

AN EVALUATION OF THE METALLURGY OF THE MILLING OPERATION AT REEVES MACDONALD MINES LIMITED, REMAC, BRITISH COLUMBIA

by

W. ARTHUR WALL AND R. W. BRUCE

MINERAL PROCESSING DIVISION

NOTE: THIS REPORT RELATES ESSENTIALLY TO THE SAMPLES AS RECEIVED. THE REPORT AND ANY CORRESPONDENCE CONNECTED THEREWITH SHALL NOT BE USED IN FULL OR IN PART AS PUBLICITY OR ADVERTISING MATTER.

COPY NO.

5

AUGUST, 1971

81-798873



Mines Branch Investigation Report IR 71-77

AN EVALUATION OF THE METALLURGY OF THE MILLING OPERATION AT REEVES MACDONALD MINES LIMITED, REMAC, BRITISH COLUBMIA

by

W. Arthur Wall* and R.W. Bruce**

- - -

SUMMARY OF RESULTS

No difficulty was experienced in floating a rougher lead concentrate with a satisfactory lead recovery but all of the lead concentrates assayed over 12 per cent zinc. Cleaning and recleaning of the lead concentrate did not appreciably reduce the zinc content. Microscopic examination of the lead concentrates showed that 50 per cent of the galena (much of it less than 10 micron in size) was present as fine inclusions in sphalerite and, to a lesser extent, in pyrite. The flotation of these middling particles due to the galena inclusions accounts for the presence of sphalerite and pyrite in the lead concentrate.

Silver occurs in the ore as the mineral argyrodite mainly as inclusions in sphalerite. This accounts for the higher than normal silver assay of the zinc concentrate.

*Research Scientist and **Head, Non-Ferrous Minerals Section, Mineral Processing Division, Mines Branch, Department of Energy, Mines and Resources, Ottawa, Canada.

CO	N	TE	N	Т	S
$\mathbf{u}\mathbf{v}$	Τ.	ייניב	1.4	1	ບ

No page stor

11 4 Martin States

•	Page
Summary of Results	i
Introduction	1
Location of Property Shipment Purpose of Investigation Sampling and Analysis	1 1
Mineralogical Examination	4
Outline of Investigation	
Discussion of Results	6
Conclusions	8
Acknowledgement	. 9
Appendix A	1

INTRODUCTION

Location of Property

The Annex Mine of Reeves MacDonald Mines is located south of Remac, British Columbia.

Shipment

A 300-pound sample of mill feed, representative of the Annex Mine ore, was received on October 15, 1970. Included in the same shipment, were twenty-five pounds of lead concentrate and twenty-five pounds of zinc concentrate. These concentrates were reported to be representative of the concentrates being produced from the Annex Mine ore.

Purpose of Investigation

Mr. L.M. Kinney, Vice-President, Mining, Reeves MacDonald Mines Limited in his letter of September 1, 1970 requested that an investigation be carried out to determine the possibility of increasing the lead content and reducing the zinc content of the lead concentrate. He was also interested in the possibility of increasing the silver recovery with the lead concentrate and thus reducing the silver that is presently being recovered in the zinc concentrate.

Sampling and Analysis

The samples of lead concentrate and zinc concentrate were air-dried and representative portions were removed in a Jones splitter. One portion of each concentrate was submitted for chemical analysis with the results as tabulated in Table 1.

Lead	and	Zinc	Concent	rates	Chemical	Analyses*	

Element	lement Pb Conc					
Silver oz/ton	84.41	8.585				
Lead %	37.60	0.72				
Zinc %	17.40	47.50				
Iron %	7.49	-				
Insoluble %	1.45	_				
Cadmium %	-	0.78				

*From Internal Reports MS-AC-70-1031 and 1038

Another representative sample of each concentrate was screened, cycloized, and the sized-fractions submitted for chemical analysis and microscopic examination. The chemical analysis of the sized fractions of the lead concentrate are shown in Table 2 and of the zinc concentrate in Table 3.

TABLE 2

e de la companya de Companya de la companya de la comp	Weight	and a second second	Assay	Dist	Distribution %				
Size ? +150 mesh 1 +200 mesh 2 +250 mesh 1 +40.6 micron 24	%	Ag oz/ton	Pb %	Zn %	Ag	Pb	Zn		
+150 mesh	1.2	15.16	16.92	24.62	0.2	0.5	1.7		
+200 mesh	5.1	14.67	18.27	28,90	0.9	2.5	8.5		
+250 mesh	1.1	16.33	20.00	28.90	0.2	0.6	1.8		
+40.6 micron	24.3	47.13	38.73 19.67		13.6	25.0	27.5		
+30.9 micron	21.3	84.48	36.55	26.40	21.3	20.7	32.3		
+22.5 micron	10.2	95.23	36.55	16.91	11.5	9.9	9.9		
+15.5 micron	9.1	103.24	38.73	14.19	11.1	9.4	7.4		
+11.9 micron	6.1	113.27	43.04	13.57	8.2	7.0	4.8		
-11.9 (calcd)	21.6	128.83	42.46	4.93	33.0	24.4	6.1		
Feed (Assay)	100.0	84.41	37.60	17.40	100.0	100.0	100.0		

Chemical Analysis* of Sized Fraction of Lead Concentrate

*From Internal Report MS-AC-70-1049 and 1129

TABLE	3
-------	---

Size	Weight	A	ssay	Dist	tribution	ion %				
	%	Ag oz/ton	Pb %	Zn %	Ag	Рb	Zn			
+150 mesh +200 mesh +250 mesh +40.6 micron +30.9 micron +22.5 micron +15.5 micron	8.5 16.4 2.6 19.3 21.8 4.5 5.7	6.27 7.92 9.22 11.55 7.17 6.42 6.43 7.00	0.60 0.68 0.66 0.64 0.43 0.44 0.55	31.60 41.10 43.25 48.35 50.75 53.95 54.35	6.2 15.1 2.8 26.0 18.2 3.4 4.3 2.6	7.1 15.5 2.4 17.1 13.0 2.8 4.3	5.7 14.2 2.4 19.6 23.3 5.1 6.5			
+11.9 micron -11.9 (calcd)	3.2 18.0	7.00 10.23	0.97 1.34	54.90 51.51	2.6 21.4	4.3 33.5	3.7 19.5			
Feed (Assay)	100.0	8.585	0.72	47.50	100.0	100.0	100.0			

Chemical Analysis* of Sized Fractions of Zinc Concentrate

*From Internal Reports MS-AC-70-1134 and 1140.

Representative hand specimens were selected from the ore, as received, for microscopic examination. The remainder of the ore was crushed to minus 10 mesh and split into 2000-gram portions. One 2000-gram sample, selected at random was sub-divided into fractions for chemical analysis, semi-quantitative spectrochemical analysis, and mineralogical examination. The results of the chemical analysis are shown in Table 4 and the results of the semi-quantative spectrochemical analysis in Table 5.

TABLE 4

Chemical Analysis* of Mill Feed

Silver	4.375	oz/t	ton
Lead	1.19	per	cent
Non-Sulphide Lead	0.38	88	**
Zinc	10.75	17	**
Iron	4.97	**	11

*From Internal Reports MS-AC-70-1031, 1038 and 1053.

TABLE 5

Semi-Quantitative Spectrochemical Analysis* of Mill Feed

Principal Constituents	>1%	Mg, Fe, Zn, Ca
Major Constituents	<1.0% >0.1%	Pb, Si,
Minor Constituents	<0.1%	Mn, Ga, Al, Ni, Ti, Ag, Cu
Not Detected		Ba, Be, B, Sb, Ge, As, Mo, W, Sn
		Cr, Nb, Ta, Bi, Sr, Co, Na, Zr, In, V

*From Internal Report MS-AC-70-300

MINERALOGICAL EXAMINATIONS*

A number of polished sections were prepared from the hand specimens and examined under the ore microscope to identify the ore minerals and to determine their grain sizes and textural relationships. The 48 to 325-mesh fraction was screened from the head sample and separated into sink and float products by means of heavy liquids and the products were examined.

Polished sections of the eight size-fractions from the lead concentrate and of the eight size-fractions from the zinc concentrate were prepared and examined microscopically to identify the ore minerals and to evaluate their liberation. The minus 11.9-micron fractions were not examined because of the size of particles.

Representative samples of the cleaner lead concentrates obtained in Tests 3 to 7 inclusive also were submitted for microscopic examination.

Results of Investigation

The minerals identified in the ore were sphalerite, pyrite, galena, argyrodite(?), magnetite, pyrrhotite, dolomite, mica, calcite, and quartz. The most abundant ore minerals were sphalerite, pyrite, and galena, with only traces of magnetite and pyrrhotite.

*Mines Branch Investigation Report IR 71-22 by R.G. Pinard.

Argyrodite was the only silver-bearing mineral found in the ore. The ore minerals occur in a wide variety of associations and are intimately intergrown.

The sphalerite in the ore occurs mainly in a massive form. Few areas of the sphalerite are free from inclusions and most of it is riddled with grains of other minerals consisting mainly of galena, pyrite, gangue, and argyrodite.

The galena is present largely as inclusions in or associated with sphalerite. Galena contains only a few inclusions of other minerals.

The only silver-bearing mineral occurring in the ore is believed to be argyrodite (Ag_8GeS_6) . The argyrodite occurs as very small grains mainly as inclusions in sphalerite and as grains adhering to sphalerite and rarely to galena.

Examination of the zinc concentrate showed that the sphalerite consists mainly of free grains even in the plus 150-mesh fraction. Relatively few grains of the sphalerite are contaminated by galena, pyrite, or gangue.

Examination of polished sections of the lead concentrate show the galena content to be evenly distributed between free grains and small inclusions in sphalerite and to a lesser extent in pyrite. Small inclusions of galena, many less than 10 microns in size, were found in otherwise free grains of sphalerite and pyrite. The presence of sphalerite and pyrite in the lead concentrate may be due to these inclusions of galena which cause the particle to float.

Examination of the polished sections of cleaner lead concentrates from Tests 3, 4, 6, and 7 showed that the galena and sphalerite were intergrown to a large degree. The finer grind of the cleaned lead concentrate of Test 5 liberates more of the ore minerals but the concentrate still contained many intergrown grains of galena and sphalerite.

OUTLINE OF INVESTIGATION

This investigation was carried out in an attempt to produce a lead concentrate containing the minimum amount of zinc and a zinc concentrate

- 5 -

containing the minimum amount of silver. Various combinations of reagents, flotation conditions and degrees of fineness of grind were investigated.

Full details of all tests are shown in the Mines Branch Flotation Test Reports in Appendix A.

DISCUSSION OF RESULTS

Test 1 was carried out with normal lead flotation reagents as shown in Flotation Test Report No. 1 in Appendix A. The rougher lead concentrate, consisting of 19.3 per cent of the weight of ore, assayed 19.58 ounces silver per ton, 5.00 per cent lead and 45.34 per cent zinc. The concentrate contained 86.6 per cent of the silver, 84.4 per cent of the lead and 77.3 per cent of the zinc in the feed. The final tailing assayed 0.11 ounces silver per ton, 0.08 per cent lead and 0.11 per cent zinc and contained 1.6 per cent of the silver, 4.4 per cent of the lead and 0.6 per cent of the zinc in the feed. Though there was no separation of the lead from the zinc, this test indicated that there was no problem in floating the silver, lead, and zinc from the gangue minerals.

In Test 2, selective flotation of lead and zinc, at a coarser grind, produced a rougher lead concentrate assaying 32.57 ounces silver per ton, 10.45 per cent lead, and 20.19 per cent zinc and contained 68.6 per cent of the silver, 83.4 per cent of the lead, and 16.5 per cent of the zinc. With four stages of cleaning, the lead concentrate was increased to 38.20 per cent lead but the zinc was only decreased to 16.85 per cent. The lead recovery decreased from 83.4 per cent to 47.4 per cent. The rougher zinc concentrate assayed 5.42 ounces silver per ton, 0.45 per cent lead, and 46.06 per cent zinc. The zinc content of the lead concentrate is much higher than normal.

