, 1983

Key: -1- 300g/T Z-11 with Na_2SO_3

-2- 300g/T Z-11 without Na_2SO_3

-3- 500g/T Z-11 with Na_2SO_3

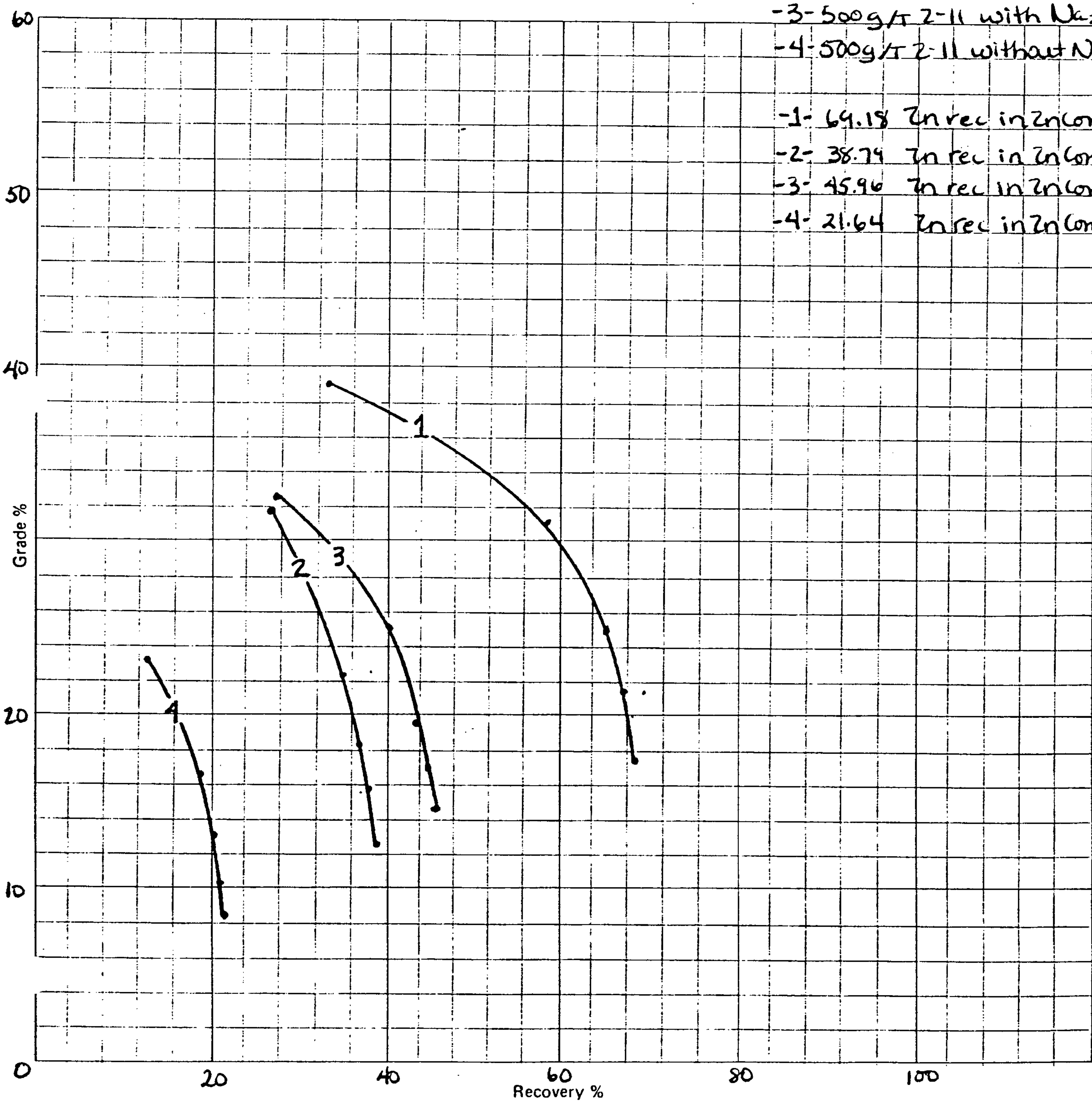
-4- 500g/T Z-11 without Na_2SO_3

-1- 69.18 Zn rec in Zn Conc.

-2- 38.79 Zn rec in Zn Conc.

-3- 45.96 Zn rec in Zn Conc.

-4- 21.64 Zn rec in Zn Conc.



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METALLURGICAL TEST REPORT

Coarse Oxide Ore Testing - Sample of Jan. 13, 1983

Grade-Recovery Curve

Test No.: Weighted Averages. - Pb

Objective: To optimize treatment cost

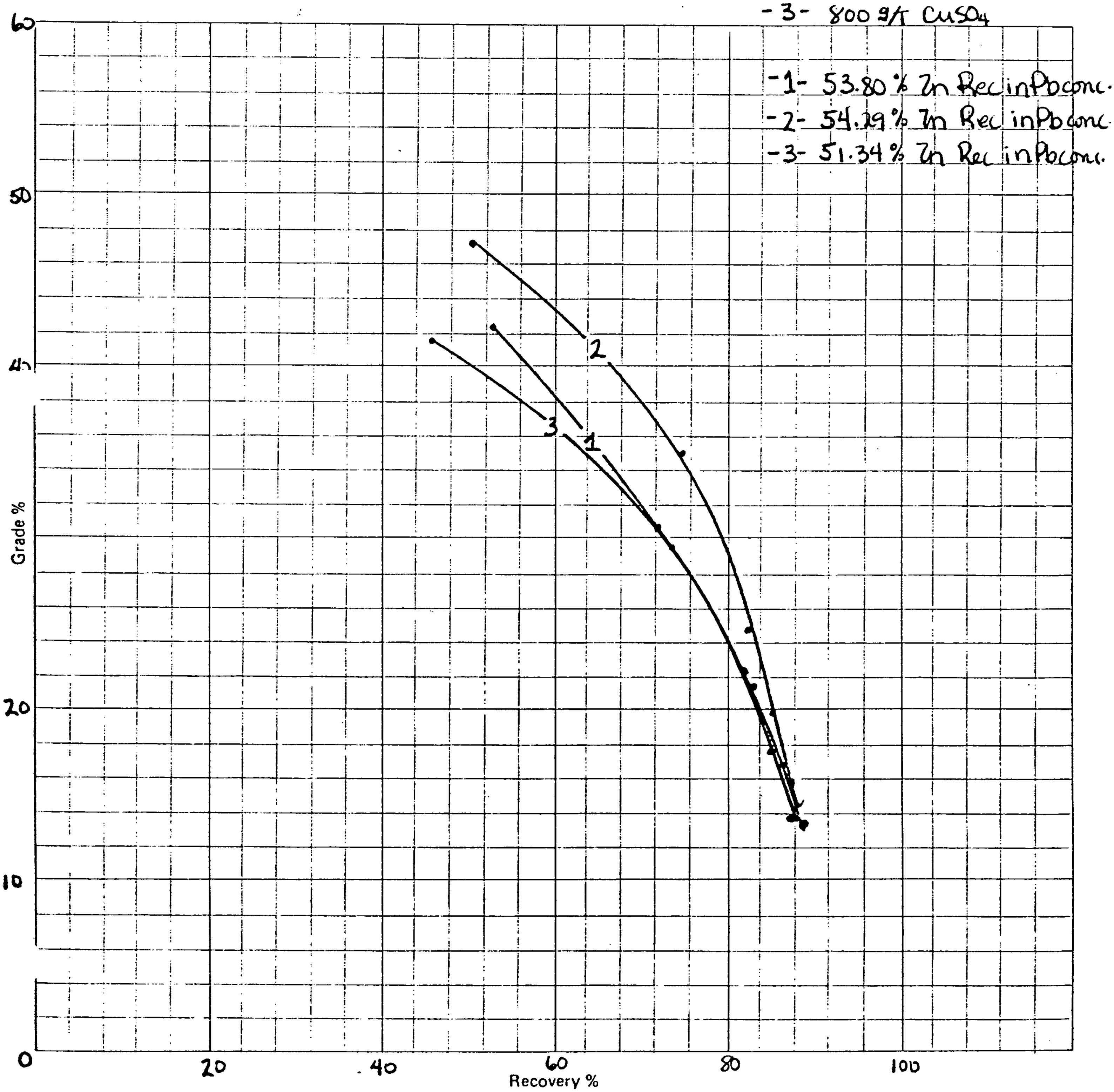
Reagents: $CuSO_4$

Date: January 1983

Key: -1- 400 g/T $CuSO_4$

-2- 600 g/T $CuSO_4$

-3- 800 g/T $CuSO_4$



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METALLURGICAL TEST REPORT

Coarse Oxide Ore Testing - Sample of Jan 13, 1983.

Grade-Recovery Curve

Test No.: Weighted Averages - Zn

Objective: To optimize treatment cost.

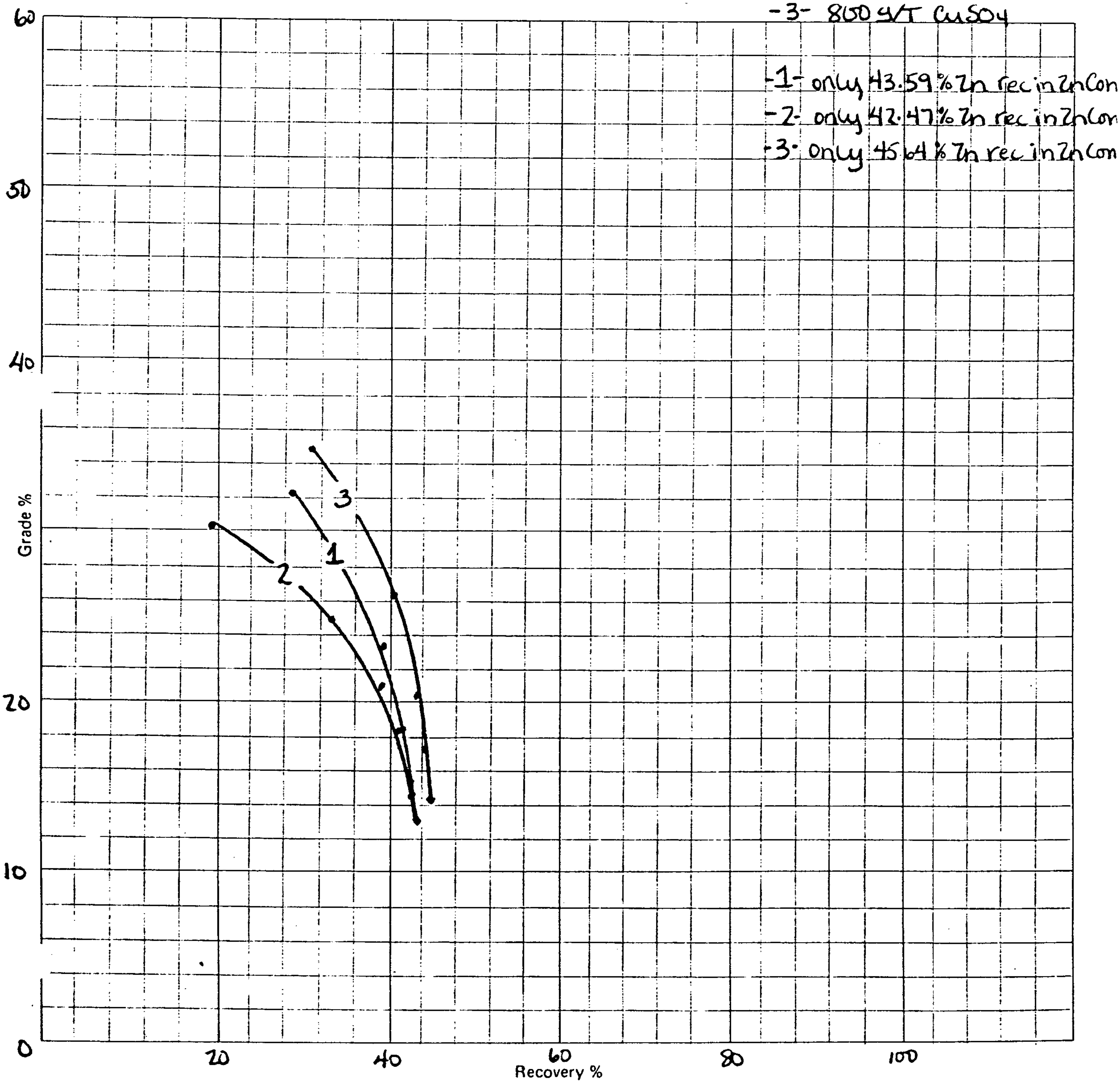
Reagents: $CuSO_4$

Date: January, 1983.

Key: -1- 400 g/T $CuSO_4$

-2- 600 g/T $CuSO_4$

-3- 800 g/T $CuSO_4$



"Lime consumption"

COARSE ORE [illegible] Jan 13

no sulphite

Pb Cct.

