

TR9-168-170

R. 471

**24. ABERFOYLE TIN, N.L.: SLIME TABLE TAILINGS****Sample**

A sample of mill slime table tailings was submitted by Aberfoyle Tin, N.L. for investigation of the nature of the tin losses in this tailing.

The sample was submitted as a thickened pulp which contained approximately 100 lbs of dry solids.

**Assays**

Total Tin—1.38 per cent.

Van Tin—1.23 per cent.

**Investigation**

The experimental work consisted of a sizing analysis of the sample including infrasizing, and a concentration test to assess the probable tin recovery obtainable by gravity concentration methods. This test involved hydraulic classification of the sample, followed by concentration of the classifier sands by tabling and treatment of the slimes (classifier overflow) on a Buckman tilting deck. The tilting deck concentrate was further concentrated by tabling.

Two sand fractions were obtained by classification (a) settled in a rising current of 40 mm per second, and (b) settled in a rising current of 6 mm per second.

The two sand fractions were tabled separately. No significant amount of tin was recovered from the coarser fraction, but removal of the coarser material facilitated tabling operations on the other sand fraction. The table concentrates, middlings and tailings from the coarse sands were combined with the equivalent products from the finer sand fraction and are shown as sand table products in the tabulation.

**Summary**

1. The sizing analysis shows that 37.6 per cent of the sample is coarser than 200 mesh. The plus 200 mesh portion contains negligible amounts of tin, and improved plant performance may result from its removal from the slime table feed.

2. Seventy five per cent of the total tin is contained in infrasizer fractions 1, 2 and 3. This tin should be recoverable by gravity concentration if in the free state. This was partially confirmed by a "vanning" assay which showed a recovery of 89.1 per cent tin in a concentrate assaying 37.5 per cent tin.

3. Table concentration of classifier sands and Buckman tilting deck concentration with tabling of deck concentrates of the classified overflow (slimes) resulted in an overall tin recovery of 78.8 per cent in a concentrate amounting to 4.52 per cent by weight and assaying 23.8 per cent tin. No attempt was made to upgrade this concentrate.

4. It is suggested that consideration be given to the use of Buckman tilting decks and vanners for the treatment of slimes.

B. Hydraulic classifier overflow in a rising current velocity of 6 mm per second: minus 40 micron cassiterite. Buckman tilting deck concentration of this fraction was performed under the following conditions:—

Deck Slope: Two inches per foot.

Feed Rate: One gallon of pulp per minute per foot of deck width.

Feed Pulp Density: 19 per cent solids.

Concentration Cycle: Five minutes.

Product	Per Cent		
	Weight	Tin	Tin Distribution
Buckman Deck Concentrate ....	9.39	7.07	48.6
Buckman Deck Tailing .....	53.58	0.34	13.4
Composite Deck Feed (Classifier Overflow) .....	62.97	1.34	62.0

C. Table concentration of Buckman tilting deck concentrates.

Product	Per Cent		
	Weight	Tin	Tin Distribution
Table Conc. ....	2.70	23.1	45.7
Table Middling .....	0.36	2.21	0.6
Table Tailing .....	6.33	0.51	2.3
Composite Deck Concentrate ....	9.39	7.07	48.6

The recovery obtained from the tilting deck feed amounted to 45.7 per cent overall.

**Test Results**

*Sizing Analysis*

Fraction	Equivalent Particle Diameters		Per Cent		
	Quartz	Cassiterite	Wght	Tin	Tin Dist.
+ 60 mesh		3.0	7.4	0.09	0.5
+ 85 mesh		2.6			
+ 100 mesh		1.8			
+ 150 mesh			11.9	0.07	0.6
+ 200 mesh			18.3	0.12	1.6
Infrasizer 1	+ 56 microns	+ 45 microns	7.7	2.79	15.6
2	40-56 microns	30-45 microns	25.5	2.15	39.8
3	28-40 microns	20-30 microns	11.7	2.28	19.4
4	20-28 microns	14-20 microns	7.0	2.02	10.3
5	14-20 microns	10-14 microns	3.8	1.87	5.2
6	10-14 microns	8-10 microns	2.4	1.63	2.8
7	-10 microns	-8 microns	4.3	1.33	4.2
Composite			100.0	1.38	100.0

*Gravity Concentration*

A. Tabling of hydraulic classifier sands: settled in rising current velocity of 6 mm per second plus 40 micron cassiterite.

Product	Weight	Per Cent	
		Tin	Tin Distribution
Sand Table Concentrate	1.82	24.8	33.1
Sand Table Middling ....	1.19	1.35	1.1
Sand Table Tailing ....	34.02	0.16	3.8
<b>Composite Sands ....</b>	<b>37.03</b>	<b>1.40</b>	<b>38.0</b>

From the above the total gravity concentration is shown as follows:—

Product	Weight	Per Cent	
		Tin	Tin Distribution
Sand: Table Concentrate	1.82	24.8	33.1
Slime: Deck Con-Table	2.70	23.1	45.7
Con. ....	4.52	23.8	78.8