

TR6-248-253

R. 394

CONCENTRATION TESTS ON DIAMOND DRILL CORE FROM
HOLE N.C. 1, ARDLETHAN, N.S.W.

Introduction

This is the third of a series of investigations to obtain data relating to the recovery of tin by gravity concentration from diamond drill core samples from Ardlethan, N.S.W.

Method of sample preparation, &c., were given in some detail in the reports of Investigations R.390 and R.392, and to save repetition you are referred to these reports (this volume, pp. 229, 240).

Sample

Composite samples R.394A-C and R.394F were made up in the manner outlined in Investigation R.390.

The various composite samples were:—

Reg. No.	Description	Percent Tin	Sample Number	Percent Tin in Composite Sample
745	N.C. 1— 1	0.19	R.394A	0.41
746	N.C. 1— 2	0.24		
747	N.C. 1— 3	0.71		
748	N.C. 1— 4	0.58		
749	N.C. 1— 5	0.22		
750	N.C. 1— 6	0.78	R.394B	0.38
751	N.C. 1— 7	Trace		
752	N.C. 1— 8	0.15		
753	N.C. 1— 9	0.30	R.394C	0.73
754	N.C. 1—10	0.55		
755	N.C. 1—11	1.54		
756	N.C. 1—12	0.38		
757	N.C. 1—13	0.19		
758	N.C. 1—14	0.47		
759	N.C. 1—15	0.60		

Note: Where the tin content of the ore was less than 0.10%, the result was reported as "trace".

Sample R.394F was made up from equal weights of samples R.392A-C.

Investigation

As Investigation R.390.

Summary

Table concentration gave:—

Sample No.	Composite Head % Sn	Combined Concentrates % Sn	Combined Tailings % Sn	Percent Recovery of Tin in Concentrates
R.394A	0.40	24.5	0.14	63.8
R.394B	0.40	22.7	0.13	68.9
R.394C	0.73	29.9	0.23	69.6
Arithmetical Average	0.51	25.7	0.17	67.4

These results are similar to those obtained in Investigation R.392. Concentrate grade has been increased from an average of about 10% tin in earlier investigations to an average 25.7% tin in the present investigation.

The comparatively high tailings for R.394C, at 0.23% tin, is partly due to insufficient middlings being removed from the minus 60 plus 100 mesh fraction for regrinding and re-concentration.

Heavy liquid separations on the plus 30 mesh material are similar to separations in Investigations R.390 and R.392.

Research

Sample reduction: As Investigation R.390.

Flotation of sulphides: As Investigation R.390. No sulphides floated from samples R.394A and R.394B.

Table concentration: As Investigation R.392. The quantity of middlings for each concentration stage is shown in the table below, as a percentage of the original total sample.

Fraction	Middlings Percent Weight		
	R.394A	R.394B	R.394C
Plus 60 mesh	3.0	6.3	3.2
Plus 100 mesh	2.2	2.8	1.8
Plus 200 mesh	2.3	2.3	1.9

In this series, and in the series of tests to follow, efforts have been made to significantly increase the concentrate grade, (without increasing tailing losses) to about 25-30% tin. In Investigations R.390 and R.392 concentrate grades averaged about 10% tin.

Sample R.394A

Product	Percent		Percent Distribution Sn
	Weight	Sn	
Concentrate:			
+ 60 mesh	0.19	22.25	10.7
+ 100 mesh	0.34	26.5	22.8
+ 200 mesh	0.28	21.1	15.0
- 200 mesh	0.22	27.5	15.3
Total Concentrate	1.03	24.5	63.8

Product	Weight	Percent Sn	Percent Distribution Sn
Tailings:			
+ 60 mesh	36.98	0.10	9.3
+ 100 mesh	23.26	0.19	11.2
+ 200 mesh	10.86	0.11	3.0
- 200 mesh	27.87	0.18	12.7
Total Tailings	98.97	0.14	36.2
Composite Head	100.00	0.40	100.0
Head (Assay)		0.41	

Concentration Results—Individual Fractions

+ 60 mesh fraction:			
Concentrate	0.52	22.25	53.8
Tailings	99.48	0.10	46.2
Composite	100.00	0.21	100.0
+ 100 mesh fraction:			
Concentrate	1.43	26.5	66.9
Tailings	98.57	0.19	33.1
Composite	100.00	0.57	100.0
+ 200 mesh fraction:			
Concentrate	2.53	21.1	83.3
Tailings	97.47	0.11	16.7
Composite	100.00	0.63	100.0
- 200 mesh fraction:			
Concentrate	0.78	27.5	54.6
Tailings	99.22	0.18	45.4
Composite	100.00	0.47	100.0

Sample R.394B

Concentrate:			
+ 60 mesh	0.32	19.3	15.4
+ 100 mesh	0.45	23.3	26.1
+ 200 mesh	0.23	20.6	11.8
- 200 mesh	0.22	28.6	15.6
Total Concentrate	1.22	22.7	68.9
Tailings:			
+ 60 mesh	32.47	0.08	6.5
+ 100 mesh	29.45	0.13	9.5
+ 200 mesh	7.59	0.07	1.3
- 200 mesh	29.27	0.19	13.8
Total Tailings	98.78	0.13	31.1
Composite Head	100.00	0.40	100.0
Head (Assay)		0.38	