Roughers	[illegible] kg
Cleaners	.75 kg
	3.[illegible] kg

Zn Cct

Roughers	[illegible] kg
Cleaners	1.00 kg
	1.[illegible] kg

total 4.55 kg

sulphite

Pb Cct

Roughers	2.50 kg
Cleaners	.85 kg
	3.35 kg

Zn Cct

Roughers	.40
Cleaners	.80
	1.20 kg

total 4.55 kg

Blend (40% fines - 60% coarse)

no sulphite

Pb Cct

Rougher	3.75 kg
Cleaners	.80 kg
	4.55 kg

Zn Cct

Rougher	.45 kg
Cleaners	1.00 kg
	1.45 kg

total = 6.0 kg

sulphite

Pb Cct

Rougher	3.50 kg
Cleaners	.90 kg
	4.40 kg

Zn Cct

Rougher	.40 kg
Cleaners	.85 kg
	1.25 kg

total = 5.65 kg

OPERATING SUPPLIES - REAGENTS.

		ZONE III		OXIDE.	
REAGENT.	REAGENT COST $/Kg	CONSUMPTION Kg/t	UNIT COST $/t MILLED	CONSUMPTION Kg/t	UNIT COST $/t MILLE
SODA ASH.	0.367	2.00	0.734	0	0.
LIME	0.235	1.50	0.353	7.00	1.645
$CuSO_4$	0.943	0.50	0.472	0.70	0.660
XANTHATE	1.798	0.30	0.539	0.40	0.719
CYANIDE	2.113	0.100	0.211	0.085	0.180
MI.B.C	2.116.	0.015	0.032	0.015	0.032
DOW 1012	2.397	0.003	0.007	0.003	0.007
SODIUM SULPHITE	0.723	–	–	1.00	0.723
FLOCCULANT	5.386.	0.003	0.016	0.003.	0.016
ILTER AID	2.469	0.04	0.099	0.04	0.099
DEXTRINE					
TOTAL			2.463		4.081

4.55

25 Jan 83

Reagent consumption for Screened Oxide.

<u>Quantitatively</u>

	Usage	Change from Ox present	$ change
lime	- 4.5 Kg/T	2.5 Kg/T	0.588

<u>Qualitatively</u>

Xanthate	- 0.30 Kg/T	0.1 Kg/T	0.180
$CuSO_4$	- 0.50 Kg/T	0.2 Kg/T	0.189
Na_2SO_3	- ?		

Total - $0.957

Stan.

COARSE ORE.

Pb	Zn.	Fe.	Ag	Py/Po
3.17	5.15.	14.33	1.43	4.55.

FINES

Pb	Zn	Fe	Ag	Py/Po.
2.89	4.18.	16.12.	1.40.	5.55.

60/40 BLEND COARSE/FINES

Pb	Zn	Fe	Ag.	Py/Po.
3.06.	4.76.	15.05	1.42.	4.95

screened oxide v.s. unscreened.

surprising that lead assay of the fines is lower than

coarse material

Blend

Z-11	$CuSO_4$	Na_2SO_3	Pb Ro Gr	Pb Ro Rec	Pb Ro Zn Rec	Zn Ro Gr	Zn Ro Rec	Zn Sc Tls %Pb	Zn Sc Tls %Zn
.3	.4	—	16.1	82.2	28.8	20.9	67.4	.65	.27
"	.8	—	16.2	81.7	32.0	21.4	63.6	.68	.32
"	.4	1.0	16.1	81.4	31.2	22.5	64.4	.66	.30
"	.8	1.0	15.3	81.6	29.2	18.1	66.7	.61	.29
.5	.4	—	12.2	82.0	54.7	10.9	41.4	.65	.29
.5	.8	—	16.9	81.1	43.3	15.8	52.9	.63	.32
.5	.4	1.0	14.2	84.0	49.8	18.2	46.3	.59	.27
.5	.8	1.0	16.7	82.7	39.9	17.6	55.7	.61	.30
.5	.6	—	12.5	83.2	65.3	12.7	30.9	.58	0.26
.5	.6	1.0	14.0	82.6	57.5	13.8	38.4	.61	.28

F1,82.

Coarse.

Z-11	$CuSO_4$	Na_2SO_3	Pb Ro Gr	Pb Ro Rec	Pb Ro Zn Rec	Zn Ro Gr	Zn Ro Rec	Zn Sc Tls %Pb	Zn Sc Tls %Zn
0.3	0.4	—	13.5	89.0	55.5	14.7	42.0	.35	0.20
0.3	0.8	—	13.2	89.5	58.3	12.3	39.2	.33	0.21
0.5	0.4	—	13.9	89.9	75.3	7.8	22.3	.34	0.21
0.5	0.6	—	12.5	90.8	83.1	6.2	14.7	0.32	0.19
0.5	0.8	—	12.4	89.6	68.8	11.7	28.4	0.39	0.22
0.3	0.4	1.0	13.7	89.2	30.8	15.3	66.6	0.33	0.26
0.3	0.8	1.0	13.9	87.1	32.9	15.4	63.9	0.37	0.29
0.5	0.4	1.0	12.1	88.9	54.5	13.1	42.5	0.39	0.29
0.5	0.6	1.0	12.7	89.4	85.5	5.0	12.0	0.35	0.20
0.5	0.8	1.0	17.4	85.6	46.6	15.9	49.7	0.37	0.26
0.3	0.6	—	13.7	89.7	62.7	11.5	35.1	0.34	0.19
0.3	0.6	1.0	29.7	82.3	17.7	24.2	77.1	0.48	0.39

F2

Cleaner tests on oxidized ore
- coarse + blend

Blend

	Pb 3CC	CLNR Rec	Zn Rec	Zn 3CC	CLNR Rec	Zn SC T/S. % Pb	% Zn.
Na_2SO_3	63.5	71.9	16.3	53.1	79.0	0.65	0.31
No Na_2SO_3	64.5	73.1	16.8	52.7	79.6	0.64	0.27

Coarse

Na_2SO_3	61.1	63.6	13.6	52.3	81.6	0.53	0.33
No Na_2SO_3	64.7	67.4	9.64	51.7	87.2	0.47	0.25

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Oxidized Ore · Blend · 40% fines/60% coarse

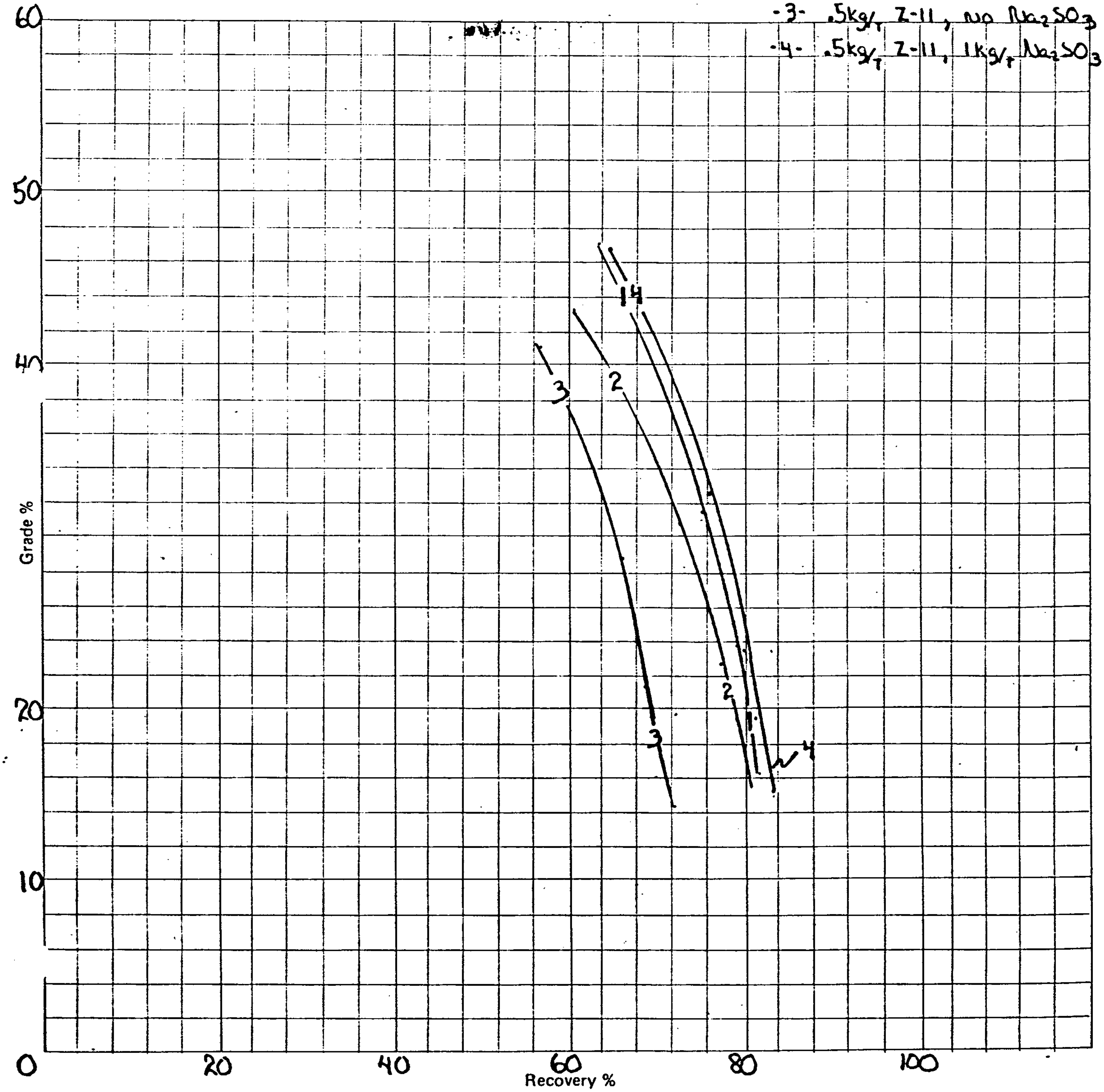
Grade-Recovery Curve

Test No.: Weighted Ave · Pb Metallurgy · Date: January · 83

Objective: to optimize, treatment cost

Reagents: Z-11, Na_2SO_3

Key:
- -1- .3kg/t Z-11, no Na_2SO_3
- -2- .3kg/t Z-11, 1kg/t Na_2SO_3
- -3- .5kg/t Z-11, no Na_2SO_3
- -4- .5kg/t Z-11, 1kg/t Na_2SO_3



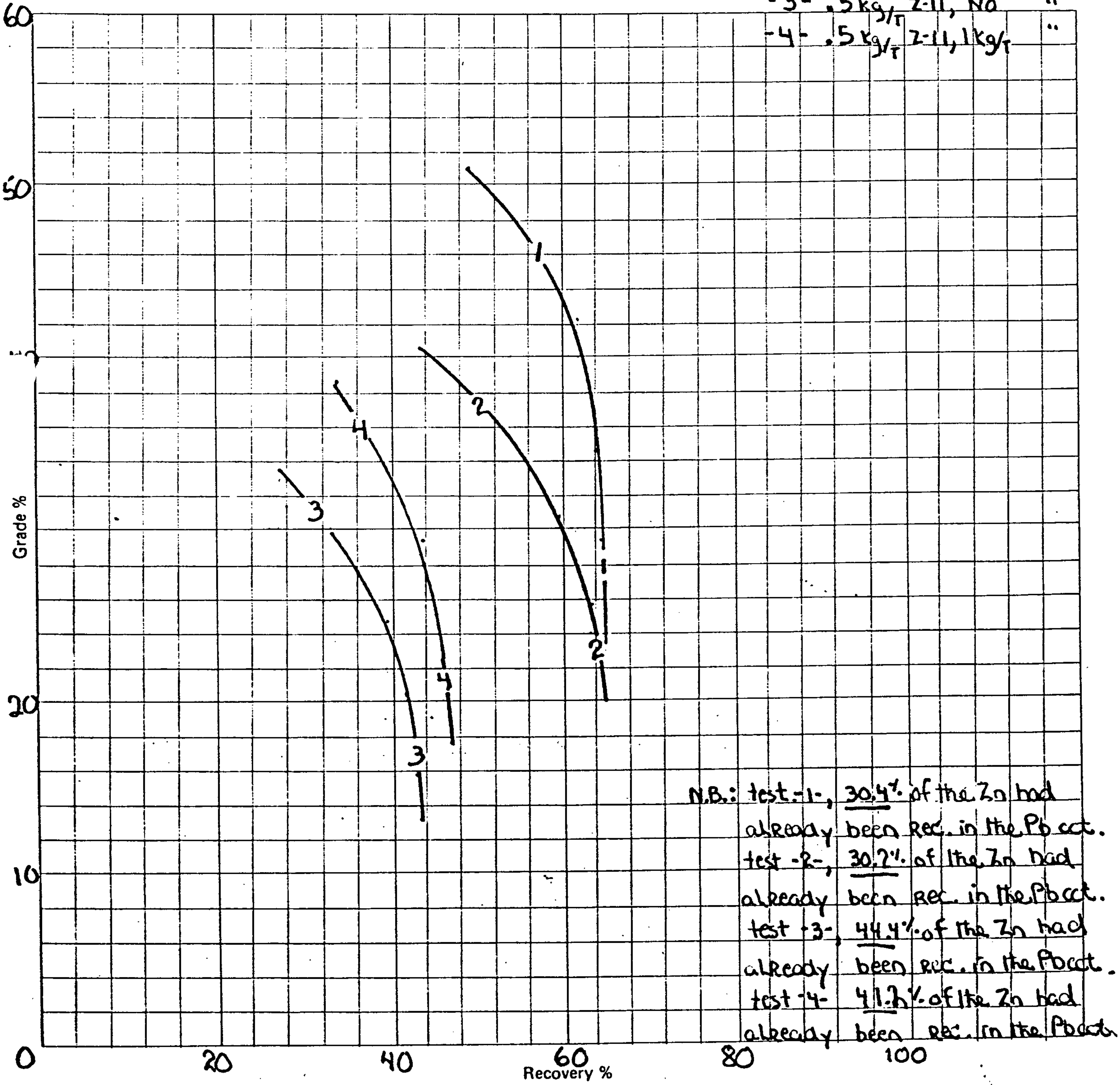
Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Oxidized Ore · Blend. 40% fines / 60% COARSE
Grade-Recovery Curve

