August 19, 1940. T 0 m W A

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of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 882

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Gold Ore from Williams Claims, Savant Lake, Ontario.

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Shipment:

A sample of Gold ore, net weight 175 lb., was left at the Bureau of Mines Laboratories, Ottawa, on July 18, 1940, by N. W. MacDowell, 11 Granite St., Brockville, Ontario, who stated that the sample of ore was taken from a property known as the Williams Claims at Savant Lake, Ontario.

Purpose of the Investigation:

The investigation was made to determine the

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character of the ore and a method of treatment.

Character of the Ore:

Six polished sections were prepared and examined under the reflecting microscope for the purpose of determining the character of the ore.

Gangue -

The gangue is composed of hard, highly siliceous material with abundant finely disseminated carbonate. It is transected by narrow, sinuous fractures, and almost everywhere is stained a deep brown by iron oxides.

Metallic Minerals -

Metallic mineralization is not very heavy in the sections examined but much of the original sulphides may have been removed by the severe surface leaching to which the sample has undoubtedly been subjected. Metallic minerals, listed in their approximate order of abundance, are: pyrite, "limonite," chalcopyrite, arsenopyrite, pyrrhotite and marcasite, and native gold.

<u>Pyrite</u> is present as coarse to fine irregular grains scattered unevenly through gangue. Replacement by "limonite" is prominent, and in places this has proceeded to such an extent that all that remains of the pyrite is numerous small remnants in "limonite."

"Limonite" is almost as abundant as pyrite. It occurs as small masses and coarse to fine irregular grains in gangue. As already mentioned, it has extensively attacked and replaced pyrite. <u>Chalcopyrite</u> and <u>arsenopyrite</u> are to be seen as occasional medium to small irregular particles scattered among the pyrite and "limonite."

<u>Pyrrhotite</u> is visible in one section as rare small irregular grains surrounded by an alteration product which appears to be marcasite.

<u>Gold</u>. Ten grains of native gold were observed and measured. They range from 144 microns (+150 Tyler mesh) down to 14 microns (+1100 Tyler mesh) in size. All occur alone in quartz.

Sampling and Analysis:

The shipment of ore was crushed and sampled by standard methods, and was found to contain: Gold 1.65 oz./ton, Silver 0.15 oz./ton.

Investigative Procedure and Results:

The ore was ground in water and jigged. The jig concentrate was amalgamated. The jig tailings and amalgamation residue were cyanided for different periods of time.

The recovery of Gold by amalgamation was 41%.

The extraction by cyanidation of the amalgamation residue was 97% of the Gold.

The overall recovery was 98.5% of the Gold. DETAILS OF THE TEST:

Amalgamation followed by Cyanidation.

The ore was ground 85% - 200 mesh at a dilu-

tion of 4 parts solids to three parts of water.

The ground pulp was jigged by passing it through a Denver Laboratory Mineral Jig. The jig concentrate was microscopically examined for free Gold. The Gold in the concentrate was easily visible, and considerable fine Gold was seen under the microscope.

The jig concentrate was barrel-amalgamated and, after separating the Mercury from the residue, the residue was mixed with the jig tailing.

The combined jig tailing and amalgamation residue was then filtered and sampled.

Two portions from the filter cake were repulped in cyanide solution at a dilution of 1 part solids to 1.5 parts of solution containing 1.0 lb. NaCN per ton. Lime was added to the pulp to give protective alkalinity. The samples were agitated for 24 and 48 hours.

Frequent additions of reagents were required to maintain the strength of the solutions due to the oxidized condition of the sample of ore.

Test No. 1

Amalgamation

Results:

Assays, Feed	Au oz./ton Tailing	Recovery, per cent
1.65	0.97	41.2

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Cyanidation of the jig tailing and amalgamation residue

Results:

Time Agitation,	Au	Assays, oz./ton	Extraction, per cent	Final Ti lb./ton	tration, solution	Reagents C lb./to:	onsumed, n ore
Hours	Feed	Tailing	·	🐘 NaCN	CaO	NaCN	CaO
24 48	0 .97 0.97	0.03 0.025	96.9 97.4	1.00 1.00	0.06 0.10	2•74 3•06	15.4 18.8

Summary of the Test:

The reducing power of the solution from the 48 hour test was 250 cc. N/10 KMnO₄ per litre.

Recovery by amalgamation -- 41.2%.

Gold in cyanide feed -- 58.8%.

× 9	Gold extracted by cyanidation 96.9% in 24 hr.
	Extraction from original feed 58.8 x .969 = 57.0%.
	Overall recovery within 24 hr 98.2%.
. •	Overall recovery within 48 hr 98.5%.

Conclusions:

The appearance of the sample of ore indicated that it had been taken from the surface or from the zone of surface oxidation. The oxidized condition of the ore greatly increased the amount of reagents consumed in cyanidation.

The test shows that 41% of the Gold was recovered by amalgamation and that the amalgamation tailing was amenable to cyanidation, with an overall re-.covery of 98% of the Gold.

It is to be expected that fresh, clean ore

will use less reagents in cyanidation.

The high grade of this sample of ore is no doubt due to the concentration of the leached oxidized sulphides which causes the enrichment of the ore in the zone of oxidation.

This sample cannot be considered to be representative of ore below the zone of oxidation, where values have not been concentrated by leaching. When development underground has proceeded sufficiently to determine the size and character of the orebody, a further shipment should be made to determine if the character of the ore has changed. The results of the present investigation apply only to the sample submitted.

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