G-22

020614

THE GRUM PROJECT
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Submitted by:

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January 25, 1977.

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Cyprus Anvil Mining Corporation — Interoffice Correspondence

To: W. Muir — Date: January 25, 1977.

From: M. Holm

Subject: The Metallurgical Testwork on the Five Ore Samples from the Grum Deposit.

OBJECTIVES

To determine, by a series of flotation tests, the compatablity of Grum ores to:

1. The Anvil reagent scheme
2. The flotation scheme developed by Lakefield Research. LR 1868 Jul '76

SUMMARY

All the Grum samples except the quartz sulphides responded favorably to the flotation scheme used in the Anvil concentrator. Slight adjustments were required in reagent additions due to the higher Grum metal contents (see Table I below).

TABLE I - GRUM HEAD ASSAYS

Sample Number	Ore Type	Pb	Zn	Fe	Cu
D-1	Massive banded sulphides	5.03	9.9	8.0	0.21
E-1	Massive flow sulphides	6.52	11.4	8.4	0.07
F-1	Massive porous sulphides	4.61	13.1	26.7	0.08
G-1	Quartz sulphides	1.73	3.3	6.2	0.09
H-1	Banded sulphides	5.46	9.4	15.5	0.11
	Anvil crusher stockpile	4.73	9.6	35.1	
	1976 Y.T.D. Anvil feed	2.66	5.48	30.7	

The good responses of these Grum samples were a marked contrast to those Grum samples previously tested at Cyprus Anvil[1]. The previous testing showed the Grum ore to be highly oxidized and containing preactivated zinc which floated with the lead concentrate. The latest Grum samples were not a as oxidized and did not contain as much preactivated zinc.

[1] M. Fernandes, July 1975.

The Grum quartz sulphide ore sample did not respond as well as the other Grum samples because it contained graphite, had lower heads, and was much more difficult to grind due to its hardness (see Table II).

The Cyprus Anvil flotation scheme proved superior to the Lakefield Research flotation scheme[2], which produced uncontrollable foaming when a duplication was attempted in the Anvil metallurgical laboratory. The Cyprus Anvil flotation scheme also proved itself equal to a modified Lakefield flotation scheme[3] (see Table III). The considerably finer primary grinding used in the Lakefield flotation scheme did not appear to yield any benefits not obtained by regrinding the rougher concentrates[4], as is the practice at Cyprus Anvil. The fine grind, however, did cause some sliming in the lead and zinc rougher flotation.

In general, the Grum ores responded very similarly to normal Anvil ore using Anvil practices in the lead flotation circuit. The zinc flotation of Grum ores with the Cyprus Anvil scheme was slightly superior to that of normal Anvil ore, this was due to the high zinc heads of the Grum ores, which made cleaning the rougher concentrates relatively simple.

[2] See Lakefield Test #139 in Appendix.

[3] This had reduced reagent quantities to control foaming.

[4] See regrind and cleaning test Appendix.

INTRODUCTION

This series of flotation tests was carried out on Grum ore samples which were frozen in water to prevent oxidation during storage. The purpose of the metallurgical testwork was to determine the response of the various types of Grum ores to the milling practices of the Anvil mill. The possibility of Cyprus Anvil custom milling Grum ore had also been expressed.

The testing also included a reagent and grinding scheme developed by Lakefield Research, specifically for Grum ores. The intention was to reproduce the Lakefield results at Cyprus Anvil.

John Carrington, of A. E. X., advised us that it would be possible to mine massive banded sulphides, massive flow sulphides and massive porous sulphides separately from the quartzitic and banded ores. He also advised us that massive sulphides constitute the major part of the orebody.

DISCUSSION

1. Grinding

There are considerable differences in the grindabilities of Grum ores and this was sometimes reflected in the flotation results. Screen analysis of flotation tailings from tests with the standard Anvil test grinding time[5] yielded the results contained in Table II.

TABLE II - SCREEN ANALYSIS DATA (ANVIL GRIND)

Cumulative Weight % Passing

Tyler Mesh	Anvil Crusher Stk. Pile	Grum Quartz Sulphides	Grum Massive Flow	Grum Massive Banded	Grum Massive Porous	Grum Banded (H-1)	Size Microns μ
100	93.4	72.5	93.9	90.5	99.6	95.2	150
150	77.9	61.4	82.0	78.8	98.0	84.5	106
200	51.1	51.0	62.0	62.8	69.0	67.0	74
325	32.1	42.2	48.6	50.3	39.6	55.6	44
P_{80}	120μ	180μ	110μ	115μ	90μ	100μ	

[5] The Anvil test grind aims for @ 65% -200 mesh.

2. Oxidation

Although oxide assays were not performed on the Grum samples, it is evident that the degree of oxidation present in previous samples obtained from Grum was far greater. The ore samples used by Lakefield Research were also highly oxidized[6]. This point was underlined by the amounts of sodium carbonate required to achieve a pH of 9.8 during lead rougher flotation in the Lakefield Test #139* and during testing at Cyprus Anvil. The decrease of five pounds per ton consumption of soda ash, a fifty percent reduction from the Lakefield testing to the Cyprus Anvil testing, indicates significantly less oxidation. The fact that the latest samples from Grum had a great deal less preactivated zinc floating in the lead roughers, than during previous testing, is another sign of less oxidized ore.

3. The Grum milling scheme developed by Lakefield Research

Since a copy of a flotation test performed at Lakefield Research on Grum ore was available at Cyprus Anvil, an attempt was made to duplicate the results in an identical test in the Cyprus Anvil laboratory. This attempt produced a float which foamed excessively and floated all minerals available with no selectivity.

A modified Lakefield test, with reduced reagent amounts[7], produced good results. This was adopted as the basic or modified Lakefield flotation test for the purpose of comparison. The results were comparable to those obtained with the standard Anvil tests[8]. The complete results of these tests are in Appendix III.

* See Appendix.

6 Lakefield Research Progress Report #3.

7 See Table III.

8 See Table IV.

TABLE III

MODIFICATIONS ON LAKEFIELD TEST #139

Reagent	Lakefield #139 lbs./ton	Modified Lakefield lbs./ton	Change lbs./ton
Na_2CO_3	10	5.0	5.0
$ZnSO_4$	1.0	1.0	Nil
NaCN	0.30	0.30	Nil
R-242	0.12	0.07	-0.05
R-404	0.04	0.025	-0.015
M.I.B.C.	Nil	Nil	Nil
$Ca(OH)_2$	2.0	2.0	Nil
$CuSO_4$	1.5	1.0	-0.50
Z-200	0.14	@ 0.014	-0.126
M.I.B.C.	0.02	Nil	-0.02
Teefroth A*	0.01	N/A	-0.01
D.F. 1012	Nil	@ 0.02	+0.015
Z-11	0.04	@ 0.15	+0.11
Pb flot. time	12 min. (rgr.)	12 min. (rgr.)	Nil
Zn flot. time	7 min. (rgr.)	10 min.	+3 minutes
grind time	30 minutes	same	Nil
grind % pass	87.5% -325 mesh	same	Nil

* N/A (not available)

4. Testing with the Anvil standard flotation test

The flotation scheme used at Anvil, with the minor changes required by the higher mineral contents of the Grum ores, was tested on each individual Grum ore type. It was also used on a combination sample containing all Grum ore types, as well as a 1:1 blend of each Grum ore plus a sample of Anvil crusher stockpile ore. The following table contains some of the results.

TABLE IV FLOTATION RESULTS

Ore Sample	Cumulative Grades Anvil Pb	Anvil Zn	Mod. Lakefield Pb	Mod. Lakefield Zn	Cumulative Recoveries Anvil Pb	Anvil Zn	Mod. Lakefield Pb	Mod. Lakefield Zn
Grum H-1	35.5	33.9	32.3	25.4	82.7	70.1	82.9	74.6
Grum Banded	34.7	34.6	25.8	29.1	71.4	75.6	60.4	81.0
Grum Flow	35.1	34.1	34.9	35.4	74.9	72.1	78.9	74.9
Grum Porous	40.1	53.9	38.3	51.2	77.6	80.9	84.2	79.1
Grum Quartz	21.2	18.9	21.7	20.9	61.7	75.0	60.2	81.9
Grum Combined*	28.7	27.4	N/A	N/A	82.9	71.5	N/A	N/A
Grum Comb. + Anvil	36.7	40.6	N/A	N/A	84.0	78.7	N/A	N/A
Anvil Stk. Pile	55.6	38.1	48.3	50.5	90.4	70.6	92.0	80.5

* Composite of all Grum Samples

TABLE V - GRADE VS RECOVERY

Sample Type	Pb Grade @ 70% Rec. Anvil	Pb Grade @ 70% Rec. Lakefield	Zn Grade @ 70% Rec. Anvil	Zn Grade @ 70% Rec. Lakefield
Massive Banded (D-1)	36	graphite	42	46
Massive Flow (E-1)	43	40	37	47
Massive Porous (F-1)	46	51	58	51
Quartzitic (G-1)	24 *	22 *	37	39
Banded (H-1)	52	46	34	42
Anvil Stockpile +	67	67	46	50
Grum Combined	43	N/A	35	N/A

N/A not available

* at 60% recovery

\+ exceptional Anvil ore sample

Notes: Lakefield grind 30 minutes or 87.5% -325 mesh.
Anvil test grind 11 minutes or 60% -200 mesh.
This is slightly coarser than normal in the Anvil mill.

TABLE VII

GRADE VS RECOVERY

Anvil Ore & Grum Ore (1:1) Combinations

Ore Type Plus 50% Anvil Ore	Cumulative %Pb Grade @ 75% Rec.	Cumulative Zn Grade @ 75% Rec.	Cumulative %Zn Grade @ 70% Rec.
Massive Banded (D-1)	52	46	51.5
Massive Flow (E-1)	48	46	52.0
Massive Porous (F-1)	49.5	56.5	57.5
Quartz Sulphide (G-1)	45	47	50.0
Banded (H-1)	48.5	40.5	50
Grum Combination	48.5	47.5	50.5

The results obtained from this series of tests were excellent and far superior to the results normally obtained in the Anvil mill with Anvil ores alone.

It was found, however, that careful control of collector to the lead roughers was essential in limiting the amount of zinc floating in the lead rougher concentrates. In attempting to improve lead recoveries by increasing the amount of collector used it was observed that the zinc sulphides in the lead concentrates increased dramatically after about 82 percent recovery, however this also occurs with Anvil ores. Zinc sulphate was tested as a zinc depressant as Lakefield Research had included it in their reagent scheme. The results of these tests showed that zinc sulphate had little or no affect on the amount of zinc floating with the lead. This is demonstrated in tests #2955 versus #2963 where in test #2963 with 1#/ton $ZnSO_4$ 21.0% of the total zinc floated in the lead roughers and scavengers, in test #2955 in which no zinc sulphate was used only 18.3% of the total zinc floated with the lead. This is further demonstrated by tests #9229 and #9233 (see Grade Recovery Curve #10).

The good results obtained with the relatively coarse Anvil grind (compared to the Lakefield) show that the extremely fine grind used by Lakefield research is probably unnecessary if regrinding of rougher concentrates is to be used, as in the Anvil mill. A standard Anvil regrind and cleaning test done on Grum banded (H-1) ores yielded final concentrates of 78.3% lead in the lead concentrate and 54.9% zinc in the zinc concentrate. This is at least as good as the best Anvil ores produce for concentrate grades. The complete cleaning tests are available as tests #2985 and #2986 in Appendix III.

The grum quartzitic, banded and flow samples do contain some graphite which may interfere with lead flotation as occurs in test #2946, and is usually not a serious problem.

CONCLUSIONS AND RECOMMENDATIONS

There should be no real problem milling the various Grum ores in the Anvil mill if they are not oxidized. The reagent consumption will be slightly higher than with normal Anvil ore, due primarily to the higher mineral contents of most of the Grum ores which would require slightly more copper sulphate and collector.

The tonnage milled per hour may have to be reduced somewhat if Grum ore is milled without blending with Anvil ore. This would have to be done for two main reasons. The first reason would be to ensure a slightly finer primary grind than with Anvil ore if the Grum ore was quartzitic material. The other reason for slightly reducing the T. P. H. milled would be the very real possibility of overloading the zinc cleaning ciruit due to extremely high zinc heads, especially with Grum porous ores.

Recoveries and grades should approximate or better those obtained with Anvil ores.

APPENDIX I

LAKEFIELD TEST #139

LAKEFIEL. RESEARCH OF CANADA LIMITED

Test No: 139 Project No: 1868 Date: 13 July 76 Operator: CP-DL

urpose: To perform a six-stage locked cycle test on the Mattagami ore sample. - GRUM SAMPLE

Procedure:
As for test No. 126.

Feed: Six 1000 gram charges of minus 10 mesh ore sample

Grind: 30 minutes/kg at 60 percent solids in the laboratory ball mill

Conditions:

	Reagents Added, pounds per ton							Time, minutes			
	Na_2CO_3	$ZnSO_4$	NaCN	R-242	R-404	MIBC		Grind	Cond.	Froth	pH
Primary Grind	10.0	1.0	0.30	0.08				30			
Pb Rougher					0.01				1	3	9.8
				0.02	0.01				1	3	
				0.01	0.01				1	3	
				0.01	0.01				1	3	
Pb Regrind	2.0	1.0	0.30	0.04				30			
Pb 1st Cleaner					0.01				1	4	9.7
				0.01	0.01				1	4	
Pb 2nd cleaner	0.4	0.2	0.10						2	5	9.8
Pb 3rd Cleaner	0.4	0.1	0.10						2	4	9.8
Pb 4th cleaner	0.4		0.05						2	3	9.8

Stage	Rougher	PC Regrind	1st to 3rd Clean	4th Cleaner
lotation Cell	500 g D-1	Lab Rod Mill	500 g D-1	250 g D-1
Speed: r.p.m.	1300		1300	1000
% Solids	33			

LAKEFIELD RESEARCH OF CANADA LIMITED

Test No: 139(cont'd) Project No: 1868 Date: _____ Operator: _____

Purpose: _____

Procedure: _____

Feed: _____

Grind: _____

Conditions:

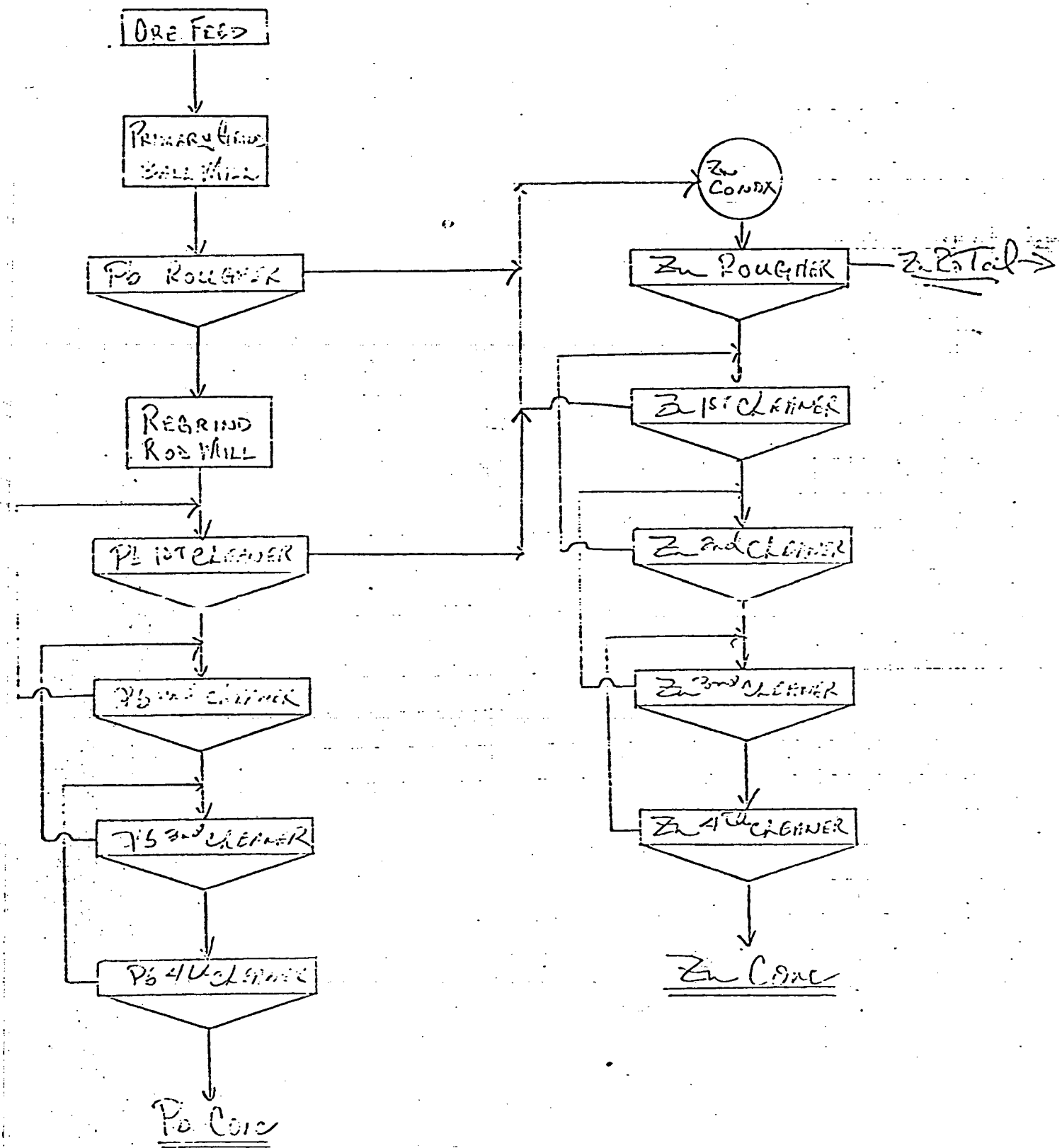
	Reagents Added, pounds per ton							Time, minutes			
	$Ca(OH)_2$	$CuSO_4$	Z-200	Z-11	MIBC	Teefroth A		Grind	Cond.	Froth	pH
Zn Roughing	2.0	1.5							3	-	10.8
Zn Roughing (1)			0.03	0.02					1	2	
(2)			0.04	0.02	0.02	0.01			1	3	
(3)			0.02	-	-	-			1	2	
									1		
Zn 1st Cleaner	.8								1	2	11.2
			0.01			0.01			1	3	
Zn 2nd cleaner	.8								1	4	11.2
Zn 3rd cleaner	.6								1	2½	11.3
Zn 4th Cleaner	.4								1	2½	11.3

Stage	Zn Rough-Cleaner				
Flotation Cell	500gD-1				
Speed: r.p.m.	1100				
% Solids					

	Product	Weight g	Weight %	Assays, % Pb	Assays, % Zn	% Distribution Pb	% Distribution Zn
1	Pb Cleaner Conc A	63.0	1.05	64.2	10.7	8.1	0.7
2	B	88.3	1.46	62.6	11.5	10.9	1.1
3	C	106.4	1.76	58.4	13.1	12.3	1.5
4	D	110.5	1.83	59.0	13.2	12.9	1.5
5	E	102.7	1.71	56.0	12.4	11.5	1.3
6	F	104.9	1.74	57.5	13.1	12.0	1.4
7	Pb 4th Cleaner tail F	47.8	0.79	34.2	23.5	3.2	1.2
8	Pb 3rd Cleaner tail F	105.0	1.74	26.9	26.0	5.6	2.9
9	Pb 2nd Cleaner tail F	201.3	3.34	15.9	27.0	6.4	5.7
10	Pb 1st Cleaner tail F	292.9	4.86	4.18	21.7	2.4	6.7
11	Zn Cleaner Conc A	111.5	1.85	1.16	53.8	0.3	6.3
12	B	158.1	2.62	2.25	54.2	0.7	9.0
1	C	164.7	2.73	2.00	53.1	0.7	9.2
2	D	169.7	2.82	2.14	57.0	0.7	10.1
3	E	150.2	2.49	2.42	55.2	0.7	8.7
4	F	159.5	2.65	2.71	57.0	0.8	9.5
5	Zn 4th Cleaner tail F	66.0	1.09	5.00	48.9	0.7	3.9
6	Zn 3rd Cleaner tail F	134.3	2.23	4.77	41.2	1.3	5.7
	Zn 2nd Cleaner tail F	211.8	3.40	4.12	26.5	1.8	5.9
8	Zn 1st Cleaner tail F	281.7	4.67	2.93	1.59	1.6	2.2
9	Zn Rougher tail A	340.4	5.65	0.62	0.91	0.4	0.3
0	B	483.8	8.03	0.83	1.69	0.8	0.9
1	C	550.4	9.13	0.83	1.67	0.9	1.0
2	D	592.6	9.83	0.87	1.85	1.0	1.1
1	E	602.1	9.99	0.95	2.ox.	1.1	1.3
2	F	623.4	10.34	0.98	2.08	1.2	1.1
	Head calc.)	6028.6	100.00	8.36	15.8	100.0	100.0

Calculated Grades and Recoveries

Combined Pb Cleaner Conc	9.55	59.2	12.5	67.7	7.5	
Combined Pb Cleaner tails	10.73	13.7	21.2	17.6	16.5	
Combined Zn Cleaner Conc	15.16	2.16	55.1	3.9	52.8	
Combined Zn Cleaner tails	11.59	3.85	23.8	5.9	17.2	
Combined Zn Rougher tails	52.97	0.87	1.78	5.1	6.5	


ORE FEED
PRIMARY GRIND BALL MILL
Pb ROUGHER
REGRIND ROD MILL
Pb 1ST CLEANER
Pb 2nd CLEANER
Pb 3rd CLEANER
Pb 4th CLEANER
Pb CONC
Zn CONDX
Zn ROUGHER
Zn Tail
Zn 1ST CLEANER
Zn 2nd CLEANER
Zn 3rd CLEANER
Zn 4th CLEANER
Zn CONC