Test 3 was carried out at the same grind as Test 2 but with different flotation reagents. The rougher lead concentrate assayed 20.29 per cent lead and 19.04 per cent zinc but contained only 8.0% of the zinc in the feed compared to 16.5 per cent in Test 2. Test 5 was similar to Test 2 with two additional reagents, zinc hydro sulphite for zinc depression and MIBC for a frother. The rougher lead concentrate was similar to that obtained in Test 2. Regrinding the lead concentrate before two stages of cleaning produced a clean lead concentrate with assays similar to those obtained for the clean lead concentrate in Test 2. There was a significant increase in recovery of the silver and the lead. The zinc cleaner concentrate assayed 4.90 ounces silver per ton, 0.37 per cent lead, and 40.38 per cent zinc and contained 22.8 per cent of the silver, 6.8 per cent of the lead, and 75.8 per cent of the zinc in the feed.

Test 8 was a repeat of Test 5 at a considerably finer grind. The rougher lead concentrate assays and recoveries were very similar to those obtained in Test 5. Finer regrinding of the rougher lead concentrate, before two stages of cleaning, resulted in a lower lead assay and higher zinc assay and lower lead recovery and higher zinc recovery.

The zinc cleaner concentrate in Test 8 assayed 6.61 ounces silver per ton, 0.37 per cent lead, and 38.19 per cent zinc. This concentrate contained 34.0 per cent of the silver, 6.9 per cent of the lead, and 81.3 per cent of the zinc in the feed.

Tests 10 to 13 were carried out at various grinds, pH's and reagent combinations. In each case, the quantity of the promoter, sodium Aerofloat, was kept to a minimum. Regardless of the lead assays of the rougher lead concentrate (range 1.8 to 8.4 per cent) the minimum zinc assay was 12.2 per cent.

In the remainder of the tests, various combinations of grind, flotation conditions, and reagents were used but all the lead concentrates produced contained more than normal amounts of zinc. No difficulty was experienced in producing a low-grade rougher lead concentrate with a satisfactory silver-lead recovery but the lowest zinc assay reported was 13.5 per cent (Test 19). Cleaning and re-cleaning the lead concentrate did not lower the zinc content to any significant degree. In these tests, no difficulty was experienced in recovering the zinc in a zinc concentrate with satisfactory assays of silver, lead, and zinc and with a satisfactory recovery of the zinc. Test 14 illustrates the results that can be expected from the zinc flotation. The rougher zinc concentrate assayed 7.95 ounces silver per ton, 0.45 per cent lead, and 51.19 per cent zinc with recoveries of 33.2 per cent silver, 7.6 per cent lead, and 86.7 per cent zinc. One stage of cleaning increased the grade to 61.6 per cent zinc.

- 7 -

CONCLUSIONS

The main objectives of this investigation were to decrease the amount of zinc floating with the lead and thereby increase the grade of the lead concentrate and at the same time increase the silver recovery in the lead concentrate thereby decreasing the silver that is presently being recovered in the zinc concentrate.

Microscopic examination of the ore and of various samples of the lead concentrate showed that the galena in the lead concentrate was evenly distributed between free grains of galena and numerous fine inclusions of galena in otherwise free grains of sphalerite. It appears that these inclusions of galena cause the sphalerite to float in the lead concentrate.

These observations were confirmed by investigative tests in which regrinding the reflotation of the lead concentrate failed to reduce the zinc content. An example of this is seen from the results of Test 8 in which the rougher lead concentrate grade was increased from 12.2 per cent to 24.2 per cent lead, but the zinc decreased only from 16.3 to 16.2 per cent zinc. Also the chemical analysis of the sized fractions of the sample of lead concentrate shows that while the lead assay of each size fraction increases and zinc assay decreases as the size decreases, the decrease of the zinc assay is not significant except in the finest size fraction of 11.9 microns.

The silver that is recovered in the zinc concentrate was found to be due to extremely fine inclusions of the silver mineral argyrodite in grains of sphalerite. This silver occurrence accounts for the high silver content in the zinc concentrate and precludes its recovery with the lead concentrate. A silver content of about 8 oz per ton of zinc concentrate can be expected and this will represent about 25 per cent of the silver in the ore.

From the results of this investigation, it does not appear that any major improvement can be made in the grades of concentrates or in the metallurgical recoveries in processing this ore.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the assistance of the following members of the Mineral Sciences Division: Mr. R.G. Pinard who carried out the mineralogical examinations; Mr. D.P. Polombo who performed the spectrographic analysis; Mr. G.A. Derry who performed the fire assaying and Messrs. J. Cloutier, D. Cumming, R. Donahoe, J.C. Hole, B. Kobus and P. Lanthier who carried out the chemical analysis.

/ms

APPENDIX

APPENDIX A

Mines Branch Flotation Test Reports

Abbreviations used in Test Data Reports

CaO	Lime
NaCN	Sodium Cyanide
ZnS04	Zinc Sulphate
A15	Aerofloat Reagent 15
DF250	Dowfroth 250
Z-11	Sodium Isopropyl Xanthate
CuSO4	Copper Sulphate
T130	Thiocarbanilide 130
R242	Aerofloat 242
so ₂	Sulphur Dioxide
610	Depressant 610
633	Depressant 633
MIBC	Methyl Isobutyl Carbinol Frother
Z-3	Potassium Ethyl Xanthate
RM	Rod Mill
Na ₂ S ₂ O ₄	Sodium Hydro Sulphite
Na ₂ CO ₃	Sodium Carbonate
ZnS204	Zinc Hydro Sulphite
Z-200	Isopropyl Ethyl thiono Carbonate
Na ₂ SO ₃	Sodium Sulphite
Sod A	Sodium Aerofloat
AF71	Frother AF71
3477	Aero Promoter 3477
A31	Aerofloat Reagent 31
H ₂ SO ₄	Sulphuric Acid
404	Promoter 404
$Na_2CR_2O_7$	Sodium Dichromate
301 -	Sodium Secondary Butyl Xanthate
211	Sodium Diisopropyl Dithiophosphate

Time	ary F % Solids 67 50 25 25 25 25 25	pH 8.2 8.2 8.0	Un us 7 x 1	nit sed 4 RM -g cell	1.5		ZnSO4	A 15	gents, DF 250 0.03		TES ⁻ ton CuSC	FED B	2000-g sy: W	AW
Time min 30 5 3 3 10	% Solids 67 50 25 25 25	рН 8.2 8.2	Un us 7 x 1	sed 4 RM	1.5			A 15	DF250	Z-11	ton CuSC			
min 30 5 3 3 10	Solids 67 50 25 25 25	8.2	us 7 x 1	sed 4 RM	1.5			A 15	DF250	Z-11	CuSC			
30 5 3 3 10	67 50 25 25 25	8.2	7 x 1	4 RM	1.5							4		
5 3 3 10	50 25 25 25	8.2			1	0.25	1.00	0.04	0.03	0 05				
3 3 10	25 25 25	8.2	2000	-g cell			·	0.04	0.03	0 05				
3 10	25 25						·			0 05				
10	25	8.0							lf	0.05				
		8.0							-	0.05				
5	25	8.0			L			•			1.5	0		
									0.03	0.10				
				_		, in the second s								
			·											
			<u> </u>		l									
Tw	-			ANAL	YSIS	(2)				DI	STRIE	UTIO	N	
%		Ag	oz/to	n .	Pb%	Zn %				A	g	Pb	Zn	
1.0	2		0 5 0		F 00	45 24				04	6	24 4	77 2	
11			1		1		4			1	•			
14	11	1					1			1	·		1	
11 .		1												
62.	5		0.11		0.08	0.11				1 1	.6	4.4	0.6	
100.	0		4.36		1.14	11.33				10	0.010	0.0	100.0	
														• •
	ł							1					1	
	% 19. 9. 62. 100. tailin	-	% Ag 19.3 1 9.1 1 62.5 1 100.0 1 - 1 tailing 98.3 per	% Ag oz/to 19.3 19.58 9.1 3.32 9.1 2.34 62.5 0.11 100.0 4.36 - 4.36 tailing 98.3 per cent m	% Ag oz/ton 3 19.3 19.58 3.32 9.1 2.34 62.5 62.5 0.11 100.0 100.0 4.36 4.36 - - - tailing 98.3 per cent minus 2 -	% Ag oz/ton Pb% 19.3 19.58 5.00 9.1 3.32 0.76 9.1 2.34 0.65 62.5 0.11 0.08 100.0 4.36 1.14 - - - tailing 98.3 per cent minus 200 meters 200 meters	% Ag oz/ton Pb% Zn % 19.3 19.58 5.00 45.34 9.1 3.32 0.76 18.85 9.1 2.34 0.65 6.85 62.5 0.11 0.08 0.11	% Ag oz/ton Pb% Zn % 19.3 19.58 5.00 45.34 9.1 3.32 0.76 18.85 9.1 2.34 0.65 6.85 62.5 0.11 0.08 0.11 100.0 4.36 1.14 11.33 tailing 98.3 per cent minus 200 mesh. 200 mesh.	% Ag oz/ton Pb% Zn % 19.3 19.58 5.00 45.34 9.1 3.32 0.76 18.85 9.1 2.34 0.65 6.85 62.5 0.11 0.08 0.11 100.0 4.36 1.14 11.33 - - - - - tailing 98.3 per cent minus 200 mesh. 200 mesh. -	% Ag oz/ton Pb% Zn % 19.3 19.58 5.00 45.34 9.1 3.32 0.76 18.85 9.1 2.34 0.65 6.85 62.5 0.11 0.08 0.11 100.0 4.36 1.14 11.33 - - - - tailing 98.3 per cent minus 200 mesh. 200 mesh.	% Ag oz/ton Pb% Zn % Ag 19.3 19.58 5.00 45.34 86 9.1 3.32 0.76 18.85 6 9.1 2.34 0.65 6.85 4 62.5 0.11 0.08 0.11 1 100.0 4.36 1.14 11.33 10 - 20 mesh. 200 mesh.	% Ag oz/ton Pb% Zn % Ag 19.3 19.58 5.00 45.34 86.6 8 9.1 3.32 0.76 18.85 6.9 4.9 62.5 0.11 0.08 0.11 1.6 100.0 4.36 1.14 11.33 100.010 - 100.010 4.36 1.14 11.33 100.010 - 100.010 4.36 1.14 11.33 100.010	% Ag oz/ton Pb% Zn % Ag Pb 19.3 19.58 5.00 45.34 86.6 84.4 9.1 3.32 0.76 18.85 6.9 6.0 9.1 2.34 0.65 6.85 4.9 5.2 62.5 0.11 0.08 0.11 1.6 4.4 100.0 4.36 1.14 11.33 100.0 100.0 - 0 0 98.3 per cent minus 200 mesh. 200 mesh. 200 mesh.	% Ag oz/ton Pb% Zn % Ag Pb Zn 19.3 19.58 5.00 45.34 86.6 84.4 77.3 9.1 3.32 0.76 18.85 6.9 6.0 16.6 9.1 2.34 0.65 6.85 4.9 5.2 5.5 62.5 0.11 0.08 0.11 1.6 4.4 0.6 100.0 4.36 1.14 11.33 100.0 100.0 100.0 100.0 - 0 0 0.00 0.00 0.00 100.0 100.0 100.0 100.0