Test No.: Weighted Ave. · Zn Metallurgy ·
Objective: to optimize treatment cost
Reagents: Z-11, Na_2SO_3

Date: January · 83
Key: -1- .3 kg/T Z-11, no Na_2SO_3
-2- .3 kg/T Z-11, 1 kg/T "
-3- .5 kg/T Z-11, No "
-4- .5 kg/T Z-11, 1 kg/T "



Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Blended Oxide Ore Testing - Sample of Jan 13, 1983

Grade-Recovery Curve

Test No.: Weighted Averages - Pb

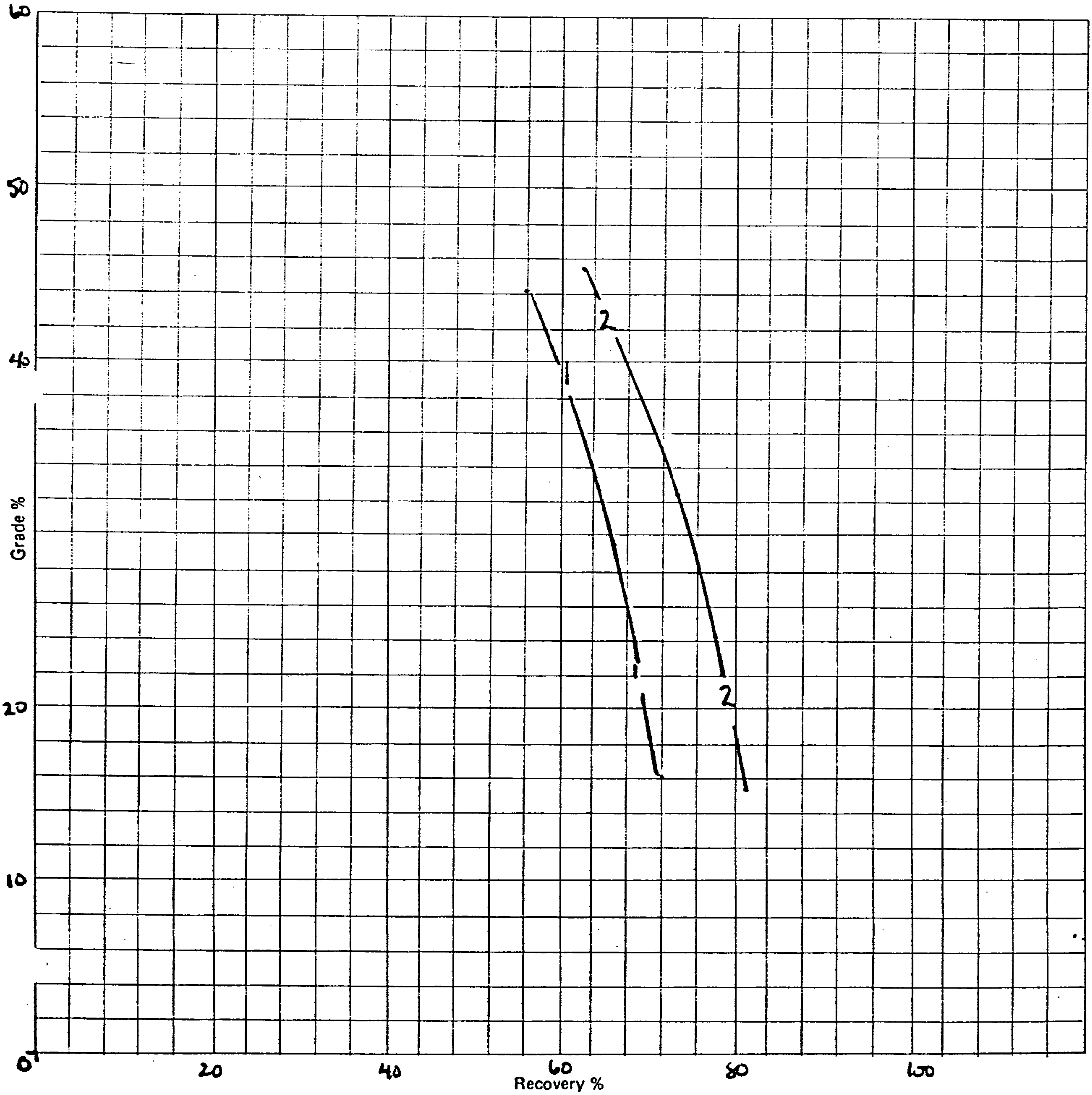
Objective: To optimize treatment cost.

Reagents: $CuSO_4$ + 300 g/t Z-11

Date: Jan, 1983

Key: -1- 400 g/t $CuSO_4$

-2- 800 g/t $CuSO_4$



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METALLURGICAL TEST REPORT

Blended Oxide Ore Testing - Sample of Jan 13, 1983

Grade-Recovery Curve

Test No.: Weighted Averages - Zn

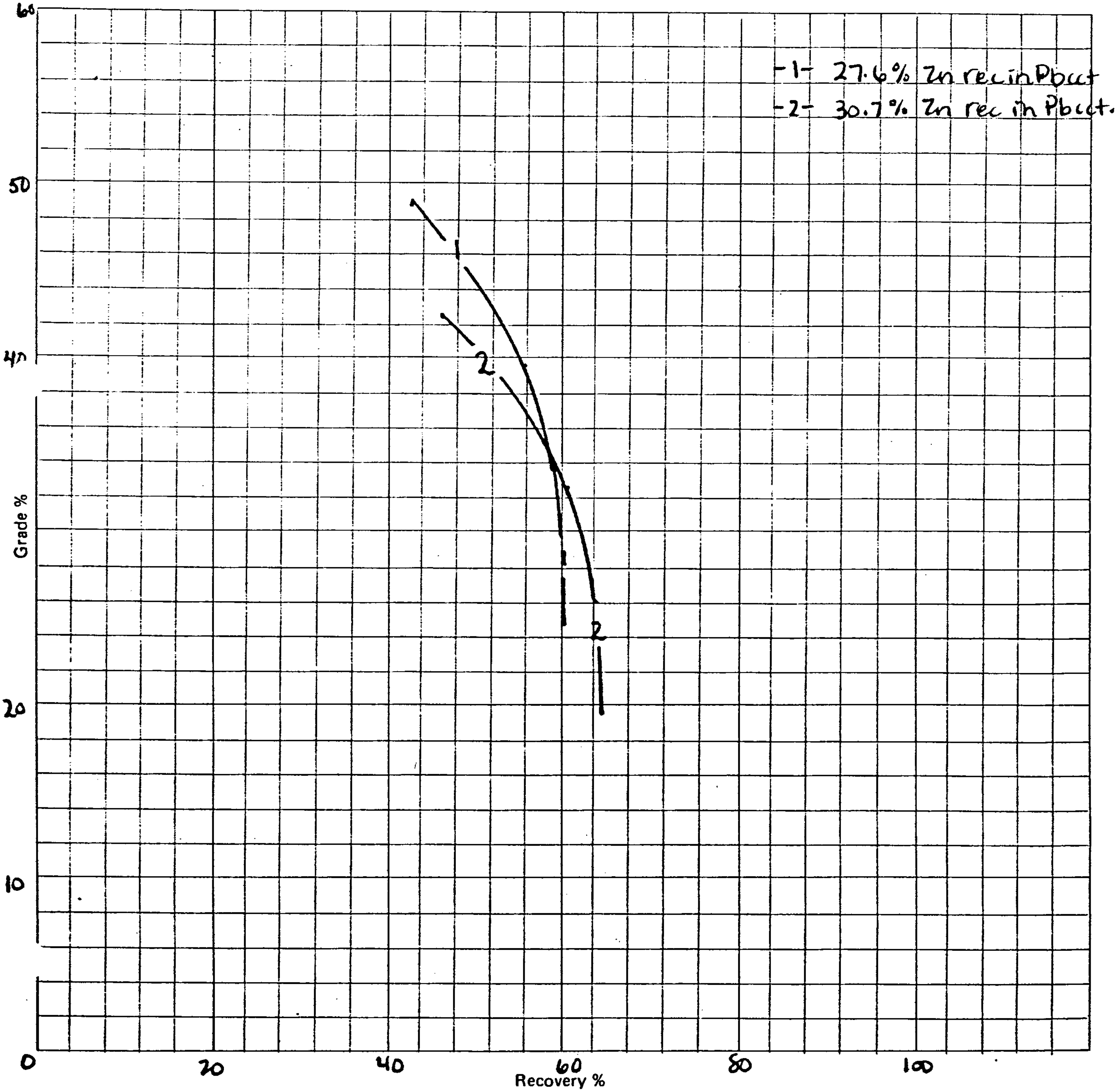
Objective: To optimize treatment cost

Reagents: $CuSO_4$ + 300 g/t Z-11

Date: Jan, 1983

Key: -1- 400 g/t $CuSO_4$

-2- 800 g/t $CuSO_4$



Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Blended Oxide Ore Testing - Sample of Jan 13, 1983

Grade-Recovery Curve

Test No.: Weighted Averages - Pb

Objective: To optimize treatment cost

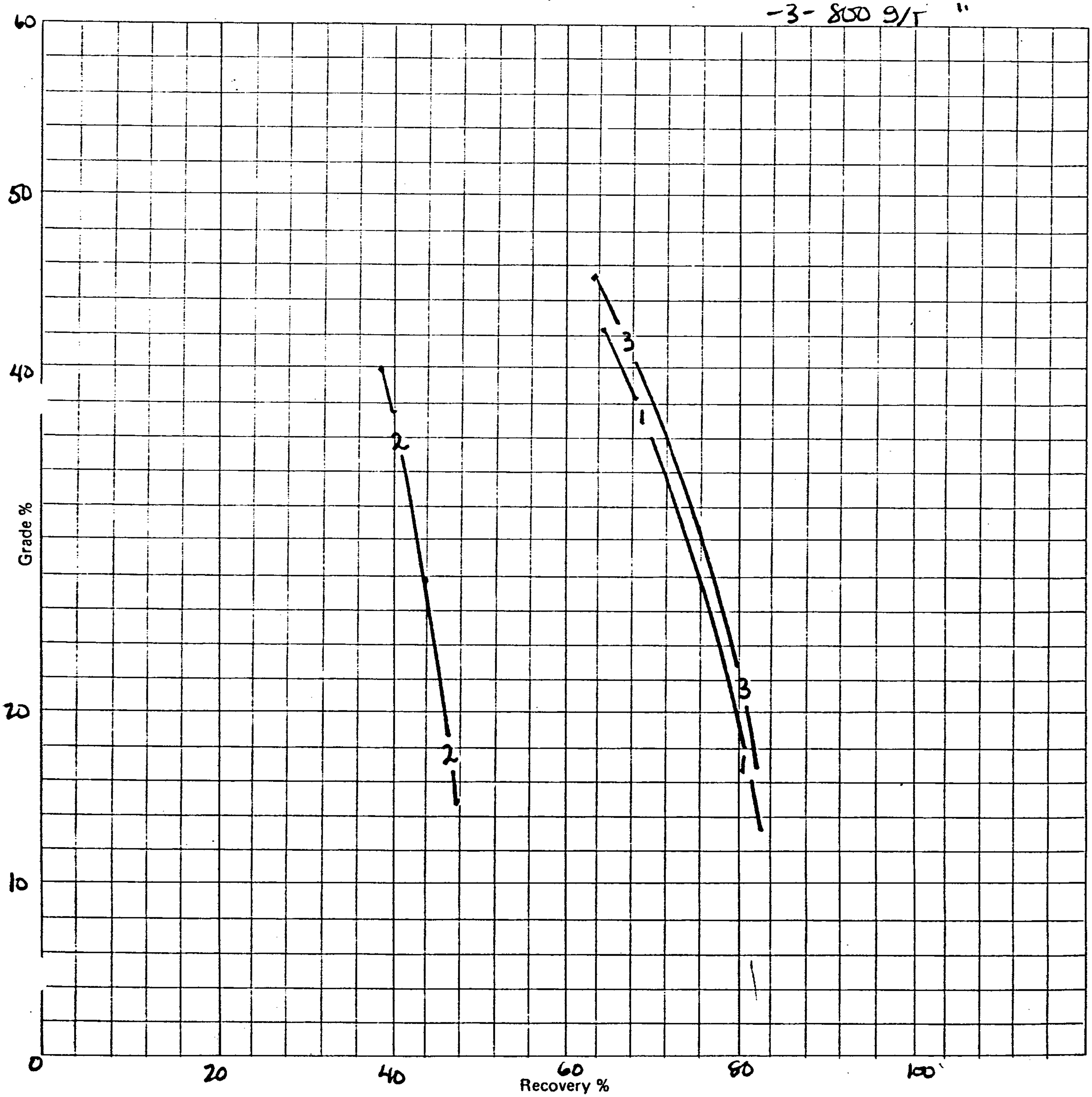
Reagents: $CuSO_4$ + 500 g/T Z-11

Date: Jan, 1983

Key: -1- 400 g/T $CuSO_4$

-2- 600 g/T "

