

TR8-205-206

R. 456

28. TIN SLUICING

Sample

A sample of reject material from sluicing operations at the North Valley near Waratah was obtained from Mr. W. Hankey for investigation of values and suggested methods of improving recovery.

Summary

1. Examination of the sample shows a tin content of 6.8 per cent. The cassiterite is present in various forms from partly water worn to angular grains. A wide range of sizes exist from 8 to minus 200 mesh. Some cassiterite is present as composites with quartz, &c., and would require grinding for maximum recovery of high grade concentrate.

2. Sizing analysis details the tin contents and is shown in a tabulation. The plus 8 mesh fraction amounted to 19.8 per cent by weight and this was submitted to sink-float separation in a liquid having a specific gravity of 2.95. This treatment resulted in good separation of the cassiterite and the sink product amounted to 5.4 per cent with a tin content of 28.7 per cent. The sizing analysis also shows a minor proportion of cassiterite in the fine sizes, which would not be recovered by the existing treatment.

3. Concentration by jigging and tabling after reduction to minus $\frac{1}{8}$ inch size resulted in a recovery of 94.1 per cent of the tin in a composite concentrate assaying 41 per cent of tin. Of the 94.1 per cent recovery, 9.7 per cent of the tin was recovered by tabling.

4. The reasons for losses by sluicing are:—

- (a) Composites of cassiterite with light gangue.
- (b) Angular cassiterite which does not hold well in a sluice box.
- (c) High proportion of large stone resulting in disturbance in the sluice box.
- (d) Fine cassiterite.

5. Recovery can be improved by using jigs for concentration either direct or for cleaning up operations. In either case removal of oversize rock would be necessary before concentration. Moderate grinding would improve recovery and grade of concentrate.

6. The quantity of tin possibly too fine for recovery by sluicing or jigging in the sample examined amounted to approximately 10 per cent of the total. This does not necessarily indicate the extent of the problem of loss of fine tin, as further quantities would have been lost in cleaning up operations. Examination of samples in the operating face appear to indicate a higher proportion of very fine tin in comparison with the sample examined.

7. Recovery of large high grade specimens and high grade cassiterite could be mechanized on large scale operations in place of the existing hand picking operations.

Sizing

Fraction	Per Cent		Per Cent	
	Weight	Sn.	Sn.	Distribution
Sink @ 2.95—				
+ 8	5.4	5.4	28.7	22.7
Float @ 2.95—				
+ 8	14.4	14.4	0.017	0.1
+ 14	22.5	63.0	6.32	58.4
+ 22	24.9			
+ 36	15.6			
+ 44	5.1	9.5	4.70	6.5
+ 52	1.8			
+ 60	2.6			
+ 85	3.2	5.6	10.8	8.9
+ 100	1.5			
+ 120	0.9			
+ 150	0.6	0.8	21.9	2.6
+ 200	0.2			
— 200	1.3	1.3	4.24	0.8
Composite	100.0	100.0	6.82	100.0

Jig and Table Concentration

Product	Per Cent		Per Cent Sn	
	Weight	Sn	Distribution	
Jig conc. + 60 mesh	15.62	38.2	76.0	
Jig conc. — 60 mesh	0.95	69.3	8.4	
Total Jig con.	16.57	40.0	84.4	
Table conc. — 60 mesh	1.45	52.6	9.7	
Total conc.	18.02	41.0	94.1	
Jig tailing + 60 mesh	67.36	0.54	4.6	
Table tailing — 60 mesh	14.62	0.71	1.3	
Total tailing	81.98	0.57	5.9	
Total Jig tailing	83.43	1.48	15.6	
Composite feed	100.00	7.86	100.0	