N

•

٤

TEST NO. 2 SAM	PLE:]	Reeve	s Mac	Donald	d Mine	s Limi	ted					DAT	E: Nov	. 5, 19	970.]
OBJECT OF TEST: Pre						· · · · · · · ·						CHAI	RGE:2	000-g		1
				0								TEST	red b	Y: WAV	V	1
OPERATION	Time	%		U	nit		·	<u> </u>	Rea	agents,	lb per	ton				1
OPERATION	min	Solids	pH		sed	T 130	R 242	ZnSO	NaCN	SO ₂	610	633	MIB	CCuSO	CaO	1 z
Grind (1)	15	67	8.2		4 RM		0.10	0.70	0.10						1	1
Condition	5	50	6.5	2000	-g cell		<u> </u>			15.0					<u> </u>	
Condition	5	ļ				<u> </u>	ļ				0.02	0.02				
Condition	5						0.04	.0.30			-					
Pb Float	4	25	7.6			ļ										
Zn Condition	5	25	8.9	<u> </u>			0.15						0.0	2 1.0	1.0	
Zn Float	3	25	ļ			1	0.02									1
Zn Scavenging	2	25	8.9				0.02					<u> </u>				0
Pb Clean No. 1	2	ļ		<u>500-g</u>					0.05							1
Pb Clean Nos.2,3&4	1			250-g				0.16	0.05							ļ
Zn Clean No. 1	2	<u> </u>	11.9	500-g	g cell				0.30						0.30	1
Zn Clean No. 2	1			250-9	g cell											
PRODUCT	W	т		λ '		YSIS	(2)				DI	STRIB	UTIO	N	_	1
	%	6	. 0	z/ton	Pb%	Zn%	<u></u>		1		A	g	Pb	Zn		1
Clean Pb conc.		4			38.20								47.4			1
No. 1 clean Pb tail		8	1	1	2.92									2.1		
$\frac{1}{1} 2 \frac{1}{1} $	11	8			2.94	1					1	8.0	7.3	3.4		[
11 3 11 11 11	11	8			5.70 6.49	1						5.9	5.9	2.6		
11 4 11 11 11	11	2	1	1	11.65	+							10.4	6.2		
Ro.Pb conc. (calcd)	11	0			10.45								12.4	2.2		1
Clean Zn conc.	41					1					1		83.4	1		
No. 1 clean Zn tail	11				0.33	1					6	7.1		65.0		
No. 2 " " "		.9			0.68						1	3.0	2.3	1		
		.8		4	0.63	1						3.5	1.6	8.0		
Ro Zn conc (calcd)	18	11	4	5.42		46.06						3.6	7.4	78.0		
Zn Scav.conc.	- 11	.2	1	2.12		5.03					1	4.1	3.5	3.7		
Ro tail		.2			0.10						1	3.7	5.7	1.8		1
Feed (calcd)	100	.0		4.27	1.13	10.99					10	0.0 1	00.0	100.0		
REMARKS: (1) Flotation	tailin	 	0 0 0 0	cent -		200										ŕ
(2) From Int																l
(2) From Int	ernali	repor.	IS IND.	-AU-1	0-1136	and 1	14(.									I

•

TEST NO. 3 SAM	PLE: R	eeves	MacD	onald M	[ines Li	imite	ed							v. 24,	1970
OBJECT OF TEST: Di	fferen	t Reag	ents									СН	ARGE:	2000-	τ Σ
												TE	STED E	BY: WA	
	Time	%		Uni	t				Rea	gents,	ib per	r ton			
OPERATION	min	Solids	p n	use	d Z	2-3	DF 250	Na ₂ S ₂ C	ZnSO	NaCN	SO ₂	CuS	10		
Grind (1)	15	67		7×14	RM										
Condition	5	45	6.5			.05	0.02	2.0	1.0	0.5	15				
Pb Float	3	25	7.7			.05	0.02				•				
Zn condition	5	25	7.7		0	.10				-		2.	0		
	5	25	8.2		0	.05	0.02								-
	2	25	8.2		0	.10	0.02								
Clean Pb	1.5	ż		250-g	cell							1			1
								s.	-		•				
· · · · · · · · · · · · · · · · · · ·															
								·	•						
BRODUCT	W	т			ANALYS	SIS	(2)			.	D	ISTR	IBUTIC	N %	
FRODUCT	9/	6	Ag	oz/toh F	ъ% Z	n%					A	g	Pb	Zn	
			4	6 00 25	00 10	53					21	5 9	715	6.2	
	i!	H	1											1	
Jiean PD tall		ו 4	2	5.25 5	• • • • • •	• 55						J• /	J.J	1.0	
				1 20 20	20110	04			-		1	2 Q	76 8	80	
Ro. Pb conc (calcd)		4.9	4	1.20 20	. 27 19	.04					. 4		10.0	0.0	
	20	2 4			50 41	00	•				4	2 4	10 3	80.7	
	11 ·	. 11		1		1	, ·								
		· 11			1						1			\$	
Rotall	D	• 9		1.305 0	0.15	. 59					1.	J • 1 ·	0.0	5.0	
	1.0			1 22 1	10 10	67		. ·		-	10	م م	100 0	100 0	· .
OPERATION min Solids PH used Z-3 DF 250Na2S2QInSO4 NaCN SO2 CuSO4 Grind (1) 15 67 7 x 14 RM <t< td=""><td></td></t<>															
									1						
	11	11													
		H	· ·		}										

TEST NO. 4 SAMP	PLE: R	eeves	MacD	onald	Mines	Limite	ed					DAT	E: No	ov. 26,	1970.
OBJECT OF TEST:	agrant	Zinc	Hydro	guln	hite							СНА	RGE:	2000-g	
K				- suip								TES	TED B	Y: WA	W
OPERATION	Time	%	На	ι ι	Init				Rea	gents,	lb per	ton			
OFERATION	min	Solids	PU	u u	sed N	Ja2CO3	R242	ZnS_2Q_4	$ZnSO_4$	NaCN	DF250	CuSC	D_4Z-2	00	
Grind (1)	15	67		7 x	14 RN	1 1.0		1.0	1.0	0.5					
Condition	5	45	8.3	200)-g cel	1	0.05				0.02		1		1
Pb float	4	25	8.3												
Condition	5		8.0									2.0			
Zn float	4		7.0				0.05						0.0)5	
Pb clean	2	i		500-	g cell			1.0							
	2			1000	-g cell										
Zn clean				1000	-g cell								_		
PRODUCT	W' %					_YSIS	(2)	r				r	BUTIO	1	
		·	Alg	oz/to	ı Pb%	Zn %						<u>z</u>	Pb	Zn	
Cl. Pb conc	6	.1	2	6.41	14.04	15.82					3	9.2	73.6	9.1	
Cl. Pb tail	3	.2		6.37	2.26	13.41				<u>i</u>		5.0	6.2	4.1	
Ro. Pb conc (calcd)	9	. 3	1	9.5?.	9.98	14.99					4	4.2	79.8	13.2	
Cl. Zn conc	20	.5	1	0.04	0.48	41.09					5	0.0	8.4	79.4	
Cl. Zn tail	n – – – – – – – – – – – – – – – – – – –	. 0		1.92		6.78						3.3	3.6		
Ro. Zn conc (calcd)	27	. 5	2	7.80		32.36					5	3.3	12.0	83.9	
Ro. tail	63	. 2	0	D.165	0.15	0.49						2.5	8.2	2.9	
Feed (calcd)	100	. 0	4	4.11	1.16	10.60					10	0.0	100.0	100.0	
REMARKS: (1) Flotation		-													
(2) From Int	ernal	Kepor	t MS	AC-7	0-1177	and 11	80.								

5

· ·

TEST NO. 5 SAME	PLE:	Reeve	s Ma	cDona	ld Min	es Lir	nited		······			DAT	E: Nov	7. 27, 1	970.
OBJECT OF TEST: Vari	ation	of Rea	agent	Comb	ination	n plus r	egrino	l of co	ncentr	ate.				2000-g	
				-								TES	TED B	Y: WA	W .
OPERATION	Time	%		ιι	Jnit				Rea	gents	, Ib per	ton		······	· · · · · · · · · · · · · · · · · · ·
OPERATION	min	Solids	рН	u	sed	T 130	R242	ZnSO	NaCN	SO ₂	610	633	ZnS ₂	O/MIBC	DF250
Grind (1)	15	67		7 x	14 RM	0.10	0.10	1.0	0.2				1.	0	
Condition	5	35	6.6)-g cell					2.5	<u> </u>				
Condition	2	35									0.10	0.10			· · · ·
Lead flotation	4	25	6.7				0.05				-			0.04	
Zinc condition (2)	_10	25	8.0			·									
Zinc flotation	4	25	8.0							•					0.02
Zinc clean	2		'. 	1000)-g_cel	1									
				<u> </u>										·.	
_Pb conc grind	30			1	le Mill			· · · ·				ļ			
No. 1. Pb clean	1.5	-		250-	g cell				0.10	· · · · · · · · · · · · · · · · · · ·					
No. 2. Pb clean	1.5							0.25	0,10	·					
· · · · · · · · · · · · · · · · · · ·	L	<u> </u>									<u> </u>	<u> </u>			
PRODUCT	W .	11		····		LYSIS	(3)					STRIE		·····	
		•	Ag	oz/tor	nPb%	Zn%					<u> </u>	g	Pb	Zn	
Clean Pb conc	2.	. 8	9	3.40	30.00	14.33					59).5 ⁻	75.7	3.7	
Clean Pb tail No. 1.	7.	.3		4.28	0.87	16.15					1	.1	5.8	10.8	
Clean Pb tail No. 2.	1.	.2		12.07	3.00	17.95						.3	3.2	2.0	
Ro Pb conc (calcd)	11.	.3		27.19	8.32	15.88		-			69	.9 8	34.7	16.5	
Clean Zn conc	20.		:		0.37						1	. 8	6.8	75.8	
Clean Zn tail	11	,1			0.45						1	.0	2.4	4.6	
Ro Zn conc (calcd)	26.	. 5		4.28	0.38	33.05					25	.8	9.2	80.6	
· · · · · · · · · · · · · · · · · · ·															
Ro tail	62.	.2	·	0.30	0.11	0.50				∦ .	4	. 3	6.1	2.9	
	1.00			1 21	, , , ,	10 0/	* ⁻						00 0	100 0	
Feed (calcd)	100	. •		4.59	1.11	10.80		÷.			1101	0.0 1	00.0	100.0	
									<u> </u>			<u> </u>			
REMARKS: (1) Flotation	tailin	g 85 p	ercer	ıt min	us 200	mesh.	_		/						
(2) Reagents	CuSC	$D_{4}^{-2.0}$	lb/to	n Ça	0-1.0	lb/ton;	Z-11,	-0.10	lb/tor	L					
(3) From Int	cernal	Repor	ts MS	S-AC-	-70-11	(7 and	1182.			-		· 、		, o	

.

TEST NO. 6 SAMPLE: Reeves MacDonald Mines Limited DATE: No OBJECT OF TEST: Different Reagents TESTED E TESTED E TESTED E OPERATION Time % pH Unit used Nag S0/ZRS04 SO2 Reagents. Ib per ton Condition 15 67 7 x 14 RM 2,0 1.0 0.05 2 Condition 5 45 6.9 2000-g cell 10 0.05 1.0 2.0 Zinc condition 15 25 7.7 1.0 0.05 1.0 2.0 No. 1 Pb clean 2 500-g cell 0.25 1.0 2.0 1.0 2.0 PRODUCT WT Ase or/t PhZ znZ 0.05 0.05 1.0 2.0 No. 1 Pb clean 2 500-g cell 0.25 1.0 2.0 1.0 2.0 PRODUCT WT Asg or/t PhZ znZ Asg Pb 1.0 2.0 1.0 2.0 1.2 2.0 1.1	v. 30,	1970														
OBJECT OF TEST:		~ -														
	Di	.ffere	nt Kea	gents										TED E	Y: WAW	
OPERATION		Time	%	nН		Jnit				Rea	igents,	lb per	ton			
		min	Solids	P/1	L	ised	Na ₂ SO	ZnSO ₄	S02	R242	DF250	Na ₂ CO;	CuSO1	<u>Z-2</u>	00	
Grind ⁽¹⁾		15	67		7 x 1	4 RM	2.0	1.0								
Condition			45	6.9	2000-	g cell			10	0.05						
Lead flotation		4	25	7.0							0.05					ļ
			L		·			ļ								
								ļ				1.0	2.0			
Zinc flotation		5	25	7.7						0.05	0.03			0.0	05	· · · · · ·
No. 1 Ph clean		2			500-0	cel1	0.25									-
							1 0.23							-		
10, 2 10 crean	OPERATION min Solids PH (1) 15 67						-	1								
Zinc clean		2			1000-	g cell										
PRODUCT		21				ANA	LYSIS	(2)			1	DI	STRIE	BUTIO	N %	
		%	6	A	g oz/t	Pb%	Zn%						\g	Pb	Zn	
Clean Pb conc		2	.8		78.26	22.44	17.62				· ·	50).1	53.5	4.6	
1 .		11													2.8	
	-														0.5	
Ro Pb conc (calcd)		. 5	•3		51.23	14.83	16,08					62	2.1	67.0	7.9	
Clean Zn conc		21	.5		5.81	0.95	43.20					28	3.6	17.4	85.7	
		41	41												4.0	
Ro Zn conc (calcd)		28	.4		5.04	0.99	34.25			-		32	2.8	24.0	89.7	
Ro tail		66	.3		0.335	0.16	0.40					5	5.1	9.0	2.4	
Feed (calcd)	,	100	.0		4.37	1.17	10.84					100).0 1	.00.0	.100.0	
REMARKS (1) Flo	tatio	n tai	 ling 8	5.0 p	er cen	t minus	: 200 me	esh	l				·····	<u></u>	<u> </u>	
(2) Fro	m Int	ernal	Repor	ts MS-	-AC-70	-1205 a	nd 1210)								
			-	-												

