

TR3-162-166 R. 321

JIG MIDDLEINGS

R. 322

TABLE FLOTATION TAILING

STOREYS CREEK TIN MINING CO. N.L.

Samples.

R. 321 is a sample of mill jig middleings and R. 322 is a sample of sulphide tailing produced by table flotation of mill products.

Sizing Analyses

Fraction (B.S.)	Percent Weight	
	R. 321	R. 322
+ 10	13.1	1.9
+ 30	74.0	24.4
+ 60	7.2	23.5
+100	3.0	19.6
+200	2.0	17.1
-200	0.7	13.5

Both samples contained appreciable pyrite and some sphalerite. The assaying has been restricted to determinations of tungstic oxide.

Head Assays.

R. 321	10.0 percent tungstic oxide
R. 322	3.3 percent tungstic oxide

Sizing Analyses.

Fraction (B.S.)	Weight	R. 321		R. 322		WO ₃ % Dist.
		WO ₃	WO ₃ % Dist.	Weight	WO ₃	
+ 10	13.1	11.8	15.3	1.9	5.0	2.9
+ 22				18.0	4.08	23.5
+ 30	74.0	10.1	74.2	6.4	3.92	7.7
+ 44				13.1	2.97	12.0
+ 52				6.3	2.46	4.8
+ 60	7.2	10.8	7.7	4.1	2.17	2.7
+ 72				8.1	1.88	4.7
+ 85				6.9	0.95	2.0
+100	3.0	3.2	1.0	4.6	2.15	3.0
+150				14.0	1.45	6.2
+200	2.0	3.9	0.8	3.1	1.75	1.7
-200	0.7	14.9	1.0	13.5	7.2	29.8
Composite	100.0	10.1		100.0	3.26	

Mineragraphic investigations show that both samples contained free and composite grains of wolfram. In the flotation tailings composites with wolfram and pyrite were noted in sizings as fine as plus 72 mesh which was the finest sizing examined. Examination of the jig middling showed the majority of the wolfram to be present as free grains. The presence of the free wolfram is to be anticipated due to the difficulty of producing a clean concentrate in the presence of heavy gangue such as pyrite.

Investigations.

Investigations desired were examinations to determine the cause of losses and tests to increase recoveries from these mill products. Practically no free wolfram is visible in the table flotation tailings by panning, indicating the presence of composite grains.

No responsibility is accepted for the results shown in this report except in so far as they apply to the samples tested.

Summary.*R. 321 Mill Jig Middlings.*

1. The sample contained 10 percent of tungstic oxide, and 60 percent of this was recovered as a jig concentrate assaying 63.2 percent of WO₃.

Reduction of the jig tailings to minus 20 mesh and table concentration of all the minus 20 mesh material resulted in a further recovery of 3.9 percent (Test 2).

2. Test 2A. A variant of Test 2 using the same jigging procedure but finer grinding of the tailings to minus 85 mesh and table concentration after removal of the sulphides by flotation resulted in a recovery of 92.3 percent of the tungstic oxide. The sulphide discard amounted to 67 percent by weight with negligible loss of wolfram.

3. Tests 5 and 6 show recoveries obtained by grinding, sulphide removal by flotation and table concentration. At the 44 mesh grind the recovery amounted to 65.2 percent and the 85 mesh grind 76.3 percent. This latter recovery is about 16 percent lower than the combined process of jigging and retreatment of jig tailing at the 85 mesh sizings, and no doubt the lower recovery was caused by sliming of the wolfram.

R. 322 Table Flotation Tailing.

4. Only a minor quantity of wolfram in the sample is visible by panning as a good deal of the wolfram is present as composite grains with the sulphides.

5. Reduction by closed circuit ball mill grinding to minus 44 mesh, cleaner flotation rejection of the sulphides followed by table concentration (Test 3), gave a recovery of 64.0 percent of the wolfram.

6. Similar procedure but with finer grinding to minus 72 mesh (Test 4) resulted in a recovery of 67.6 percent of the wolfram. The cleaner flotation sulphide product in both tests amounted to 80 percent by weight with 0.38 and 0.33 percent of tungstic oxide respectively.

Test Results.

R. 321 Jig Middling.

Jig and table concentration.

Jig concentration of plus 20 mesh fraction followed by reduction of jig tailings to minus 20 mesh and table concentration together with the original minus 20 mesh fraction.

Test 2.

Product	Weight	Percent	Percent WO ₃
		WO ₃	Distribution
Jig Concentrate	9.19	63.2	60.0
Table Concentrate	0.61	62.0	3.9
Tailings	90.20	3.88	36.1
Composite	100.0	9.7	100.0

Test 2A.

Jig concentration as received followed by minus 85 mesh grind of the tailings, flotation rejection of sulphides which amounted to 67 percent and table concentration of the flotation sink product.

Product	Weight	Percent	Percent WO ₃
		WO ₃	Distribution
Jig Concentrate	9.19	63.2	59.9
Table Concentrate	5.43	57.9	32.4
Table Tailing	18.10	4.07	7.6
Cleaner Sulphide Float	67.28	0.15	0.1
Composite	100.0	9.7	100.0

Tests 5 & 6.

Ball mill reduction to minus 44 mesh in the case of Test 5, and 85 mesh in Test 6. Rejection of sulphides by flotation followed by table concentration.

Flotation Conditions.

	lbs. per ton/minutes	
	Rougher	Cleaner
H ₂ SO ₄	5/5	—
CuSO ₄ .5H ₂ O	1/5	0.5/5
Mixed Xanthates	0.75	0.25
Cresylic Acid	0.15	0.05
Flotation Time	/10	/6

Test 5.

Product	Weight	Percent	Percent WO ₃
		WO ₃	Distribution
Table Concentrate	10.2	64.1	65.2
Table Tailing	23.8	13.2	31.3
C1. Sulphide Float	66.0	0.55	3.5
	100.0	10.0	100.0

Test 6.

Product	Weight	Percent	Percent WO ₃
		WO ₃	Distribution
Table Concentrate	11.5	67.9	76.3
Table Tailing	20.1	11.2	22.0
C1. Sulphide Float	68.4	0.25	1.7
	100.0	10.2	100.0

R. 322 Table Flotation Tailing.

This investigation consisted of two tests by grinding to 44 and 72 mesh, cleaner flotation of sulphides, followed by table concentration of the flotation sink product.

Flotation Conditions.

	lbs. per ton/minutes	
	Rougher	Cleaner
CuSO ₄ .5H ₂ O	1/5	0.5/5
Mixed Xanthates	1	0.5
Cresylic Acid	0.3	0.1
Flotation Time (Test 3)	30	17
Flotation Time (Test 4)	13	15
pH	5.5	

Results.

Test 3 Minus 44 Mesh Grind.

Product	Weight	Percent	Percent WO ₃
		WO ₃	Distribution
Table Concentrate	4.9	43.1	64.0
Table Tailing	14.6	6.05	26.8
C1. Flotation Tailing	80.5	0.38	9.2
Composite	100.0	3.3	100.0
Total Tailing	95.1	1.25	

ORE DRESSING INVESTIGATIONS.

Test 4. Minus 72 Mesh Grind.

Product	Percent		Percent WO_2 Distribution
	Weight	WO_2	
Table Concentrate	5.2	45.2	67.6
Table Tailing	14.1	6.08	24.8
Cleaner Flootation Tailing	80.7	0.33	7.6
Composite	100.0	3.47	
Total Tailing	94.8	1.18	