



DEPARTMENT OF MINES
CANADA

MINES BRANCH

O T T A W A September 29th, 1930.

R E P O R T
of the
ORE DRESSING AND METALLURGICAL LABORATORIES

365

Experimental Tests on a Sample of Tailings
From the Mill of the Argonaut Gold Mines,
Limited, Larder Lake, Ontario.

By J. S. Godard

Ottawa, Sept. 29, 1930.

REPORT
of the
ORE DRESSING AND METALLURGICAL LABORATORIES
Report No. ³⁶⁵...

Experimental Tests on a Sample of Tailings from
the Mill of the Argonaut Gold Mines, Limited,
Larder Lake, Ontario.

By J.S. Godard.

=====

Shipments: A shipment of 70 pounds of tailings was received
July 23, 1930 from P.M. Fleming, Haileybury, Ontario.

Characteristics of The Tailings: At different periods the
ore of the Argonaut Gold Mines, Limited at Larder Lake, Ont.,
was treated first by cyanidation and later by amalgamation
and flotation of the amalgamation tailings. From the low
copper content of the tailings sample submitted we presume
they were those discharged from the mill when operating with
the latter flow sheet.

The sample contained gold 0.115 oz. per ton, copper 0.19 per cent and iron, both as pyrite and magnetite 9.93 per cent. The balance was mainly silica. A screen analyses showed that about 62 per cent was -200 mesh.

Results of a Screen Analyses on a 4000 Gram Sample.

Mesh	Wt. %	Assays			% Values		
		Au oz/ton	Cu %	Fe %	Au	Cu	Fe
+65	0.5	0.40	0.15	9.78	1.7	0.4	0.5
+100	3.5	0.12	0.11	7.36	3.7	2.1	2.6
+150	7.8	0.10	0.07	6.05	6.8	2.9	4.8
+200	25.9	0.10	0.13	6.25	22.6	18.0	16.3
-200	62.3	0.12	0.23	12.09	65.2	76.6	75.8

Calculated head sample from products, Au 0.115 oz. per ton, Cu 0.19%, Fe 9.93%.

Purpose of Experimental Tests: The purpose of the experimental tests was to determine the best method of recovering the gold in the tailings.

Experimental Tests.

Tests 1-2-3

Concentration Tests - Flotation - Tabling the Flotation Tailings.

Test No. 1

Results

Product	Wt. %	Assays		% Values
		Au oz/ton		Au
Flot. conc.	4.7	1.12		36.0
Table conc.	8.1	0.57		31.6
Table Tail +200	29.7	0.07		14.2
" " -200	35.8	0.05		12.2
Slimes	21.7	0.04		6.0

No regrinding practised before flotation.

Recovery in concentrates 67.6%.

Test No. 2

Results

Product	Wt. %	Assays Au oz/ton	% Values Au
Flot. conc.	4.4	1.18	44.6
Table conc.	8.0	0.28	19.2
Table Tail +200	19.5	0.07	11.8
" " -200	39.8	0.05	17.1
Slimes	28.3	0.03	7.3

Sample ground 5 minutes before flotation.

Recovery in concentrates 63.8%.

Test No. 3

Results

Product	Wt. %	Assays Au oz/ton	% Values Au
Flot. conc.	6.3	1.12	62.0
Table conc.	7.0	0.18	11.1
Table Tail +200	37.4	0.05	3.3
" " -200	30.9	0.04	10.9
Slimes	48.4	0.03	12.7

Sample ground 20 minutes before flotation.

Recovery in concentrates 73.1%.

Flotation Reagents.

The flotation reagents used were as follows,-
 Na₂CO₃ 4.0 lb. per ton, coal tar creosote 0.15 lb. per ton,
 potassium xanthate 0.30 lb. per ton, pine oil #5 0.08 lb.
 per ton and copper sulphate 1.0 lb. per ton.

Tests 4-5

Cyanidation Tests.

Two cyanidation tests were made on the tailings. The cyanide strength was 0.05% KCN and the pulp dilution 3:1, the agitation periods were 24 hours in test 4, and 48 hours in test 5.

Results. Screening the Cyanidation Tailings on 200 Mesh.

Test No. 4

Mesh	Wt. %	Assays Au oz/ton	% Values Au	Aver. Tail Au oz/ton.
+200	31.9	0.03	48.4	0.02
-200	68.1	0.015	51.6	

Test No. 5

+200	36.0	0.02	52.9	0.014
-200	64.0	0.01	47.1	

Summary - Tests 4-5

No.	Head Au oz/ton	Tails Au oz/ton	Extrn %	Time Hours	Reagents lb/ton	
					KGN	CaO
4	0.114	0.02	82.5	24	1.1	3.3
5	0.114	0.014	87.7	48	1.4	4.0

Conclusions: In the treatment of these tailings, cyanidation gives the higher recovery of the gold values.