-3- 800 g/T "



Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Blended Oxide Ore Testing - Sample of Jan 13, 1983

Grade-Recovery Curve

Test No.: Weighted Averages - Zn

Objective: To optimize treatment cost

Reagents: $CuSO_4$ & 500 g/T Z-11

Date: Jan, 1983

Key: -1- 400 g/T $CuSO_4$

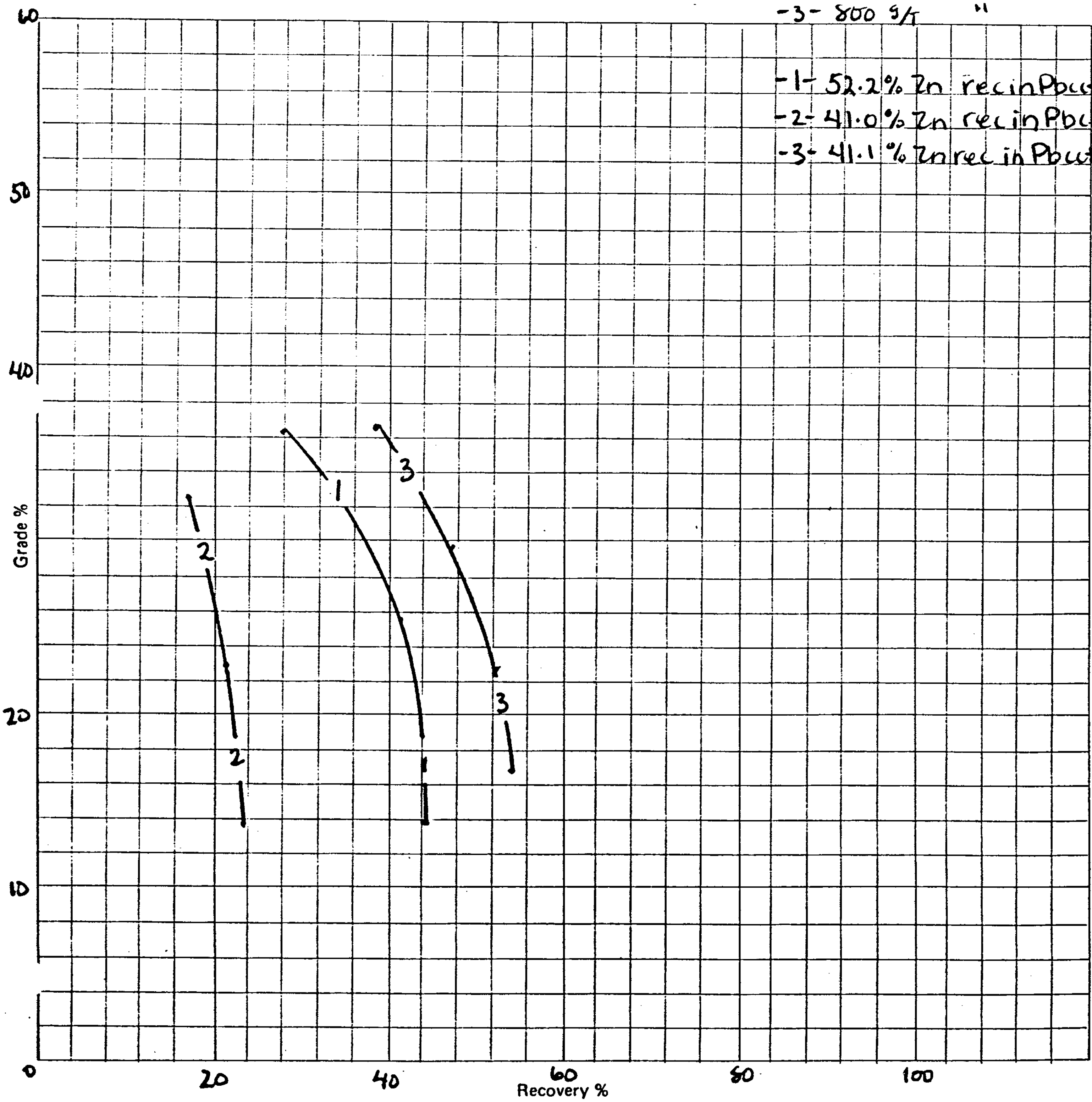
-2- 600 g/T "

-3- 800 g/T "

-1- 52.2% Zn rec in Pb cct.

-2- 41.0% Zn rec in Pb cct

-3- 41.1% Zn rec in Pb cct.



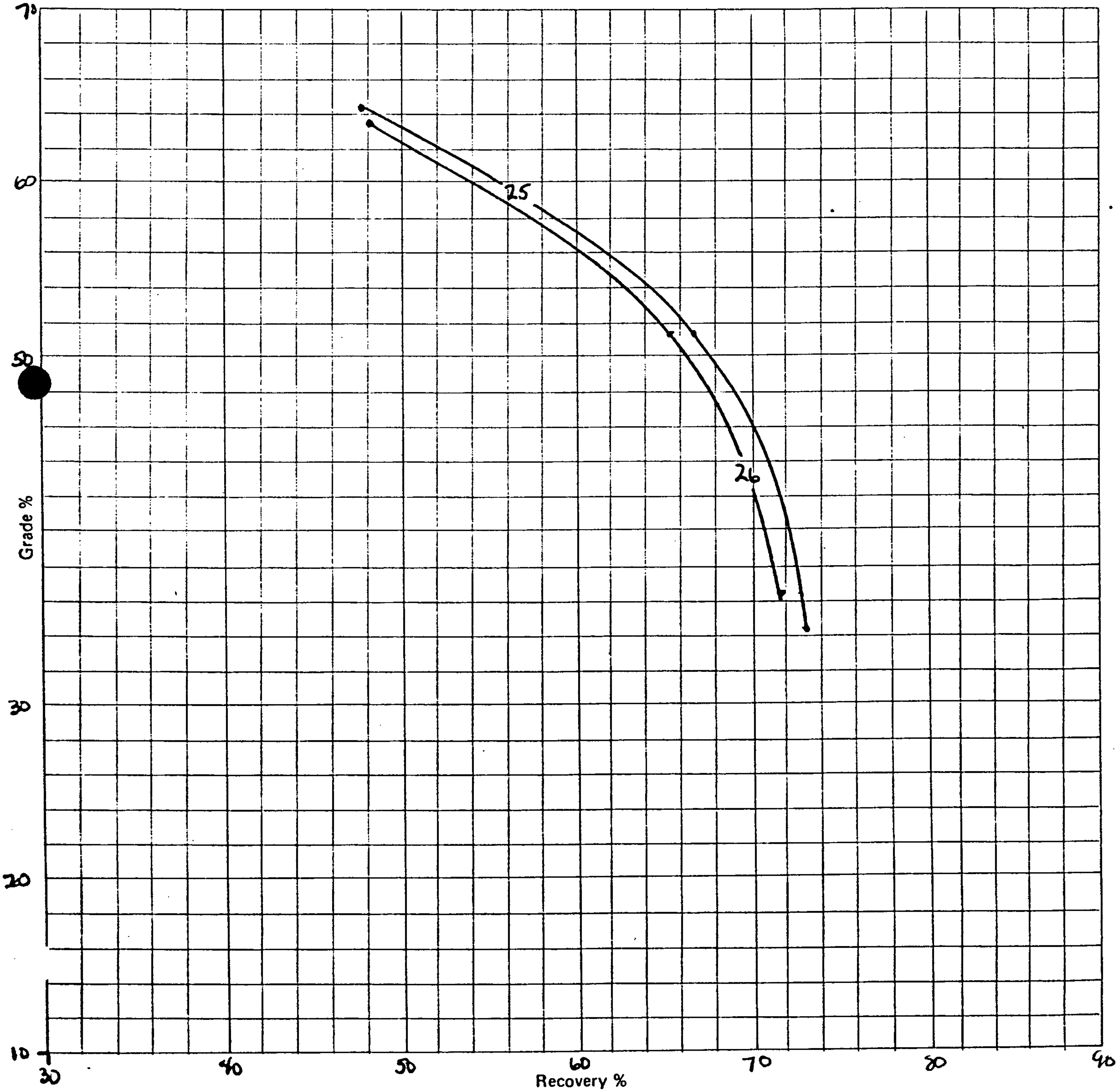
Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Blended oxide ore Testing - Sample of Jan 13, 1983
Grade-Recovery Curve

Test No.: 25 + 26 - Pb.
Objective: To optimize treatment Cost.
Reagents: Std. open-cycle cleaner test

Date: Jan, 1983
Key: -25- without Na_2SO_3
-26- with Na_2SO_3



Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Blended oxide ore Testing - sample of Jan 13, 1983.

Grade-Recovery Curve

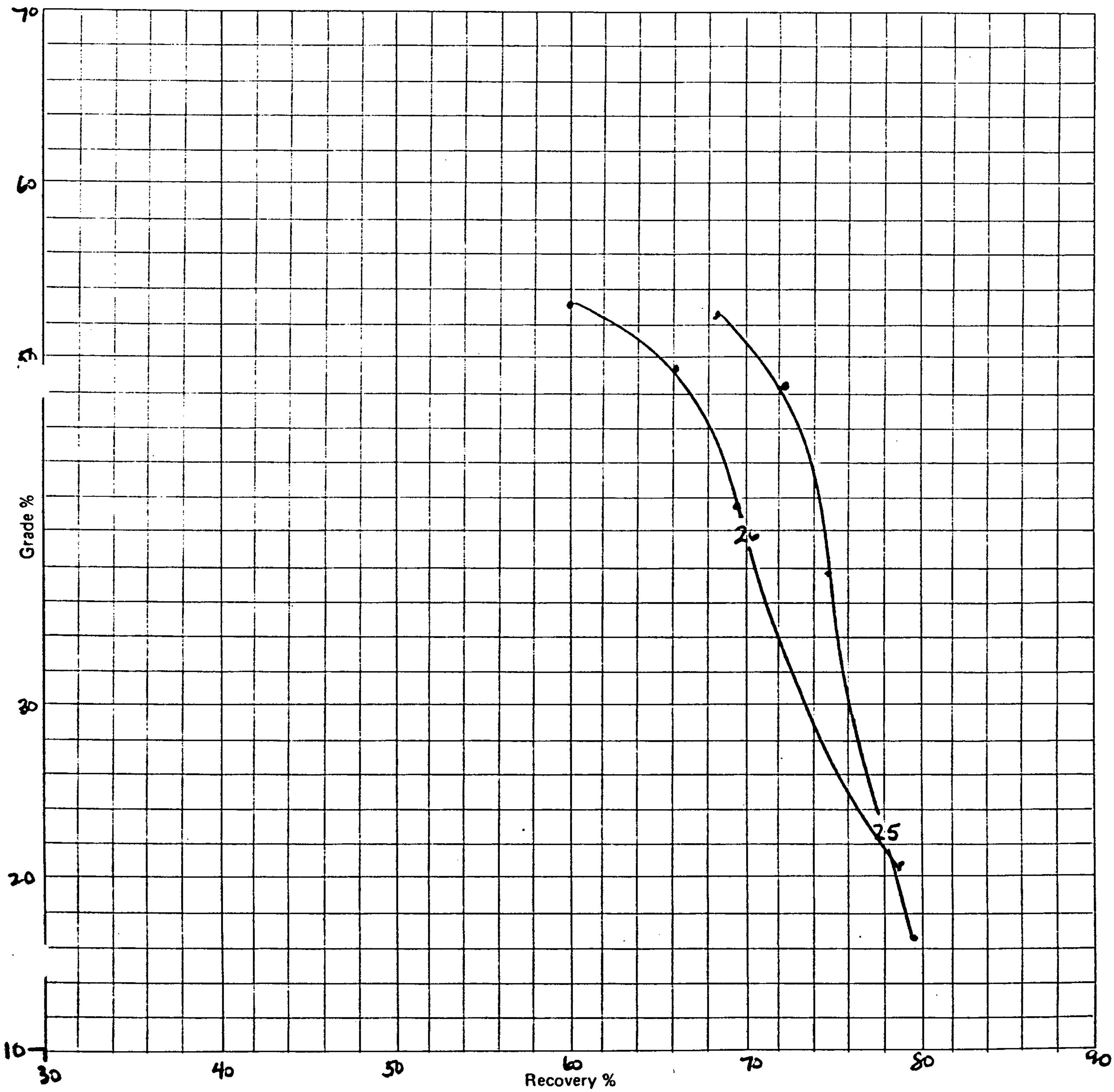
Test No.: 25 + 26 - Zn.

Date: Jan, 1983

Objective: To optimize treatment cost

Key: -25- without Na_2SO_3
-26- with Na_2SO_3

Reagents: Std open-cycle cleaner test



Test no. 25 (Lime Determination)
(see graphs (33) + (34))

Purpose: To optimize treatment cost.