APPENDIX II

GRADE - RECOVERY CURVE GRAPHS

Cyprus Anvil Mining Corporation

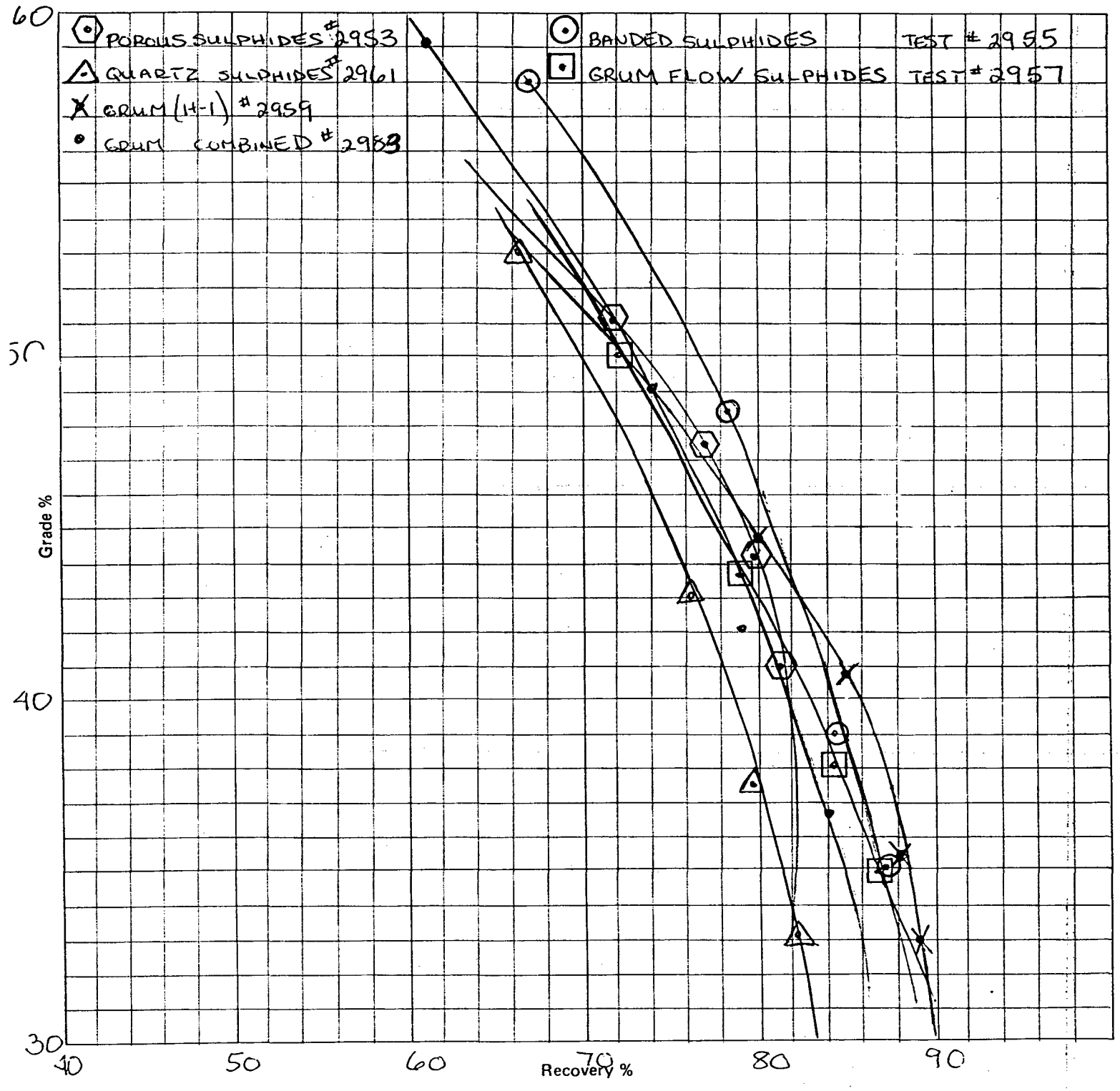
METALLURGICAL TEST REPORT

Grade-Recovery Curves Pb
ANVIL STD. TESTS COMBINED SAMPLES

Test No.: _____ Date: _____

Objective: 50% ANVIL ORE + 50% GRUM Key: _____

Reagents: _____ _____

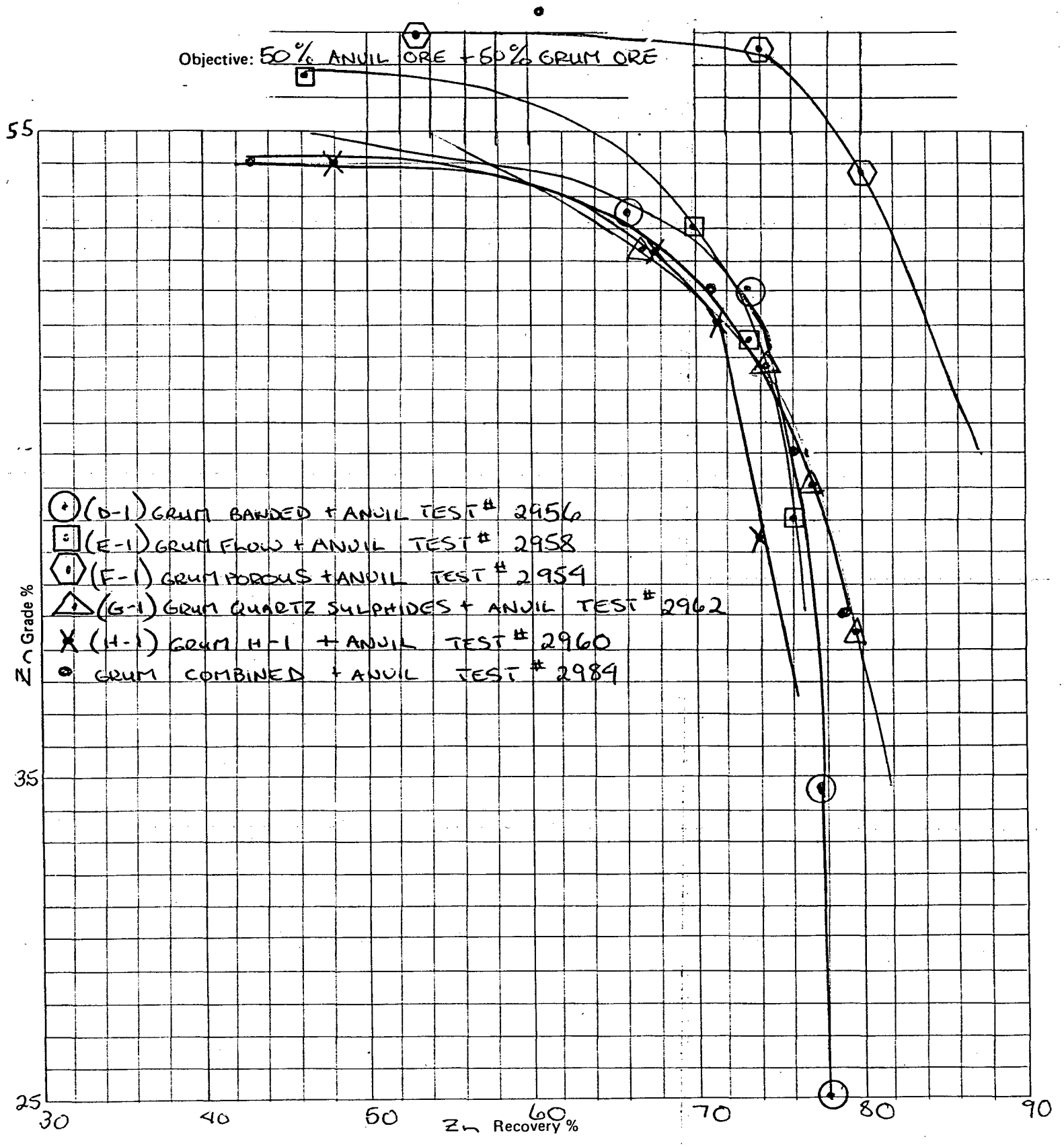


Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

ANVIL STD. TESTS COMBINED SAMPLES

Zn Grade-Recovery Curves



Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

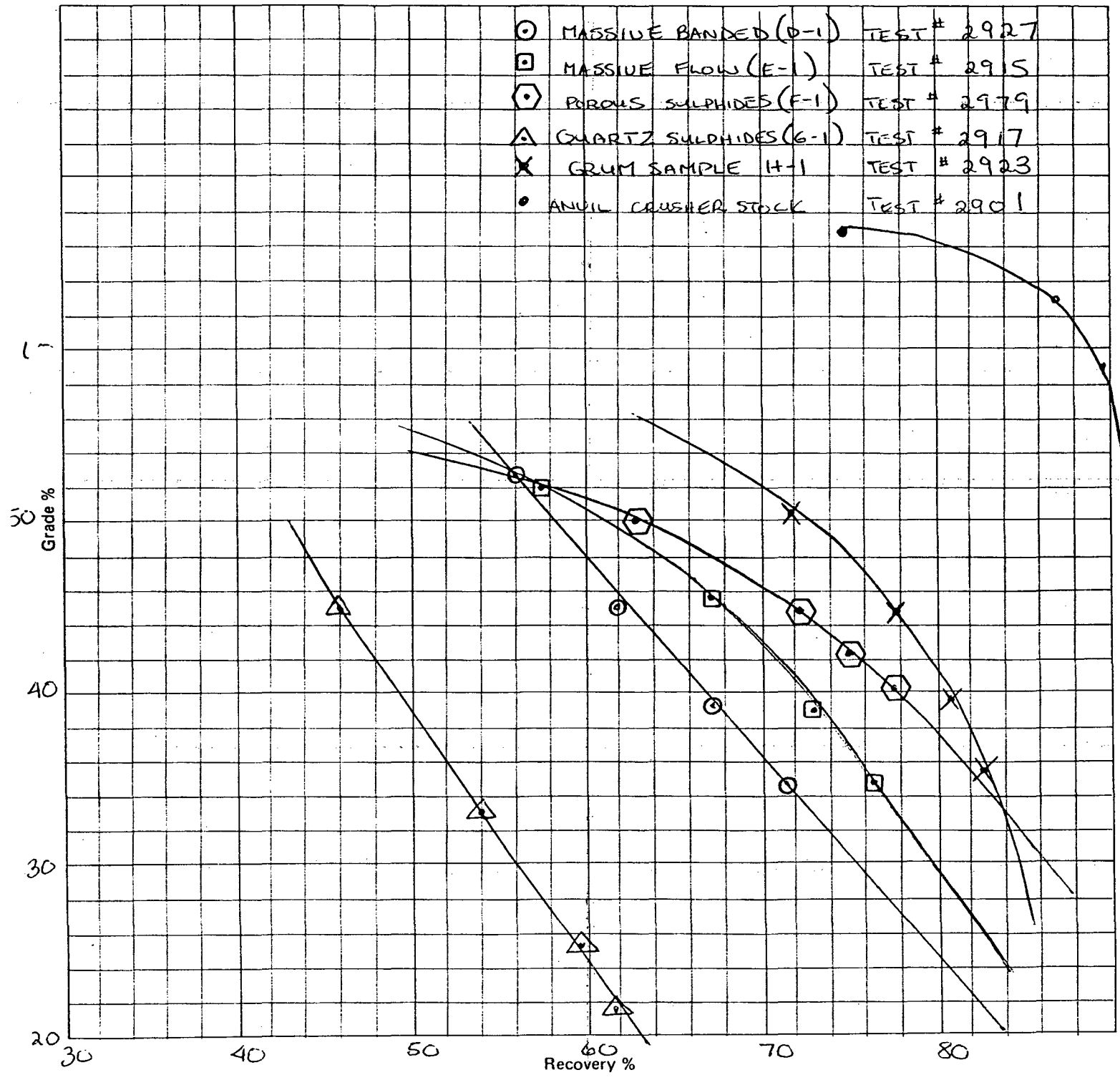
Grade-Recovery Curves Pb

ANVIL STANDARD TESTS

Test No.: _____ Date: _____

Objective: _____ Key: _____

Reagents: _____ _____



Cyprus Anvil Mining Corporation

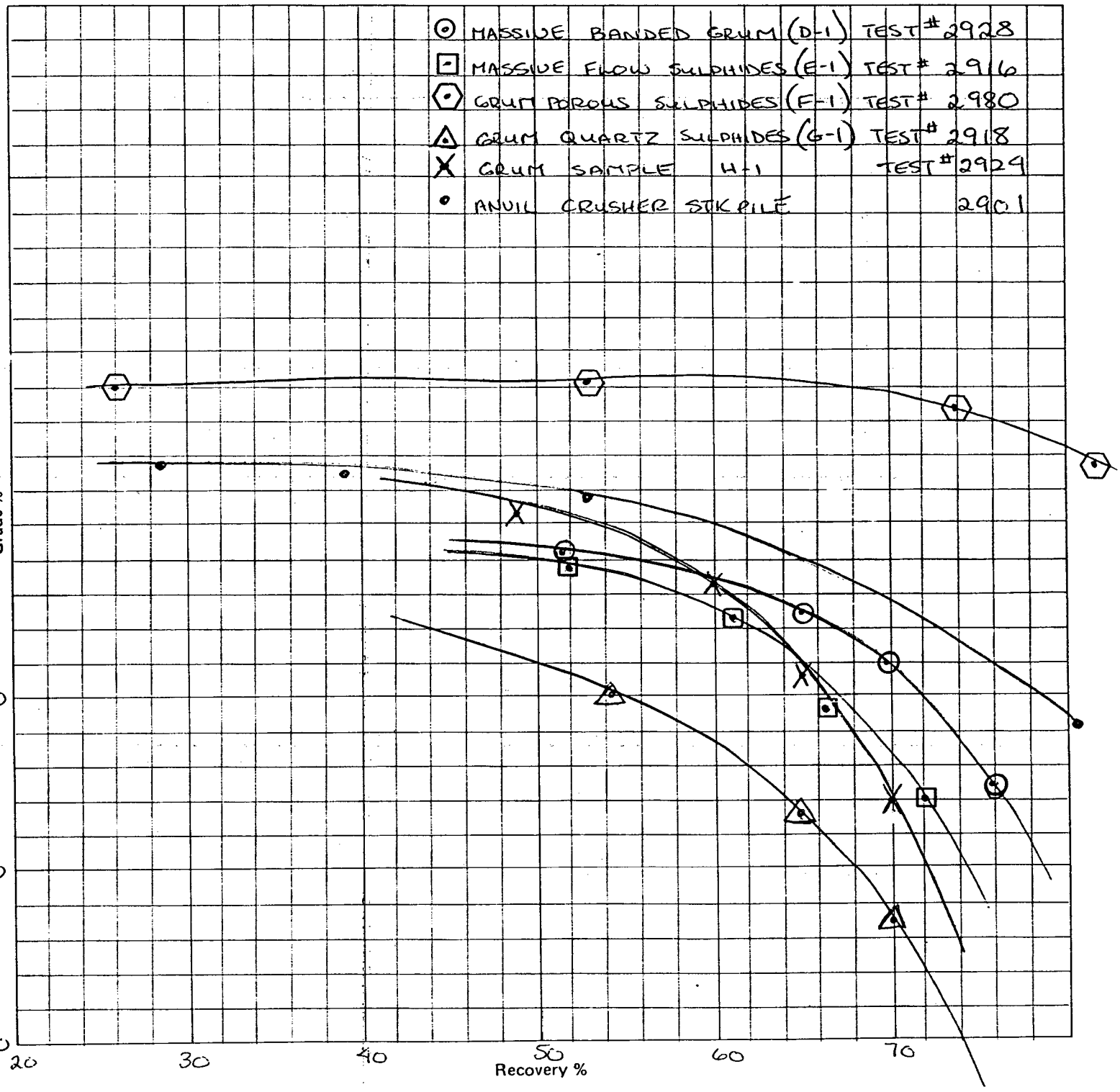
METALLURGICAL TEST REPORT

Grade-Recovery Curves Zn
ANVIL STANDARD TESTS

Test No.: _____ Date: _____

Objective: _____ Key: _____

Reagents: _____ _____



Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

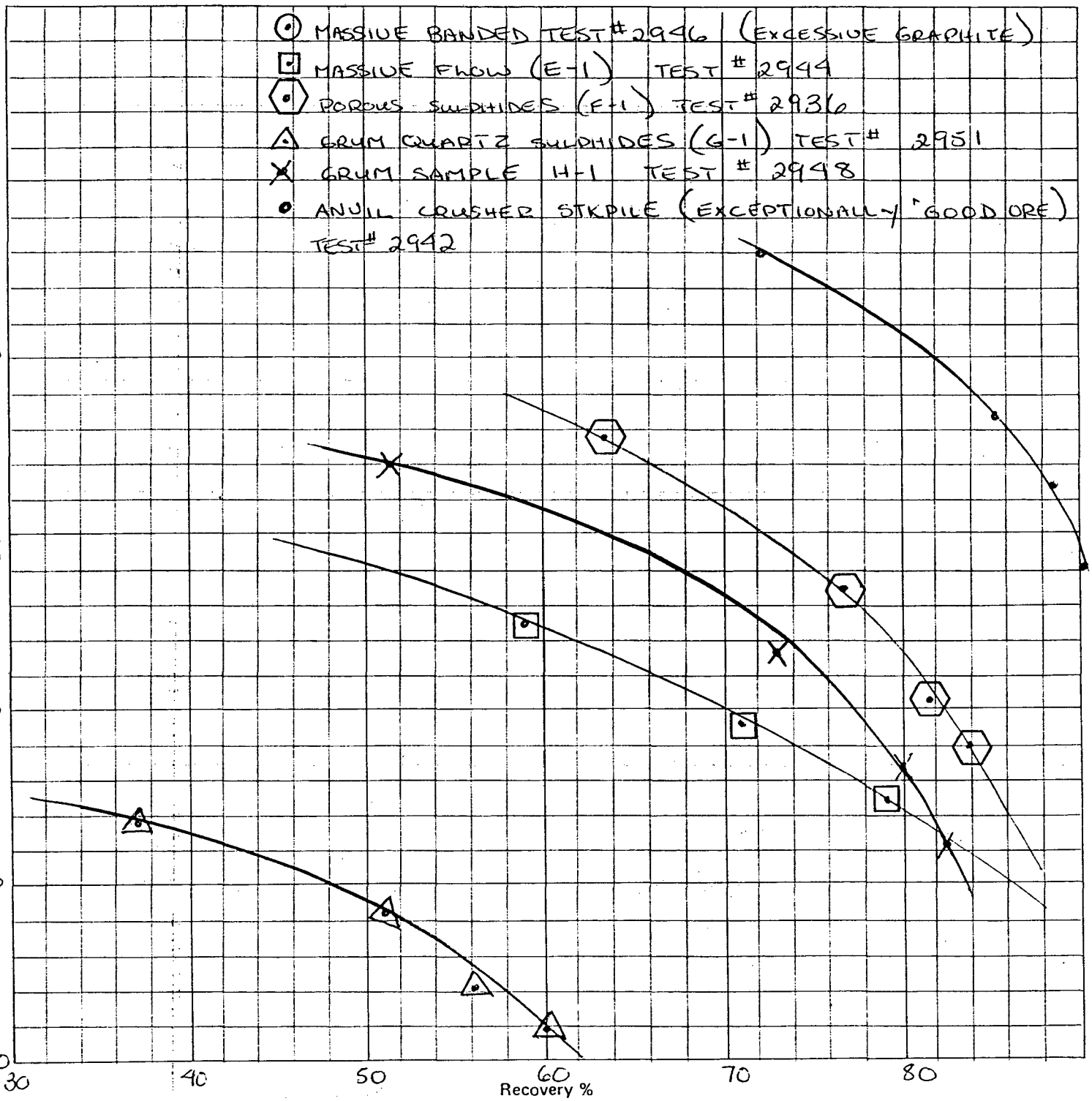
Grade-Recovery Curves

MODIFIED LAKEFIELD TESTS Pb

Test No.: _____ Date: _____

Objective: _____ Key: _____

Reagents: _____ _____



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METALLURGICAL TEST REPORT

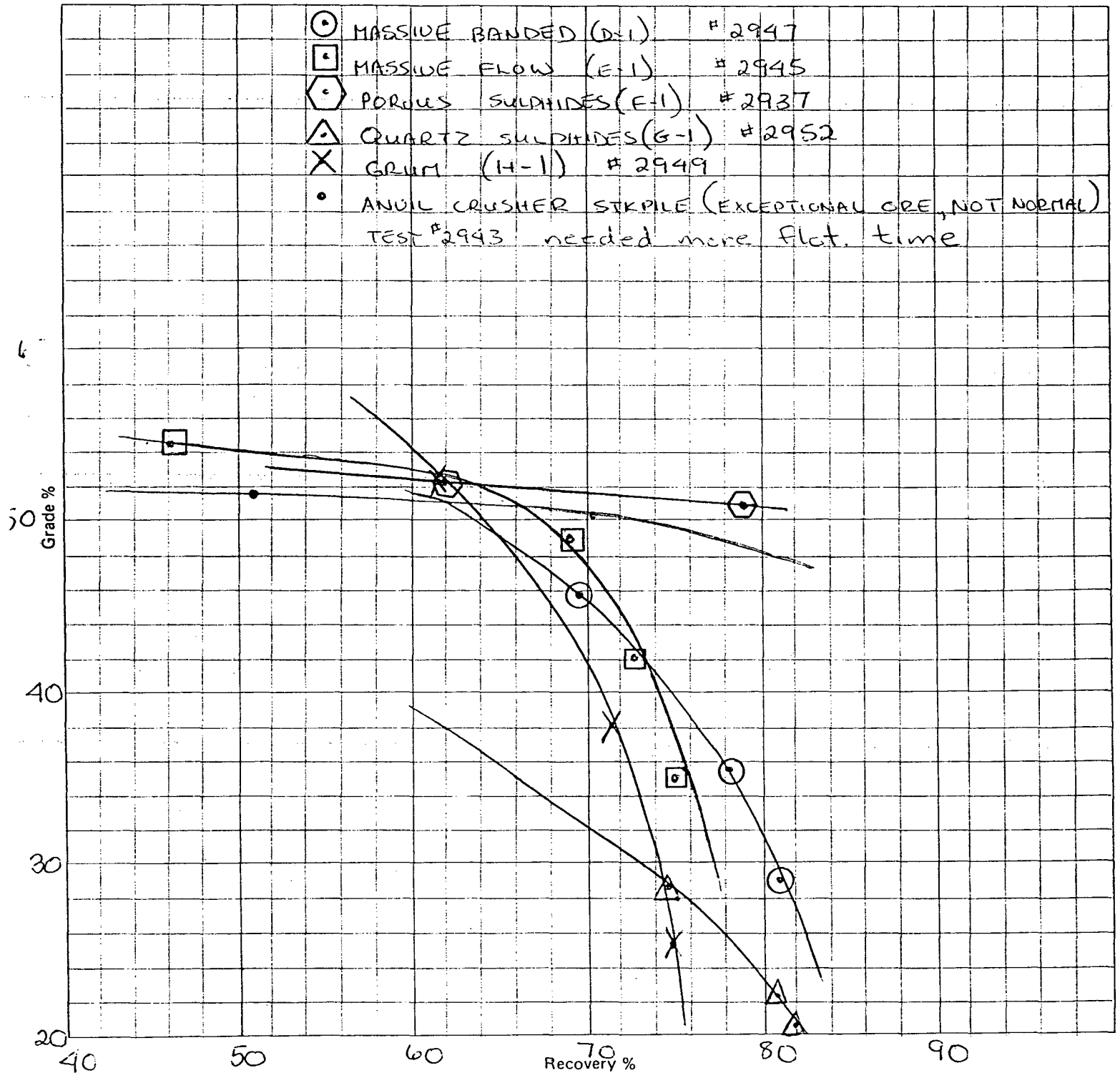
Grade-Recovery Curve Zn

MODIFIED LAKEFIELD TESTS

Test No.: _____ Date: _____

Objective: Zn Flotation Key: _____

