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R. 374

# ABERFOYLE TIN MINING COMPANY N.L.

## SLIME TABLE TAILING

### Sample

The sample of slime table tailings was supplied by Mr. N. Musgrove on the 17th January, 1961, and was stated to be representative of current plant practice. The sample was submitted to determine the nature of the tin losses.

### Summary

A sample of slime table tailings from Aberfoyle Mill has been examined by sizing and elutriation, followed by assay of the fractions. The tailings sample assayed 0.84% tin, which is appreciably lower than current average plant slime table tailings. Due to doubts that the sample is representative, concentration tests were not carried out on the sample.

About 32% of the tin in the sample examined was coarser than 20 microns and should be recoverable if in the free state. The sample contains appreciable true slimes (minus 18 microns quartz equivalent) from which no recovery of tin is practicable by gravity concentration.

Plant slime table tailings vary considerably in tin content, and systematic sampling and sizing examination to determine the nature of the variations is warranted.

### Assays

Head Sample: Tin 0.84%. WO<sub>3</sub> 0.48%.

### Sizing

A sizing of the sample showed:—

Size Fraction B.S. Screen	Equivalent Size Microns: Cassiterite	Percent Weight	Remarks
+ 60		0.1	Mica and wood
+ 72		0.1	Mica and wood
+ 85		0.2	Mica and wood
+ 100		0.1	Mica and wood
+ 120		0.3	Mica and wood
+ 150		1.6	Mostly mica
+ 200		4.7	Much mica
Elutriation Fraction 1.	+ 76 — 40	0.1	
Elutriation Fraction 2.	+ 40 — 28	7.9	
Elutriation Fraction 3.	+ 28 — 20	25.7	
Elutriation Fraction 4.	+ 20 — 13	22.9	
Elutriation Fraction 5.	+ 13 — 10	11.8	
Elutriation Overflow	— 10	24.5	
Composite		100.0	

The elutriator used is described and illustrated in "Research Procedure in an Investigation into the Basic Causes of High Tailing Loss at Mt Morgan", by W. H. Cropp, Procedure of the Australian Institute of Mining and Metallurgy, No. 115, 30th September, 1939, pp. 357-382.

### Examination of Sizing Products

For convenience, several fractions were grouped for tin assays.

Fraction B.S. Screen	Weight	Percent	Percent Distribution of Tin
+ 120	0.8	0.06	0.1
+ 150	1.6	0.06	0.1
+ 200	4.7	Trace	0.0
Elutriation Fraction 1 and 2	8.0	0.82	7.8
Elutriation Fraction 3	25.7	0.79	24.2
Elutriation Fraction 4	22.9	1.08	29.5
Elutriation Fraction 5	11.8	1.19	16.7
Elutriation Overflow	24.5	0.74	21.6
Composite	100.0	0.84	100.0

Some 32% of the tin in the tailings is contained in elutriation fractions 1, 2 and 3, which contains any tin coarser than 20 microns, and the bulk of this tin should be recoverable if in the free state.

Minor recovery of tin in elutriation fractions 4 and 5 may be possible. Tin in the elutriation overflow is irrecoverable by gravity concentration. Overall recovery of tin from the slime table feed may be improved by prior removal of these true slimes.

The coarser fractions of the tailings are mostly mica and wood pulp. The tin content of these fractions is 0.06% tin, and probably represents close to the optimum obtainable.

The sample examined contains 0.84% tin. This is appreciably lower than recent plant practice as reported in the four weekly metallurgical reports.

Four Weeks Ending	Slime Tailing Percent Tin	Ore Grade Percent Tin
4. 2.61	1.11	1.07
10.12.60	1.27	1.13
12.11.60	1.20	1.11
15.10.60	1.27	1.16
17. 9.60	1.28	1.25
20. 8.60	1.02	1.08
23. 7.60	0.87	1.06
2. 7.60	0.84	1.15
28. 5.60	0.98	1.05
30. 4.60	0.66	0.93
2. 4.60	0.97	0.98
5. 3.60	1.12	0.98
6. 2.60	1.03	0.99

In view of the lower tin content of the sample supplied as compared with recent average plant tailings, some doubt exists if the sample is truly representative. For this reason concentration tests were not carried out on the sample.

There does not appear to be any direct relationship between ore grade for tin content of the slime tailings. Although the two highest tailing assays correspond to the two highest grade feeds, and the lowest tailing assay corresponds to the lowest grade feed, the remaining points appear to be scattered without any pattern.

For the five periods ending 23.7.60, the content of the slime tails averaged well below 1.0%. Other monthly tailings have reached 1.27-1.28% tin. Systematic sampling and sizing examination of the tailings should show the nature of the variation in the tin losses.

A previous sample of the slime table tailings was submitted by Mr. Musgrove. Mr. Musgrove later advised that this sample was too coarse to be considered typical, and suggested that the sample be discarded.

A sizing of this sample showed:—

Size Fraction B.S. Screen	Percent Weight	
	Initial	Cumulative
+ 60 mesh .....	....	....
+ 72 mesh .....	0.1	0.1
+ 85 mesh .....	0.1	0.2
+ 100 mesh .....	0.2	0.4
+ 120 mesh .....	1.2	1.6
+ 150 mesh .....	4.3	5.9
+ 200 mesh .....	10.7	16.6
— 200 mesh .....	83.4	....
	100.0	

This sample contained 10.7% plus 200 mesh material compared with 7.1% plus 200 mesh material in the sample examined in more detail.