Feed: oxide ore - blend (without Na_2SO_3)

Product	wts (g)	Assays Pb	Assays Zn	Assays Fe	Assays Ag	Assays Cu	Assays Mn	Distribution Pb	Distribution Zn	Distribution Fe	Distribution Ag	Distribution Cu	Distribution Mn
Pb conc	24.10	64.50	7.32	4.40	23.79			47.75	3.54	0.75	30.53		
Pb CT,	18.00	34.10	13.60	9.80	12.47			18.86	4.91	1.25	11.95		
Pb 2CT	27.20	7.74	15.20	13.30	4.19			[illegible]	8.30	2.57	6.07		
Zn conc	64.70	1.43	52.70	9.70	1.93			2.84	68.46	4.46	6.65		
Zn 3CT	9.60	3.84	19.60	14.30	3.09			1.13	3.78	0.98	1.58		
Zn 2CT	24.90	2.66	5.40	15.10	1.89			2.03	2.70	2.67	2.49		
Zn 1CT	138.50	1.77	1.66	15.00	1.00			7.53	4.62	14.76	7.38		
Zn Sc Tls	680.80	0.64	0.27	15.00	0.92			13.38	3.69	72.56	33.35		
Heads.	987.80	3.30	5.04	14.25	1.90			100.0	100.0	100.0	100.0		

Product	Pb in Pb cct. Cumulative Grade	Pb in Pb cct. Cumulative Rec.	Zn in Zn cct. Cumulative Grade	Zn in Zn cct. Cumulative Rec.	Ag in Pb cct Cumulative Grade	Ag in Pb cct Cumulative Rec.	Cu in Pb cct. Cumulative Grade	Cu in Pb cct. Cumulative Rec.
3rd Conc	64.50	47.75	52.70	68.46	23.79	30.53		
2nd Conc	51.50	66.61	48.42	72.24	18.95	42.48		
1st conc	34.33	73.08	37.62	74.94	13.16	48.55		
Ro conc.			16.67	79.55				

Test no. 26 (Lime Determination)
(see y phs (33) + (34))
Purpose: To optimize treatment cost.

Feed: oxide ore - blend (with Na2SO3)

Product	wts (g)	Assays Pb	Zn	Fe	Ag	Cu	Mn	Distribution Pb	Zn	Fe	Ag	Cu	Mn
Pb Conc	24.00	63.50	7.42	4.50	22.21			48.02	3.64	0.77	31.74		
Pb 3CT	16.40	33.30	14.60	10.30	11.47			17.21	4.89	1.21	11.20		
Pb 2CT	22.20	9.60	17.10	12.70	4.71			6.72	7.76	2.02	6.23		
Zn Conc	55.30	1.85	53.10	9.60	2.14			3.22	60.00	3.80	7.21		
Zn 3CT	10.30	4.10	28.80	12.40	3.43			1.33	6.06	0.92	2.10		
Zn 2CT	16.80	3.31	10.96	14.40	2.33			1.75	3.76	1.73	2.33		
Zn 1CT	101.80	2.02	4.41	15.10	1.63			6.48	9.17	11.01	9.88		
Zn Sc Tls	745.70	0.65	0.31	14.70	0.66			15.27	4.72	78.53	29.31		
Heads	992.5	3.20	4.93	14.06	1.69			100.0	100.0	100.0	100.0		

	Pb in Pb cct. Cumulative		Zn in Zn cct. Cumulative		Ag in Pb cct Cumulative		Cu in Pb cct. Cumulative	
Product	Grade	Rec.	Grade	Rec.	Grade	Rec.	Grade	Rec.
3rd Conc	63.50	48.02	53.10	60.00	22.21	31.74		
2nd Conc	51.24	65.23	49.28	66.06	17.85	42.94		
1st Conc	36.47	71.94	41.47	69.82	13.19	49.17		
Ro conc.			20.99	78.99				

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Coarse Oxide Ore Testing - Sample of Jan 13, 1983

Grade-Recovery Curve

Test No.: 23 + 24 - Lead.

Date: Jan - 83

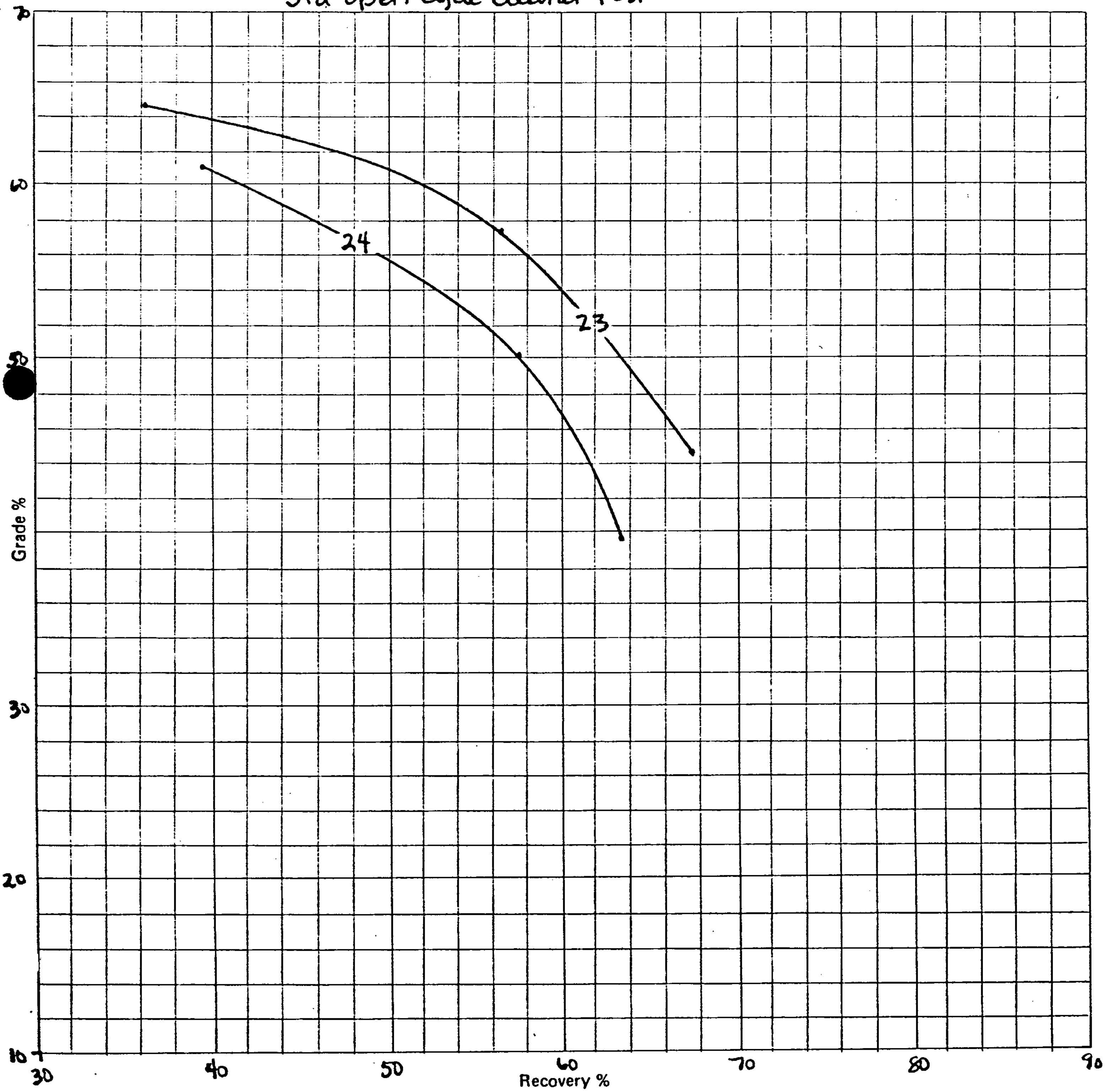
Objective: To optimize treatment cost

Key: -23- without Na_2SO_3

-24- with Na_2SO_3

Reagents: Lime

Std open-cycle Cleaner test



Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Coarse oxide ore Testing - Sample of Jan 13, 1983.
Grade-Recovery Curve

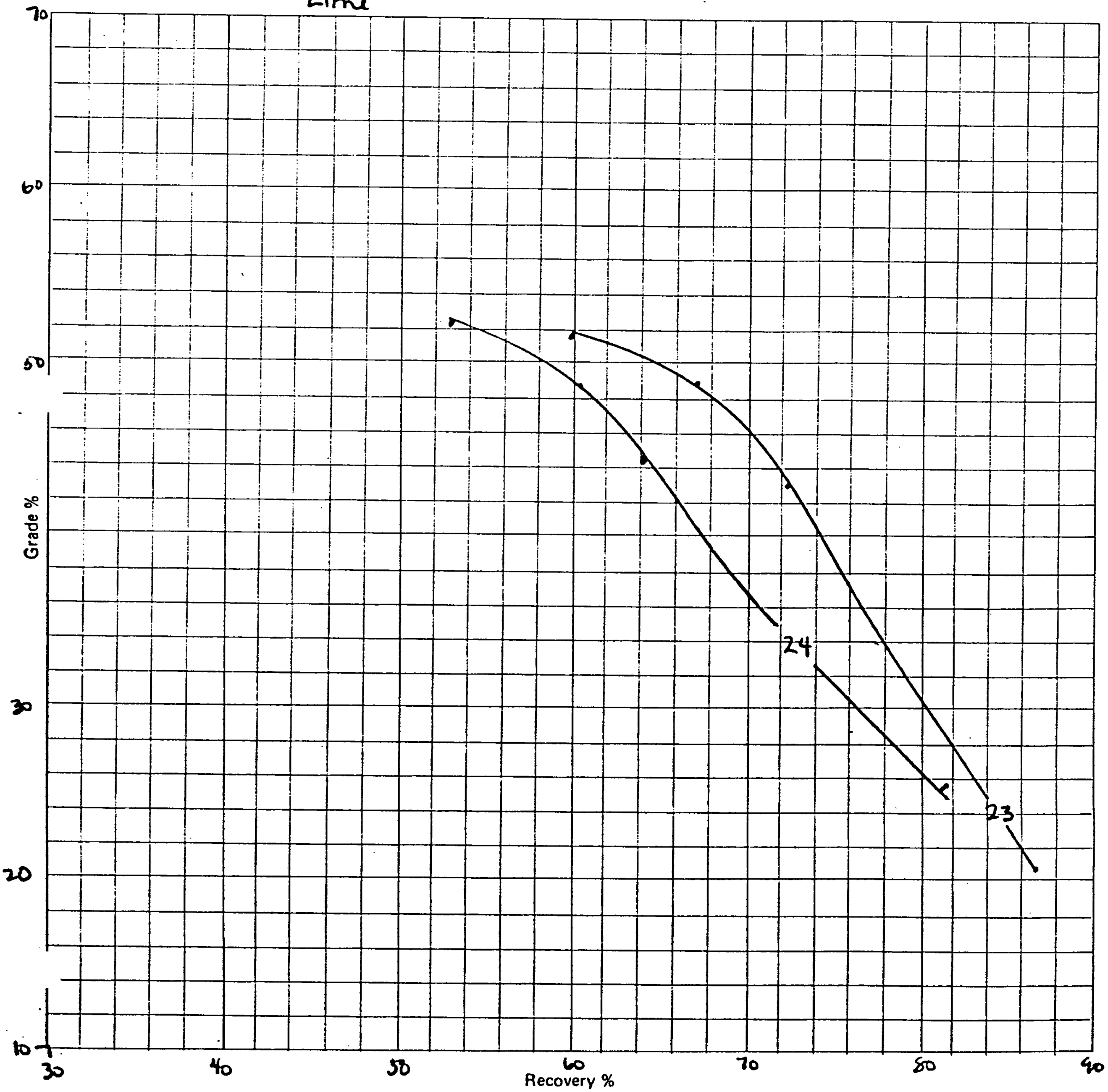
Test No.: 23 + 24 - Zinc

Date: Jan, 1983

Objective: To optimize treatment cost

Key: -23- no Na_2SO_3
-24- with Na_2SO_3

Reagents: std open-cycle cleaner test
Lime



Test no. 23 (Lime Determination)
(see graphs (?) + (36))
Purpose: To optimize treatment cost
Cleaner test.

Feed: Oxide ore - coarse. ; without Na_2SO_3

Product	wts (g)	Assays Pb	Zn	Fe	Ag	Cu	Mn	Distribution Pb	Zn	Fe	Ag	Cu	Mn
Pb Conc.	18.30	64.70	6.69	3.50	23.16			36.18	2.33	0.51	24.93		
Pb 3CT	13.80	48.[illegible]	10.90	6.00	15.27			20.29	2.86	0.66	12.40		
Pb 2CT	17.20	20.80	18.60	10.70	6.72			10.93	4.45	1.48	6.80		
Zn Conc	61.00	2.60	51.70	8.20	2.12			4.85	59.98	4.01	7.61		
Zn 3CT	11.20	7.27	33.80	10.40	3.45			2.49	7.20	0.93	2.27		
Zn 2CT	20.20	5.37	13.20	13.60	2.80			3.31	5.07	2.20	3.33		
Zn 1CT	127.50	3.16	6.15	15.10	1.90			12.31	14.91	15.44	14.25		
Zn SCTls.	670.80	0.47	0.25	13.90	0.72			9.63	3.19	74.76	28.41		
Heads	940.0	3.48	5.59	13.27	1.81			100.0	100.0	100.0	100.0		

Product	Pb in Pb cct. Cumulative Grade	Rec.	Zn in Zn cct. Cumulative Grade	Rec.	Ag in Pb cct Cumulative Grade	Rec.	Cu in Pb cct. Cumulative Grade	Rec.
3rd conc	64.70	36.18	51.70	59.98	23.16	24.93		
2nd conc	57.56	56.47	48.92	67.19	19.77	37.33		
1st conc	44.74	67.40	41.11	72.26	15.22	44.13		
Ro. conc			20.84	87.17				

Test no. 24 (Lime Determination)
(see graphs (35) + (36))

Purpose: To optimize treatment cost.