Reagents: LAKEFIELD SCHEME _____



Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Pb Grade-Recovery Curves

Test No.: 2977, 2981, 2975 Date: _____

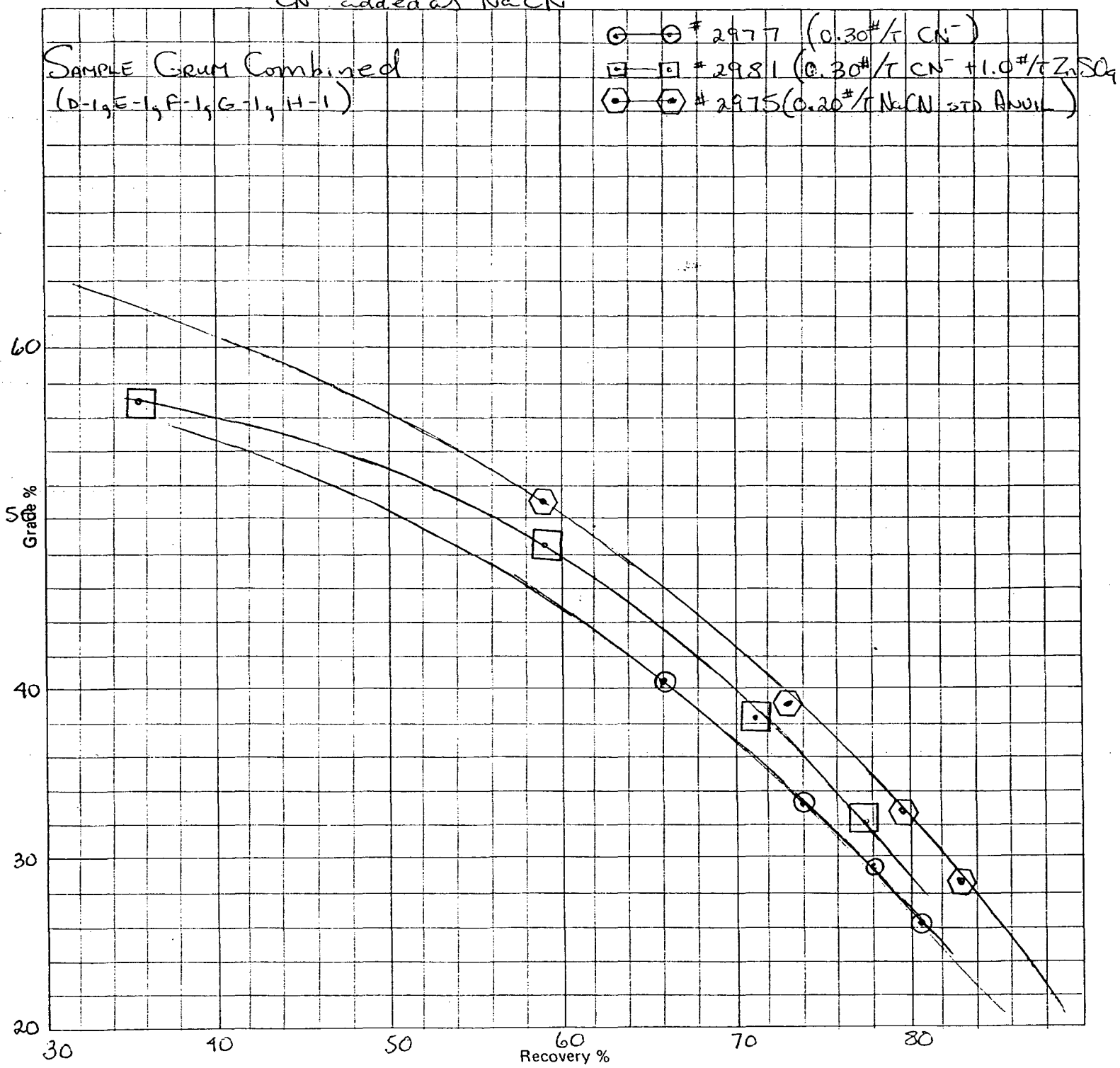
Objective: Pb GRADE (CN^- and $ZnSO_4$ affect) Key: _____

Reagents: CN^-, $ZnSO_4$ _____

CN^- added as NaCN

SAMPLE GRUM Combined
(D-1, E-1, F-1, G-1, H-1)

⊙—⊙ # 2977 (0.30#/T CN^-)
⊡—⊡ # 2981 (0.30#/T CN^- + 1.0#/T $ZnSO_4$)
⬡—⬡ # 2975 (0.20#/T NaCN STD ANVIL)



Cyprus Anvil Mining Corporation

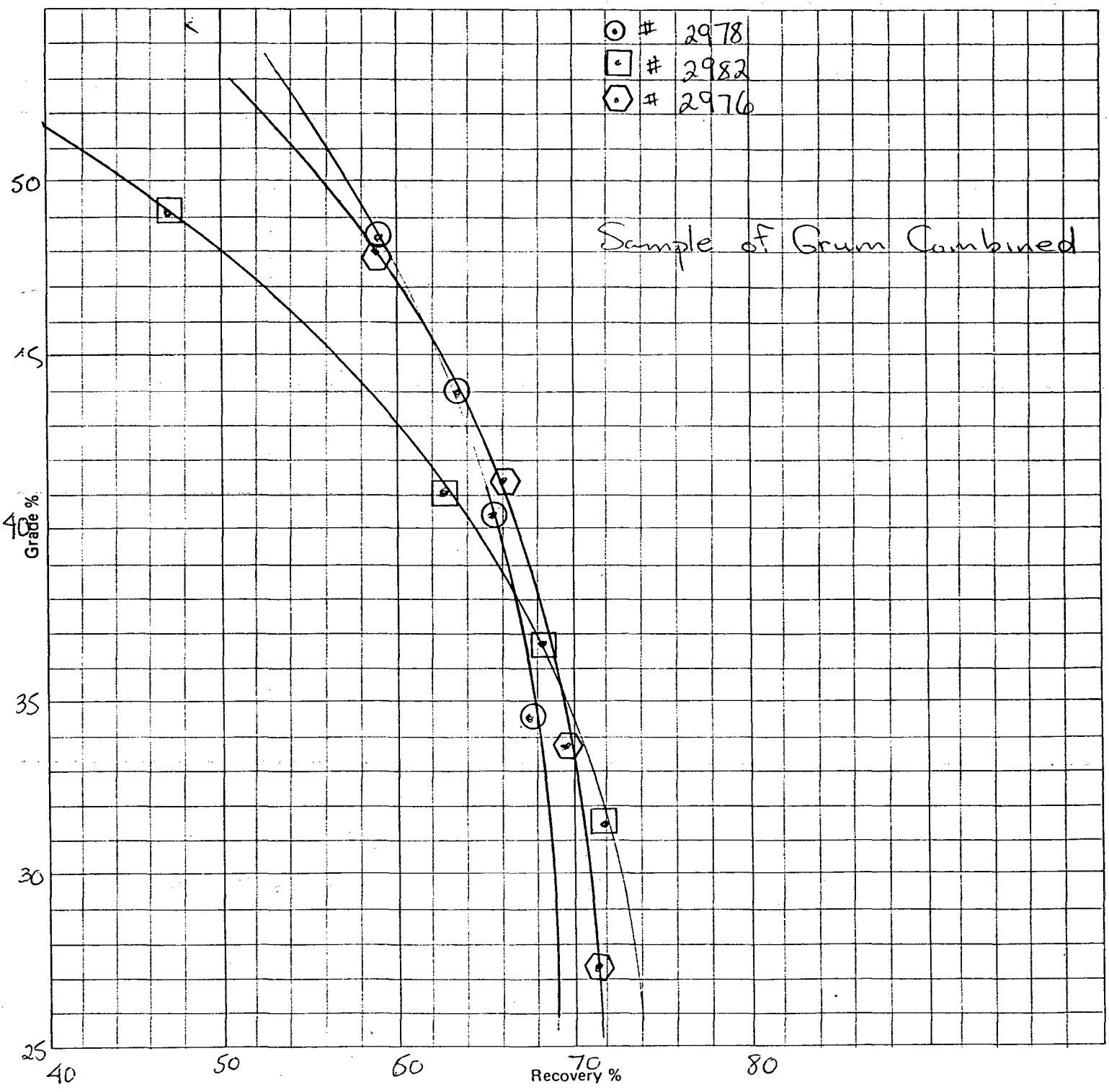
METALLURGICAL TEST REPORT

Grade-Recovery Curve

Test No.: 2978, 2982, 2976 Date: _____

Objective: Zn GRADE Key: _____

Reagents: _____ _____



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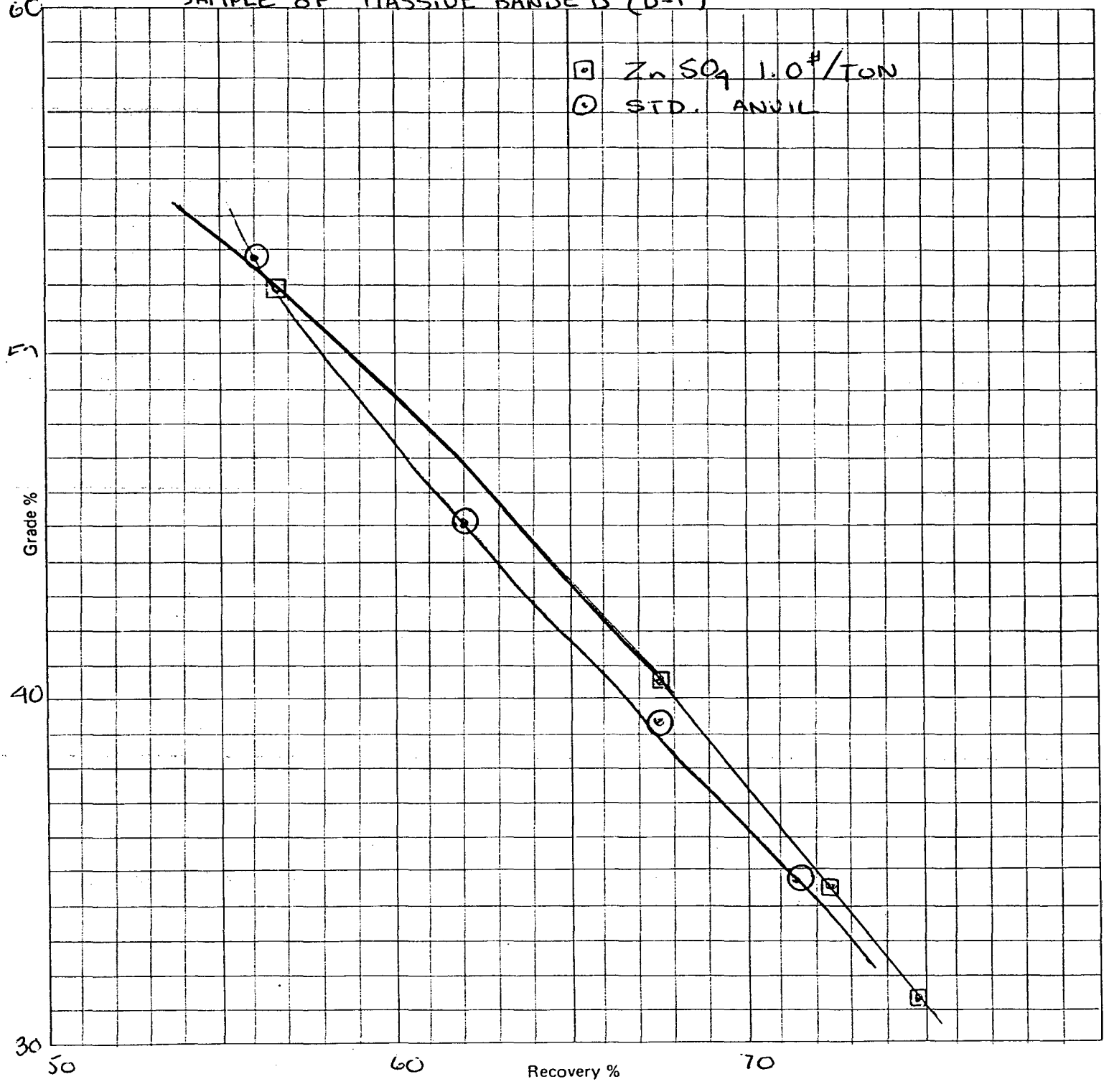
METALLURGICAL TEST REPORT

Pb Grade-Recovery Curve

Test No.: 2969 , 2927 Date: _____

Objective: EFFECT OF $ZnSO_4$ ON Zn IN Pb CONC. Key: _____

SAMPLE OF MASSIVE BANDED (D-1)



Cyprus Anvil Mining Corporation

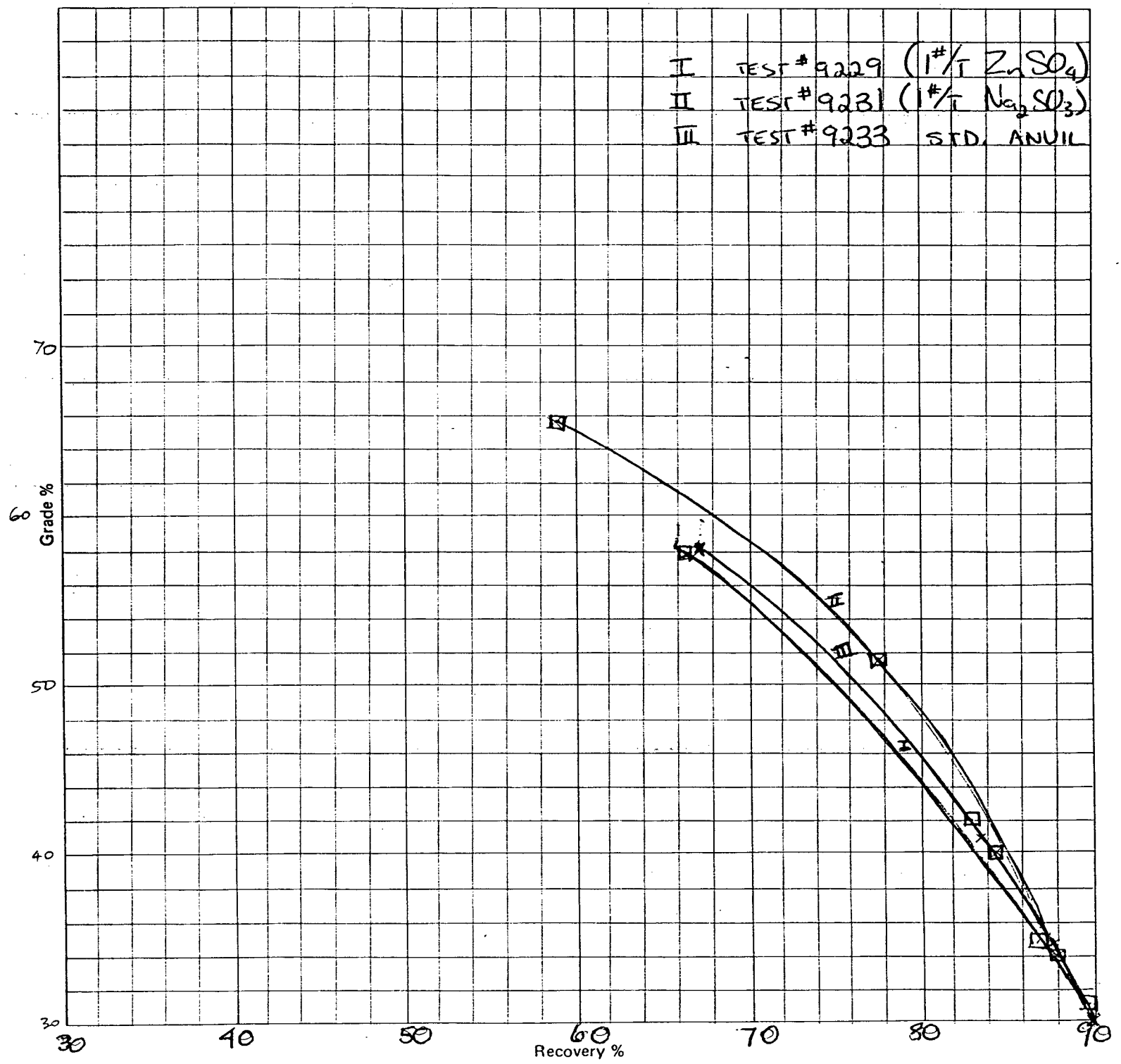
METALLURGICAL TEST REPORT

Pb Grade-Recovery Curve

SAMPLE OF: (H-1) and Cyprus Anvil 50/50 Date: _____

Objective: IMPROVED Pb GRADE Key: _____

Reagents: $ZnSO_4$, Na_2SO_3, STD. _____



APPENDIX III

THE MOST SIGNIFICANT FLOTATION TESTS

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2985 | SAMPLE OF: Pb Roughers from 2 test flot. of Anvil Stk + Drum

