TR7_137_144 R. 395

CONCENTRATION TESTS ON DIAMOND DRILL CORE FROM HOLE DP3, ARDLETHAN, N.S.W.

Introduction

This is the fourth of a series of investigations to obtain data relating to the recovery of tin by gravity concentration from diamond drill core samples from Ardlethan.

Methods of sample preparation, &c., were given in some detail in the report of Investigation R.390 and to save repetition you are referred to this report (Tech. Rep. 6, p. 229).

Sample

Composite samples R.395B-E were made up in the manner outlined in Investigation R.390. Sample R.395A was made up of equal parts of samples DP3-1, 2, 3 and 5, but only half the equivalent part of sample DP3-4 due to the small quantity of this sample originally received.

The various samples were:—

Reg. No.	Description	Percent Tin	Sample Number	Percent Tin in Composite Sample
1138	DP3—1	0.14		
1139	2	Trace		
			R.395A	0.26
1141	4	0.55		
1142	5	0.73		
1144	6	0.25		
1145	7	0.75		
1146	8	1.03	R.395B	0.68
1147	9	0.75		
1148	10	0.69		
1149	11	0.78		
1150	12	0.69		
1151	13	0.85	R.395C	0.73
1152	14	0.63		
1153	15	0.62		
1154	16	0.48		
1155	17	0.34		
1156	18	0.52	R.395D	0.61
1157	19	0.77		
1158	20	0.81		
1159	21	0.63		
1160	22	0.88		
1161	23	0.72	R.395E	0.64
1162	24	0.33		
1163	25	0.46		

Note: Sample 1143 DP3-4/5 sludge was not used in making up the composite samples. Where the tin content of the ore was less than 0.10 percent, the result was reported as " Trace ".

Sample R.395F was made up from equal weight of samples R.395A-E.

Investigation

As Investigation R.390.

Summary

Table concentration gave—

Sample No.	Composite Head Percent Sn	Combined Concentrate Percent Sn	Combined Tailings Percent Sn	Percent Recovery of Sn in Concentrate
R.359A	0.28	19.9	0.07	74.6
R.395B	0.66	31.3	0.19	67.4
R.395C	0.74	31.2	0.22	70.5
R.395D	0.61	25.7	0.19	69.1
R.395E	0.63	25.8	0.20	68.1
Arithmetical Average	0.58	26.8	0.17	69.9

Results generally are similar to those obtained in Investigation R.394 (Tech. Rep. 6, p. 248). The recoveries are a little higher, due principally to the higher tin content of the ore.

Research

Sample reduction: as Investigation R.390.

Flotation of sulphides: as Investigation R.390. No sulphides floated from sample R.395A and R.395B.

Table concentration: as Investigation R.392 (Tech. Rep. 6, p. 240). The quantity of middlings ground from each concentration stage is tabulated below as a percentage of the original total sample.

Fraction	R.395A	Middlings Percent Weight R.395B	R.395C	R.395D	R.395E
Plus 60 mesh	5.8	3.5	3.5	3.5	2.6
Plus 100 mesh	2.6	2.0	2.1	1.5	1.8
Plus 200 mesh	1.2	1.5	1.7	1.7	0.9

Product	Weight	Percent Sn	Distribution Sn
Sample R.395A			
Concentrate:			
+ 60 mesh	0.21	14.1	10.5
+ 100 mesh	0.40	20.4	28.9
+ 200 mesh	0.19	24.6	16.5
— 200 mesh	0.26	20.4	18.7
Total Concentrate	1.06	19.9	74.6
Tailings:			
+ 60 mesh	30.55	0.07	7.6
+ 100 mesh	31.53	0.05	5.6
+ 200 mesh	12.23	0.08	3.5
— 200 mesh	24.63	0.10	8.7
Total Tailings	98.94	0.07	25.4
Composite head	100.00	0.28	100.0
Head (assay)	....	0.26	....
Concentration Results—Individual Fractions.			
+ 60 mesh fraction:			
concentrate	0.69	14.1	58.3
tailings	99.31	0.07	41.7
Composite	100.00	0.17	100.0
+ 100 mesh fraction:			
concentrate	1.27	20.4	84.0
tailings	98.73	0.05	16.0
Composite	100.00	0.31	100.0
+ 200 mesh fraction:			
concentrate	1.56	24.6	83.0
tailings	98.44	0.08	17.0
Composite	100.00	0.46	100.0
— 200 mesh fraction:			
concentrate	1.03	20.4	68.0
tailings	98.97	0.10	32.0
Composite	100.00	0.31	100.0