Feed: Oxide ore - coarse (with Na_2SO_3)

Product	wts (g)	Assays Pb	Zn	Fe	Ag	Cu	Mn	Distribution Pb	Zn	Fe	Ag	Cu	Mn
Pb Conc	21.60	61.10	8.62	3.80	21.25			39.51	3.49	0.62	28.91		
Pb CT3	16.80	35.90	17.80	7.70	11.51			18.06	5.60	0.98	12.18		
Pb 2CT	14.90	13.60	16.30	11.40	4.85			6.07	4.55	1.29	4.55		
Zn Conc	54.10	2.62	52.30	8.30	1.72			4.24	52.97	3.41	5.86		
Zn 3CT	11.80	8.81	33.50	9.90	3.59			3.11	7.40	0.89	2.67		
Zn 2CT	10.90	9.93	17.90	12.40	3.56			3.24	3.65	1.03	2.44		
Zn 1CT	94.90	4.75	9.89	13.90	1.88			13.50	17.57	10.03	11.24		
Zn SCTls.	773.20	0.53	0.33	13.90	0.66			12.27	4.78	81.74	32.14		
Heads	998.20	3.35	5.35	13.17	1.59			100.0	100.0	100.0	100.0		

Product	Pb in Pb cct. Cumulative Grade	Rec.	Zn in Zn cct. Cumulative Grade	Rec.	Ag in Pb cct Cumulative Grade	Rec.	Cu in Pb cct. Cumulative Grade	Rec.
3rd Conc	61.10	39.51	52.30	52.97	21.25	28.91		
2nd Conc	50.08	57.57	48.93	60.37	16.99	41.09		
1st Conc	39.88	63.64	44.53	64.02	13.60	45.64.		
Ro Conc.			25.38	81.59				

CYPRUS ANVIL MINING CORPORATION INTEROFFICE CORRESPONDENCE

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To	J. Levanaho	cc:	[redacted]
From	S. Chmelyk		R. Murarka
Date	January 26, 1983		B. Wallinger, Met. Techs.
Subject	LOCKED CYCLE TESTS DONE ON OXIDIZED ORE		

INTRODUCTION:

A locked cycle test was conducted on a oxidized ore sample as part of the on going testwork with oxidized ore to improve metallurgy. The test was done in order to get an idea of what the optimum metallurgy is with oxidized ore using standard procedures.

The locked cycle test was conducted on the same sample as previous testwork* (sample obtained in April, 1982). A standard open circuit cleaner test was conducted as well to determine a base line metallurgy to compare to the previous testwork done with the large ball mill and to compare to the locked cycle test.

*Oxidized Ore Testwork - Preliminary Report, S. Chmelyk to J. Levanaho, January 7, 1983.

CONCLUSIONS:

Considerable trouble was encountered maintaining stability in the cleaner portion of the locked cycle test resulting in major losses to the 1st cleaner tails on both circuits. An open circuit configuration was used in this test and it is felt this is why stability in the test was not achieved. This test should be repeated using a closed circuit configuration, refer to Appendix C for flow diagrams. The fourth cycle of the test gave the best results:

LEAD		ZINC	
Grade	Recovery	Grade	Recovery
69.6	65.2	47.1	81.5

By doing the closed circuit test it is hoped that lead recovery will improve as well as reducing its contamination in the zinc circuit.

The open circuit cleaner test displayed very poor lead metallurgy. There was a considerable amount of lead lost through the lead 1st cleaner tails resulting in poor lead recovery and contamination in the zinc circuit. The lead cleaners appear to be very sensitive to lime addition and depressions can occur very easily.

APPENDIX A

TEST RESULTS

LOCKED CYCLE CLEANER TEST - JANUARY, 1983

DETAILED RESULTS — OXIDIZED ORE (APRIL, 1982)

		WEIGHT	ASSAY %				DISTRIBUTION %			
		GRAMS	Pb	Zn	Fe	Ag	Pb	Zn	Fe	Ag
Pb CONCENTRATE	1	9.1	38.60	6.15	10.9	12.82	2.51	0.24	0.11	1.77
	2	19.4	70.00	3.86	3.8	21.74	9.72	0.33	0.08	6.38
	3	11.2	79.60	1.73	1.4	25.22	6.38	0.08	0.02	4.27
	4	27.7	69.60	4.14	3.9	21.41	13.79	0.50	0.12	8.97
	5	24.9	68.20	4.30	3.8	20.98	12.15	0.47	0.11	7.97
Zn CONCENTRATE	1	47.5	3.15	49.40	9.7	1.87	1.07	10.24	0.52	1.34
	2	75.7	4.18	45.40	11.0	2.67	2.26	15.00	0.94	3.06
	3	74.3	5.18	45.60	10.2	2.85	2.75	14.79	0.86	3.20
	4	60.1	3.03	47.10	10.1	2.23	1.43	13.59	0.75	2.23
	5	34.7	2.06	47.00	9.5	1.62	0.51	7.12	0.37	0.85
Zn 1st CLEANER TAILS	1	109.0	3.48	8.61	18.1	1.89	2.71	4.10	2.23	3.12
	2	162.1	2.78	3.70	18.2	1.48	3.22	2.62	3.34	3.63
	3	124.9	4.15	4.81	18.4	2.16	3.71	2.62	2.60	4.08
	4	144.3	2.76	2.56	20.1	1.66	2.85	1.61	3.28	3.62
	5	208.8	4.97	10.32	18.0	2.68	7.42	9.40	4.25	8.47
Zn SCAVENGER TAILS	1	627.2	0.52	0.30	19.5	0.42	2.33	0.82	13.83	3.99
	2	631.6	0.70	0.41	19.3	0.52	3.16	1.13	13.78	4.97
	3	828.0	0.75	0.32	19.1	0.44	4.44	1.16	17.88	5.51
	4	676.1	0.64	0.33	18.3	0.64	3.10	0.97	13.99	6.55
	5	736.9	0.62	0.39	19.3	0.40	3.27	1.25	16.08	4.46
Zn FINAL TAILS (Zn 1st TAILS & Zn SCAV. TAILS)	1	736.2	0.96	1.53	19.3	0.64	5.04	4.93	16.06	7.11
	2	793.7	1.12	1.08	19.1	0.72	6.38	3.75	17.12	8.60
	3	952.9	1.20	0.91	19.0	0.66	8.15	3.78	20.48	9.59
	4	820.4	1.01	0.72	18.6	0.81	5.95	2.58	17.27	10.17
	5	945.7	1.58	2.58	19.0	0.90	10.69	10.65	20.33	12.93
Pb SCAV CONC	5	24.0	9.38	11.78	17.0	5.05	1.61	1.23	0.46	1.83
Zn SCAV CONC	5	113.8	1.53	1.42	19.7	1.04	1.25	0.71	2.53	1.79
Pb 2nd CLN TLS	5	7.3	35.80	9.43	12.0	13.79	1.87	0.30	0.10	1.52
Pb 3rd CLN TLS	5	6.7	44.40	9.16	8.9	16.17	2.13	0.27	0.07	1.64
Zn 2nd CLN TLS	5	77.3	6.12	17.80	15.2	3.21	3.38	6.00	1.33	3.76
Zn 3rd CLN TLS	5	25.9	5.15	30.50	12.4	2.72	0.95	3.45	0.36	1.07
CAL'C HEAD		4894.5	2.86	4.68	18.1	1.35	100.00	100.00	100.00	100.00

AVERAGE OF CYCLES 4 & 5

Pb CONCENTRATE	26.3	68.9	4.2	3.9	21.2	58.8	2.9	0.6	38.7
Zn CONCENTRATE	47.4	2.6	47.1	9.8	1.9	4.0	58.1	2.7	6.2
Zn TAILS	883.1	1.3	1.7	18.8	0.9	37.2	39.1	96.7	55.1
CAL'C HEAD	956.8	3.2	4.0	17.9	1.5	100.0	100.0	100.0	100.0

LOCKED CYCLE TEST - METALLURGY CALCULATED BY CYCLE

CYCLE 1

		ASSAYS			DISTRIBUTION		
	wt. (gm)	Pb	Zn	Fe	Pb	Zn	Fe
Pb CONC.	9.1	38.6	6.15	10.9	29.10	1.59	0.67
Zn CONC.	47.5	3.15	49.40	9.7	12.44	66.50	3.12
Zn 1st TAILS	109.0	3.48	8.61	18.1	31.43	26.59	13.36
Zn SCAV TAILS	627.2	0.52	0.30	19.5	27.03	5.33	82.84
HEADS	792.8	1.52	4.45	18.2			

CYCLE 2

	wt. (gm)	Pb	Zn	Fe	Pb	Zn	Fe
Pb CONC.	19.4	70.0	3.86	3.8	52.96	1.72	0.46
Zn CONC.	75.7	4.13	45.40	11.0	12.21	78.63	5.19
Zn 1st TAILS	162.1	2.78	3.70	18.2	17.59	13.73	18.38
Zn SCAV TAILS	631.6	0.70	0.41	19.3	17.24	5.93	75.96
HEADS	888.8	2.88	4.92	18.05			

CYCLE 3

	wt. (gm)	Pb	Zn	Fe	Pb	Zn	Fe
Pb CONC.	11.2	79.6	1.73	1.4	36.92	0.44	0.08
Zn CONC.	74.3	5.18	45.6	10.2	15.94	79.29	4.01
Zn 1st TAILS	124.9	4.15	4.81	18.4	21.44	14.07	12.17
Zn SCAV TAILS	828.0	0.75	0.32	19.1	25.70	6.20	82.73
HEADS	1038.4	2.33	4.11	18.19			

CYCLE 4

	wt. (gm)	Pb	Zn	Fe	Pb	Zn	Fe
Pb CONC.	27.7	69.6	4.14	3.9	65.15	3.00	0.67
Zn CONC.	66.1	3.03	47.10	10.1	6.77	81.49	4.16
Zn 1st TAILS	144.3	2.76	2.56	20.1	13.46	9.67	18.07
Zn SCAV TAILS	676.1	0.64	0.33	18.3	14.62	5.84	77.09
HEADS	914.2	3.24	4.18	17.6			

CYCLE 5

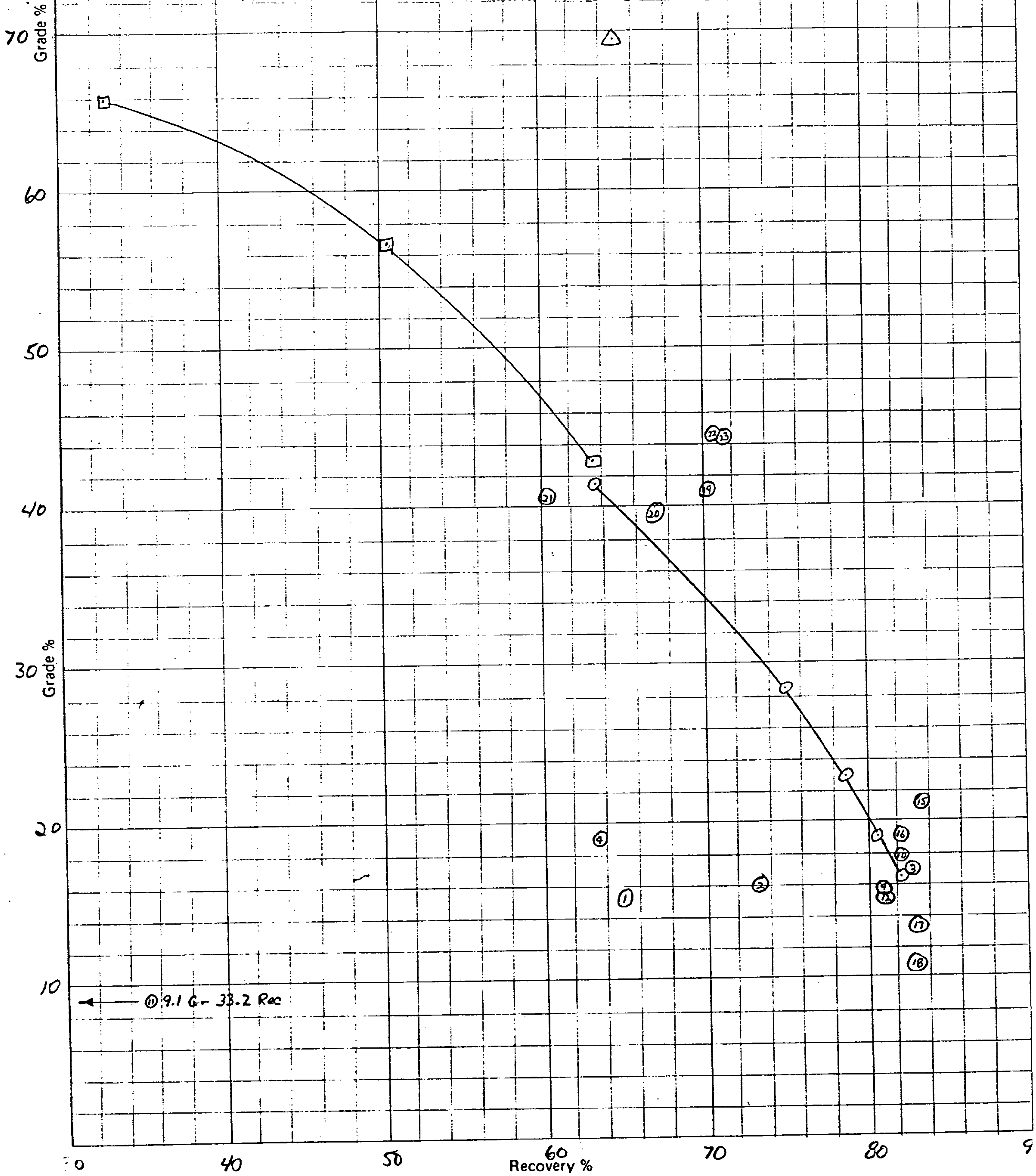
	wt. (gm)	Pb	Zn	Fe	Pb	Zn	Fe
Pb CONC.	24.9	68.2	4.30	3.8	52.02	2.56	0.52
Zn CONC.	34.7	2.06	47.00	9.5	2.18	39.02	1.79
Zn 1st TAILS	208.8	4.97	10.32	18.0	31.08	51.56	20.42
Zn SCAV TAILS	736.9	0.62	0.39	19.3	14.00	6.87	77.27
HEADS	1005.3	3.25	4.16	18.3			