OBJECTIVE: Lead Cleaning and Regrinding | DATE: Combined Jan 7/77

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
NaCN		.03	Pb Rgrd.			10		The roughers concentrates were obtained from tests done on Anvil flotation process.
Z-11		.02	Pb 1st Clean.	10.5			5	
Z-11		.05	Pb 2nd Clean.	10.5			4	
MIBC			Pb 3rd Clean	10.5			3	
Z-11		.05						

RESULTS:

PRODUCT	WEIGHTS gm.	WEIGHTS %	ASSAYS % Pb	ASSAYS % Zn	ASSAYS % Fe	UNITS Pb	UNITS Zn	UNITS Fe	DISTRIBUTION % Pb	DISTRIBUTION % Zn	DISTRIBUTION % Fe
Pb 1ST Cl. Tail	111.3	41.45	12.40	22.2	17.20	5.19	9.20	7.13	11.48	71.37	78.78
Pb2 Cl. Tail	47.1	17.54	47.7	13.8	7.60	8.37	2.42	1.33	18.69	18.77	14.70
Pb3 Cl. Tail	17.6	6.55	65.6	6.7	3.80	4.30	.44	.25	9.60	3.41	2.76
Pb Final Conc.	92.5	34.45	78.3	2.4	1.00	26.98	.83	.34	60.24	6.44	3.76
Pb Rougher	268.5		44.79	12.89	9.05						

Tested by: Mahlm

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 24860. | SAMPLE OF: Zn Rgr. from 2 flot. tests of ANVIL STKPILE + GRUM COMBINE

OBJECTIVE: Zn Cleaning + Regrinding | DATE: JAN 7/77

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
			Zn Regrind			10		The roughed concentrate was obtained by doing 2 test flots on Anvil Flotation process.
CaO								
Z-11		.03	Zn 1 Cleaner	11.0			3	
CaO								
Z-11		.02	Zn 2 Cleaner	11.5			3	
CaO								CaO added until pH required was obtained.
Z-11		.02	Zn 3 Cleaner	11.8			3	
CaO								
Z-11		.02	Zn 4 Cleaner	11.8			2	pH adjusted with milk of lime

RESULTS:

PRODUCT	WEIGHTS gm.	WEIGHTS %	ASSAYS % Pb	ASSAYS % Zn	ASSAYS % Fe	UNITS Pb	UNITS Zn	UNITS Fe	DISTRIBUTION % Pb	DISTRIBUTION % Zn	DISTRIBUTION % Fe
Zn 1 Clean. Tail	753.9	53.56	1.70	14.40	24.10	0.91	7.71	12.91	39.06	24.75	78.10
Zn 2 Clean. Tail	88.3	10.42	5.00	45.10	9.50	0.52	4.70	0.99	22.32	15.09	5.99
Zn 3 Clean. Tail	48.3	5.70	5.30	43.20	7.50	0.30	2.46	0.43	12.88	7.90	2.60
Zn 4 Clean. Tail	30.9	3.65	4.70	41.80	6.80	0.17	1.63	0.25	7.30	5.23	1.51
Zn Final Conc.	226.1	26.68	1.60	54.90	7.30	0.43	14.65	1.95	18.44	47.03	11.80
Zn Rougher	847.5		2.33	31.15	16.53						

Tested by: Mallan

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 1955-56 | SAMPLE OF: ANVIL STOCKPILE + GRAY BANDED SULPHIDES (50,

OBJECTIVE: ANVIL FLOT TEST + GRIND | DATE: DEC 14/76

REAGENTS: Na_2CO_3, NaCN, $CuSO_4$, $Ca(OH)_2$, Z-11, MIBC, DF 1012

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.0						
NaCN		0.20	GRIND 9+2			2		
Z-11		0.05						
MIBC			Pb Ro 1	9.7			2	
Z-11		.01	Ro 2				2	
Z-11		.005	Sc 1				2	
Z-11		.005	Sc 2				3	
$Ca(OH)_2$		2.0						
$CuSO_4$		1.0	Zn Cond	10.9		10		
Z-11		.09						
DF 1012			Zn Ro 1				2	
Z-11		.02	Zn Ro 2				2	
Z-11		.01	Zn Sc 1				2	lots of pyrite (needs higher Zn pH)
Z-11		.01	Zn Sc 2				3	

RESULTS:

PRODUCT	WEIGHTS gm.	WEIGHTS %	ASSAYS % PB	ASSAYS % ZN	ASSAYS % FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION % PB	DISTRIBUTION % ZN	DISTRIBUTION % FE
PBRC1	111.80	.06	58.00	10.40	5.60	3.24	.58	.31	67.14	5.74	1.64
PBRC2	43.50	.02	24.70	18.90	13.60	.54	.41	.30	11.12	4.06	1.55
PBSC1	54.60	.03	11.30	20.90	17.40	.31	.57	.47	6.39	5.64	2.49
PBSC2	31.50	.02	7.10	18.60	16.60	.11	.29	.26	2.32	2.69	1.37
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	254.20	.13	1.00	52.50	9.50	.13	6.67	1.21	2.63	65.90	6.34
ZNRC2	73.20	.04	1.50	20.10	22.00	.05	.73	.80	1.14	7.27	4.23
ZNSC1	116.10	.06	.90	4.50	35.00	.05	.26	2.03	1.08	2.58	10.67
ZNSC2	213.20	.11	.60	2.00	39.00	.06	.21	4.15	1.32	2.11	21.83
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1104.00	.55	.60	.70	17.20	.33	.39	9.48	6.86	3.82	49.86
HEADS	2002.10		34.79	24.01		4.82	10.11	19.02	86.97	77.85	

PB CUMULATIVE GRADES / CUMULATIVE RECOVERIES

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
58.00	67.14
48.67	78.26
38.95	84.65
34.79	86.97
34.79	86.97

ZN CUMULATIVE GRADES / CUMULATIVE RECOVERIES

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
52.50	65.90
45.26	73.17
34.59	75.75
24.01	77.85
24.01	77.85

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No: 2963-64 | SAMPLE OF: ANVIL STOCKPILE + GRUMP BANDED SULPHIDES (50/50)

OBJECTIVE: DOES $ZnSO_4$ have any affect on Zn in Pb | DATE: DEC 20/7(

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.50	GRIND 9+2					
NaCN		0.20						
Z-11		0.045						
MIBC			Pb Ro 1	9.7			2	Graphite floating
$ZnSO_4$		1.0						
Z-11		.01	Ro 2				2	
Z-11		.005	Sc 1				2	
Z-11		.005	Sc 2				3	
$Ca(OH)_2$		2.7	Zn cond			10		
$CuSO_4$		1.0						
Z-11		.09						
D.F 1012			Zn Ro 1	11.6			2	
Z-11		.02	Ro 2				2	
Z-11		.015	Sc 1				2	
Z-11		.01	Sc 2				3	

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	114.30	.06	59.50	9.50	6.50	3.37	.54	.37	59.07	5.09	1.62
PBRC2	82.40	.04	24.50	19.10	19.60	1.00	.78	.80	17.53	7.38	3.51
PBSC1	51.10	.03	13.40	20.10	23.90	.34	.51	.61	5.95	4.82	2.66
PBSC2	41.40	.02	8.80	19.30	25.00	.18	.40	.51	3.16	3.75	2.25
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	182.70	.09	.90	55.10	9.00	.08	4.99	.82	1.43	47.22	3.58
ZNRC2	76.60	.04	1.60	44.90	15.40	.06	1.71	.58	1.06	16.13	2.57
ZNSC1	51.00	.03	2.30	23.40	23.70	.06	.59	.60	1.02	5.60	2.63
ZNSC2	76.30	.04	2.20	12.50	26.70	.08	.47	1.01	1.46	4.47	4.43
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1341.00	.66	.80	.88	26.30	.53	.59	17.49	9.32	5.54	76.75
HEADS	2016.80		34.12	40.49		5.71	10.57	22.78	85.71	73.42	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
59.50	59.07
44.84	76.60
38.36	82.55
34.12	85.71
34.12	85.71

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
55.10	47.22
52.09	63.35
47.37	68.95
40.49	73.42
40.49	73.42

(E-1)

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results 50/50

TEST No. 2957-58 | SAMPLE OF: ANVIL CRUSHER STOCKPILE + GRUM FLOW SULPH

OBJECTIVE: ANVIL FLOT TEST + GRIND | DATE: DEC 15/76

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.5						
NaCN		0.20	GRIND 9+2					
Z-11		.045						
MIBC			Pb Ro 1	10.0			2	
Z-11		.01	Ro 2				2	
Z-11		.005	Sc 1				2	
Z-11		.005	Sc 2				3	
$Ca(OH)_2$		2.5						
$CuSO_4$		0.90				10		
Z-11		.08						
DF 1012			Zn Ro 1	10.6			2	
Z-11		.02	Ro 2				2	pH slightly low
Z-11		.01	Sc 1				2	
Z-11		.005	Sc 2				3	

RESULTS:

PRODUCT	WEIGHTS		ASSAYS %			UNITS			DISTRIBUTION %		
		%	Pb	Zn	Fe	Pb	Zn	Fe	Pb	Zn	Fe
PBRC1	157.20	.08	50.00	13.40	6.30	3.91	1.05	.49	72.27	9.39	2.42
PBRC2	39.70	.02	19.00	21.80	15.90	.38	.43	.31	6.94	3.86	1.54
PBSC1	43.60	.02	12.60	21.40	17.90	.27	.46	.39	5.05	4.16	1.91
PBSC2	29.80	.01	9.40	20.30	18.00	.14	.30	.27	2.58	2.70	1.31
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	183.30	.09	1.00	57.00	8.30	.09	5.20	.76	1.69	46.56	3.72
ZNRC2	118.20	.06	2.48	44.40	12.30	.15	2.61	.72	2.70	23.39	3.55
ZNSC1	36.20	.02	3.20	20.20	18.60	.06	.36	.33	1.07	3.26	1.65
ZNSC2	58.60	.03	2.86	10.50	21.40	.08	.31	.62	1.54	2.74	3.07
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1344.00	.67	.50	.66	24.60	.33	.44	16.44	6.18	3.95	80.83
HEADS	2010.60		34.94	43.00		5.41	11.16	20.34	86.83	75.95	

PB CUMULATIVE GRADES / CUMULATIVE RECOVERIES

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
50.00	72.27
43.75	79.21
38.10	84.26
34.94	86.83
34.94	86.83

ZN CUMULATIVE GRADES / CUMULATIVE RECOVERIES

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
57.00	46.56
52.06	69.95
48.65	73.21
43.00	75.95
43.00	75.95

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2965-666 | SAMPLE OF: Massive Flow Sulphides + Anvil (5%

OBJECTIVE: Try Na_2SO_3 + $ZnSO_4$ | DATE: Dec 20/-

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.50	Grind 9+2					
Na_2SO_3		1.50						
$ZnSO_4$		1.0						
NaCN		0.20						
MIBC			Pb Ro 1	10.2			2	
Z-11		.090	(in mill)					
Z-11		.01	Ro 2				2	
Z-11		.005	Sc 1				2	
Z-11		.005	Sc 2				3	
$Ca(OH)_2$		2.5	Cond Zn			10		
$CuSO_4$		0.90						
Z-11		.08						
DF 1012			Zn Ro 1	11.5			2	
Z-11		.02	Ro 2				2	
Z-11		.02	Sc 1				2	
Z-11		.01	Sc 2				3	

RESULTS:

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS			DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	120.50	.06	58.90	11.80	4.70	3.54	.71	.28	62.33	6.41	1.3
PBRC2	65.70	.03	23.80	21.30	14.10	.78	.70	.46	13.73	6.31	2.2
PBSC1	42.00	.02	13.80	21.40	17.10	.29	.45	.36	5.09	4.05	1.7
PBSC2	54.20	.03	10.00	21.00	18.10	.27	.57	.49	4.76	5.13	2.3
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
ZNRC1	191.30	.10	1.00	55.50	8.30	.10	5.29	.79	1.68	47.84	3.8
ZNRC2	80.00	.04	2.70	44.50	11.40	.11	1.77	.45	1.90	16.04	2.2
ZNSC1	64.50	.03	3.20	20.70	18.40	.10	.67	.59	1.81	6.02	2.8
ZNSC2	71.30	.04	2.80	10.20	22.70	.10	.36	.81	1.75	3.28	3.9
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
ZN ST	1317.00	.66	.60	.83	25.00	.39	.54	16.41	6.94	4.93	79.4
HEADS	2006.50		34.64	39.89		5.67	11.06	20.64	85.92	73.18	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
58.90	62.33
46.52	76.07
40.49	81.16
34.64	85.92
34.64	85.92

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
55.50	47.84
52.26	63.89
46.20	69.90
39.89	73.18
39.89	73.18

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2953-54 | SAMPLE OF: Anvil Crusher Stkpile + Porous Gruun (50/50)

OBJECTIVE: Flotation with Anvil Scheme | DATE: Dec 13/76

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.0	GRIND 9+2			2		
NaCN		0.20						
Z-11		0.05						
MIBC		0.029	Pb Ro 1	9.5			2	
			Ro 2				2	
Z-11		0.01	Sc 1				2	
Z-11		0.01	Sc 2				3	
CaO		2.5	Zn Cond			10		
$CuSO_4$		1.0						
Z-11		.09						
DF1012		0.03	Zn Ro 1	10.8			2	
Z-11		0.03	Ro 2				2	
Z-11		0.02	Sc 1				2	
Z-11		0.01	Sc 2				3	