. 7 -

TEST NO. 7 SAME	PLE:	Reeves	MacDo	onald	Mines I	Limited								ec. 1, 1	
OBJECT OF TEST:												CH,	ARGE:	2000-8	5
Rep	eat of	Test	6 at 0	coarse	r grind	1.						TES	STED B	BY: WAV	V
OPERATION .	Time	%	Hq	ι	Jnit				Rea	igents,	lb per	ton			
	min	Solids	рп	u	ised	Na,SO,	Zn SO _u	SO2	R242	DF 250	Na ₂ CO ₃	CuSC	$D_{l_{l_{l_{l_{l}}}}}$	1	
Grind (1)	10	67		7x14	RM	2.0	1.0				X	1	-		
Condition	-5	45	6.7	2000-	-g cell			2 0							
Condition	2	45	6.7			<u> </u>			0.05	0.05					
Lead flotation	5	25	7.5	ļ								<u> </u>			-
Zinc condition	15	25	8.0								1.0	2.0		· · · ·	
Zinc condition	2	25	8.0	1								1	0.1	0	
Zinc flotation	4	25	8.0								· · · · ·			<u> </u>	
									•			<u> </u>	`		
No. 1 Pb clean	1		7.7		<u>g cell</u>						1.0	ļ			
No. 2 Pb clean	1		9.7		g cell						1.0	ļ			
Zn clean	2			[1000-	g cell					<u> </u>	L	<u> </u>	<u> </u>		
PRODUCT	W ⁻		<u> </u>			LYSIS (2)	T	-				IBUTIC	· · · · · · · · · · · · · · · · · · ·	i
A 1 51	_			oz/t		Zn % 20.38	· · · · · · · · · · · · · · · · · · ·			_		g 3.9	РЪ 62.1	Zn 8.6	
Clean Pb conc Clean Pb tail No. 1	4.	5		2.28 4.93	16.58	15.00						5.1	3.7	2.1	1
Clean Pb tail No. 2	11	2		1.72	6.09	15.65					1	6.0	6.1	1.8	
Ro Pb conc (calcd)		.2		9.42	12.00	18.47						5.0	71.9	12.5	
Clean Zn conc	22.	.0		5.37	0.63	38.16					2	7.1	11.6	79.2	
Clean Zn tail	3.			3.04	1.13	13.47						2.7	3.7	5.0	
Ro Zn conc (calcd)	25.			5.02	0.71	34.44						9.8	15.3	84.2	
Ro tail	66.	.9		0.34	0.23	0.53						5.2	12.8	3.3	
Feed (calcd)	100.	0		4.36	1.20	10.61					10	0.0	100.0	100.0	
						ľ									
,															
					ļ										-
		11		l		. 1			1	11	1	1		1	

٠..

(2) From Internal Reports MS-AC-70-1192 and 1194.

œ.