OPEN CIRCUIT CLEANER TEST OXIDIZED ORE - APRIL, 1982

PROD.	wt. (gm)	ASSAYS Pb	Zn	Fe	Ag	DISTRIBUTION Pb	Zn	Fe	Ag
PBCONC	14.40	65.90	3.89	4.30	21.59	32.90	1.17	.35	21.31
PB3CT	11.30	45.20	8.17	8.90	15.46	17.71	1.98	.57	11.97
PB2CT	16.90	22.20	11.28	14.10	8.90	13.01	3.98	1.35	10.31
ZNCON	41.79	2.68	51.20	10.00	2.33	3.87	44.55	2.36	6.66
ZN3CT	14.60	4.79	40.10	11.20	3.05	2.42	12.22	.92	3.05
ZN2CT	15.10	5.27	21.70	14.70	3.20	2.76	6.84	1.26	3.31
ZN1CT	80.80	3.46	11.20	18.20	2.23	9.69	18.88	8.31	12.35
ZNSCT	794.30	.64	.63	18.90	.57	17.36	10.44	84.88	31.03
HEADS	989.10	2.92	4.85	17.88	1.48				

CUMULATIVE GRADES PB	CUMULATIVE RECOVERIES PB	CUMULATIVE GRADES ZN	CUMULATIVE RECOVERIES ZN	CUMULATIVE GRADES AG	CUMULATIVE RECOVERIES AG
65.90	32.90	51.20	44.55	21.59	21.31
56.80	50.61	48.32	56.77	18.89	33.28
43.07	63.62	42.69	63.60	14.93	43.59
		25.97	82.49		

LEAD METALLURGY - OXIDIZED ORE (APRIL RMF)



Δ - LOCKED CYCLE TEST

⊡ - STANDARD OPEN CIRCUIT CLEANER TEST.

⊙ - STANDARD LEAD ROUGHER TEST. (TEST 8, OXIDIZED ORE - PRELIMINARY REPORT, 7 JAN 83,

①, ② ETC - LEAD ROUGHER TESTS - <u>OXIDIZED ORE - PRELIMINARY REPORT</u>, 7 JAN 83,
S. CHMELUK TO J. LEVANANO

APPENDIX B
TEST DETAILS

PURPOSE : Locked Cycle test to determine optimum metallurty using standard procedures on oxidized ore.

PROCEDURE : Both circuits open.

FEED : Oxidized ore from April, 1982.

GRIND : 1000 gm charge/500 ml H_2O/20 minute grind.

STAGE	REAGENTS - added (g/T)					Time (minutes)			PH	
	Na_2SO_3	NaCN	Z-11	$CuSO_4$	CaOH	Grind (min)	Cond	Froth (min)	Start	Finish
PRIMARY GRIND	1500	75			4000	18				
"			60			2				
LEAD Ro/Sc							1	5+5	10.0	____
LEAD REGRIND		25			250	10				
LEAD 1st CL.			35				1	5	10.2	____
LEAD 2nd CL.			25				1	4	10.4	____
LEAD 3rd CL.			15				1	3	10.6	____
ZINC COND.			60	600	Slurry		10		11.0	____
ZINC Ro/Sc								5+5		____
ZINC REGRIND				250	250	10				
ZINC 1st CL.			35		Slurry		1	5	11.2	____
ZINC 2nd CL.			25		Slurry		1	4	11.4	____
ZINC 3rd CL.			15		Slurry		1	3	11.6	____

PURPOSE : Std Open-cycle Cleaner Test to compare against locked-cycle cleaner test.

PROCEUDRE : Std Open-cycle cleaner test for Oxide Ore.

FEED : Oxide Ore April, 1982.

GRIND : 1000g charge/500 ml H_2O/20 minute grind.

	REAGENTS - added (g/T)					Time (minutes)			PH	
STAGE	Na_2SO_3	NaCN	Z-11	$CuSO_4$	CaOH	Grind (min)	Cond	Froth (min)	Start	Finish
PRIMARY GRIND	1500	75			4000	18				
"			60.0			2				
LEAD Ro/Sc			40.0				2	10	9.47	10.20
LEAD REGRIND		25.0			250.0	10				
LEAD 1st CL.			165.0				2	5	9.71	10.40
LEAD 2nd CL.			25.0				2	4	8.80	10.80
LEAD 3rd CL.			15.0				2	3	10.20	11.00
ZINC COND.			60.0	600.0	Slurry		10		9.97	11.36
ZINC Ro/Sc			40.0					10		11.36
ZINC REGRIND				100.0	250.0	10				
ZINC 1st CL.			45.0		Slurry		2	5	10.36	11.20
ZINC 2nd CL.			35.0		Slurry		2	4	9.30	11.55
ZINC 3rd CL.			15.0		Slurry		2	3	11.13	11.70

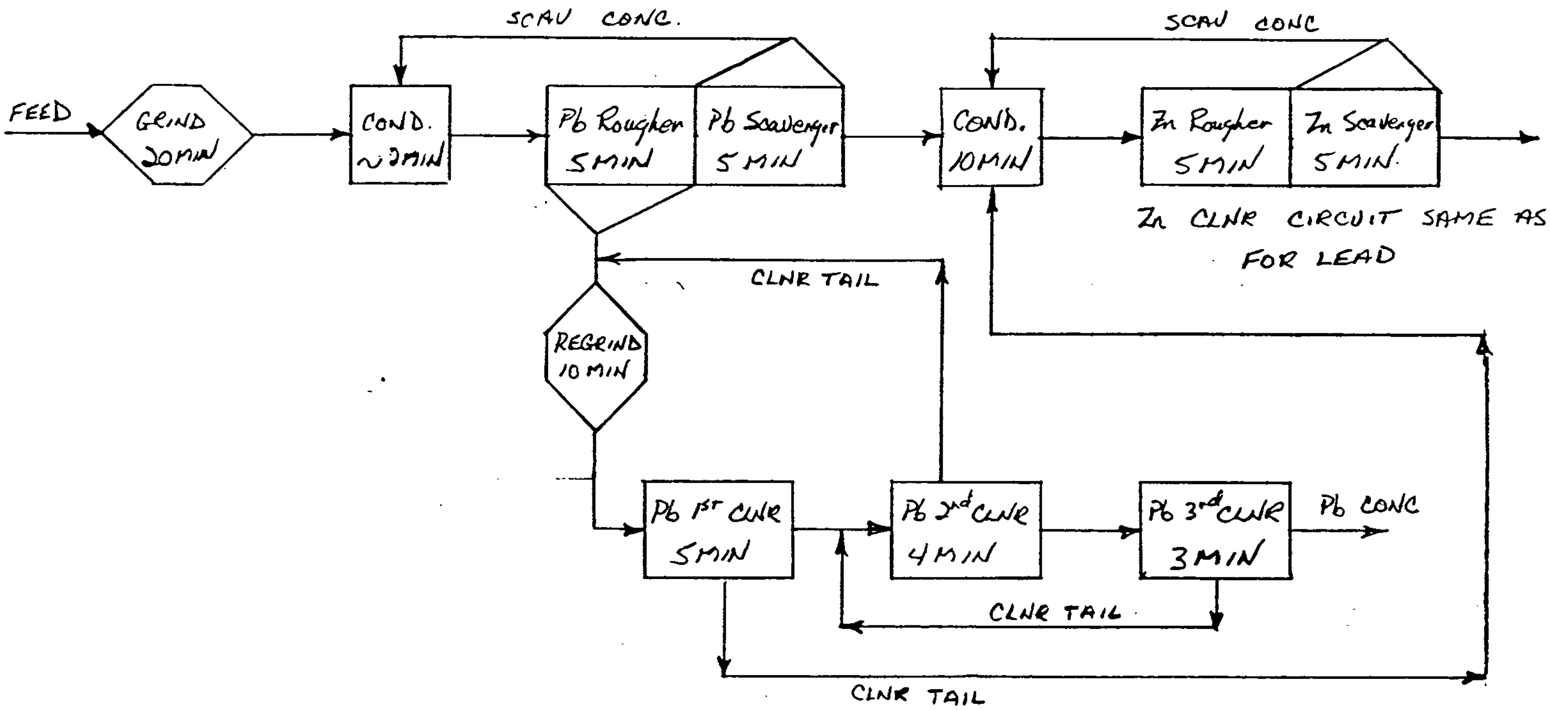
[illegible]

SAMPLE OF: Zn SCAV TIS OXIDE ORE CINK TEST

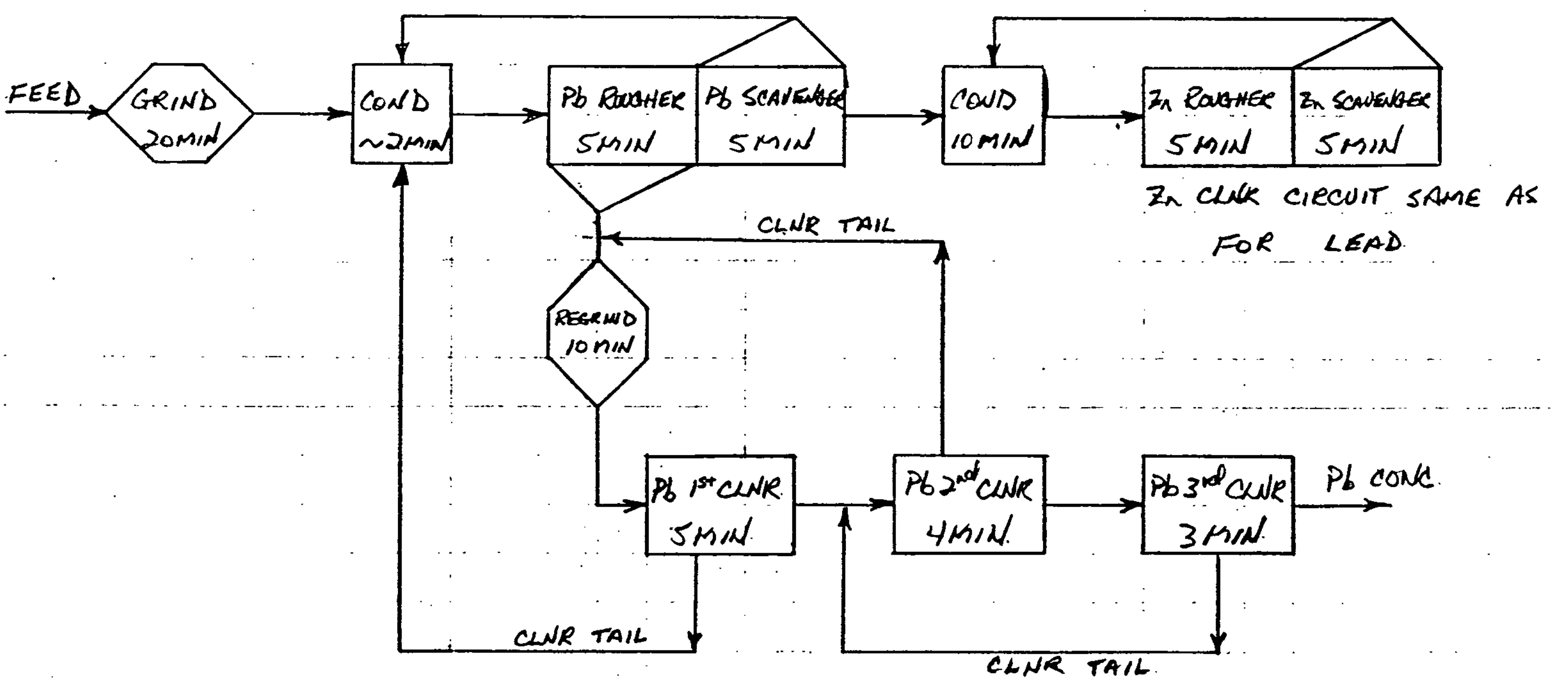
TYLER MESH NUMBER	WEIGHT RETAINED	WEIGHT % RETAINED	CUMULATIVE % RETAINED	CUMULATIVE % PASSING	μ (MICRON)
+65	0.1	0.05	0.05	99.95	212
+100	0.1	0.05	0.10	99.85	150
+150	0.1	0.05	0.15	99.70	106
+200	1.7	0.85	1.00	98.70	74
+325	27.2	13.60	14.60	84.10	44
-325	170.8				

APPENDIX C
LOCKED CYCLE FLOW SHEETS

LOCKED CYCLE FLOWSHEET
OPEN CIRCUIT



LOCKED CYCLE FLOWSHEET
CLOSED CIRCUIT



Why do mill charges change?
Why are charges so large?
What prompted the use of such high addition rates of NaCN, Na_2SO_3.
Rod rep is 2 kg grinding — time in large mill vis a vis planer performance.