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	151.60	.07	51.10	14.50	8.20	3.58	1.01	.57	71.79	8.03	1.95
PBRC2	23.90	.01	24.60	23.40	15.70	.27	.26	.17	5.45	2.04	.59
PBSC1	19.30	.01	13.40	25.70	20.10	.12	.23	.18	2.40	1.81	.61
PBSC2	18.70	.01	9.60	24.30	22.00	.08	.21	.19	1.66	1.66	.65
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	135.50	.06	1.50	57.20	8.40	.09	3.58	.53	1.88	28.33	1.79
ZNRC2	115.70	.05	1.50	60.00	7.00	.08	3.20	.37	1.61	25.37	1.27
ZNSC1	99.00	.05	2.40	55.90	9.30	.11	2.55	.42	2.20	20.23	1.45
ZNSC2	58.00	.03	2.90	30.30	21.30	.08	.81	.57	1.56	6.42	1.94
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1545.00	.71	.80	1.08	37.00	.57	.77	26.38	11.45	6.10	89.76
HEADS	2166.70		41.09	53.86		4.98	12.63	29.39	81.29	80.35	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
51.10	71.79
47.49	77.23
44.11	79.63
41.09	81.29
41.09	81.29

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
57.20	28.33
58.49	53.70
57.76	73.93
53.86	80.35
53.86	80.35

Tested by: MAHolm

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results (50/50)

TEST No. 961-62 | SAMPLE OF: CRUM QUARTZ SULPHIDES + ANVIL CRUSHERS

OBJECTIVE: ANVIL STD FLOT TEST + GRIND | DATE: DEC. 16

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.5						
NaCN		.20	GRIND 9+2					
Z-11		.04						
MIBC			Pb Ro 1	9.8			2	Some graphite and
Z-11		.005	Ro 2				2	talc
Z-11		.005	Sc 1				2	
Z-11		.005	Sc 2				3	
$Ca(OH)_2$		2.7						
$CuSO_4$		.75	Cond			10		
Z-11		.07						
DF 1012			Zn Ro 1	11.1			2	
Z-11		.01	Ro 2				2	
Z-11		.01	Sc 1				2	
Z-11		.01	Sc 2				3	

RESULTS:

	WEIGHTS	ASSAYS %	UNITS	DISTRIBUTION %

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS			DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	80.60	.04	53.00	8.10	7.40	2.12	.32	.30	66.27	4.80	1.54
PBRC2	33.40	.02	19.00	14.90	17.70	.31	.25	.29	9.84	3.66	1.53
PBSC1	23.20	.01	10.20	15.20	21.00	.12	.17	.24	3.67	2.59	1.26
PBSC2	22.70	.01	7.10	13.90	20.50	.08	.16	.23	2.50	2.32	1.20
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	176.60	.09	1.00	51.30	9.30	.09	4.50	.81	2.74	66.55	4.25
ZNRC2	35.30	.02	1.70	30.50	14.90	.03	.53	.26	.93	7.91	1.36
ZNSC1	23.60	.01	1.90	16.40	19.60	.02	.19	.23	.70	2.84	1.20
ZNSC2	38.80	.02	1.80	8.30	22.30	.03	.16	.43	1.08	2.37	2.24
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1581.00	.78	.50	.60	20.90	.39	.47	16.40	12.26	6.97	85.43
HEADS	2015.20		33.17	39.54		3.20	6.75	19.19	82.29	79.67	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
53.00	66.27
43.04	76.12
37.49	79.79
33.17	82.29
33.17	82.29

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
51.30	66.55
47.83	74.46
44.68	77.31
39.54	79.67
39.54	79.67

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2959-60 | SAMPLE OF: ANVIL CRUSHER STOCKPILE + GRUM H-1 (50/50)

OBJECTIVE: ANVIL FLOT. TEST + GRIND | DATE: DEC 15/7(

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.5						
NaCN		0.25	GRIND 9+2					
Z-11		.095						
MIBC	3DP		Pb Ro 1	9.8			2	
Z-11		.01	Ro 2				2	
Z-11		.005	Sc 1				2	
Z-11		.005	Sc 2				3	
$Ca(OH)_2$		2.7						
$CuSO_4$		.85	Zn Cond			10		
Z-11		.08						
DF 1012	2DP		Zn Ro 1	11.0			2	
Z-11		.02	Ro 2				2	
Z-11		.01	Sc 1				2	
Z-11		.005	Sc 2				3	

RESULTS:

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	182.00	.09	44.60	11.70	11.70	4.00	1.05	1.05	79.94	16.78	4.41
PBRC2	29.50	.01	17.50	16.20	20.60	.25	.24	.30	5.08	2.42	1.26
PBSC1	39.40	.02	7.70	16.50	24.30	.15	.32	.47	2.99	3.29	1.98
PBSC2	22.00	.01	5.90	15.90	24.90	.06	.17	.27	1.28	1.77	1.14
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	181.50	.09	.80	54.00	9.50	.07	4.83	.85	1.43	49.60	3.57
ZNRC2	77.30	.04	1.30	45.00	12.00	.05	1.71	.46	.99	17.60	1.92
ZNSC1	41.10	.02	1.60	21.60	20.70	.03	.44	.42	.65	4.49	1.76
ZNSC2	43.50	.02	1.60	9.90	23.90	.03	.21	.51	.69	2.18	2.16
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1414.00	.70	.50	1.10	27.90	.35	.77	19.43	6.96	7.87	81.79
HEADS	2030.30		33.22	42.51		5.00	9.73	23.76	89.29	73.87	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
44.60	79.94
40.82	85.02
35.62	88.01
33.22	89.29
33.22	89.29

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
54.00	49.60
51.31	67.20
47.24	71.69
42.51	73.87
42.51	73.87

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2983-84 | SAMPLE OF: Drum Combined + Cy Anvil Stockpile

OBJECTIVE: | DATE:

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.00	Grind 1+2					
Na_2SO_3		1.50						
NaCN		.30						
$ZnSO_4$		1.00						
Z-11		.035						
MIBC			Pb Ro 1	9.5			2	
			Ro 2				2	
			Sc 1				2	
			Sc 2				3	
$Ca(OH)_2$		2.0	Zn Cond			10		
$CuSO_4$		0.90						
Z-11		.08						
DF 1012		0.02						
Z-200		.007	Zn Ro 1	10.9				
Z-11			Zn Ro 2					
Z-11			Sc 1					
Z-11			Sc 2					

RESULTS:

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	89.60	.04	59.10	9.50	5.20	2.60	.42	.23	60.98	4.45	1.04
PBRC2	41.10	.02	27.30	19.10	14.90	.55	.39	.30	12.92	4.11	1.37
PBSC1	23.90	.01	17.80	20.00	17.00	.21	.23	.20	4.90	2.50	.91
PBSC2	44.20	.02	10.40	19.30	19.30	.23	.42	.42	5.29	4.46	1.91
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	152.90	.08	1.20	54.00	8.20	.09	4.05	.62	2.11	43.19	2.81
ZNRC2	116.00	.06	2.10	46.00	11.00	.12	2.62	.63	2.81	27.91	2.86
ZNSC1	56.30	.03	2.40	19.00	21.10	.07	.53	.58	1.56	5.60	2.66
ZNSC2	45.20	.02	1.90	8.60	25.00	.04	.19	.55	.99	2.03	2.53
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1467.00	.72	.50	.75	25.50	.36	.54	18.37	8.45	5.75	83.89
HEADS	2036.20		36.73	40.63		4.26	9.39	21.90	84.09	78.72	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
59.10	60.98
49.10	73.90
44.26	78.80
36.73	84.09
36.73	84.09

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
54.00	43.19
50.55	71.10
45.09	76.69
40.63	78.72
40.63	78.72

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2923-24 | SAMPLE OF: GRUM H-1

OBJECTIVE: ANVIL STD | DATE: NOV 30/76

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		1	GRIND					
NaCN		0.20	9+2			2		
Z-11		.05						
			PbRo1	10.0			2	
			Ro2				2	
Z-11		.015	Sc1				2	
Z-11		.015	Sc2				3	
CuO		2.0						
$CuSO_4$		0.75	Cond.			10		
Z-11		.07						
			Zn Ro1	11.05			2	
			Ro2				2	
Z-11		.02	Sc1				2	
Z-11		.02	Sc2				3	

RESULTS:

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	138.40	.07	51.40	9.80	8.70	3.73	.71	.63	70.91	7.59	4.09
PBRC2	35.80	.02	18.90	14.70	16.80	.35	.28	.32	6.74	2.94	2.04
PBSC1	29.30	.02	10.40	14.50	18.90	.16	.22	.29	3.04	2.38	1.88
PBSC2	30.00	.02	6.80	14.30	18.40	.11	.22	.29	2.03	2.40	1.88
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	172.90	.09	1.40	50.40	8.70	.13	4.57	.79	2.41	48.75	5.11
ZNRC2	56.70	.03	2.10	35.50	12.70	.06	1.05	.38	1.19	11.26	2.45
ZNSC1	52.70	.03	2.40	17.50	19.00	.07	.48	.52	1.26	5.16	3.40
ZNSC2	87.80	.05	2.30	10.00	24.30	.11	.46	1.12	2.01	4.91	7.25
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1305.00	.68	.80	2.00	16.20	.55	1.37	11.08	10.41	14.60	71.88
HEADS	1908.60		35.54	33.85		5.26	9.36	15.41	82.72	70.09	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
51.40	70.91
44.72	77.65
39.78	80.69
35.54	82.72
35.54	82.72

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
50.40	48.75
46.72	60.02
41.27	65.18
33.85	70.09
33.85	70.09

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2917-18 | SAMPLE OF: GRUM QUARTZ SULPHIDES

OBJECTIVE: ANVIL STD. (ADJUSTED COLLECTOR COHEADS) | DATE: NOV 30/71

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		4	GRIND 9+2					
NaCN		0.20						
Z-11		0.09						
MIBC		3DP						Tails screen [illegible]
			Pb Ro1	10.2			2	+100 33.4
			Ro2				2	+150 9.6
Z-11		.015	Sc1				2	+200 [illegible]
Z-11		.015	Sc2				3	+325 7.[illegible]
								-325 [illegible]
CaO		2.0	COND					
$CuSO_4$		0.60				10		
Z-11		0.05						
			Zn Ro 1	11.2			2	
			Ro 2				2	
Z-11		.015	Sc 1				2	pyrite in Scavs
Z-11		.015	Sc 2				3	

RESULTS:

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS			DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	34.70	.02	45.00	5.10	8.70	.79	.09	.15	45.98	2.63	2.15
PBRC2	20.70	.01	13.00	6.60	13.50	.14	.07	.14	7.92	2.03	1.99
PBSC1	23.10	.01	7.80	6.90	16.60	.09	.08	.19	5.31	2.37	2.73
PBSC2	20.20	.01	4.20	6.20	12.90	.04	.06	.13	2.50	1.86	1.86
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	91.10	.05	1.00	40.00	9.60	.05	1.84	.44	2.68	54.26	6.23
ZNRC2	39.70	.02	1.30	18.40	13.80	.03	.37	.28	1.52	10.88	3.90
ZNSC1	44.40	.02	1.40	7.30	21.80	.03	.16	.49	1.83	4.83	6.90
ZNSC2	91.70	.05	1.40	3.70	27.50	.06	.17	1.28	3.78	5.05	17.97
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1612.00	.82	.60	.67	4.90	.49	.55	3.99	28.48	16.08	56.27
HEADS	1977.60		21.23	18.88		1.72	3.40	7.10	61.71	75.01	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
45.00	45.98
33.04	53.90
25.62	59.21
21.23	61.71
21.23	61.71

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
40.00	54.26
33.44	65.13
26.82	69.96
18.88	75.01
18.88	75.01

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2979-80 | SAMPLE OF: GRUM POROUS SULPHIDES (F-1)

OBJECTIVE: IMPROVED REC. WITH ANOIL FLOT TEST | DATE: DEC 28/76

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.0						
NaCN		0.20	GRIND 9+2					
Z-11		.04						
MIBC			Pb Ro 1	10.3			2	
Z-11		.005	Ro 2				2	
Z-11		.005	Sc 1				2	
Z-11		.005	Sc 2				3	
$Ca(OH)_2$		2.0						
$CuSO_4$		1.0	Cond			10		
Z-11		.09						
DF 1012			Zn Ro 1	11.7			2	
Z-11		.03	Ro 2				2	
Z-11		.02	Sc 1				2	
Z-11		.01	Sc 2				3	

RESULTS:

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	135.70	.07	50.00	16.00	5.90	3.29	1.05	.39	63.84	6.96	1.63
PBRC2	34.90	.02	25.90	25.80	12.40	.44	.44	.21	8.51	2.39	.88
PBSC1	17.30	.01	18.10	28.50	14.90	.15	.24	.12	2.95	1.58	.53
PBSC2	17.70	.01	14.10	29.10	16.10	.12	.25	.14	2.35	1.65	.58
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	140.00	.07	2.20	58.00	5.00	.15	3.93	.34	2.90	26.04	1.43
ZNRC2	147.30	.07	1.70	59.10	4.30	.12	4.22	.31	2.36	27.92	1.29
ZNSC1	114.60	.06	2.90	54.00	7.40	.16	3.00	.41	3.13	19.84	1.73
ZNSC2	66.70	.03	3.50	33.40	17.40	.11	1.08	.56	2.20	7.14	2.36
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1391.00	.67	.90	1.34	31.60	.61	.90	21.28	11.78	5.98	89.57
HEADS	2065.20		40.13	53.87		5.15	15.10	23.76	77.64	80.94	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
50.00	63.84
45.07	72.35
42.59	75.29
40.13	77.64
40.13	77.64

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
58.00	26.04
58.56	53.95
57.26	73.80
53.87	80.94
53.87	80.94

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2915-16 | SAMPLE OF: Massive Flow Sulphides Gem (E-1)

OBJECTIVE: Anvil Std Test | DATE: Nov 29/7

REAGENTS: As Ind

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		4	} Gr 2 IND 9+2					
NaCN		0.20						
Z-11		.05						
MIBC		3 DP						
			Pb Ro 1	10.2			2	Graphite
			Ro 2				2	
Z-11		.015	Sc 1				2	
Z-11		.015	Sc 2				3	
CuO		2	} Cond			10		
$CuSO_4$		.75						
Z-11		.07						
10 12		2 DP						
			Zn Ro 1	11.2			2	(new lime used and pH is up)
			Zn Ro 2				2	
Z-11		.02	Sc 1				2	
Z-11		.02	Sc 2				3	

RESULTS:

PRODUCT	WEIGHTS	ASSAYS %	UNITS	DISTRIBUTION %

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	149.20	.07	52.00	12.60	4.80	3.85	.93	.36	57.66	8.34	4.15
PBRC2	48.20	.02	26.20	16.60	9.10	.63	.40	.22	9.39	3.55	2.54
PBSC1	55.10	.03	14.80	16.70	10.50	.40	.46	.29	6.06	4.08	3.36
PBSC2	41.20	.02	11.50	16.90	11.50	.24	.35	.24	3.52	3.09	2.75
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	245.70	.12	2.60	47.50	7.80	.32	5.79	.95	4.75	51.78	11.12
ZNRC2	64.40	.03	4.30	32.40	10.30	.14	1.04	.33	2.06	9.26	3.85
ZNSC1	71.80	.04	5.80	16.80	13.70	.21	.60	.49	3.10	5.35	5.71
ZNSC2	94.70	.05	6.00	13.60	16.00	.28	.64	.75	4.22	5.71	8.79
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1244.00	.62	1.00	1.60	8.00	.62	.99	4.94	9.25	8.83	57.73
HEADS	2014.30		35.11	34.10		6.68	11.19	8.56	76.63	72.11	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
52.00	57.66
45.70	67.05
38.96	73.11
35.11	76.63
35.11	76.63

