

#250

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

Experimental tests on a gold ore from the Gold
Hill Mines, Boston Creek, Ont.

J. S. Godard

Shipment: A shipment of ore consisting of five samples was received from the Gold Hill Mines, Boston Creek, Ontario, July 7, 1926. The samples and their weights were as follow:

Sample	400 ft. level	13.5 lbs.
	A 500 ft. level	10.0 "
	B 500 ft. level	10.0 "
	A 600 ft. level	12.25 "
	B 600 ft. level	11.75 "

Characteristics of the ore: It was thought that the gold present in this ore was a gold telluride, but the presence of tellurium was undetected by microscopic examination and by a qualitative test on a 10 gram sample. Small amounts of lead and copper are present. The gangue is silicious.

Purpose of experimental tests: The purpose of these tests was to determine the occurrence of the gold and an economic metallurgical treatment.

Analysis: The analysis of the samples was as follows:

Sample	400 ft. level	2.54 oz/ton gold
	A 500 ft. level	0.11 " "
	B 500 ft. level	0.11 " "
	A 600 ft. level	0.68 " "
	B 600 ft. level	2.26 " "

For the purpose of the tests a sample was prepared consisting of the 400 ft. level sample and the B 600 ft. level sample. Assay of combined sample - 2.30 oz/ton gold

Cyanidation Tests:

Details -

No.	Weight	Mesh	Density	KCN %	Time	Remarks
1	500	-100	1:2	0.20	65 hrs	Ore dry crushed
2	500	-200	1:2	0.20	65	Ore wet crushed
3	500	-200	1:3	0.15	65	and de-watered

The cyanide tailing from test no. 1 was screened and the products assayed -

Mesh	Weight %	Assay	% values
+150	18.9	0.60	46.3
+200	20.1	0.29	23.8
-200	61.0	0.12	29.9
Average tailing		0.25	

Results -

No.	Head	Tailing	Extraction %	Reagents consumed lb/ton	
				KCN	CaO
1	2.30	0.25	89.2	3.32	5.1
2	2.30	0.06	97.4	10.84	10.3
3	2.30	0.15	93.5	11.12	11.5

Amalgamation Tests: Two amalgamation tests were made on the combined sample. A screen analysis was made on the tailing from each test. -

No.	Mesh	Weight %	Assay	% values	% gold amalgamated
4	+100	2.9	0.49	4.0	84.7
	+150	6.7	0.51	9.7	
	+200	12.0	0.52	17.6	
	-200	78.4	0.31	68.7	
	Average tailing		0.354		
5	+100)	1.4	1.64	6.3	84.2
	+150)				
	+200	4.4	0.73	8.5	
	-200	94.2	0.33	85.2	
	Average tailing		0.365		

Flotation & Cyanidation:

Test No. 6 - concentration

Product	Weight %	Au oz	Cu %	% of values	
				Au	Cu
Concentrate	17.7	9.36	2.42	81.8	96.4
Tailing	82.3	0.45	0.02	18.2	3.6

Cyanidation of tailing ground to -200 mesh

Pulp density	KCN %	Head	Tailing	Extrn %	Reagents consd.		Time
					KCN	CaO	
1 : 2	0.075	0.45	0.08	82.2	1.3	6.9	72 hrs.

Distribution of gold - In concentrate 81.8 %
 In cyanide solutn 14.9 %
 In cyanide tailing 3.3 %
 Recovery 96.7 %

Test No. 7 - Concentration

Product	Weight %	Au oz	Cu %	% of values	
				Au	Cu
Concentrate	20.6	7.76	2.16	78.2	94.9
Tailing	79.4	0.56	0.03	21.8	5.1

Cyanidation of tailing ground to -200 mesh

Pulp density	KCN %	Head	Tailing	Extrn %	Reagents consd.		Time
					KCN	CaO	
1 : 3	0.05	0.56	0.12	78.6	1.0	6.0	72 hrs.

Distribution of gold - In concentrate 78.2 %
 In cyanide solutn 17.2 %
 In cyanide tailing 4.6 %
 Recovery 95.4 %

250

Summary:

1. Cyanidation - Good extractions were obtained by cyanidation. These are offset by high cyanide consumption, especially in the test where the ore is ground to -200 mesh, where over 10 lbs/ton cyanide was used.
2. Amalgamation - Amalgamation results were satisfactory. 85% of the gold is recovered by this method. This high recovery indicates that the gold is present in a free state and that not more than 15% of it could be as a telluride.
3. Flotation and cyanidation - This method of treatment was satisfactory. The recoveries were over 95% and the cyanide consumption was low in both tests. The concentrate was of too low grade to stand shipment, but this could be remedied by re-cleaning

Conclusions: From the above tests cyanidation of ore would not be practical, because of high cyanide consumption and fouling of the solution. Amalgamation is satisfactory and should be inserted in the flow sheet. Flotation and cyanidation of the flotation tailing is satisfactory. The flotation removed the cyanide material, probably copper, though undetermined. Amalgamation followed by flotation and tabling the flotation tailing; amalgamation followed by flotation; and amalgamation followed by flotation and cyanidation of flotation tailing are other possible flow sheets for the treatment of this ore. Insufficient sample made it impossible to attempt tests based on these lines.