[illegible] CORRESPONDENCE

Peter Taggart

January 7, 19[illegible]

[illegible] ORE TESTING - PRELIMINARY REPORT

INTRODUCTION:

The following is a summary of the various lead rougher grades and recoveries achieved and a brief description of the test conditions.

TEST NO.	LEAD ROUGHER Grade	LEAD ROUGHER Recovery	TEST CONDITIONS
1	15.6	65.1	8 kg test with large mill collector and NaCN added to the beginning of grind. Sealed mill.
2	16.0	73.6	Repeat of above test.
3	17.0	82.9	NaCN & Z-11 added 15 min. before end of grind, lid was taken off to add reagents.
4	18.8	63.6	Same as above reagents added through spout.
8	16.3	82.2	2 kg test in rod mill (stainless steel).
9	15.9	81.2	Same as above but in large mill (steel).
10	17.9	82.1	Repeat of 9 - less CaO used.
11	9.1	33.2	8 kg test Z-11 at start of grind NaCN 15 min. before the end of the grind.
12	15.5	81.0	NaCn at the start of the grind Z-11 15 min. before the end of the grind.
15	21.2	83.5	1 kg/T Na_2SO_3 at beginning of the grind Z-11, NaCN 4.05 kg/T Na_2SO_3 15 min. before end
16	19.1	82.2	Same as above 3 kg/T and 2 kg/T Na_2SO_3 added at beginning of grind and 15 min. before end.
17	13.3	83.1	6 kg test same as above, modified mill to be open.
18	10.6	83.2	Same as #16 but Z-11 added to conditioning just prior to flotation.
19	41.0	70.6	Same as #16 O_2 blown through the mill

TEST NO.	LEAD ROUGHER		[illegible]
	Grade	Recovery	
20	39.7	67.3	Same as #19 but with air blown through the open mill.
21	[illegible]	60.[illegible]	[illegible] NaCN [illegible] 2-11 added to the [illegible]
22	44.8	71.1	Same as above NaCN and 2-11 added 2 min. before the end of the grind.
23	44.7	71.5	Same as above stage addition of NaCN.

DISCUSSION: Refer to the attached grade recovery graph.

For the purpose of interpetation the standard lead rougher grade - recovery curve will be used as a base for this testwork. Tests 1, 2, 4 & 11 are all well below the standard curve. With the exception of test 4 in each case the xanthate was added to the beginning of the grind. As well test #21 is well below the results achieved in comparable tests 19, 20, 22 & 23. Test #21 was the only one of the five tests in which the xanthate was added to the beginning of the grind. It would appear that the lenght of the grind time in the large ball mill (2 hours) is causing destruction of the xanthate bonds to the particles. This destruction of the xanthate during the grinding process when added to the beginning of the grind was not noted during testwork with normal sulphide ore. Tests done when calibrating the large ball mill and large flotation cell with xanthate added to the beginning of the grind gave the following results:

will the same grinding time?

Pb Rougher Grade	Pb Rougher Recovery
14.6	88.4

In the plant xanthate to the lead roughers is added via 7 & 8, 9 & 10 pumpboxes. Thus we may be experiencing some xanthate destruction in the tertiary mills. When milling oxidized ore we should strongly consider adding the xanthate to the tertiary collection box rather than to the pumpboxes.

most of the 2-11 will report to the C.O.F. anyway.

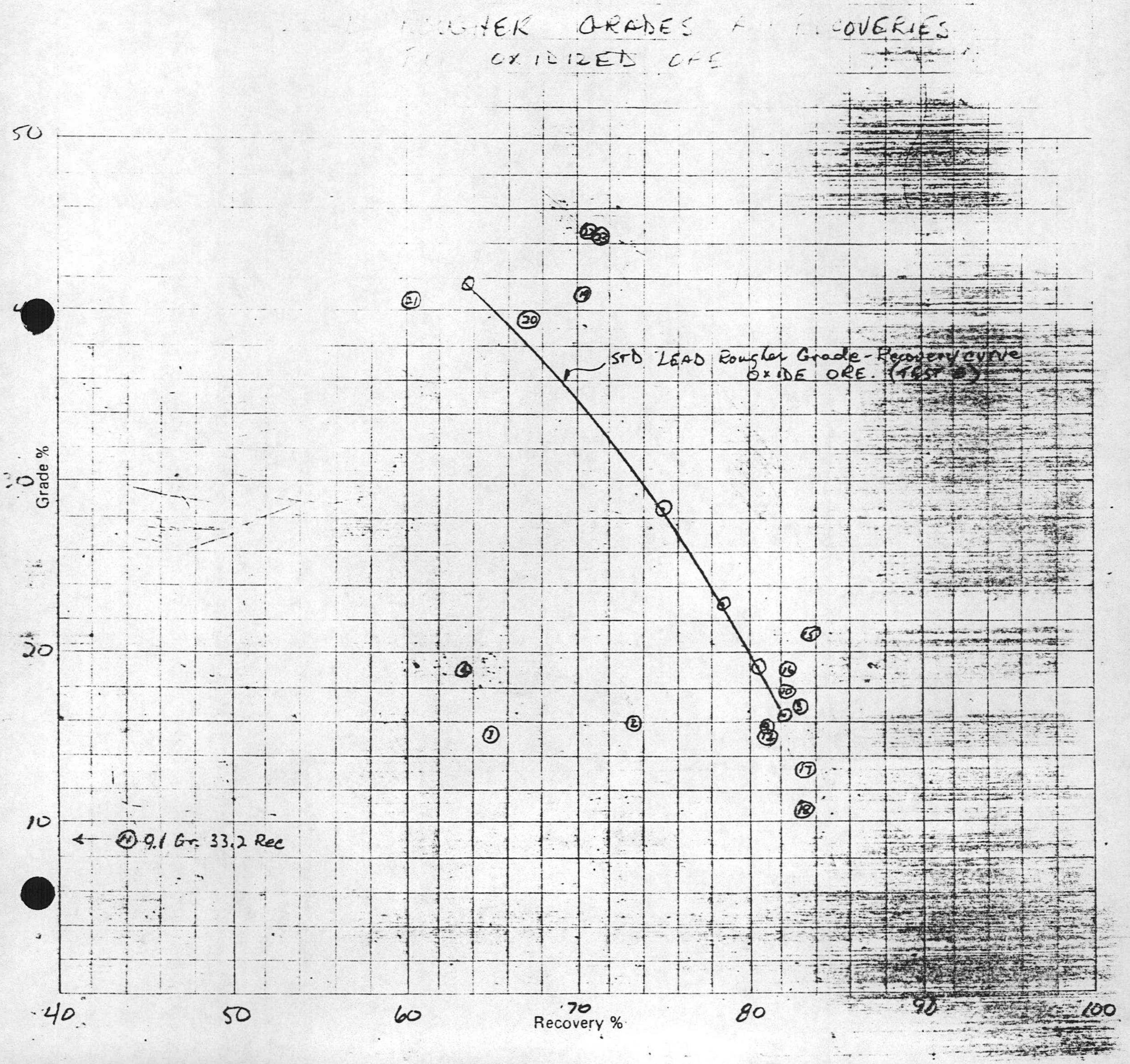
Tests 22 & 23 are well above the standard grade-recovery curve. Although the recoveries are low it is felt that by pulling harder physically and chemically with more xanthate the recovery may be improved while maintaining an improvement in the grade-recovery curve. Thus introducing air or oxygen to the laboratory mill appears to have improved the lead metallurgy. Galena requires a certain amount of oxidation in order for flotation to occur. It is possible that when milling oxidized ore there is insufficient oxygen in the pulp for proper oxidation of the galena. By blowing air or oxygen through the mill we are ensuring an adequate amount of O_2 dissolved in the pulp and this is why a metallurgical improvement is noticed. Testwork is ongoing to examine these theories.

SC/df

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Grade-Recovery Curve



CYPRUS ANVIL MINING CORPORATION INTEROFFICE CORRESPONDENCE

To J.K. Carrington cc: P. Taggart

From J. Levanaho J. Purkis

Date January 3, 1983 D. Gregoire, A. Laird

Subject OXIDE METALLURGY - YOUR MEMO 22/12/82

1. Oxide Stockpile

At the moment the best forecast which can be made is Peter Taggart's forecast. But according to metallurgical testwork and the progress that we have already made we feel very confident that after two - three weeks we are able to improve our forecasts. To make a guess the forecast will probably be as follows:

a) Doing nothing, we use Peter's metallurgy.
b) By screening out of fines we might be able to increase recoveries, but at least laboratory testwork must be done using the new method before any kind of estimates can be given.
c) If we can get the grind from 75μm to 65μm Pb recovery will improve from 70.0 to 70.6% and Zn from 73.0 to 74.2%.

2. Process Controls

a) S. Chmelyk has a project to make a suggestion of modifying the reagent feeding system. The report will be issued before the end of Janaury. Before shut-down we already brought new flowmeters for lime, which have not been installed. Some reagents have already good systems, only limes/solenoid valve systems must be changed.

b) To get dependable on-stream anaylsis there will be an assayer in every shift, who looks after carrier regularly and changes parameters if required.

c) Cell level control systems work fairly well. We have to install some pure box level control systems. This will be done simultaneously with the control system installation.

d) The shifters are going through our reports to make a list of failures. The report will be ready in Janaury. Dickie is making a report of spillage points. It will be ready within two weeks.

e) For operating procedures some work has been done already. We had already a program for this before the latest lay-off. This work will continue in February.

Metallurgical operating procedures will be done after the ore type and blend testwork will be finished.

1/2

CYPRUS

f) When we once start the Mill we certainly need on-shift metallurgical assistance for awhile. Both metallurgists and two technicians will be on shift. This will last one or two months and testwork will suffer for awhile. When we once start there are six Metallurgical Technician positions in our budget.

g) Fourth cleaning stage will hopefully increase the grade slightly, it cannot be regarded as necessarily. But because we have problems with some ore types to get the necessary grade, additional cleaning stage will help. It will be installed simultaneously with post-flotation. We have all pumps, pump boxes and flotation cells, some rebuilt and piping work is needed.

There are possibilities to improve the Mill performance. Some of these need some minor capital costs. Most of the programs will be finalized before the end of January.

J. LEVANAHO,
PROCESS CONTROL ENGINEER.

JL/df

2/2

recan file 213

	Pb G	Pb R	Zn G	Zn R
A.F.E FRESH ZONE III	67.0	87.5	53.5	88.5
BASE CASE ('78 & '79 MET)	61.1	84.0	50.4	80.0
OXIDE TEST ('73 PLANT)	66.0	72.0	51.5	78.0
OXIDE TEST ('79 PLANT)	56.0	78.0	49.5	57.0 (78.0)
OXIDE MET. IN AFE	52.9	76.8	48.5	71.3

1982 PRODUCTION				
4BV (1.3 OX/2.1 Z III)	61.6	83.4	51.6	81.9
4BV (1.7 OX/1.7 Z III)	60.0	82.2	51.0	79.9
1981 PLAN	60.7	78.2	50.9	79.2
VARIANCE. (81 PLAN WORSE)	0.7	(4.0)	(0.1)	(0.7)

AVERAGE PLANT TESTS.	61.0 55.0	75.0 70.0	50.5 48.0	78.0 70.0
ASSUME 1.7m FRESH Z III	67.0	87.5	53.5	88.5
THEN 1982 PRODUCTION =	64.0	81.3	52.0	83.3
RECOMMEND	62.0	81.5	51.5	81.5
[≡ OXIDE MET	57.0	75.5	49.5	74.5]
PJ. recent results	50	65	52	75
	~~62~~	~~81.5~~	~~51.5~~	~~81.5~~
we used last edition	57	75.5	49.5	74.5
Recommend II	55	70	52	78

Bigger lime .4 kg/mt.

CMC. .05, .075 .1. no difference.

ar + NaCN. 1.75/kg. stage added.

50 kilos. corroded