Regrind Lead Concentrate TESTED BY: WAW CPERATION Time $\frac{9}{\text{min}}$ Unit used Reagents. Ib per ton Ti30 R 242 ZnS04 NaCN ZnS2Q S02 610 633 MIBC Z-11 Condition 10 633 MIBC Z-11 Condition 10 50 6.5 2000-g cell Reagents. Ib per ton Condition 15 Condition Condition 15 Condition Solids Ph 100 for 0.10 1.0 0.02 2.0 Condition Condino Condino <th colsp<="" th=""><th>TEST NO. 8 SAI</th><th>MPLE:</th><th>Reeves</th><th>MacDo</th><th>onald</th><th>Mines I</th><th>imited</th><th></th><th></th><th></th><th></th><th></th><th>DAT</th><th>TE: De</th><th>c. 8, 19</th><th>970</th></th>	<th>TEST NO. 8 SAI</th> <th>MPLE:</th> <th>Reeves</th> <th>MacDo</th> <th>onald</th> <th>Mines I</th> <th>imited</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>DAT</th> <th>TE: De</th> <th>c. 8, 19</th> <th>970</th>	TEST NO. 8 SAI	MPLE:	Reeves	MacDo	onald	Mines I	imited						DAT	TE: De	c. 8, 19	970
OPERATION Time min % Solids PH Unit used Reagents. ib per ton Crind 30 67 7 x 14 RM 0.10 0.01 0.02 2.0 610 633 MIBC 2-11 Crind 10 50 6.5 200-g cell 1 15 15 1 1 Condition 5 50 00-g cell 1 0.10 0.2 2.0 0.05 Zinc condition 5 50 00-g cell 0.05 1 0.05 Zinc float 6 25 8.0 0.05 1 0.10 Pb conc grind 60 Pebble Mill 0.25 0.1 1 0.10 No. 1 Pb clean 1 250-g cell 0.25 0.1 1 1 No. 2 Pb clean 1 250-g cell 0.25 0.1 1 1 Clean Pb tail No. 1 3.8 4.53 16.20 1 14.3 5.8 Clean Pb tail No. 2 1	OBJECT OF TEST:				• •								СНА	RGE:			
OPERATION min Solida PH used T 130 R 242 ZnSQ. NaCN ZnSQ. SOL 610 633 MIBC Z-11 Grind (1) 30 67 7 x 14 RM 0.10 0.10 0.02 2.0 15	R	legrind L	ead Co	ncenti	ate								TES	TED B	Y: WAW		
min Solids Used T 13 0 k 24 ZnS04, NaCN ZnS20, S02 S10 633 MBC Z-11 Condition 10 50 6.5 2000-g cell 15 1 0.10 0.0 0.2 2.0 1 1 1 1 0.10 0.0 0.10 0.0 1 1 1 0.10 0.0 1 0.10 0.0 1 0.10 0.0 1 0.10 0.0 1 0.10 0.0 1 0.10 0.0 1 0.10 0.0 0.10		Time	%		L	Init				Rea	agents,	lb per	ton				
Condition 10 50 6.5 2000-g cell 15 0.10 0.10 Pb float 4 25 7.3 0.05 0.05 0.05 Zine condition 6 25 8.0 0.05 0.05 0.10 0.10 Zine float 6 25 8.0 0.05 0.05 0.05 0.10 0.10 Pb conc grind 60 Pebble Mill 0.25 0.1 0.10 0.10 No. 1 Pb clean 1 250-g cell 0.25 0.1 0.10 0.10 No. 2 Pb clean 1 0.25 0.1 0.10 0.10 0.10 Zn clean 1 020-g cell 0.25 0.1 0.10 0.10 PRODUCT WT ANALYSIS(3) DISTRIBUTION % 0.10 0.10 0.10 0.10 Clean Pb tail No. 1 3.8 4.53 16.20 14.3 5.8 4.5 Clean Pb tail No. 2 1.7 8.3 16.20 14.3 5.2 13.0 Clean Pb tail No. 2 1.7 6.61 0.37		min	Solids	рп	u	sed	T 130	R 242	ZnS04	NaCN	ZnS_2O_4	S02	610	633	MIBC	Z-11	
Condition 10 50 6.5 2000-g cell 15 0.10 0.10 Pb float 4 25 7.3 0.05 0.05 0.05 Zine condition 6 25 8.0 0.05 0.05 0.10 0.10 Zine float 6 25 8.0 0.05 0.05 0.05 0.10 0.10 Pb conc grind 60 Pebble Mill 0.25 0.1 0.10 0.10 No. 1 Pb clean 1 250-g cell 0.25 0.1 0.10 0.10 No. 2 Pb clean 1 0.25 0.1 0.10 0.10 0.10 Zn clean 1 020-g cell 0.25 0.1 0.10 0.10 PRODUCT WT ANALYSIS(3) DISTRIBUTION % 0.10 0.10 0.10 0.10 Clean Pb tail No. 1 3.8 4.53 16.20 14.3 5.8 4.5 Clean Pb tail No. 2 1.7 8.3 16.20 14.3 5.2 13.0 Clean Pb tail No. 2 1.7 6.61 0.37	Grind (1)	30	67		7 x 1	4 RM	0.10	0.10	1.0	0.2	2.0						
Pb float 4 25 7.3 0.05 Zinc condition (2) 10 25 8.0 0.05 0.05 Zinc float 6 25 8.0 0.05 0.05 Pb conc grind 60 Pebble Mill 0.25 0.10 No. 1 Pb clean 1 250-g cell 0.25 0.1 No. 2 Pb clean 1 250-g cell 0.25 0.1 No. 2 Pb clean 1 250-g cell 0.25 0.1 PRODUCT WT ANALYSIS(3) DISTRIBUTION % PRODUCT WT ANALYSIS(3) DISTRIBUTION % PRODUCT WT Ag oz/t Pb Zn Mg oz/t Fb% Zn% Ag Pb Zn Clean Pb tail No. 1 3.8 1.7 8.73 16.81 Ro Pb conc (calcd) 8.3 12.18 16.33 85.2 13.0 Clean Zn tail 6.4 0.205 0.10 0.34 3.0 5.2 2.0 Clean Zn conc (calcd) 28.9 0.205 0.10 0.34 3.0 5.2 2.0 <	Condition	10	50	6.5				· ·	1			15					
Zinc condition (2) 10 25 8.0 0.05 0 0.05 0 0.10 Zinc float 6 25 8.0 0.05 0.05 0.10 0.10 Ph conc grind 60 Pebble Mill 0.25 0.1 0.10 No. 1 Pb clean 1 500-g cell 0.25 0.1 0.10 No. 2 Pb clean 1 250-g cell 0.25 0.1 0.25 Zn clean 2 1000-g cell 0.25 0.1 0.25 PRODUCT WT ANALYSIS(3) DISTRIBUTION % Mag oz/t Pb% Zn% Ag Pb Zn Clean Pb conc 2.8 24.23 16.20 14.3 5.8 Clean Pb tail No. 1 3.8 12.18 16.33 85.2 13.0 Clean Pb tail No. 2 2.7 6.61 0.37 38.19 34.0 6.9 81.3 Clean A tail 6.4 0.205 0.10 0.34 3.0 5.2 2.0 Ro tail 62.8 0.205 0.10 0.34	Condition		-										0.1	0 0.	10		
Zinc float 6 25 8.0 0 0.10 Ph conc grind 60 Pebble Mill 0.25 0.1 0.10 Son 1 pb clean 1 250-g cell 0.25 0.1 0.10 No. 2 Pb clean 1 250-g cell 0.25 0.1 0.10 No. 2 Pb clean 1 250-g cell 0.25 0.1 0.10 Zn clean 2 1000-g cell 0.25 0.1 0.10 PRODUCT WT ANALYSIS(3) DISTRIBUTION % PRODUCT WT ANALYSIS(3) DISTRIBUTION % Clean Pb conc 2.8 2.4 16.20 4.8 4.5 16.30 Clean Pb tail No. 1 3.8 4.53 16.20 58.6 4.5 14.3 5.8 Clean Zn conc 22.5 6.61 0.37 38.19 34.0 6.9 81.3 Clean Zn conc (calcd) 28.9 0.205 0.10 0.34 3.0 5.2 2.0 Ro Zn conc (calcd) 28.9 0.205 0.10 0.34 3.0 5.2	Pb float	4	25	7.3							-				0.05		
Zinc float 6 25 8.0 0 0.10 Ph conc grind 60 Pebble Mill 0.25 0.1 0.10 Son 1 pb clean 1 250-g cell 0.25 0.1 0.10 No. 2 Pb clean 1 250-g cell 0.25 0.1 0.10 No. 2 Pb clean 1 250-g cell 0.25 0.1 0.10 Zn clean 2 1000-g cell 0.25 0.1 0.10 PRODUCT WT ANALYSIS(3) DISTRIBUTION % PRODUCT WT ANALYSIS(3) DISTRIBUTION % Clean Pb conc 2.8 2.4 16.20 4.8 4.5 16.30 Clean Pb tail No. 1 3.8 4.53 16.20 58.6 4.5 14.3 5.8 Clean Zn conc 22.5 6.61 0.37 38.19 34.0 6.9 81.3 Clean Zn conc (calcd) 28.9 0.205 0.10 0.34 3.0 5.2 2.0 Ro Zn conc (calcd) 28.9 0.205 0.10 0.34 3.0 5.2	Zinc condition ⁽²⁾	10	25	8.0	•			0.05									
No. 1 Pb clean 1 500-g cell 0.25 0.1 1 1 No. 2 Pb clean 1 250-g cell 0.25 0.1 1 1 Zn clean 2 1000-g cell 0.25 0.1 1 1 PRODUCT WT ANALYSIS(3) DISTRIBUTION % PRODUCT % Ag oz/t Pb% Zn% Ag Pb Zn Clean Pb conc 2.8 24.23 16.20 14.3 5.8 14.3 5.8 Clean Pb tail No. 1 3.8 4.53 16.20 14.3 5.8 12.3 2.7 Ro Pb conc (calcd) 8.3 12.18 16.33 12.3 2.7 3.0 2.9 85.2 13.0 Clean Zn conc 22.5 6.61 0.37 38.19 34.0 6.9 81.3 2.7 3.7 Ro Zn conc (calcd) 2.89 0.400 31.21 9.6 85.0 9.6 85.0 Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 Feed (calcd)	Zinc float		25	8.0												0.10	
No. 2 Pb clean 1 250-g cell 0.25 0.1 Zn clean 2 1000-g cell 0.25 0.1 0.25 0.1 PRODUCT WT ANALYSIS(3) DISTRIBUTION % Clean Pb conc 2.8 24.23 16.20 4.33 16.31 Clean Pb tail No. 1 3.8 4.53 16.20 14.3 5.8 Clean Pb tail No. 2 1.7 8.73 16.631 12.3 2.7 Ro Pb conc (calcd) 8.3 1.2.18 16.63 85.2 13.0 Clean Zn tail 6.4 28.9 0.205 0.10 0.34 34.0 6.9 81.3 Clean Cn conc (calcd) 28.8 0.205 0.10 0.34 3.0 5.2 2.0 Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. 12.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100	Pb conc grind	60			Pebb1	e Mill											
Zn clean 2 1000-g cel1 Distribution PRODUCT WT ANALYSIS(3) DISTRIBUTION % Mag oz/d Pb% Zn% Ag Pb Zn Clean Pb conc 2.8 24.23 16.20 Ag Pb Zn Clean Pb tail No. 1 3.8 24.23 16.20 14.3 5.8 4.53 Clean Pb tail No. 2 1.7 8.73 16.81 12.3 2.7 Ro Pb conc (calcd) 8.3 12.18 16.33 34.0 6.9 81.3 Clean Zn conc 22.5 6.61 0.37 J8.19 34.0 6.9 81.3 Clean Zn conc (calcd) 8.3 0.205 0.10 0.34 3.0 5.2 2.0 Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 Feed (calcd) 100.0 4.37 ⁽⁴⁾ 1.20 10.57 100.0 100.0 0.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents Ca0 - 1.5, CuS04	No. 1 Pb clean	and the second se						<u> </u>								Į	
PRODUCT WT ANALYSIS(3) DISTRIBUTION % Clean Pb conc 2.8 24.23 16.20 Ag Pb Zn Clean Pb tail No. 1 3.8 4.53 16.20 14.3 5.8 Clean Pb tail No. 2 1.7 8.73 16.81 12.3 2.7 Ro Pb conc (calcd) 8.3 12.18 16.33 85.2 13.0 Clean Zn conc (calcd) 8.3 0.51 6.30 34.0 6.9 81.3 Clean Zn conc (calcd) 28.9 0.40 31.21 9.6 85.0 Ro Zn conc (calcd) 28.9 0.40 31.21 9.6 85.0 Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 Red (calcd) 100.0 4.37 ⁽⁴⁾ 1.20 10.57 100.0 100.0 0.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents Ca0 - 1.5, CuSO ₄ - 2.0, R 404 - 0.05 Ib/ton. (3) From Internal Reports MS-AC-70-1211 and 1217.	No. 2 Pb clean	1			250-g	cell			0.25	0.1							
PRODUCT WT ANALYSIS(3) DISTRIBUTION % Clean Pb conc 2.8 24.23 16.20 Ag Pb Zn Clean Pb tail No. 1 3.8 4.53 16.20 14.3 5.8 Clean Pb tail No. 2 1.7 8.73 16.81 12.3 2.7 Ro Pb conc (calcd) 8.3 12.18 16.33 85.2 13.0 Clean Zn conc (calcd) 8.3 0.51 6.30 34.0 6.9 81.3 Clean Zn conc (calcd) 28.9 0.40 31.21 9.6 85.0 Ro Zn conc (calcd) 28.9 0.40 31.21 9.6 85.0 Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 Red (calcd) 100.0 4.37 ⁽⁴⁾ 1.20 10.57 100.0 100.0 0.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents Ca0 - 1.5, CuSO ₄ - 2.0, R 404 - 0.05 Ib/ton. (3) From Internal Reports MS-AC-70-1211 and 1217.								ļ									
PRODUCT % Ag oz/t Pb% Zn% Ag Pb Zn Clean Pb conc 2.8 24.23 16.20 58.6 4.5 14.3 5.8 Clean Pb tail No. 1 3.8 4.53 16.20 14.3 5.8 14.3 5.8 Clean Pb tail No. 2 1.7 8.3 12.18 16.33 12.3 2.7 Ro Pb conc (calcd) 8.3 6.61 0.37 38.19 34.0 6.9 81.3 Clean Zn conc 22.5 6.61 0.37 38.19 34.0 6.9 81.3 Clean Zn conc (calcd) 28.9 0.205 0.10 0.34 3.0 5.2 2.0 Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 Feed (calcd) 100.0 4.37 ⁽⁴⁾ 1.20 10.57 100.0 100.0 100.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents Ca0 - 1.5, CusO ₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC	Zn clean	2			1000-	<u>g cell</u>											
PRODUCT % Ag oz/t Pb% Zn% Ag Pb Zn Clean Pb conc 2.8 24.23 16.20 58.6 4.5 14.3 5.8 Clean Pb tail No. 1 3.8 4.53 16.20 14.3 5.8 14.3 5.8 Clean Pb tail No. 2 1.7 8.3 12.18 16.33 12.3 2.7 Ro Pb conc (calcd) 8.3 6.61 0.37 38.19 34.0 6.9 81.3 Clean Zn conc 22.5 6.61 0.37 38.19 34.0 6.9 81.3 Clean Zn conc (calcd) 28.9 0.205 0.10 0.34 3.0 5.2 2.0 Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 Feed (calcd) 100.0 4.37 ⁽⁴⁾ 1.20 10.57 100.0 100.0 100.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents Ca0 - 1.5, CusO ₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC					<u> </u>								<u> </u>				
76 Ag oz/t Pb% Zn% Ag Pb Zn Clean Pb conc 2.8 3.8 4.53 16.20 14.3 5.8.6 4.5 Clean Pb tail No. 1 3.8 4.53 16.20 14.3 5.8 4.53 16.20 14.3 5.8 14.3 5.8 Clean Pb tail No. 2 1.7 8.73 16.81 12.3 2.7 3.7 Ro Pb conc (calcd) 8.3 12.18 16.33 34.0 6.9 81.3 Clean Zn conc 22.5 6.61 0.37 38.19 34.0 6.9 81.3 Clean Zn tail 6.4 0.205 0.10 0.34 3.0 5.2 2.0 Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 Feed (calcd) 100.0 4.37 ⁽⁴⁾ 1.20 10.57 100.0 100.0 100.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents Ca0 - 1.5, CusO ₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Inte	PRODUCT	11				ANAI	_YSIS(3)				D	STRI	BUTIO	N %		
Clean Pb tail No. 1 3.8 1.7 4.53 16.20 14.3 5.8 Clean Pb tail No. 2 1.7 8.3 1.7 8.73 16.81 12.3 2.7 Ro Pb conc (calcd) 8.3 1.7 12.18 16.33 12.3 2.7 Clean Zn conc 22.5 6.61 0.37 38.19 34.0 6.9 81.3 Clean Zn tail 6.4 0.51 6.30 0.40 31.21 3.0 5.2 2.0 Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 Feed (calcd) 100.0 4.37 ⁽⁴⁾ 1.20 10.57 100.0 100.0 100.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents Ca0 - 1.5, CuSO ₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217.		%	5	Ap	; oz/t		РЪ%	Zn%					Ag	РЪ	Zn		
Clean Pb tail No. 1 3.8 1.7 4.53 16.20 14.3 5.8 Clean Pb tail No. 2 1.7 8.3 1.7 8.73 16.81 12.3 2.7 Ro Pb conc (calcd) 8.3 1.7 12.18 16.33 12.3 2.7 Clean Zn conc 22.5 6.61 0.37 38.19 34.0 6.9 81.3 Clean Zn tail 6.4 0.51 6.30 0.40 31.21 3.0 5.2 2.0 Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 Feed (calcd) 100.0 4.37 ⁽⁴⁾ 1.20 10.57 100.0 100.0 100.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents Ca0 - 1.5, CuSO ₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217.	Clean Pb conc	2	.8				24.23	16,20						58.6	4.5		
Clean Pb tail No. 2 1.7 8.73 16.81 12.3 2.7 Ro Pb conc (calcd) 8.3 6.61 0.37 38.19 34.0 6.9 81.3 Clean Zn tail 6.4 0.40 31.21 9.6 85.0 9.6 85.0 Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 Reed (calcd) 100.0 4.37 ⁽⁴⁾ 1.20 10.57 100.0 100.0 100.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents CaO - 1.5, CuSO ₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217.	Clean Pb tail No. 1	11	41														
Clean Zn conc 22.5 6.61 0.37 38.19 34.0 6.9 81.3 Clean Zn tail 6.4 28.9 0.51 6.30 0.40 31.21 9.6 85.0 Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 Feed (calcd) 100.0 $4.37^{(4)}$ 1.20 10.57 100.0 100.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents Ca0 - 1.5 , CuSO ₄ - 2.0 , R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217.	Clean Pb tail No. 2														•		
Clean Zn tail 6.4 0.4 0.51 6.30 0.40 31.21 Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 Feed (calcd) 100.0 4.37 ⁽⁴⁾ 1.20 10.57 100.0 100.0 100.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents CaO - 1.5, CuSO ₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217.	Ro Pb conc (calcd)	8	.3				12.18	16.33						85.2	13.0		
Clean Zn tail 6.4 0.4 0.51 6.30 0.40 31.21 Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 Feed (calcd) 100.0 4.37 ⁽⁴⁾ 1.20 10.57 100.0 100.0 100.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents CaO - 1.5, CuSO ₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217.	C_{1eqn} $7n$ conc	22	5		61		0 27	20 10				2		6.0	01 2		
Ro Zn conc (calcd) 28.9 0.205 0.40 31.21 9.6 85.0 Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 Feed (calcd) 100.0 4.37 ⁽⁴⁾ 1.20 10.57 100.0 100.0 100.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents CaO - 1.5, CuSO ₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217.					.01							5	4.0		5		
Ro tail 62.8 0.205 0.10 0.34 3.0 5.2 2.0 Feed (calcd) 100.0 4.37 1.20 10.57 10.57 100.0 100.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents CaO - 1.5, CuSO ₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217.															1		
Feed (calcd) 100.0 4.37 ⁽⁴⁾ 1.20 10.57 100.0 100.0 REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents CaO - 1.5, CuSO ₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217.							0.,0	51121							0.00		
REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents CaO - 1.5, CuSO ₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217.	Ro tail	62	.8	0	. 205		0.10	0.34					3.0	5.2	2.0		
REMARKS: (1) Flotation tailing 98.3 per cent minus 200 mesh. (2) Reagents CaO - 1.5, CuSO ₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217.		100			an (4)		1 00	10 57						100 0			
 (2) Reagents CaO - 1.5, CuSO₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217. 	Feed (calca)	1100	.0	4.	37 1		1.20	10.57						100.0	100.0		
 (2) Reagents CaO - 1.5, CuSO₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217. 	:	·	l				1										
 (2) Reagents CaO - 1.5, CuSO₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217. 						}					i.						
 (2) Reagents CaO - 1.5, CuSO₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217. 																	
 (2) Reagents CaO - 1.5, CuSO₄ - 2.0, R 404 - 0.05 1b/ton. (3) From Internal Reports MS-AC-70-1211 and 1217. 	REMARKS (1) Flotat	ion tail	ing 98	.3 ner	cent	minus	200 me	sh.	4								
(3) From Internal Reports MS-AC-70-1211 and 1217.									ю.								
									/11 •								
	· •		Report	e <u></u>	<u></u>	<u></u>	<u></u>									•.	

