Section 1.—Ore Dressing Investigations

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ARDLETHAN TIN MINE, N.S.W.:

EXAMINATION OF MILL PRODUCTS

The examinations detailed herein are as follow and were discussed with and agreed to by Mr. L. Bollen.

Final Mill Tailing

a. Sizing analyses.

b. Size into fractions plus 30 mesh, minus 30 plus 52 mesh, minus 52 plus 72 mesh, minus 72 plus 100 mesh, minus 100 plus 200 mesh, and minus 200 mesh.

Sink-float separations to determine free and composite cassiterite. This was performed at densities at 2.9 and 4.0 using T.B.E. and thallium salts.

The minus 200 mesh fraction was not examined by the proposed method due to technical difficulty, and also that concentration by tabling as performed should be a good practical proof of recoverable cassiterite.

c. Free and total cassiterite in D.S.M. screen oversize in minus 14 plus 28, and minus 28 plus 48 mesh fraction.

d. Sizing analyses of sale grade concentrate.

Ardlethan Combined Tailing-Sizing Analysis

Screen Size B.S.S.	Per Cent Weight	Per Cent Tin	Per Cent Tin Distribution	Per Cent Tin Distribution Cum.
+30	1.6	0.18	1.44	1.44
−30+52	4.24	0.13	2.64	4.08
−52+72	7.29	0.13	4.56	8.64
−72+100	11.74	0.13	7.35	15.99
−100+200	21.59	0.12	12.44	28.43
I.S.Fraction				
1	3.86	0.40	7.40	35.83
2	8.84	0.17	7.20	43.03
3	6.86	0.31	10.23	53.26
4	5.08	0.41	9.99	63.25
5	4.10	0.40	7.88	71.13
6	3.68	0.43	7.59	78.72
7	21.08	0.21	21.28	100.00
Composite	100.00	0.21	100.00	....

Sink-float separations at S.G. 2.9 and 4.0 of the plus 200 mesh fractions.

Product	Per Cent Weight Individual	Weight O'all	Per Cent Tin	Per Cent Tin Distribution Individual	Tin Distribution O'all
+ 30 mesh Fl. 2.9 ..	96.95	1.5900	0.14	76.81	1.1060
Fl. 4.0 ..	3.03	0.0497	1.13	19.01	0.2738
Sink 4.0 ..	0.02	0.0003	37.6	4.18	0.0602
Composite + 30 mesh ..	100.0	1.6400	0.18	100.00	1.4400
+ 52 mesh Fl. 2.9 ..	87.32	3.7024	0.02	14.95	0.3947
Fl. 4.0 ..	12.59	0.5338	0.62	60.05	1.5853
Sink 4.0 ..	0.09	0.0038	36.1	25.0	2.6600
Composite + 52 mesh ..	100.00	4.2400	0.13	100.00	2.6400
+ 72 mesh Fl. 2.9 ..	90.00	6.5610	0.04	24.91	1.1360
Fl. 4.0 ..	9.93	0.7240	0.68	51.94	2.3685
Sink 4.0 ..	0.07	0.0050	43.00	23.15	1.0555
Composite + 73 mesh ..	100.00	7.2900	0.13	100.00	4.5600
+100 mesh Fl. 2.9 ..	89.68	10.5284	0.014	9.65	0.7090
Fl. 4.0 ..	10.23	1.2010	0.71	55.86	4.1060
Sink 4.0 ..	0.09	0.0106	48.7	34.49	2.5350
Composite + 100 mesh ..	100.00	11.7400	0.13	100.00	7.3500
+200 mesh Fl. 2.9 ..	86.82	18.7448	0.02	12.55	1.5613
Fl. 4.0 ..	13.03	2.8128	0.44	41.46	5.1572
Sink 4.0 ..	0.15	0.0324	42.4	45.99	5.7215
Composite + 200 mesh ..	100.00	21.5900	0.14	100.00	12.4400

Consolidated tabulation of the tin distribution in the various products, and sizes of the plus 200 mesh portion of the tailings.

Screen Fraction B.S.S.	Per Cent Tin Distribution Fl. 2.9	Fl. 4.0	Sink 4.0	Total
+ 30	1.1060	0.2738	0.0602	1.4400
− 30+52	0.3947	1.5853	0.6600	2.6400
− 52+72	1.1360	2.3685	1.0555	4.5600
− 72+100	0.7090	4.1060	2.5350	7.3500
−100+200	1.5613	5.1572	5.7215	12.4400
Composite + 200 mesh	4.9070	13.4908	10.0322	28.4300

In the above tabulation it is shown that 35.3 per cent of the tin in the plus 200 mesh portion of the tailing is contained in the fraction which sinks in S.G. 4.0.

No attempt was made to do sink-float separations in the minus 200 mesh portion, and the sample was concentrated by tabling.

Table Concentration of the Minus 200 mesh fraction of the Tailings

Product	Per Cent Weight		Per Cent Tin	Per Cent Tin Distribution	
	Individual	O'all		Individual	O'all
Rougher Table Concentrate	0.88	0.47	9.03	24.23	17.37
Table Tailings	99.12	53.03	0.25	75.77	54.20
Composite —200 mesh	100.00	53.50	0.33	100.00	71.57

The sinks at 4 Sp.G. in the plus 200 mesh fractions contained 10.03 per cent of the total tin, half of which reported from the minus 100 plus 200 mesh fraction. From the minus 200 mesh fraction an additional 17.37 per cent of the tin was recovered by tabling. Thus the total free cassiterite with perhaps some heavy (plus 4 Sp.G.) composites amounted to 0.056 per cent tin of which 0.036 per cent was recovered from the minus 200 mesh fraction.

D.S.M. Screen Oversize. Minus 14 mesh plus 28 mesh, and minus 28 mesh plus 48 mesh Fractions.

Sink-float separations at S.G. 2.9 and 4.0:—

Product	Per Cent		
	Weight	Tin	Tin Distribution
−14+28 mesh fraction			
Float 2.9	87.32	0.07	15.90
Float 4.0	12.25	1.36	43.36
Sink 4.0	0.43	36.4	40.74
Composite −14+28 mesh	100.00	0.38	100.00
−28+48 mesh fraction			
Float 2.9	87.50	0.04	7.42
Float 4.0	11.95	1.43	36.24
Sink 4.0	0.55	48.3	56.34
Composite −28+48 mesh	100.00	0.47	100.00

Coarse Concentrate. Lots 45-50 inclusive. Sizing Analysis

Screen Fraction B.S.S.	Per Cent		
	Weight	Tin	Tin Distribution
+18	0.8	28.5	0.4
−18+36	5.6	55.4	5.3
−36+52	6.3	52.5	5.6
−52+72	9.2	64.4	10.1
−72+100	11.9	65.4	13.3
−100+200	32.5	60.0	33.3
−200	33.7	55.6	32.0
Composite	100.0	58.6	100.0