Product	Weight	Percent Sn	Percent
Sample R.395B			
Concentrate:			
+ 60 mesh	0.12	31.5	5.7
+ 100 mesh	0.40	33.5	20.2
+ 200 mesh	0.50	29.2	22.0
— 200 mesh	0.38	34.1	19.5
Total Concentrate	1.40	31.3	67.4
Tailings:			
+ 60 mesh	32.06	0.20	9.7
+ 100 mesh	28.48	0.16	6.9
+ 200 mesh	14.45	0.20	4.4
— 200 mesh	23.61	0.33	11.6
Total Tailings	98.60	0.19	32.6
Composite head	100.00	0.66	100.0
Head (assay)	....	0.68	....
Concentration Results—Individual Fractions.			
+ 60 mesh fraction:			
concentrate	0.39	31.5	38.2
tailings	99.61	0.20	61.8
Composite	100.00	0.32	100.0
+ 100 mesh fraction:			
concentrate	1.37	33.5	74.4
tailings	98.63	0.16	25.6
Composite	100.00	0.62	100.0
+ 200 mesh fraction:			
concentrate	3.37	29,2	83.6
tailings	96.63	0.20	16.4
Composite	100.00	1.18	100.0
— 200 mesh fraction:			
concentrate	1.58	34.1	62.4
tailings	98.42	0.33	37.6
Composite	100.00	0.86	100.0
Sample R.395C			
Concentrate:			
+ 60 mesh	0.27	24.85	9.1
+ 100 mesh	0.45	36.0	21.9
+ 200 mesh	0.31	43.2	18.1
— 200 mesh	0.64	24.7	21.4
Total Concentrate	1.67	31.2	70.5
Tailings:			
+ 60 mesh	30.29	0.16	6.6
+ 100 mesh	26.44	0.15	5.4
+ 200 mesh	12.14	0.24	3.9
— 200 mesh	28.41	0.35	13.4
Sulphides	1.05	0.13	0.2
Total Tailings	98.33	0.22	29.5
Composite head	100.00	0.74	100.0
Head (assay)	....	0.73	....

Concentration Results—Individual Fractions.

Product	Weight	Percent Sn	Distribution Sn
+ 60 mesh fraction:			
concentrate	0.88	24.85	58.0
tailings	99.12	0.16	42.0
Composite	100.00	0.38	100.0
+ 100 mesh fraction:			
concentrate	1.66	36.0	80.2
tailings	98.34	0.15	19.8
Composite	100.00	0.75	100.0
+ 200 mesh fraction:			
concentrate	2.45	43.2	81.9
tailings	97.55	0.24	18.1
Composite	100.00	1.29	100.0
— 200 mesh fraction:			
concentrate	2.22	24.7	61.6
tailings	97.78	0.35	38.4
Composite	100.00	0.89	100.0

Sample R.395D

Concentrate:			
+ 60 mesh	0.38	14.0	8.8
+ 100 mesh	0.30	34.4	17.0
+ 200 mesh	0.57	20.6	19.3
— 200 mesh	0.38	38.3	24.0
Total Concentrate	1.63	25.7	69.1
Tailings:			
+ 60 mesh	31.94	0.13	6.8
+ 100 mesh	26.02	0.20	8.6
+ 200 mesh	10.61	0.13	2.3
— 200 mesh	25.79	0.28	11.9
Sulphides	4.01	0.20	1.3
Total Tailings	98.37	0.19	30.9
Composite head	100.00	0.61	100.0
Head (assay)	..	0.61	....

Concentration Results—Individual Fractions.

