

# FILE COPY

O T T A W A

July 26th, 1940.

## R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 873.

Copper Ore from Porter Township,  
Sudbury District, Ontario.

RECEIVED JULY 27 1940



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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Shipment:

A shipment of 24 sacks of copper ore, gross weight one ton, was received on June 26th, 1940. The ore was taken from the property of G. R. Steeves, Porter township, Sudbury district, Ontario. The shipment was submitted by Bernard Grover, 50 Broad Street, New York City, N. Y.



Purpose of the Investigation:

The investigation was made to determine the character of the ore and the grade of concentrate obtained by flotation for shipment to a smelter.

Character of the Ore:

Six polished sections were prepared and examined microscopically for the purpose of determining the character of the ore.

Gangue -

Gangue comprises the greater proportion of the sections and consists of slightly fractured glassy quartz with a small amount of carbonate. The latter appears to be dolomitic in character.

Metallic Minerals -

Metallic mineralization is composed essentially of pyrrhotite and chalcopyrite. These two minerals are closely associated in places and are present in almost equal amounts, with pyrrhotite, perhaps, slightly more abundant. Both occur largely as small masses and discontinuous stringers in gangue; a small percentage of both occurs also as small disseminated grains. Both minerals contain narrow replacement veinlets of "limonite"; these are more extensive in the pyrrhotite than in the chalcopyrite. "Limonite" is also visible as narrow rims along the margins of some pyrrhotite masses. A small amount of pyrite is present as narrow veinlets in pyrrhotite, and as occasional irregular grains admixed with the other sulphides.



Sampling and Analysis:

The shipment was crushed and sampled by standard methods and was found to contain:

Gold - 0.01 oz./ton,  
Copper - 2.28 per cent.

Investigative Procedure:

The ore was concentrated by flotation.

Results of the Investigation:

The results of concentration show a recovery of approximately 93 per cent of the copper in a rougher concentrate assaying 22.5 per cent copper and 0.05 ounce gold per ton. The ratio of concentration was 10.7:1.

The grade of concentrate can be raised by cleaning. The resulting cleaner tailing or middling product would be returned to the circuit with no material lowering of the grade of the final concentrate or decrease in recovery.

Details of the Test:

Flotation.

A sample of the ore was ground 75 per cent minus 200 mesh in a ball mill, dilution 4 parts solids to 3 parts water, with 10.0 pounds of lime and 0.1 pound of sodium cyanide per ton.

The pulp was floated in a flotation machine by conditioning for 5 minutes with 0.03 pound of potassium amyl xanthate per ton and frothing with 0.025 pound of pine oil per ton. The pulp had a hydrogen ion



concentration, pH 10.8.

The rougher concentrate was cleaned in a smaller flotation machine with 10.0 pounds of lime per ton of concentrate. The high grade of the cleaned concentrate resulted in too much copper in the cleaner tailing or middling product.

Results of Flotation:

Product	Weight, : per : cent	Assays,		Distribution,		Ratio of : concen- : tration
		: Au, : oz./ton	: Cu, : p.c.	: per cent : Au	: per cent : Cu	
Feed	: 100.0	0.007	2.25	100.0	100.0	
Rougher conc.	: 9.3	0.05	22.48	69.1	93.1	10.7:1.
Flotation tailing:	90.7	0.0025	0.17	30.9	6.9	
Cleaner conc.	: 5.3	0.05	29.80	36.0	69.8	19:1.
Cleaner tailing	: 4.0	0.06	12.96	33.1	23.3	25:1.

Conclusions:

The appearance of the ore in the shipment indicated that it had been taken from the surface of the deposit in the oxidized zone.

Clean ore, obtained below the zone of oxidation, should be more amenable to concentration by flotation.

The results of this investigation can therefore only be considered to apply to ore of the same grade and character as that included in the shipment.

The proper reagent balance and the grade of



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the resulting concentrate can best be determined by an investigation carried out on a sample of fresh clean ore which can be considered to be representative of the orebody as a whole or of the type to be used as a mill feed.

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