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October 24th, 1941.

R E P O R T

of the


ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1108.

Infrasizing and Superpanning Tests on
Flotation Tailing from
the Tombill Gold Mines Limited,
Geraldton, Northwestern Ontario.

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BUREAU OF MINES
DIVISION OF METALLIC MINERALS
—
ORE DRESSING AND
METALLURGICAL LABORATORIES


CANADA
DEPARTMENT
OF
MINES AND RESOURCES
MINES AND GEOLOGY BRANCH

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the Tombill Gold Mines Limited,
Geraldton, Northwestern Ontario.

Shipment:

An 8-pound shipment of flotation tailing was
received on September 20th, 1941, from A. C. Anderson,
Mill Superintendent, Tombill Gold Mines Limited, Geraldton,
northwestern Ontario.

Location of Property:

The property of the Tombill Gold Mines Limited, from which the present sample of flotation tailings was received is situated in the Little Long Lac mining area, Thunder Bay district, northwestern Ontario.

Sampling and Assaying:

After cutting by standard methods, a representative sample of the shipment was obtained, which assayed as follows:

Gold	-	0.015 oz./ton.
Silver	-	0.03 "
Iron	-	5.54 per cent.
Sulphur	-	0.10 "
Arsenic	-	0.06 "
Copper	-	None detected.

Investigative Work:

Mr. Anderson, in his letter of September 17th, 1941, desired information regarding the shipment which would determine the association of the gold with the gangue and slimed sulphides. In order to obtain these data, superpanning and infrasizing tests were made on portions of the shipment. These tests indicated that the major portion of the gold in the tailing was not contained in the slimed sulphides but, rather, is attached to the gangue material in the form of very fine free gold.

Details of Test Work:

Test No. 1. - Superpanning.

A portion of the tailing was concentrated on the Haultain superpanning machine. The different products were assayed for gold.

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(Details of Test Work, cont'd) -

Results:

Product	Weight, per cent	Screen test, per cent -200 mesh	Assays, Au oz./ton	Distribution of gold, per cent
Feed	100.00	-	0.017 [*]	100.0
Panner concentrate	0.65	-	0.15	5.7
Panner coarse sands	49.10	66.0	0.02	57.8
Panner fine sands	23.13	68.0	0.015	20.5
Panner slimes	27.12	99.0	0.01	16.0

* Calculated.

The panner slimes assayed 0.13 per cent sulphur and contained 55.0 per cent of the sulphur in the feed.

The panner concentrate was examined under a powerful binocular microscope. Two small pieces of free gold were seen, approximately 10 to 15 microns in diameter. The bulk of the concentrate consisted of magnetite, a very few scattered grains of arsenopyrite, a negligible amount of pyrite.

Test No. 2. - Infrasizing Test.

A portion of the sample was screened to plus and minus 200 mesh sizes. The plus 200 mesh material was assayed for gold and sulphur. The minus 200 mesh portion was passed through the Haultain infrasizer and the resulting products likewise assayed for gold and sulphur. On the plus 200 mesh the assays were 0.07 per cent sulphur and 0.02 ounce gold per ton.

The minus 200 mesh material assayed as follows:

Nominal size, in microns	Weight, per cent	Au, oz./ton	S, per cent	Distribution, per cent
Above 56	0.08			
56 to 40	15.35	0.025	0.07	24.8
40 to 28	14.79	0.020	0.05	19.5
28 to 20	13.22	0.015	0.05	15.0
20 to 14	11.28	0.010	0.08	8.3
14 to 10	9.12	0.0075	0.05	5.3
Below 10	36.16	0.010	0.18	27.1
Totals	100.00	0.0133	0.10	100.0

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(Test No. 2, cont'd) -

Time of infrasizing: 5 hours, 30 minutes.
 Number of drops per minute: 63.
 Height of drop: 5/16 inch.
 Differential pressure: 19 inches of water.
 Standard golf balls were used.

Summary:

Size, in mesh	Weight, per cent	A S S A Y S		Distribution,	
		Au, oz./ton	S, per cent	per cent Au	S
Above 200	31.1	0.020	0.07	41.1	23.9
Below 200	68.9	0.013	0.10	58.9	76.1
Totals (cal.)	100.0	0.015	0.09	100.0	100.0

Test No. 3. - Hydraulic Classification.

A portion of the sample was passed through the hydraulic classifier, or trap, and the resulting trap concentrate was examined under a powerful binocular microscope. This concentrate was seen to consist mostly of magnetite with a few grains of sulphides. One minute piece of free gold, approximately 10 microns in diameter, was seen.

Test No. 4. - Barrel Amalgamation.

Another portion of the sample was washed, filtered, and repulped. The pulp was then amalgamated with mercury for one hour in a jar mill. The amalgam residue was assayed for gold. This test was run in duplicate. In both cases the amalgam residue assayed 0.015 ounce gold per ton, showing no extraction of the gold by amalgamation.

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Test No. 5. - Extraction by Aqua Regia.

Portions of the sample were extracted overnight with a solution of aqua regia. The residue was washed, filtered, and assayed for gold. The results showed a "trace" of gold in each case.

Summary and Conclusions:

Barrel amalgamation of the tailings showed no appreciable extraction of the gold.

Extraction by aqua regia indicated that the gold in the tailings was soluble under these conditions.

Trap concentration gave a concentrate which included one minute particle of free gold.

In the superpanning test two gold particles were observed, 15 to 20 microns in diameter. In this test a large percentage of the sulphides reported in the slimed product. The coarser-sized particles carried the larger amount of the gold.

The infrasing results showed no close relationship between the gold and the sulphide distribution. In this case also the finer-sized material carried the larger part of the sulphides, while the greater proportion of the gold reported in the coarser-sized products.

These results indicate that the larger part of the gold in this flotation tailing is not contained in the slimed sulphides but rather is attached to the gangue material in the form of very fine free gold.

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