+ 60 mesh fraction:			
concentrate	1.19	14.0	56.5
tailings	98.81	0.13	43.5
Composite	100.00	0.30	100.0
+ 100 mesh fraction:			
concentrate	1.12	34.4	66.1
tailings	98.88	0.20	33.9
Composite	100.00	0.58	100.0
+ 200 mesh fraction:			
concentrate	5.09	20.6	89.5
tailings	94.91	0.13	10.5
Composite	100.00	1.17	100.0

Product	Weight	Percent Sn	Distribution Sn
— 200 mesh fraction:			
concentrate	1.44	38.3	66.6
tailings	98.56	0.28	33.4
Composite	100.00	0.83	100.0
Sample R.395E			
Concentrate:			
+ 60 mesh	0.41	18.0	11.7
+ 100 mesh	0.33	36.1	18.9
+ 200 mesh	0.45	24.3	17.4
— 200 mesh	0.47	26.8	20.1
Total Concentrate	1.66	25.8	68.1
Tailings:			
+ 60 mesh	30.27	0.18	8.7
+ 100 mesh	24.16	0.13	5.0
+ 200 mesh	13.44	0.08	1.7
— 200 mesh	24.95	0.36	14.3
Sulphides	5.52	0.25	2.2
Total Tailings	98.34	0.20	31.9
Composite head	100.00	0.63	100.0
Head (assay)	....	0.64	....
Concentration Results—Individual Fractions.			
+ 60 mesh fraction:			
concentrate	1.32	18.0	57.2
tailings	98.68	0.18	42.8
Composite	100.00	0.42	100.0
+ 100 mesh fraction:			
concentrate	1.35	36.1	79.2
tailings	98.65	0.13	20.8
Composite	100.00	0.62	100.0
+ 200 mesh fraction:			
concentrate	3.26	24.3	91.1
tailings	96.74	0.08	8.9
Composite	100.00	0.87	100.0
— 200 mesh fraction:			
concentrate	1.86	26.8	58.5
tailings	98.14	0.36	41.5
Composite	100.00	0.85	100.0

Concentration by "Vanning"

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

Sample	Percent Recovery of Tin in Concentrate
R.395A	74.9
R.395B	73.7
R.395C	79.7
R.395D	72.7
R.395E	70.4

Heavy Liquid Separation

Sample R.395F was separated in acetylene tetrabromide (Sp.G. 2.92) as in investigation R.390.

Product	Weight	Percent Sn	Distribution Sn
— 5 mesh + 10 mesh: sink	5.1	2.18	20.2
float	36.7	0.26	17.3
Composite	41.8	0.49	37.5
— 10 mesh + 30 mesh: sink	7.7	2.28	31.9
float	29.9	0.10	5.5
Composite	37.6	0.55	37.4
— 30 mesh	20.6	0.67	25.1
Composite sample	100.00	0.55	100.0
Sink: — 5 mesh + 10 mesh	5.1	2.18	20.2
Sink: — 10 mesh + 30 mesh	7.7	2.28	31.9
Composite sink	12.8	2.24	52.1
Float: — 5 mesh + 10 mesh	36.7	0.26	17.3
Float: — 10 mesh + 30 mesh	29.9	0.10	5.5
Composite float	66.6	0.19	22.8
— 30 mesh	20.6	0.67	25.1
Composite sample	100.0	0.55	100.0

On visual examination, float and sink products appear very similar to equivalent products from Investigations R.390 and R.392, with the exception that no cassiterite larger than about pin-head size was noted.

Discussion

The 5 tabling tests can be summarized as:—

Sample No.	Composite Head % Sn	Combined Concentrate % Sn	Combined Tailings % Sn	% Recovery of Sn in Concentrates
395A	0.28	19.9	0.07	74.6
395A	0.66	31.3	0.19	67.4
395C	0.74	31.2	0.22	70.5
395D	0.61	25.7	0.19	69.1
395E	0.63	25.8	0.20	68.1
Arithmetical Average	0.58	26.8	0.17	69.9

Results generally are similar to those obtained in Investigation R.394 with regard to concentrate grade and tin content of the tailings. Recoveries are highest to date, due principally to the higher tin content of the ores.

There is little that is abnormal in any of the tests. Tin content of the — 200 mesh fractions in samples R.395B, R.395C and R.395E are higher than those in previous investigations. Tin contents of the three sulphide fractions vary between 0.13 and 0.25.

Appendix: Other related Investigations on diamond drill core samples from Ardlethan, N.S.W., are:—

Investigation R.390: Hole D.P. 1.

Investigation R.392: Hole D.P 2.

Investigation R.394: Hole N.C. 1.

Published in *Tech. Rep. Dep. Min. Tas.* 6, 229-253.