	$\begin{array}{c c c c c c c c c c c c c c c c c c c $				Conco	ntroto						<u>- 14, 1</u> 2000-g	970		
OBJECT OF TEST: 110	JLALION	OI MI	darme	, 1100			tonce	inclare						2000-g 3Y: WAW	 r
	1	1		<u> </u>						agents,	15 5 5 5			Y: WAW	
OPERATION			рH			T130	R242	ZnSO,				CaO	CuSC	, Z-11	мівс
Grind (1)	20	67		7x14	RM	0.10	0.10	1.0	0.2	2.0					
Condition	5	50	7.0	2000	-g cell						0.10	÷			
Lead float	6	25	7.0		-0	-									
Zinc condition	10	25	8.1								-	2.0	2.0	I .	
Zinc float	. 6	25	8.1											0.10	0.04
No. 1 Pb clean	2.			1000	-g cel1										
No. 2 Pb clean	1			500	-g cell										
Condition clean Pb cond	5			250	-g cell			·							
Float middling	1.5									ļ					
Zinc clean	2			1 000	-9 cell										
	l w	T II		. 2000		LYSIS	% (3)	-1	•	1		STRI	BUTIO	N %	
PRODUCT	11		Ag o	z/ton		Pb %	Zn %	Fe %	· · · · ·		Ag		Pb	Zn	
Pb conc Pb-Zn middling C1 Pb conc (calcd) No. 1 Cl Pb tail No. 2 Cl Pb tail Ro Pb conc (calcd)	0 3 8 4	.9 .7 .6 .3				25.95 5.39 20.97 1.58 2.91 6.25	22.11 14.52 20.27 13.15 15.88 15.44	13.42	2				61.6 4.2 65.8 11.5 10.6 87.9	5.7 1.2 6.9 10.4 6.3 23.6	
Cl Zn conc Cl Zn tail Ro Zn conc (calcd)	6	.9		1.50		0.37 0.48 0.40	41.60 4.62 31.67				2).8 2.4 3.2	5.9 2.8 8.7	71.9 2.9 74.8	
Ro tail	57	. 7		0.14		0.07	0.31				1	8	3.4	1.6	
Feed (calcd)	100	.0		4.37		1.18	10.88	e* .			100	0.0 1	.00.0	100.0	
				·				<u> </u>	<u> </u>	<u> </u>		<u> </u>			
REMARKS: (1) Flotati (3) From In	on tai. ternal	Report	per MS-A	cent 1 C-71-	minus 2 7 and 1	UU mest 1.	n. (2,) Keage	nt 500	iium Di	cnroma	Te J.	υ το/	LON.	

10

									· · · · ·					c. 16, 3	1970
OBJECT OF TEST: Lea	ad flota	ation v	vith s	starva	tion qu	antity	of rea	gents						2000 - g	
		+						<u> </u>		<u> </u>			TED B	Y: WAW	
OPERATION	Time	%	нα				·			p	lb per				
OPERATION Imme Solids pH used T130 ZnSO4 NaCN ZnS2C Grind (1) 15 67 7x14 RM 0.10 1.0 0.2 1.0 Lead flotation 5 25 7.5 2000-g cel1 1.0 0.2 1.0 Lead scavenge 3 25 1 1.0 0.2 1.0 Zinc condition 10 9.0 1.0 1.0 0.2 1.0 No. 1 Pb clean 1 500-g cel1 1 1.0 1.0 1.0 No. 2 Pb clean 1 250-g cel1 1.0 1.0 1.0 1.0 Zinc clean 1 1000-g cel1 1.0 1.0 1.0 1.0 Zinc clean 1 1000-g cel1 1.0 1.0 1.0 1.0 Zinc clean 1 1.000-g cel1 1.0 1.0 1.0 1.0 PRODUCT WT Analysis % (2) 1.0 1.0 1.0 1.0			ZnS_2O_4	AF71	SodA	CuSO	CaO	Z-200	0						
	CT OF TEST:Lead flotation withOPERATIONTime $\%$ min Solidsph(1)1567flotation525condition109.flotation69.flotation69.flotation109.flotation69.flotation69.flotation109.flotation69.flotation109.flotation69.Pb clean19.clean19.clean19.productWT9.flotatil1.5flotatil1.5flotatil1.6conc (calcd)7.9nger Pb conc2.9Pb conc (calcd)10.8Zn conc14.8Zn tail12.0conc (calcd)26.8il62.4						1.0	0.2	1.0		<u> </u>	<u> </u>			
			7.5	2000	-g cell		ļ		ļ	0.02	<u> </u>				<u> </u>
Lead scavenge	CT OF TEST:Lead flotation withOPERATIONTime min $\ensuremath{\beta}$ Solids \ensuremath{pH} (1)1567lotation5257.5cavenge325ondition109.0lotation69.0lotation69.0lotation109.0lotation109.0lotation19.0lotation19.0lotation19.0Pb clean19.0lean19.0lean19.0Pb clean19.0lean19.0Pb clean19.0lean19.0lean19.0Pb clean1.5Cl Pb tail4.8Cl Pb tail1.6conc (calcd)7.9ger Pb conc2.9Pb conc (calcd)10.8Zn conc14.8112.0conc (calcd)26.8162.4						L				0.05	·			
Zinc condition	CT OF TEST:Lead flotation wiOPERATION $Time \ \% \\ min \ Solids$ (1)1567flotation525scavenge325condition10flotation6Pb clean1Pb clean111Pb clean111Pb clean111Pb clean111Pb clean111Pb clean111Pb clean111.5Cl Pb tail1.6conc (calcd)7.9pger Pb conc2.9Pb conc (calcd)10.8Zn conc14.8Zn tail12.0conc (calcd)26.8162.4						<u> </u>				1	2.0	2.0		
Zinc flotation	6						<u> </u>		<u> </u>					0.10	
No. 1 Pb clean	1			500-	g cell										
									ļ						
							ļ		ļ		<u> </u>				
Zinc clean	JECT OF TEST: Lead flotation withOPERATIONTime $\%$ min Solidsnd (1)1567i flotation525i scavenge325c condition109c flotation691 Pb clean192 Pb clean192 Pb clean192 Pb clean192 Clean192 Clean1.54.82 Cl Pb tail1.6PRODUCTWT9wenger Pb conc2.91 Pb conc (calcd)7.92.910.8an Zn conc14.812.026.8an Zn tail62.41 (calcd)100.0			1000	<u>-g cell</u>										
				1											
	W	т			ANA	LYSIS	X % (2)				D	ISTRI	BUTIO	N %	
FRODUCT	JECT OF TEST: Lead flotation with stOPERATIONTime min $\%$ Solids pH nd (1)1567d flotation525d flotation109.0c condition109.0c flotation61 Pb clean12 Pb clean1c clean1PRODUCTWT %Mark Mag ozan Pb conc1.51 Cl Pb tail Pb conc (calcd)1.52 Cl Pb tail Pb conc (calcd)10.8an Zn conc an Zn tail14.810 Conc (calcd)14.81162.40						Fe %	Insol	.% Cu %		Ag	3	Pb	Zn	Fe
Clean Pb conc	CT OF TEST: Lead flotation with sOPERATIONTime $\%$ min SolidspH(1)1567flotation525scavenge325condition109.0flotation6Pb clean1Pb clean1clean1PRODUCTWT%Ag orPb conc1.5C1 Pb tail4.8C1 Pb tail1.6conc (calcd)7.9pb conc (calcd)10.8Zn conc14.8Zn tail26.8i162.4(calcd)100.0			20.00	11.54	7.05	4.52	2 0.02				25.6	1.6	2.1	
No. 1 Cl Pb tail	ECT OF TEST: Lead flotation withOPERATIONTime min $\%$ SolidspHi (1)1567flotation525scavenge325condition109.0flotation6Pb clean1Pb clean1clean1PRODUCTWT %AgPRODUCTWT %AgProb conc1.5 4.8Cl Pb tail1.6 7.9ocnc (calcd)7.9 2.9Pb conc (calcd)10.8 1.6a Zn conc14.8 12.0 26.8i162.4 100.0							1					28.2	6.7	6.4
No. 2 Cl Pb tail		14		•									15.8	2.0	2.2
		11											69.6	10.3	10.
	11												7.5	4.1	3.8
Total Pb conc (calcd)	10	0.8			8.38	14.52	6.86						77.1	14.4	14.5
Clean Zn conc	14	+ 8	1	0.09	0.74	54.05	6.21				34	+.2	9.4	73.6	18.1
							23.38					9.2	7.1	9.8	55.1
	11	11					13.90				43	3.4	16.5	83.4	73.2
Ro tail	62	2.4		0.20	0.12	0.39	1.00				2	2.9	6.4	2.2	12.
Feed (calcd)	100	0.0		4.37	1.17	10.88	5.09					1	.00.0	100.0	100.
REMARKS: (1) Flotati	on tail	ing 85	.0 pe	er cen	t minus	200 me	sh. (2) Fro	m Inte:	 rnal F	leports	s MS-A	AC-71-9	9 and 11	1.

- 11

I

TEST NO. 11 SAMP	LE: R	eeves 1	MacDo	nald N	ines Li	mited	· · ·	· · · · · · · · · · · · · · · · · · ·				DAT	E: Dec	. 17, 1	.970 ⁻
OBJECT OF TEST: Chang	ge of	Reagen	ts									CHA	RGE:	2000 - g	1
	-	0				•	·					TES	TED B	Y: WAW	·
	Time	%		ι	Jnit	T			Rea	igents,	lb per	ton			
OPERATION	min	1 1	рп	t	used	ZnSO,	NaCN	ZnS ₂ O	Sod A	AF71	CuSO,	CaO	3477		
Grind (1)	20	67		7x14	RM	1.0	0.25	1.0			<u> </u>				
Condition		50	7.3	2000-	g cell		_		0.02	0.02				_	
					•		<u> </u>							· ·	
Pb scavenge	3.5								0.03	0.02					
Zn condition	15		8.5					•			2.0	2.0			
Zn float	55					-							0.1	0	
						·									
No. 1 Clean Pb	1			500 - g	g cell			1.0							
No. 2 Clean Pb	1			250-8	cell		_	ļ							
									· .						
Zn Clean	2	· .		1000-	g cell										
				l					•						
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		STRIE	BUTIO	N %											
	%	6	Ag	oz/tor		Pb	Zn				Ag	5		Pb	Zn
Clean Pb conc	1	.0				2.0	13.95							1.7	1.3
No. 1 Clean Pb tail	4	.9				3.06	12.42							12.8	5.4
No. 2 Clean Pb tail	11						1							1.6	0.9
	11	11												16.1	76
	<i>t</i> 1								1					16.9	3.7
Total Pb conc (calcd)	10	•2				3.79	12.41							33.0	11.3
		6		14 00		2 12	1.0 71					2 0	: ·	51.3	81.1
•	11		· ·											8.0	5.1
		11		2.50								0.1		59.3	86.2
KO ZII COIRE (Carea)	29	• 2				2.52	52.17				1			57.5	00.2
Ro tail	59	.9		0.305		0.15	0.46					4.2		7.7	2.5
Feed (calcd)	100	.0				1.17	11.17				10	0.0		100.0	100.0
				<u> </u>											
REMARKS: (1) Flotatio	n tai	1 90.9	per (cent m	inus 20	0 mesh	. (2)	From I	nterna	1 Repo	orts MS	-AC-7	1-4 ai	nd 23.	1
					•										
													•		

