

TR9-149-153 R. 457

**21. RENISON ASSOCIATED TIN MINES N.L.: EXAMINATION OF  
CASSITERITE**

Samples of split drill core from DDH S.102 were received for examinations to determine the sizing of the cassiterite, and also to determine the quantities recoverable by vanning procedure. Both examinations are indicative of recoveries of cassiterite obtainable by gravity concentration.

Details of the samples were supplied by the company as follows—

*Diamond Drill Hole S.102, Federal Area*

Lab. Reg. No.	Company's Sample No.	Per Cent Tin (Average)	Footage
1845	2404	1.044	270-295
1846	2405	1.234	295-320
1847	2406	0.886	320-345
1848	2407	0.984	345-370

The assays above are each of five assays representing five feet each.

The samples were stage crushed and ground to minus 30 mesh B.S.S. size, and the minus 30 mesh portions were used to determine the grain sizes of the cassiterite. Portions of the samples were further reduced and assayed with the results shown below, and for comparison are shown the average assay values advised by Renison Associated Tin Mines.

Lab. Reg. No.	Company's Sample No.	Tin Per Cent	
		Mines Dept. Lab.	R.A.T.M.
1845	2404	1.29	1.044
1846	2405	1.23	1.234
1847	2406	0.81	0.886
1848	2407	1.07	0.984

### Summary

1. The method used for quantitative determination of the sizes of the cassiterite was first reported in R.48 (old number 1215/1940), and is based on the fact that cassiterite is virtually unattacked by digestion in hydrochloric and nitric acids and separately in hydrofluoric acid, whereas practically all associated minerals are decomposed. The cassiterite-bearing residues were then sized by elutriation. The method is somewhat laborious, but has the advantage of being quantitative for samples which can represent a considerable footage or tonnage. For this purpose microscopical sizing in ore specimens would not be practical.

2. The four samples show appreciable variation in the quantities of cassiterite in various sizings, and details are given in the tabulations. There is significant variation in sizes which are of economic value for concentration by gravity methods. Recoveries by vanning ranged from 47.5 to 82.3 per cent.

3. The following tabulation shows the total percentages of tin, percentages cumulative to elutriation fraction 3 and the percentages recoverable by vanning assays.

Lab. Reg. No.	Company's Sample No.	Per Cent Tin			Per Cent Van. Total
		Total	To e.f. 3	Van.	
1845	2404	1.29	0.91	0.77	59.5
1846	2405	1.23	0.69	0.58	47.5
1847	2406	0.81	0.55	0.47	58.4
1848	2407	1.07	0.86	0.88	82.3

The graph (Figure 33) shows the cumulative tin distribution of the four samples shown by numbers 5, 6, 7 and 8, and the spread of the distribution gives a useful picture of the range of recoverable quantities of cassiterite.