Concentration Results—Individual Fractions

+ 60 mesh fraction:			
Concentrate	0.96	19.3	70.0
Tailings	99.04	0.08	30.0
Composite	100.00	0.26	100.0

Product	Weight	Percent Sn	Percent Distribution Sn
+ 100 mesh fraction:			
Concentrate	1.52	23.3	73.5
Tailings	98.48	0.13	26.5
Composite	100.00	0.48	100.0
+ 200 mesh fraction:			
Concentrate	3.00	20.6	90.1
Tailings	97.00	0.07	9.9
Composite	100.00	0.69	100.0
- 200 mesh fraction:			
Concentrate	0.75	28.6	53.2
Tailings	99.25	0.19	46.8
Composite	100.00	0.40	100.0

Sample R.394C

Concentrate:			
+ 60 mesh	0.49	28.2	18.8
+ 100 mesh	0.72	26.5	26.0
+ 200 mesh	0.22	44.8	13.4
- 200 mesh	0.28	30.0	11.4
Total Concentrate	1.71	29.9	69.6
Tailings:			
+ 60 mesh	34.44	0.19	8.9
+ 100 mesh	24.92	0.28	9.5
+ 200 mesh	11.27	0.12	1.9
- 200 mesh	26.85	0.26	9.5
Sulphides	0.81	0.55	0.6
Total Tailings	98.29	0.23	30.4
Composite Head	100.00	0.73	100.0
Head (Assay)	0.73

Concentration Results—Individual Fractions

+ 60 mesh fraction:			
Concentrate	1.39	28.2	67.7
Tailings	98.61	0.19	32.3
Composite	100.00	0.58	100.0
+ 100 mesh fraction:			
Concentrate	2.81	26.5	73.2
Tailings	97.19	0.28	26.8
Composite	100.00	1.02	100.0
+ 200 mesh fraction:			
Concentrate	1.91	44.8	87.9
Tailings	98.09	0.12	12.1
Composite	100.00	0.97	100.0

Product	Weight	Percent Sn	Percent Distribution Sn
— 200 mesh fraction:			
Concentrate	1.04	30.0	54.8
Tailings	98.96	0.26	45.2
Composite	100.00	0.57	100.0

Concentration by "Vanning"

Recovery of tin, by vanning, from the various samples is shown below.

Sample No.	Percent Recovery of Tin in Concentrate
R.394A	56.6
R.394B	71.1
R.394C	65.4

Heavy Liquid Separation

Sample R.394F was separated in acetylene tetra-bromide (Sp. G. 2.93) as in Investigation R.390.

Product	Weight	Percent Sn	Percent Distribution Sn
Minus 5 mesh plus 10 mesh: sink	2.09	4.23	17.2
Minus 5 mesh plus 10 mesh: float	39.76	0.22	16.9
Minus 5 mesh plus 10 mesh: Composite ..	41.85	0.42	34.1
Minus 10 mesh plus 30 mesh: sink	2.72	4.41	23.3
Minus 10 mesh plus 30 mesh: float	32.70	0.13	8.2
Minus 10 mesh plus 30 mesh: Composite	35.42	0.46	31.5
Minus 30 mesh	22.73	0.78	34.4
Composite sample	100.00	0.52	100.0
Sink: minus 5 mesh plus 10 mesh	2.09	4.23	17.2
Sink: minus 10 mesh plus 30 mesh	2.72	4.41	23.3
Composite sink	4.81	4.33	40.5

Product	Weight	Percent Sn	Percent Distribution Sn
Float: minus 5 mesh plus 10 mesh	39.76	0.22	16.9
Float: minus 10 mesh plus 30 mesh	32.70	0.13	8.2
Composite float	72.46	0.18	25.1
Minus 30 mesh	22.73	0.78	34.4
Composite sample	100.00	0.52	100.0

The sink products contain considerable quantities of siliceous hematite. Pyrite is present in small amount and occurs as relatively coarse lumps, and not often composited. Only a few very small particles of cassiterite were noted.

Discussion

The three tabling tests can be summarized:—

Sample No.	Composite Head % Sn	Combined Concentrates % Sn	Combined Tailings % Sn	Percent Recovery of Sn in Concentrates
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Arithmetical Average	0.51	25.7	0.17	67.4

Average grade of concentrate at 25.7% tin is significantly higher than the 10% grades contained in Investigations R.390 and R.392.

Average tin content of the tailings is a little higher at 0.17% compared with 0.13% from Investigation R.392. The tin content of the tailings from samples R.394A and R.394B at 0.14 and 0.13% respectively are quite satisfactory. The tin content of tailing R.394C at 0.23% is higher than expected. The tin contents of all four fractions of R.394C tailings are higher than equivalent fractions from R.394A and R.394B. The gravity tailing fraction with the highest content is the minus 60 mesh plus 100 mesh tailings, which contains 0.28% tin. The unground portion of this tailing was re-tabled to determine the reason for this comparatively high tailing. A middling, amounting to 7% of the tailing and assaying 1.56% tin, was taken off. This middling contained approximately 45% of the tin in the original tailing. It can therefore be concluded that this abnormal tailing at 0.28% tin was due to insufficient removal of middlings during the initial tabling.

The sulphide from sample R.396C contains 0.55% tin. This is the highest tin content of a sulphide product to date.