5

•

				onald M	ines	Limit	ed							. 17, 19	970
OBJECT OF TEST: Char	nge of F	Reagent	- 5						•					2000 - g	
												·	TED B	Y: W.A	• W •
OPERATION	Time	%	рН	Unit						igents.	•				
OFERATION	min	Solids	рп	use	d	ZnSO4	NaCN	ZnS_2O_4	Scal A	AF71	Ca0	CuSO	+ Z-1	1.	
Grind (1)	20	67		7 x 14	RM	1.0	0.25	1.0				1			1
Condition	5	50	7.8	2000-g	cel1				0.04						
Pb float	3	25	,			1				0.03					
Pb scavenger	3	25							0.05						
Zn condition	11	25	8.7								2	2			
Zn float										0.02			0.1	0	
											<u> </u>				
No. 1 Pb clean	1.5			500-g c											
No. 2 Pb clean	1.0			250-g c	e11										
											ļ				
Zn clean	2.5	<u> </u>	<u> </u>	1000-g	ce11							<u> </u>			
PRODUCT	W	т			ANAL	YSIS	(2)	<u>. </u>			D	ISTRI	BUTIO	N %	
FRODUCT	%	6	Ag	oz/ton		Pb	Zn				A	g	РЪ	Zn	
Clean Pb conc	0	.8				2.23	14.68		1				1.6	1.1	
No. 1 Cl Pb tail	11	•4				3.66	12.14						13.9	4.8	
No. 2 Cl Pb tail		•4	1			2.16	12.93	1					2.6	1.6	
Ro Pb conc (calcd)		•6				3.17	12.61						18.1	7.5	
Pb scavenger	11	•4				4.64	11.67						17.6	4.7	
Total Pb conc (calcd)	11	•0				3.75	12.23	ĺ					35.7	12.2	
01	19		1	3.56		2.96	45.04				6	0.2	49.7	79.2	
Clean Zn conc Clean Zn tail	11	.9		3.59		1.08	9.01	•				4.0	4.6	4.0	
Ro Zn conc (calcd)	24	11		1.59		2.58	37.77						54.3	83.2	
Ro tail	64	51		0.445		0.18	0.78					6.6	10.0	4.6	
Feed (calcd)	100	18		4.373		1.16	11.03	1					100.0	100.0	
reed (calcu)		•••		4.57		1.10	11005								
									1						
									1						
								<u> </u>							
REMARKS: (1) Flotat:	ion tai	ling 9	0.9 pe	er cent m	inus	200 me	sh								
(2) From In		Repor	t MS-A	.C-71-4 a	ind 3	1									
(3) Assay y	value														

1

κ.

TEST NO. 13 SAMP	LE: I	Reeves	MacDo	nald 1	Mines L:	imited								c. 30, 1	L970
OBJECT OF TEST: Repe	at of '	Pest No	12	at fi	ner ori	nđ .						СНА	RGE: ;	2000 - g	
												TES	TED B	Y: W.A.	.W.
	Time	%		ι ι	Jnit			•		igents,					
OFERATION	min	Solids	рп	ι	used	ZnS04	NaCN	ZnS_2O	so ₂	AF 71	Scd A	CuSC	4 CaO	Z-11	
Grind (1)	30	67			14 RM	1.0	0.25	1.0				· ·			1
Condition	10	50	6.8	2000	-g ce11				25						
No. 1 Pb Float	CT OF TEST: Repeat of Test No. 12 at file DPERATION Time $\frac{\%}{min}$ pH 0 (1) 30 67 7 x (1) 2.5 2.5 (2) 5 7.4 2000 2b Float 3.0 2.5 7.4 Ag At 2.5 PRODUCT WT<							0.03							
Clean No. 1 Pb conc	T OF TEST: Repeat of Test No. 12 at 1 OPERATION Time min Solids pH 1) 30 67 7 x on 10 50 6.8 200 b Float 2.5 25 0 0 o. 1 Pb conc 1 255 25 0 ition 10 25 8.3 1 r 4 25 100 10 ition 10 25 8.3 1 r 4 25 100 100 b clean conc 2.0 5.82 6.22 b clean tail 2.4 6.22 6.22 b conc (calcd) 5.9 7.82 13.12 n conc 16.4 17.69 6.02 n tail 67.2 0.28 13.12 <t< td=""><td></td><td></td><td>1.0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>							1.0							
No. 2 Pb Float	3.0	25	7.4	2000	-g ce11						0.04				
In condition	10	25	8.3	1								2.0	2.0	0	
In float			0.5			+				0.03				0.10	5
In clean				1000	-g cell										
·						_ YSIS								· .	<u> </u>
PRODUCT	ECT OF TEST: Repeat of Test No. 12 at f OPERATION Time % pH A (1) 30 67 7 x ition 10 50 6.8 200 Ition 10 25 25 9 No. 1 Pb conc 1 250 25 9 Opdition 10 25 8.3 100 Iean 2 100 100 25 8.3 Iean 2 100 4 25 100 PRODUCT WT 9 4 6.21 Prough conc (calcd) 4.4 6.05 13.13 IPb clean tail 2.4 6.21 13.13 IPb conc (calcd) 16.4 17.69 13.13 Iean conc 16.4 17.69 13.13 Iean tail 67.2 0.28 13.15								y		DI	STRI	3UTIO	N %	
	ECT OF TEST: Repeat of Test No. 12 at f: OPERATION Time min Solids pH 1(1) 30 67 7 x 1(1) 30 67 7 x tion 10 50 6.8 200 Pb Float 2.5 25 100 no. 1 Pb conc 1 250 7.4 200 mdition 10 25 8.3 0 0 oat 4 25 1000 10 25 8.3 0 oat 4 25 1000 100 100 1000 1000 PRODUCT WT			Ag		РЪ	Zn	. <u>.</u>			A	g	Pb	Zn	
No. 1 Pb clean conc	CT OF TEST: Repeat of Test No. 12 at f OPERATION Time min Solids pH (1) 30 67 7 x (1) 30 67 7 x tion 10 50 6.8 200 Pb Float 2.5 25 7.4 200 no. 1 Pb conc 1 250 7.4 200 ndition 10 25 8.3 0 pb Float 3.0 25 7.4 200 ndition 10 25 8.3 0 oat 4 25 9 9 ean 2 100 100 100 PRODUCT WT			5.83		1.47	13.43	ĸ			2	.8	2.6	2.5	
No. 1 Pb clean tail	CT OF TEST: Repeat of Test No. 12 at OPERATION Time M_{min} ρH (1) 30 67 7 tion 10 50 6.8 20 Pb Float 2.5 25 7.4 20 no. 1 Pb conc 1 25 8.3 0 oat 4 25 9 10 ndition 10 25 8.3 0 oat 4 25 9 10 part 7 10 10 10 part 4 25 9 10 oat 4 25 9 10 part 5 7 4 6 part 5 9 7 8 pb clean tail 10.5 6.0 10 6.0<						12.04					.5	3.1	2.6	
No. 1 Pb rough conc(calo	61	11				1.47	12.66	t i i i i i i i i i i i i i i i i i i i				.3	5.7	5.1	
No. 2 rough conc	11	51				2.00	11.24				4	.7	2.6	1.6	
Rough Pb conc (calcd)	5	.9		7.85		1.59	12.31				11	•0	8.3	6.7	:
In clean conc	16		1	7-69		4.27	48.92				69	•2	61.8	73.9	
In clean tail						2.01	11.22					.2	18.6	10.8	· ·
						3.39	34.20					4	80.4	84.7	
			.												
Rough tail	67	2		0.285		0.19	1.39				. 4	.6	11.3	8.6	
Seed (calc)	100	.0		4.19		1.13	10.86				100	.0 1	.00.0	100.0	
·													a - 1		
······································											•				
							esh.					<u></u>	<u> </u>		
(2) from int	.ernal	report	.5 MD	AU = 11	-11 and	JT•									

- 14 -

TEST NO. 14 SA	MPLE: R	leeves	MacDo	nald Mi	nes Li	mited						1		. 5, 197	1
OBJECT OF TEST: 1	Reagents	used i	n mil	1								СНА	RGE:	2000 - g	
				·····								TES	TED B	Y: WAW	
OPERATION	Time	%	рН	Un	it				Rea	agents,	lb per	ton			
	mïn	Solids		us	ed .	ZnSO,	NaCN	A31	MIBC	633	CuSO,	Ca0	3477	_ZnS ₂ O	4
Grind (1)	30	67		7x14 R	M	0.10	0.07	0.02	0.02						
Condition	5	45	8.0	2000-g	cell					0.02					
Pb float	5	25							0.04						
Zn condition	10	25	8.5			1		0.02			0.80	0.60	0.05		
Zn float	4							0002							
Pb clean No. 1	1			500 - g	cell		1					1		0.05	
Pb clean No. 2	1			250 - g											
		•										1			
Zn clean	1.5			1000-g	<u>ce11</u>					ļ					
					<u>, , , , , , , , , , , , , , , , , , , </u>		<u> </u>								
	W	<u>г</u>	•		ANAL	YSIS	× (3)		<u> </u>		DI		BUTIO	<u> </u>	
PRODUCT	%		A	g ⁽²⁾		Pb %	Zn %				A	g	РЪ	Zn	
C1 Pb conc	0.	8				14.21	13.68						10.4	1.0	
C1 Pb tail No. 1	5.					12.72	16.00						60.0	7.7	
C1 Pb tail No. 2	1					11.58	13.28						10.5	1.2	
Ro Pb conc (calcd)	7.					12.73	15.33						80.9	9.9	
01 8	13.			.065		0 (2	61.60					8.8	5.5	79.2	
Cl Zn conc Cl Zn tail	4.		4	• 43		0•43 0•52	18.30				•	4.4	2.1	7.5	
Ro Zn conc (calcd)	18.	11		•43	l	0.52	51.19				4	3.2	7.6	86.7	
Ro 2n cone (cared)	10.	5	 '	•95		0.45	J1.19					3•2	7.0	00.7	
Ro tail	74.	7	ł	•46		0.17	0.49					7.9	11.5	3.4	
Feed (calcd)	100.	0	4	.37 ⁽⁴⁾		1.10	10.80				10	0.0	100.0	100.0	
REMARKS: (1) Flota							sh.) oz pe					
(3) From 3	Internal	ĸeport	s MS=,	AG-/1-1	o and	40			(4) Assa	У				
															-

.

1

·	MPLE: R	eeves]	MacDon	ald Mine	s Li	nited	. <u></u>							n. 5, 1	971	
OBJECT OF TEST:	Reagent	change												2000 - g		
	TESTED BY: W.A.W															
OPERATION	Time	%	Р. На	Unit						· · · · · · · · · · · · · · · · · · ·	, lb pe					
	min	Solids		usec		ZnSO,	NaCN	<u>Z-3</u>	H2SO	CaO	CuSO	ZnSz	O4			
Grind (1)	30	67		7x14 RM		1.0	0.2									
Condition	5	45	7.0	2000 - g	ce11			0.01	1.0	· ·	_					
Pb float	5	25	7.0													
Zn condition	15	25	10.6							7.0	2.0					
Zn float	5	25														
· ·									· · ·						<u> </u>	
Pb conc condition	5		6.7	<u>500-д с</u>	e11	· .			ļ			1.0				
No. 1 Pb clean	1			<u> </u>								ļ				
No. 2 Pb clean	0.75			250 - g c	e11									<u>. </u>		
						ļ							· ·			
Zn clean	2			1000-g	cell											
PRODUCT	W	т		A	NAL	YSIS	% (2)				D	ISTRI	BUTIO	N %		
	. 9	6	A	g(3)		Pb %	Zn %	`			A	g	Pb	Zn		
C1 Pb conc		0.6				9.61	12,71						5.0	0.7		
No. 1 Cl Pb tail		8.0				10.32	16.00						70.7	12.0		
No. 2 Cl Pb tail	11	1.2				8.65	12.54	ľ					8.9	1.4		
Ro Pb conc (calcd)		9.8				10.08	15.37						84.6	14.1		
to ib cone (carea)							2000						-	. •		
Cl Zn conc	1	1.1	10	.38		0.35	62.70				2	6.4	3.4	65.3		
Cl Zn tail	11 .	7.2		.55		0.56	23.87	· ·			1	0.8	3.4	16.1		
Ro Zn conc (calcd)	11	8.3		.87		0.43	47.43				3	7.2	6.8	81.4		
- ·· • •						0.1/	0.67		Ì			7.5	8.6	4.5	,	
Ro tail	/	1.9		•455		0.14	0.07					L • 1	_ 0∙0	4.5		
Feed (calcd)	10	0.d	4	•37 ⁽⁴⁾		1.17	10.67				10	0.0	100.0	100.0		
												·				
, (·		•		*										
				l	<u> </u>			<u> </u>		<u> </u>	<u> </u>			1		
REMARKS: (1) Flota			7 . 7 pe	r cent m	inus	200 me	esh			nterna	1 Repo	rts M	S-AC-7	1-18 an	d 50	
(3) ounces	s per to	n						(4)	Assay							

- 16

MINES BRANCH FLOTATION TEST REPORT

. 🏶 👘

.'