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
47.50	51.78
44.36	61.04
39.18	66.39
34.10	72.11
34.10	72.11

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2969-70 | SAMPLE OF: Drum Banded Sulphides (D-1)

OBJECTIVE: Effect of $ZnSO_4$ | DATE: Dec. 21/72

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.0						
NaCN		.20	GRIND 9#2					
$ZnSO_4$		1.0						
Z-11		.04						
MIBC			Pb Ro 1	10.5			2	Graphite floating
Z-11		.01	Ro 2				2	
Z-11		.005	Sc 1				2	
Z-11		.005	Sc 2				3	Also appears to be some talc
$Ca(OH)_2$		2.0	Cond			10		
$CuSO_4$		1.0						
Z-11		.09						
DF 1012			Zn Ro 1	11.2			2	
Z-11		.02	Ro 2				2	
Z-11		.02	Sc 1				2	
Z-11		.01	Sc 2				3	

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	98.10	.05	50.90	10.20	4.50	2.52	.51	.22	56.65	5.27	3.3
PBRC2	49.10	.02	19.50	19.80	10.10	.48	.49	.25	10.86	5.12	3.7
PBSC1	37.00	.02	11.50	20.40	11.80	.22	.38	.22	4.83	3.98	3.2
PBSC2	26.40	.01	8.40	20.00	10.90	.11	.27	.15	2.52	2.78	2.1
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
ZNRC1	233.40	.12	2.10	49.00	7.90	.25	5.78	.93	5.56	60.27	13.8
ZNRC2	52.00	.03	3.00	21.50	11.90	.08	.57	.31	1.77	5.89	4.6
ZNSC1	56.80	.03	2.50	13.50	14.80	.07	.39	.42	1.61	4.04	6.3
ZNSC2	103.30	.05	2.30	7.60	17.10	.12	.40	.89	2.70	4.14	13.2
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
ZN ST	1322.00	.67	.90	1.22	5.00	.60	.82	3.34	13.50	8.50	49.5
HEADS	1978.10		31.33	31.66		4.46	9.59	6.74	74.86	74.34	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
50.90	56.65
40.43	67.52
34.62	72.35
31.33	74.86
31.33	74.86

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
49.00	60.27
43.99	66.16
38.93	70.21
31.66	74.34
31.66	74.34

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2927-28 | SAMPLE OF: MASSIVE BANDED GRUM D-1

OBJECTIVE: | DATE: DEC 1/76

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		4.0						
NaCN		0.20	GRIND 9+2			2		
Z-11		0.05						
MIBC		3 DP						
			Pb Ro 1	10.0			2	
			Ro 2				2	
Z-11		.015	Sc 1				2	Graphite?
Z-11		.015	Sc 2				3	
CaO		2.0						new lime
$CuSO_4$		0.80						
Z-11		.07						
1012		6 DP	ZnRo 1	10.9			2	very heavy Zn froth
			Ro 2				2	
Z-11		.02	Sc 1				2	
Z-11		.02	Sc 2				3	

RESULTS:

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	101.70	.05	52.70	9.60	4.30	2.67	.49	.22	56.00	5.19	3.09
PBRC2	30.20	.02	18.80	14.80	7.00	.28	.22	.11	5.93	2.37	1.49
PBSC1	32.80	.02	16.70	18.00	9.00	.27	.29	.15	5.72	3.14	2.09
PBSC2	32.00	.02	11.10	19.20	9.80	.18	.31	.16	3.71	3.26	2.22
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	199.60	.10	2.40	48.50	7.80	.24	4.81	.77	5.01	51.43	11.00
ZNRC2	72.70	.04	3.30	35.00	9.60	.12	1.27	.35	2.51	13.52	4.93
ZNSC1	40.30	.02	3.80	21.00	12.80	.08	.42	.26	1.60	4.50	3.65
ZNSC2	98.30	.05	3.30	11.80	15.90	.16	.58	.78	3.39	6.16	11.05
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1403.00	.70	1.10	1.40	6.10	.77	.98	4.26	16.13	10.43	60.49
HEADS	2010.60		34.72	34.63		4.76	9.36	7.04	71.37	75.60	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
52.70	56.00
44.94	61.94
39.31	67.66
34.72	71.37
34.72	71.37

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
48.50	51.43
44.90	64.95
41.82	69.44
34.63	75.60
34.63	75.60

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2948-9 | SAMPLE OF: GRUM H-1

OBJECTIVE: MAXIMIZE REC.. USING LAKEFIELD RGTS | DATE: DEC 10/76

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.0						
$ZnSO_4$		1.0	GRIND 30					
NaCN		0.30						
R 242		0.05						
R 404		0.01	Pb Ro 1	9.6		1	3	1DP MIBC
R 242		0.01	Pb Ro 2			1	3	
R 404		.005						
R 242		.005	Pb Ro 3			1	3	
R 404		.005						
R 242		.005	Pb Ro 4			1	3	
R 404		.005						
$Ca(OH)_2$		2.0	Zn Cond	10.7		6		
$CuSO_4$		1.0						
Z-200	3DP	.021	Zn Ro 1			1	3	Zn Cond + flot time
Z-11		.07						increased from
Z200	2DP	0.014	Zn Ro 2			1	3	Lakefield tests
Z-11		.04						1DP 1012
Z200	1DP	.007	Zn Ro 3	10.4				
Z-11		.03				1	4	

RESULTS:

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	93.30	.05	54.00	6.30	7.10	2.51	.29	.33	51.40	3.13	2.14
PBRC2	71.10	.04	29.50	15.40	16.50	1.05	.55	.58	21.40	5.82	3.79
PBSC1	47.60	.02	13.50	15.00	21.50	.32	.36	.51	6.56	3.80	3.30
PBSC2	38.90	.02	8.90	14.80	23.90	.17	.29	.46	3.53	3.06	3.00
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	221.30	.11	1.50	52.40	8.70	.17	5.78	.96	3.39	61.68	6.22
ZNRC2	132.10	.07	2.00	14.00	23.60	.13	.92	1.55	2.70	9.84	10.07
ZNSC1	199.80	.10	1.20	2.90	34.40	.12	.29	3.43	2.45	3.08	22.19
ZNSC2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1202.00	.60	.70	1.50	12.70	.42	.90	7.61	8.58	9.59	49.29
HEADS	2006.10		32.38	25.35		4.89	9.37	15.44	82.89	74.60	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
54.00	51.40
43.40	72.80
36.69	79.36
32.38	82.89
32.38	82.89

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
52.40	61.68
38.05	71.52
25.35	74.60
25.35	74.60
25.35	74.60

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2951-52 | SAMPLE OF: GRUM QUARTZ SULPHIDES (G-1)

OBJECTIVE: LAKEFIELD REAGENTS + 30 min Grind | DATE: DEC 13/76

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.0						
NaCN		0.30	GRIND 30			30		
R-242		.05						
$ZnSO_4$		1.0						
R 404		.01	Pb Ro 1	10.1		1	3	200 MIBC
R 242		.01	Pb Ro 2			1	3	Graphite floating
R 404		.005						very little Pb
R 242		.005	Pb Ro 3			1	3	
R 404		.005						
R 242		.005	Pb Ro 4			1	3	
R 404		.005						
$Ca(OH)_2$		2.0	Zn Cond	10.9		6		
$CuSO_4$		.70						
Z-11		.06	Zn Ro 1			1	3	
Z-200		.019	Zn Ro 1					
Z-11		.03	Zn Ro 2			1	3	
Z-200		0.007						
Z-11		0.02	Zn Ro 3			1	3	
Z-200		.007						

RESULTS:

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	38.20	.02	33.40	4.90	8.60	.65	.10	.17	37.32	2.44	2.31
PBRC2	28.10	.01	16.80	7.10	15.10	.24	.10	.22	13.81	2.60	2.98
PBSC1	13.00	.01	12.90	6.90	16.50	.09	.05	.11	4.90	1.17	1.51
PBSC2	15.60	.01	9.20	6.50	16.30	.07	.05	.13	4.20	1.32	1.79
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	200.40	.10	1.30	28.60	8.70	.13	2.91	.89	7.62	74.81	12.25
ZNRC2	75.40	.04	1.60	6.30	19.80	.06	.24	.76	3.53	6.20	10.49
ZNSC1	24.50	.01	1.40	2.40	26.50	.02	.03	.33	1.00	.77	4.56
ZNSC2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1574.00	.80	.60	.52	5.80	.48	.42	4.64	27.62	10.68	64.13
HEADS	1969.20		21.70	20.86		1.74	3.89	7.23	60.23	81.78	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
33.40	37.32
26.36	51.12
24.16	56.03
21.70	60.23
21.70	60.23

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
28.60	74.81
22.50	81.01
20.86	81.78
20.86	81.78
20.86	81.78

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2936-7 | SAMPLE OF: GRUM POROUS SULPHIDE (F-1)

OBJECTIVE: Improve Zn Rec over Test 2932 | DATE: DEC. 6/76

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.0						
$ZnSO_4$		1.0	GRIND 30					
NaCN		0.30						
R 242		0.05						
R 404		0.01	Pb Ro 1	9.1		1	3	
R 242		.01	Pb Ro 2			1	3	
R 404		.005						
R 242		.005	Pb Ro 3			1	3	
R 404		.005						
R 242		.005	Pb Ro 4			1	3	
R 404		.005						
$Ca(OH)_2$		2.0	Zn Cond	10.9		3		
$CuSO_4$		1.0						
Z-200	.019#	2DP	Zn Ro 1			1	2	-light Zn froth Ro
Z-11		.06						-good Zn float Rz
Z-11		.04	Zn Ro 2			1	3	
Z-11		.03				1	2	

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	114.00	.06	55.70	10.20	4.20	3.14	.57	.24	63.58	4.04	.97
PBRC2	49.10	.02	27.00	23.50	11.00	.66	.57	.27	13.27	4.01	1.10
PBSC1	34.70	.02	14.50	26.00	15.60	.25	.45	.27	5.04	3.13	1.10
PBSC2	22.20	.01	10.60	25.00	18.00	.12	.27	.20	2.36	1.93	.81
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	92.00	.05	3.10	45.40	8.70	.14	2.07	.40	2.86	14.51	1.63
ZNRC2	245.70	.12	1.10	55.70	5.40	.13	6.77	.66	2.71	47.55	2.70
ZNSC1	106.60	.05	1.40	46.00	10.20	.07	2.42	.54	1.49	17.04	2.21
ZNSC2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1358.00	.67	.64	1.65	32.40	.43	1.11	21.76	8.70	7.79	89.48
HEADS	2022.30		38.25	51.24		4.94	14.23	24.32	84.24	79.10	

PB CUMULATIVE GRADES	PB CUMULATIVE RECOVERIES
55.70	63.58
47.06	76.85
41.35	81.89
38.25	84.24
38.25	84.24

ZN CUMULATIVE GRADES	ZN CUMULATIVE RECOVERIES
45.40	14.51
52.89	62.06
51.24	79.10
51.24	79.10
51.24	79.10

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 02944-45 | SAMPLE OF: GRUM MASSIVE FLOW E-1

OBJECTIVE: GRUM (LAKEFEILD TEST) WITH Extra COND + FLOT. TIME ~~and collector to maximize recovery~~ | DATE: DEC 8/76

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.0	GRIND 30					
$ZnSO_4$		1.0						
NaCN		0.30						
R 242		0.06						
R 404		0.01	Pb Ro 1	9.8		1	3	
R 242		0.01	Pb Ro 2					
R 404		0.005				1	3	
R 242		0.005	Pb Ro 3			1	3	
R 404		0.005						
R 242		0.005	Pb Ro 4			1	3	
R 404		0.005						
$Ca(OH)_2$		2.0	Cond			3		
$CuSO_4$		1.0						
Z-200	100	.014	Zn Ro 1	10.7		1	2	
Z-11		.07						
Z-11		.04	Zn Ro 2			1	3	
Z-11	.007 Z200	.03	Zn Ro 3			1	2	
Z-11		.02	Zn Ro 4			1	3	
Z-200	100	.007						

RESULTS:

PRODUCT	WEIGHTS gm	WEIGHTS %	ASSAYS % Pb	ASSAYS % Zn	ASSAYS % Fe	UNITS Pb	UNITS Zn	UNITS Fe	DISTRIBUTION % Pb	DISTRIBUTION % Zn	DISTRIBUTION % Fe

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS	UNITS	UNITS	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	60.20	.03	49.70	8.60	4.60	1.49	.26	.14	24.22	2.12	1.53
PBRC2	101.90	.05	42.20	18.70	6.10	2.14	.95	.31	34.81	7.82	3.43
PBSC1	62.60	.03	24.30	24.60	10.20	.76	.77	.32	12.31	6.32	3.52
PBSC2	54.70	.03	17.00	25.10	12.30	.46	.68	.33	7.53	5.63	3.71
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	206.40	.10	3.20	54.60	7.20	.33	5.60	.74	5.35	46.23	8.20
ZNRC2	138.40	.07	4.30	40.00	10.00	.30	2.75	.69	4.82	22.71	7.64
ZNSC1	75.30	.04	4.10	12.30	15.50	.15	.46	.58	2.50	3.80	6.44
ZNSC2	96.50	.05	3.30	5.50	21.00	.16	.26	1.01	2.58	2.18	11.19
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1215.00	.60	.60	.64	8.10	.36	.39	4.89	5.90	3.19	54.33
HEADS	2011.00		34.87	35.35		6.14	12.12	9.01	78.86	74.92	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
49.70	24.22
44.99	59.02
39.22	71.33
34.87	78.86
34.87	78.86

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
54.60	46.23
48.74	68.94
42.21	72.74
35.35	74.92
35.35	74.92

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2946 - 7 | SAMPLE OF: GRUM BANDED D-1

OBJECTIVE: GRUM SCHEME + REAGENTS (INCREASE Zn TIMES | DATE: DEC 9/76

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.0						
$ZnSO_4$		1.0						
NaCN		0.30						
R242		0.05						MIBC 3DP
R404		0.01	PbRo1	10.0		1	3	lots of graphite
R242		.01	Pb Ro2			1	3	in Pb Ro1 + Ro2
R404		.005						which appears to hinder
R242		.005	Pb Ro3			1	3	Pb flotation
R404		.005						
R242		.005	Pb Ro4			1	2	added extra Pb Collector
R404		.005						
$Ca(OH)_2$		2.0	Conc. Zn			6	---	---
$CuSO_4$		1.0						
Z-200		0.014	Zn Ro1	10.9		1	3	
Z-11		.07						
Z-11		.04	Ro2			1	3	10P 1012
Z200	.007							
Z200	.007					1	4	
Z-11		.03	Ro3					

RESULTS:

PRODUCT	WEIGHTS	ASSAYS % Pb	ASSAYS % Zn	ASSAYS % Fe	UNITS Pb	UNITS Zn	UNITS Fe	DISTRIBUTION % Pb	DISTRIBUTION % Zn	DISTRIBUTION % Fe
PBRC1	40.00 .02	6.00	9.70	6.10	.12	.19	.12	2.63	1.99	1.67
PBRC2	31.50 .02	6.20	9.70	5.10	.10	.15	.06	2.14	1.56	1.10
PBSC1	27.70 .01	22.00	8.30	4.30	.30	.11	.06	6.67	1.18	.82
PBSC2	114.70 .06	39.00	16.00	5.90	2.23	.92	.34	48.96	9.40	4.64
PBSC3	0.00 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	296.90 .15	4.70	45.60	7.50	.70	6.76	1.11	15.27	69.34	15.28
ZNRC2	133.90 .07	5.10	12.80	12.60	.34	.86	.84	7.47	8.78	11.58
ZNSC1	113.50 .06	3.70	5.00	13.20	.21	.28	.75	4.60	2.91	10.28
ZNSC2	0.00 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNSC3	0.00 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1244.00 .62	.90	.76	6.40	.56	.47	3.98	12.25	4.84	54.63
HEADS	2002.20	25.80	29.06		4.56	9.75	7.28	60.40	81.03	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
6.00	2.63
6.09	4.76
10.53	11.44
25.80	60.40
25.80	60.40

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
45.60	69.34
35.41	78.12
29.06	81.03
29.06	81.03
29.06	81.03

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2992-93 | SAMPLE OF: ANVIL CRUSHER STOCKPILE

OBJECTIVE: USE COMM Reagents | DATE: DEC 7/7

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		5.0						
$ZnSO_4$		1.0	GRIND 3.0					
NaCN		.30						
R242		.05						
R409		.01	Pb Ro1	8.9		1	3	
MIBC								
R242		.01	Ro2					
R409		.005				1	3	
R242		.005	Ro3			1	3	
R409		.005						
R242		.005	Ro4			1	3	
R409		.005						
$Ca(OH)_2$		2.0	Zn Cond	10.9		3		
$CuSO_4$		1.0						
Z-200		.014	Zn Ro1			1	2	light Zn froth Ro1 needs conditioning
Z-11		.06						
			Ro2			1	3	
Z-11		.09						
			Ro3			1	2	
Z-11		.03						Zn still floating in R3 needs more Cu

RESULTS:

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	103.30	.05	65.80	5.90	4.80	3.36	.30	.25	72.59	3.09	.71
PBRC2	37.30	.02	32.80	17.50	15.70	.60	.32	.29	13.07	3.31	.84
PBSC1	15.80	.01	15.60	19.70	24.20	.12	.15	.19	2.63	1.58	.55
PBSC2	18.90	.01	10.20	19.10	27.40	.10	.18	.26	2.06	1.83	.75
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	45.10	.02	2.00	50.10	12.90	.04	1.12	.29	.96	11.45	.84
ZNRC2	148.80	.07	.80	52.30	11.10	.06	3.85	.82	1.27	39.42	2.38
ZNSC1	82.10	.04	.80	47.50	14.10	.03	1.93	.57	.70	19.75	1.67
ZNSC2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1571.00	.78	.40	2.46	40.80	.31	1.91	31.70	6.71	19.58	92.27
HEADS	2022.30		48.26	50.51		4.63	9.76	34.35	90.35	70.62	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
65.80	72.59
57.05	85.66
52.86	88.29
48.26	90.35
48.26	90.35

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
50.10	11.45
51.79	50.87
50.51	70.62
50.51	70.62
50.51	70.62

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2901-2 | SAMPLE OF: Anvil Crusher Stockpile

OBJECTIVE: Anvil Grind vs. Drum Grind (Lakefield) | DATE: Nov 29/7

REAGENTS: 10 vs 30 minute grind

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		2.50						Screen Analysis Tails
NaCN		0.20	GRND 8+2					+100 6.7%
Z-11		.07						150 15.5
MIBC		.014	Pb Ro 1	8.7				200 26.8
			Ro 2					325 19.0
Z-11		.015	Sc 1					-325 32.0
Z-11		.015	Sc 2					
								51% - 200 mesh is coarser than normal Anvil grind (70% - 200 mesh)
CaO		1.5						
$CuSO_4$		0.75	Zn Cond			10		
Z-11		.07						
DF 1012	2 DP							
			Zn Ro 1					
			Ro 2					
Z-11		.02	Sc 1					
Z-11		.02	Sc 2					

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	144.20	.07	67.10	7.00	5.30	4.81	.50	.38	75.05	6.59	1.22
PBRC2	32.70	.02	46.10	13.20	12.40	.75	.21	.20	11.69	2.82	.65
PBSC1	17.20	.01	23.00	18.00	21.00	.20	.15	.18	3.07	2.02	.57
PBSC2	19.20	.01	14.50	18.00	25.70	.14	.17	.25	2.16	2.26	.78
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	81.40	.04	1.00	53.50	10.00	.04	2.16	.40	.63	28.44	1.29
ZNRC2	33.10	.02	1.20	50.00	12.60	.02	.82	.21	.31	10.81	.66
ZNSC1	44.20	.02	1.00	49.50	12.40	.02	1.09	.27	.34	14.29	.87
ZNSC2	165.30	.08	.80	25.00	28.00	.07	2.05	2.30	1.03	26.99	7.36
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1475.00	.73	.50	.60	36.90	.37	.44	27.05	5.72	5.78	86.59
HEADS	2012.30		55.59	38.06		6.41	7.61	31.24	91.97	80.53	

PB CUMULATIVE GRADES / CUMULATIVE RECOVERIES

CUMULATIVE GRADES	CUMULATIVE RECOVERIES
67.10	75.05
63.22	86.74
59.65	89.81
55.59	91.97
55.59	91.97

ZN CUMULATIVE GRADES / CUMULATIVE RECOVERIES

CUMULATIVE GRADES	CUMULATIVE RECOVERIES
53.50	28.44
52.49	39.25
51.66	53.54
38.06	80.53
38.06	80.53

Tested by: IMQ Watson

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2903-4 | SAMPLE OF: Anvil Crushes Stockpile

OBJECTIVE: Anvil grind vs. Drum Grind (Lake field) | DATE: Nov 24/76

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		2.5						Screen Analysis Tails
NaCN		0.20	GRIND 28+2	8.5		2		+100 0.1%
Z-11		.07						150 TRACE
MIBC		.019						200 0.8%
								325 11.6%
			Pb Ro 1					-325 87.5%
			Ro 2					
Z-11		.015	Sc 1					
Z-11		.015	Sc 2					
CaO		1.5		10.1				
$CuSO_4$		0.75	Zn Cond			10		
Z-11		.07						
DF1012	2 DROP							
			Zn Ro 1					
			Ro 2					
Z-11		.02	Sc 1					
Z-11		.02	Sc 2					

2903-04

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	143.00	.07	70.37	4.10	4.90	4.95	.29	.34	82.13	2.51	1.10
PBRC2	30.20	.01	29.10	15.10	19.90	.43	.22	.30	7.17	1.95	.94
PBSC1	32.10	.02	13.00	17.00	26.40	.21	.27	.42	3.41	2.33	1.33
PBSC2	30.00	.01	6.00	16.50	29.80	.09	.24	.44	1.47	2.12	1.40
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	82.60	.04	1.20	45.00	15.10	.05	1.83	.61	.81	15.89	1.95
ZNRC2	42.00	.02	1.20	49.00	12.90	.02	1.01	.27	.41	8.80	.85
ZNSC1	117.80	.06	.50	54.50	9.80	.03	3.16	.57	.48	27.45	1.81
ZNSC2	128.10	.06	.60	50.00	13.00	.04	3.15	.82	.63	27.38	2.61
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1426.00	.70	.30	1.90	39.40	.21	1.33	27.65	3.49	11.58	88.01
HEADS	2031.80		49.04	50.20		6.03	11.51	31.42	94.18	79.51	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
70.37	82.13
63.17	89.30
55.33	92.71
49.04	94.18
49.04	94.18

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
45.00	15.89
46.35	24.69
50.31	52.13
50.20	79.51
50.20	79.51

Tested by: [illegible]

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2981-82 | SAMPLE OF: Drum Combined

OBJECTIVE: Improved Pb grade with increased NaCN and $ZnSO_4$ | DATE: Dec 23/76

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		4.0	GRIND 9+2			2		
NaCN		0.30						
$ZnSO_4$		1.0						
Z-11		0.03						
MIBC		.012	Pb Ro 1	10.0				
Z-11		.01	Ro 2					
Z-11		.005	Sc 1					
Z-11		.005	Sc 2					
$Ca(OH)_2$		1.60	Zn Cond.			10		
$CuSO_4$		0.90						
Z-11		0.08						
D.F. 1012		.010						
Z-200		.007	Zn Ro 1	11.5				
Z-11		.02	Ro 2					
Z-11		.02	Sc 1					
Z-11		.005	Sc 2					

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	61.60	.03	57.00	8.50	4.60	1.71	.25	.14	35.57	2.39	.99
PBRC2	58.90	.03	39.40	16.70	9.30	1.13	.48	.27	23.51	4.48	1.92
PBSC1	63.00	.03	19.00	23.00	15.00	.58	.71	.46	12.13	6.61	3.31
PBSC2	55.10	.03	11.70	20.00	17.50	.31	.54	.47	6.53	5.02	3.38
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	209.40	.10	2.90	49.10	8.60	.30	5.00	.88	6.15	46.87	6.32
ZNRC2	115.70	.06	3.20	29.50	14.40	.18	1.66	.81	3.75	15.56	5.84
ZNSC1	99.30	.05	2.80	14.90	17.90	.14	.72	.86	2.82	6.75	6.23
ZNSC2	62.90	.03	2.30	9.80	17.90	.07	.30	.55	1.47	2.81	3.95
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1329.00	.65	.60	1.57	14.60	.39	1.02	9.44	8.08	9.51	68.05
HEADS	2054.90		32.16	32.40		4.80	10.67	13.88	77.74	71.99	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
57.00	35.57
48.40	59.08
38.30	71.21
32.16	77.74
32.16	77.74

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
49.10	46.87
42.12	62.43
35.75	69.18
32.40	71.99
32.40	71.99

Tested by: Mathur

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2977-78 | SAMPLE OF: Drum Combined

OBJECTIVE: Increased NaCN | DATE: Dec 22/76

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		4.5						
NaCN		0.30	GRIND 9+2			2		
Z-11		0.04						
MIBC	2 DROPS	0.012	Pb Ro 1	10.4			2	
Z-11		.01	Ro 2				2	
Z-11		.005	Sc 1				2	
Z-11		.005	Sc 2				3	
$Ca(OH)_2$		2.0						
$CuSO_4$		0.90	Zn Cond			10		
Z-11		0.085						
DF 1012			Zn Ro 1					
Z-11		0.02	Ro 2					
Z-11		0.015	Sc 1					
Z-11		0.01	Sc 2					

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	155.60	.08	40.40	14.40	9.30	3.13	1.12	.72	65.83	10.64	5.41
PBRC2	56.70	.03	13.80	21.90	16.60	.39	.62	.47	8.19	5.90	3.52
PBSC1	41.10	.02	9.30	22.60	17.60	.19	.46	.36	4.00	4.41	2.70
PBSC2	41.00	.02	7.50	21.10	17.20	.15	.43	.35	3.22	4.11	2.64
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	254.70	.13	1.50	48.70	8.90	.19	6.19	1.13	4.00	58.93	8.47
ZNRC2	48.70	.02	2.50	19.00	16.40	.06	.46	.40	1.27	4.40	2.98
ZNSC1	34.80	.02	2.50	11.50	19.00	.04	.20	.33	.91	1.90	2.47
ZNSC2	72.70	.04	2.20	7.20	19.30	.08	.26	.70	1.67	2.49	5.24
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1300.00	.65	.80	1.17	13.70	.52	.76	8.88	10.89	7.23	66.56
HEADS	2005.30		26.35	34.69		4.76	10.50	13.34	81.25	67.71	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
40.40	65.83
33.30	74.02
29.40	78.03
26.35	81.25
26.35	81.25

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
48.70	58.93
43.93	63.32
40.60	65.22
34.69	67.71
34.69	67.71

Tested by: Matthews

Cyprus Anvil Mining Corporation

METALLURGICAL TEST REPORT

Test Format and Results

TEST No. 2975-76 | SAMPLE OF: Combo Drum

OBJECTIVE: AMT OF CN REQUIRED | DATE: Dec 22/76

REAGENTS:

NAME	AMOUNT grms.	AMOUNT lbs./ton	ADDITION POINT	pH Start	pH End	TIMES Cond.	TIMES Flot.	REMARKS
Na_2CO_3		4.50	Grind 9+2					
NaCN		.20						
Z-11		.09						
MIBC			Pb Ro 1	10.3			2	
Z-11		.01	Ro 2				2	
Z-11		.005	Sc 1				2	
Z-11		.005	Sc 2				3	
$Ca(OH)_2$		2.0	Cond			10		
$CuSO_4$		.90						
Z-11		.085						
DF1012			Zn Ro 1	11.3			2	
Z-11		.02	Ro 2				2	
Z-11		.015	Sc 1				2	
Z-11		.01	Sc 2				3	

RESULTS:

PROD.	WEIGHTS GM.	WEIGHTS %	ASSAYS PB	ASSAYS ZN	ASSAYS FE	UNITS PB	UNITS ZN	UNITS FE	DISTRIBUTION PB	DISTRIBUTION ZN	DISTRIBUTION FE
PBRC1	110.00	.06	51.20	11.90	6.20	2.97	.69	.36	58.85	6.20	2.59
PBRC2	69.00	.04	20.10	21.90	15.50	.73	.80	.56	14.49	7.16	4.06
PBSC1	53.40	.03	10.90	22.80	18.90	.31	.64	.53	6.08	5.77	3.83
PBSC2	44.00	.02	7.60	20.50	17.70	.18	.48	.41	3.49	4.27	2.96
PBSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZNRC1	257.00	.14	1.40	48.20	8.70	.19	6.53	1.18	3.76	58.70	8.49
ZNRC2	84.70	.04	2.20	18.60	17.40	.10	.83	.78	1.95	7.47	5.60
ZNSC1	93.00	.05	1.90	7.40	21.50	.09	.36	1.05	1.85	3.26	7.59
ZNSC2	116.80	.06	1.40	3.80	24.50	.09	.23	1.51	1.71	2.10	10.87
ZNSC3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZN ST	1069.00	.56	.70	1.00	13.30	.39	.56	7.50	7.82	5.07	54.00
HEADS	1896.90		28.71	27.37		5.05	11.13	13.88	82.92	71.53	

PB CUMULATIVE GRADES	CUMULATIVE RECOVERIES
51.20	58.85
39.21	73.34
32.71	79.42
28.71	82.92
28.71	82.92

ZN CUMULATIVE GRADES	CUMULATIVE RECOVERIES
48.20	58.70
40.86	66.16
33.70	69.42
27.37	71.53
27.37	71.53

APPENDIX IV

SYMBOLS AND ABBREVIATIONS

Symbol	Meaning
D-1	Grum massive banded sulphides
E-1	Grum massive flow sulphides
F-1	Grum massive porous sulphides
G-1	Grum quartz sulphides
H-1	Grum banded sulphides
Y.T.D.	Year to date
P_{80}	The 80% passing size
Rec.	Recovery
N/A	Not available
Na_2CO_3	Sodium carbonate
NaCN	Sodium cyanide
$ZnSO_4$	Zinc sulphate
R-242	Cyanamid Aero promotor
R-404	Cyanamid Aero promotor
M.I.B.C.	Methyl isobutyl carbinol
$Ca(OH)_2$ or CaO	Lime
$CuSO_4$	Copper Sulphate
Z-200	Dow Chemical promotor
D.F. 1012	Dow froth
Z-11	Sodium isopropyl xanthate
Pb	Lead
Zn	Zinc
Fe	Iron
Cu	Copper