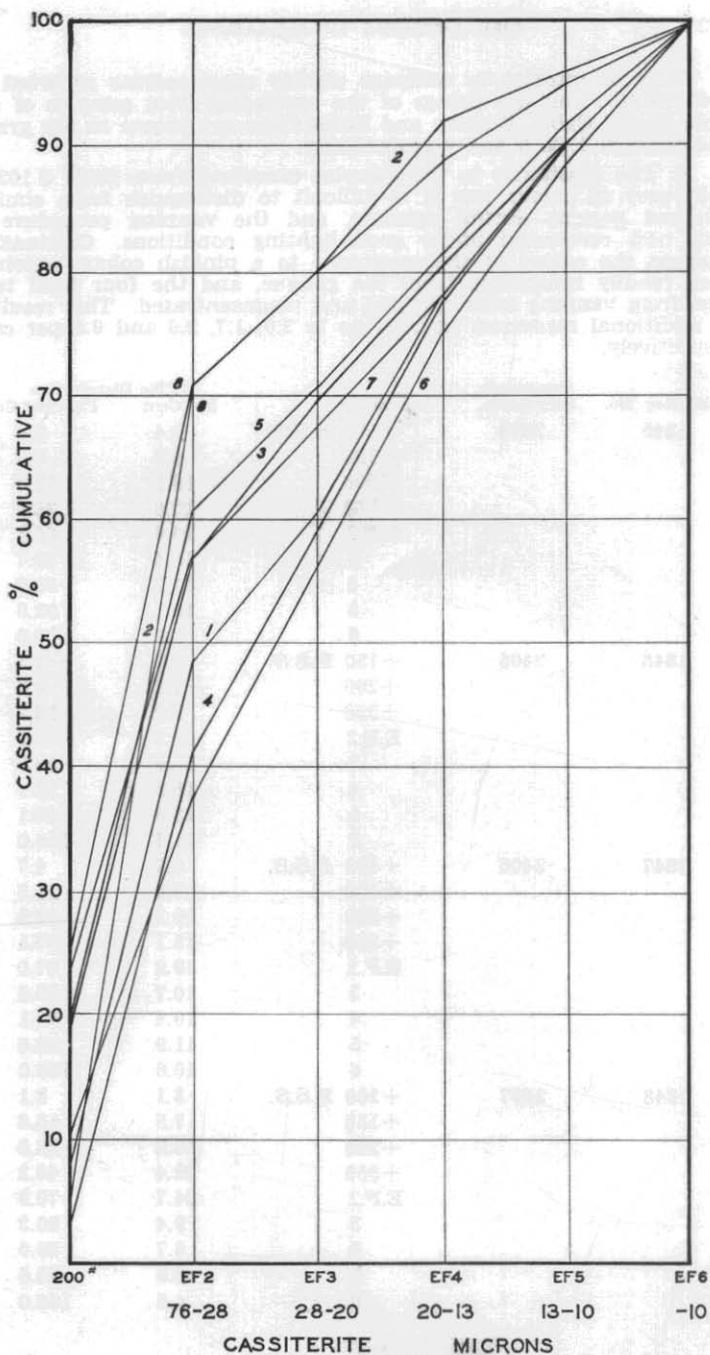


FIGURE 33.

5 cm

It is of interest to compare similar examinations reported in 1940 (R.48), and the sizings of the cassiterite from samples of ore from Black, Cable, Battery and Reids faces are shown in the graph and marked 1, 2, 3 and 4 respectively.

4. The cassiterite in the samples examined from DDH S.102 is light grey in colour and it is difficult to distinguish from similar coloured gangue during vanning, and the vanning procedure is thus best conducted under good lighting conditions. Calcination changes the colour of the cassiterite to a pinkish colour which is then readily recognized from the gangue, and the four final tailings from vanning were calcined and reconcentrated. This resulted in additional recoveries amounting to 3.0, 1.7, 2.6 and 0.6 per cent respectively.

Lab. Reg. No.	Company's Sample No.	Fraction	Tin Distribution	
			Per Cent	Per Cent Cum.
1845	2404	+100 B.S.S.	2.4	2.4
		+150	6.3	8.7
		+200	10.6	19.3
		+350	16.6	35.9
		E.F.2	24.4	60.3
		3	10.4	70.7
		4	11.2	81.9
		5	10.1	92.0
		6	8.0	100.0
		1846	2405	+150 B.S.S.
+200	7.2			9.7
+350	7.0			16.7
E.F.2	21.3			38.0
3	18.5			56.5
4	18.6			75.1
5	13.5			88.1
6	11.4			100.0
1847	2406	+100 B.S.S.	4.7	4.7
		+150	7.0	11.7
		+200	10.3	22.0
		+350	15.1	37.1
		E.F.2	19.9	57.0
		3	10.7	67.6
		4	10.4	78.1
		5	11.9	90.0
1848	2407	+100 B.S.S.	3.1	3.1
		+150	7.5	10.6
		+200	13.2	23.8
		+350	22.4	46.2
		E.F.2	24.7	70.9
		3	9.4	80.3
		4	8.7	89.0
		5	6.5	95.5
6	4.5	100.0		

Size range of cassiterite in the fractions shown in the tabulations are—

+100 Mesh B.S.S.	+152 microns
+150 Mesh B.S.S.	+105 microns
+200 Mesh B.S.S.	+ 76 microns
+350 Mesh B.S.S.	+ 44 microns
E.F.2	+ 28 microns
3	28-20 microns
4	20-13 microns
5	13-10 microns
6	Minus 10 microns

For comparative purposes sizing of the cassiterite is shown on four samples, the results of which were reported in 1940 (R.48—old number 1215/40).

Sample	Tin Distribution Per Cent Cumulative		
	+ 200 mesh	E.F. 2	E.F. 3
Battery Face .....	19.7	57.1	69.4
Black Face .....	7.8	48.7	60.7
Cable Face .....	5.1	71.0	80.4
Reids Face .....	3.0	41.4	59.0
S.102			
1845 (2404) .....	19.3	60.3	70.7
1846 (2405) .....	9.7	38.0	56.5
1847 (2406) .....	22.0	57.0	67.7
1848 (2407) .....	23.8	70.9	80.3

The tabulation shows cumulative percentages of cassiterite to 20 micron size, ranging from 56.5 to 80.3 per cent in samples from the Federal area, and the range in the samples in previous work was lowest in ore from Reids Face and highest from Cable Face (59.0 to 80.4). Prediction of recoveries from the sizing distribution of the cassiterite can be made, but will vary with the type of treatment and losses caused by excessive grinding and loss as composite particles with gangue minerals. Providing losses for these reasons are normal, the range of recoveries that could be anticipated by gravity concentration with table and vanners would be approximately 55 to 72 per cent.