TEST NO. 16 SAM	PLE: I	Reeves	MacDo	nald Min	nes Li	mited					~~~~			n. 6, 19	71
OBJECT OF TEST: Co	barse g	grind v	vith r	egrind d	of Lea	d Conc	entrat	e			· · ·	СНА	RGE:	4000 - g	
· · · · · · · · · · · · · · · · · · ·					. <u> </u>							TES	TED B	Y: W.A.	W.
OPERATION	Time	%	рН	Uni	t	1			Rea	gents,	lb per	· ton			
OFERATION	min	Solids	- PL	use	ed	T130	R 242	ZnSO,	NaCN	<u> </u>	610	633	ZnS_2	JA MIBC	Z-11
Grind (1 + 2)	15	67		7x14 RM		0.10	0.10	1.0	0.2		<u> </u>		1.0		
Condition	5	35	6.1	2000-g	<u>ce11</u>		ļ			50					
Condition	5	35								25	0.10	0.10			
Pb float	4	25	7.2				0.05							0.04	
Zn condition ⁽³⁾	10	25	8.7												
Zn f l oat	4	25	8.7												0.10
Zn c l ean	1.5			1000-g	ce11									0.01	
Zn reclean	1.0			500-g c	e11										
Pb conc screen				400-m s	creen							1	•		
+400 m grind	15			pebble	mill										
+400 m c le an	1.5			250-g c	e11			1.00	0.25					0.01	
-400 m clean + reclean	1.5			500+250)g ce	11		1.00	0.25						
PRODUCT	W	т	* • • • •		ANAL	YSIS	% (6)				DI	STRI	Βυτιο	N %	
PRODUCT	%	6	A	g(4)		Pb	Zn				A	g	РЪ	Zn	
+400 m clean Pb conc	1	L.O				31.60	18.30						26.6	1.7	
+400 m clean Pb tail	1	L•2				3.08	23,50						3.1	2.6	
+400 m Ro Pb conc (calco	1) 2	2•2				31.18	21.14						29.7	4.3	
-400 m Rec1 Pb conc		L.0			ł	40.55	12.38		ł				34.2	1.2	
-400 m Recl Pb tail		2•4				4.00	14.00						8.1	3.1	
-400 m C1 Pb tai1		0,9	·			9.58	16.00						7.3	1.3	
-400 m Ro Pb conc (calco		+.3				13.67	14.05						49.6	5.6	
Total Ro Pb conc (calcd)	11	5.5				19.60	16.45			1			79.3	9.9	
Clean Zn conc		.0		•36		0.48	58.50					6.0	4.5	59.9	
Clean Zn tail	11	9.7		。96		0.61	11.25					6.6	5.0	10.1	
Reclean Zn tail	41	֥7		.61		0.66	36.75				1	6.0	2.6	16.1	
Ro Zn conc (calcd)	1.1	5.4		•93		0.56	36.43				1	8.6	12.1	86.1	
Ro tail	11	3.1	0	.31		0.15	0.63	1				4.8	8.6	4.0	
Feed (calcd)	100	0.0	4	.37(5)		1.19	.10.75				10	0.0	100.0	100.0	
REMARKS: (1) 2000-g 1					<u> </u>					; 84.0	per c	ent m	inus 2	200 mesh	
(3) Addition	nal Rea	agents	Ca0 =	2.0 1Ъ/	ton,	CuSO,	= 3.0 3	lb/ton	(4) ou	nces p	er to	n		
(5) Assay						(6) From	Intern	nal Rep	orts 1	MS-AC-	/1-32	and 6)/	

TEST NO. 17 SAMPLE: Reeves MacDonald Mines Limited DATE: Jan. 7, 1971 CHARGE: 2000-2 OBJECT OF TEST: Float plus 325 mesh fraction, Regrind concentrate combine with minus TESTED BY: W.A.W. 325 mesh fraction and float Reagents, Ib per ton Time % Unit OPERATION pН used min Solids NaCN Na CO ZnSO⁻, CaO DF250 CuSO 301 Grind 15 67 7x14 RM Screen 325 mesh Float +325 m fraction 1000-g cell 8 25 6.9 0.10 0.04 2.0 0.15 Regrind conc 7.0 Pebble Mill 0.03 30 Pb float (2) 20 1000-g cell 1.5 0.15 0.6 Pb clean No. 1 500-g cell 7 0.2 0.3 7 Pb clean No. 2 250-g cell 0.25 0.4 Pb clean No. 3 7 Zn condition 10 1000-g cell 1.5 Zn float 9 11.0 10 5 Zn clean ANALYSIS % (4) DISTRIBUTION % WT PRODUCT Ag⁽³⁾ % Рb Zn Zn Pb Ag Reclean Pb conc 17.50 65.9 73.28 22.18 55.8 5.7 3.3 20.00 Cl Pb Tail No. 1 3.1 7.19 1.80 5.2 · 5.0 6.2 Cl Pb Tail No. 2 2.3 22.14 18.87 4.98 5.0 10.0 10.4 C1 Pb Tail No. 3 0.9 24.68 20.72 5.6 1.9 6.92 5.1 Ro Pb conc (calcd) 9.6 34.34 10.05 19.70 76.1 86.9 18.8 C1 Zn conc 11.9 5.27 0.20 55.65 14.5 2.2 65.8 Cl Zn tail 6.1 0.36 14.59 8.9 2.31 3.2 2.0 Ro Zn conc (calcd) 18.0 4.27 0.26 41.73 17.7 4.2 74.7 +325 m tail 30.1 0.195 0.03 0.28 1.4 0.9 0.8 -325 m tail 42.3 0.49 4.8 0.21 1.36 8.0 5.7 Ro Tail (calcd) 72.4 0.367 0.14 0.91 6.2 8.9 6.5 100.0 Feed (calcd) 100.0 4.331 100.0 100.0 1.11 10.06 REMARKS: (1) Reagents stage added. GuSO , at 4th stage (2) Reagents stage added (3) ounces per ton (4) From Internal Report MS-AC-71-32 and 67

MINES BRANCH FLOTATION TEST REPORT

.

18

	. 1 701	<u> </u>		nald Mines L		<u> </u>						E: Jan	2000-g		ł
DBJECT OF TEST: Gri	ind Pb	concen	trate,	depress Lea	d and	tloat z	inc								1
				1					agents,	lb por		IED B	Y: W.	A.w.	
OPERATION	Time	% Solids	pН	Unit used	T130	R 242	7-50	,	ZnS_2O_4	·	CuSO,	404	7-200	Na ₂ Cr ₂ C	1 27 D.
	30	67		7x14 RM	0.10			0.2	2.0	_ <u>0a0</u>	4		1-200		250
rind (1) b float	6	25	7.7	2000-g cell		0.10	1.0	0.2	2.0	·					
n condition	15	25	8.8	2000-g Cell	+					2	2				
n float	3	25										0.10	0.08		0.02
<u>n 110ac</u>															1
b conc grind	45			Pebble mill											ţ
ondition Pb conc	5													4.0	
loat Middling	10				1						ļ				0.02
				1000 11											
lean Zn conc	2			1000-g cell											ł
eclean Zn conc	2						 								
	1	<u> </u>	<u> </u>	1	1		L		<u>L</u>						
PRODUCT	W W			(2) g(2)		% (3)	<mark></mark>			·					
			A	g`	Pb	Zn		-		Ag		Pb	Zn		I.
ead conc	11	.9	1	•91	8.15	14.00					7.6	49.5	9.1		19
iddling conc	11	•3		•78	6.08	14.00					8.0	39.2	9.7		1
o Pb conc (calcd)	14	•2	23	•86	7.08	14.00					5.6	88.7	18.8		
n conc	16	.2	5	•03	0.27	47.00				18	3.2	3.9	71.9		
n clean tail	11	•2		.70	0.32	7.50					1.2	0.9	2.3		
n reclean tail	3	•1	2	•32 ·	0.36	12.50				1	1.6	0.9	3.7		
o Zn conc (calcd)	22	• 5	4	.18	0.29	36.63				2	1.0	5.7	77.9		
o tail	63	.3	0	•243	0.10	0.56					3.4	5.6	3.3		
						10 -0				1.0			100.0		
eed	100	•0	4	•48	1.13	10.58				100	0.0 1	.00.0	100.0		
REMARKS: (1) Flotat:	ion tai	ling 9	7.7 pe	r cent minus	200 m	esh	· · · · · · · · · · · · · · · · · · ·		2) ounc	es per	r ton	<u> </u>			
				C-71-54 and						-					

TEST NO. 19 SAMP	PLE: I	leeves	MacDo	nald N	lines L	imited								b. 25, 19	971		
OBJECT OF TEST:	C 1	ь. `	1 10				· · ·	•				CHARGE: 2000-g TESTED BY: WAW					
		t at pl	1 10.		<u> </u>	·		<u>, , -</u> ,			·····						
OPERATION	Time	%	рН		Jnit	Reagents, Ib per ton											
OPERATION	min	Solids	рп	ι	sed	T130	R 242	ZnSO4	NaCN	ZnS_2Q_1	Ca0	CuS0	4 211	· DF250			
Grind (1)	20	67		7 x	14 RM	0.10	0.10	1.00	0.20	1.0							
Pb float	2	25	7.5		-g cell												
Zn condition	10		8.5								2.0	2.0					
Zn float	4	25	10.0										0.10	0.03			
															L		
Pb grind	30	ļ			le mill	_			0.20			ļ			ļ		
Pb clean	2	ļ			g cell			0.5							ļ		
Pb reclean	2			250-8	g cell			0.5	0.10								
				500			· · · · · ·										
Zn clean	1			1500-9	<u>g cell</u>												
				1													
PRODUCT	w	11			ANA	YSIS	% (2)				DI	NSTRIBUTION %					
	9	6		(3)	РЪ	Zn		·			A	g	РЪ	Zn			
Reclean Pb conc	2.	,4			31.87	11,65				1	5	0.5	55.9	2.7			
Reclean Pb tail		.5		22.53	1.19	13.38						7.7	1.3	1.9			
Clean Pb tail	6.	.3		5,72	6.18	14.16						8.2	28.4	8.5			
Rougher Pb conc (calcd)	10.	2		28.54	11.49	13.46					6	6.4	85.6	13.1			
Clean Zn conc	16.	5		5 63	0.45	48.79					2	1.2	5.4	76.8			
Clean Zn tail	4			2.77		11.40			ļ			3.0	1.0	5.2			
Rougher Zn conc (calcd)	21	11		4.99		40.36						4.2	6.4	82.0			
Rougher tail	68.	5		0.60	0.16	0.75		· .				9.4	8.0	4.9			
Rougher carr	00.			0.00	0.10	0.75							0.0				
Feed (calcd)	100	.0		4.38	1.37	10.48					10	0.0 1	0.00	100.0			
								· .									
								1									
REMARKS: (1) Flotatio	on tai.	Ling 90).9 pe	er cen	t minus	200 me	sh.										
(2) From Int			: MS-A	.C-71-1	L15.			,									
(3) Ounces p	er tor	1.															