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O T T A W A

April 29th, 1942.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1208.

Gold Ore from the Queenston Gold Mines Limited,
Township of Gauthier, East Kirkland
Lake Area, Northern Ontario.

(Copy No. 19.)

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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Investigation No. 1208.

Gold Ore from the Queenston Gold Mines Limited,
Township of Gauthier, East Kirkland
Lake Area, Northern Ontario.

Shipment:

A shipment of 70 pounds of ore was received on March 27th, 1942. The ore was from the property of the Queenston Gold Mines Limited, comprising the group of claims formerly known as Murphy Mines Limited, three claims of the Upper Canada Mines Limited, and two claims of the Anoki Mines Limited (Oricle). The property is under the direct management of the Upper Canada Mines Limited and is located directly south of their property in the township of Gauthier, East Kirkland Lake area, northern Ontario.

The shipment was submitted by R. J. Henry, Resident

(Shipment, cont'd) -

Manager, Upper Canada Mines Limited, Dobie, Ontario, and contained the identification number 5955.

Purpose of the Investigation:

The shipment was submitted for the purpose of determining the results obtainable by cyanidation and concentration by flotation. The sample was examined to note whether tungsten and arsenic were present.

Characteristics of the Ore:

The ore was received in a finely ground condition and a screen test showed 55 per cent minus 200 mesh. Examination of the ore under ultra-violet light indicated that no scheelite was present.

Sampling and Analysis:

The ore was sampled by standard methods and was found to contain:

Gold (Au)	-	0.21 oz./ton
Silver (Ag)	-	0.045 "
Sulphur (S)	-	1.46 per cent
Iron (Fe)	-	4.90 "
Pyrrhotite	-	0.03 "
Copper (Cu)	-	0.02 "
Arsenic (As)	-	None detected.
Tungsten trioxide (WO ₃)	-	" "

Investigative Procedure:

The ore was treated by straight cyanidation and by flotation.

Results of Test Work:

95 per cent of the gold was extracted by straight cyanidation at a grind of 87 per cent minus 200 mesh. The cyanide tailing assayed 0.01 ounce gold per ton.

90.5 per cent of the gold was recovered in a

(Results of Test Work, cont'd) -

flotation concentrate assaying 3.22 ounces of gold per ton, with a ratio of concentration of 17:1, at a grind of 36 per cent minus 200 mesh. The tailing assayed 0.015 ounce gold per ton.

Details of the Tests:

Straight Cyanidation.

Tests Nos. 1 to 3.

In Test No. 1, a sample of the ore as received was agitated in a 1.0 pound NaCN per ton solution for 24 hours, lime being added for protective alkalinity.

In Tests Nos. 2 and 3, the ore was ground in ball mills at a dilution of 4 parts of solids to 3 parts of cyanide solution (1.0 pound NaCN per ton) for different periods.

The pulps were agitated for 24 hours at a dilution of one part solids to 1½ parts of solution made up to 1.0 pound NaCN per ton. Lime was added for protective alkalinity.

Results of Tests Nos. 1 to 3:

Test No.	Assays, Au,		Extraction of gold, per cent	Final titration, lb./ton solution		Reagents consumed, lb./ton ore	
	Feed	Tailing		NaCN	CaO	NaCN	CaO
1	0.21	0.03	85.7	0.72	0.20	0.42	1.70
2	0.21	0.02	90.5	0.76	0.20	0.40	1.70
3	0.21	0.01	95.2	0.72	0.20	0.42	1.70

The reducing power of the solution in Test No. 3 was 32.0 ml. N/10 KMnO₄ per litre.

(Continued on next page)

(Tests Nos. 1 to 3, cont'd) -

Screen Tests on Cyanide Tailings.			
Mesh	Weight, per cent		
	Test No. 1.	Test No. 2.	Test No. 3.
- 35+ 48	3.5	-	-
- 48+ 65	5.7	0.2	-
- 65+100	10.5	2.2	0.4
-100+150	14.0	8.4	4.3
-150+200	10.2	10.3	8.0
-200	56.1	78.9	87.3
	100.0	100.0	100.0

Straight Flotation.

Tests Nos. 4 and 5.

Test No. 4 was made on the ore as received. A sample was conditioned in a flotation machine with 2.0 pounds of soda ash and 0.2 pound of potassium amyl xanthate per ton. Then 0.10 pound of pine oil per ton was added and a concentrate was recovered.

Test No. 5 was made on ore ground 78 per cent minus 200 mesh. A sample was ground in a ball mill, dilution 4:3, with 2.0 pounds of soda ash per ton. The pulp was placed in a flotation machine and floated with 0.2 pound of potassium amyl xanthate and 0.1 pound of pine oil per ton.

Results:

Product	Test No. 4.			
	Weight, per cent	Assay, Au, oz./ton	Units Au	Distribution, per cent Au
Feed	100.0	0.21	21.113	100.0
Concentrate	5.9	3.10	18.290	86.6
Tailing	94.1	0.03	2.823	13.4

Ratio of concentration 17:1.

(Continued on next page)

(Tests Nos. 4 and 5, cont'd) -

Results:

Product	Test No. 5.				
	Weight, per cent	Assay, Au, oz./ton	Units Au	Distribution, per cent Au	Ratio of concentration
Feed	100.0	0.24	24.152	100.0	
Concentrate	7.8	2.36	22.308	92.4	12.8:1.
Tailing	92.2	0.02	1.844	7.6	

The flotation tailings in Tests Nos. 4 and 5 have the same values as the cyanide tailings in Tests Nos. 1 and 2.

Test No. 6.

This test was made on ore ground 86 per cent minus 200 mesh. The flotation concentrate was recleaned.

A sample was ground in a ball mill, dilution 4:3, with 2.0 pounds of soda ash per ton. The pulp was floated with 0.2 pound of potassium amyl xanthate and 0.1 pound of pine oil per ton.

The flotation concentrate was recleaned in a separate flotation machine without the use of any reagents.

Results:

Product	Test No. 6.				
	Weight, per cent	Assay, Au, oz./ton	Units Au	Distribution, per cent Au	Ratio of concentration
Feed	100.0	0.20	100.0	100.0	
Rougher conc.	11.9	1.60	93.5	-	8.4:1.
Cleaner conc.	5.7	3.22	-	90.5	17.4:1.
Cleaner tailing	6.2	0.10	-	3.0	16.2:1.
Flot. tailing	88.1	0.015	6.5	6.5	

The cleaner concentrate assayed:

Silver (Ag) - 0.44 oz./ton.
 Copper (Cu) - 0.20 per cent
 Arsenic (As) - Trace.

Summary and Conclusions:

The ore represented by the sample submitted for the investigation does not present any difficulties to treatment by straight cyanidation. There was no appreciable fouling of the solution and an 0.01 ounce gold per ton tailing was obtained at a grind of 87 per cent minus 200 mesh.

At a similar grind the flotation tailing was 0.015 ounce gold per ton, indicating a lower recovery by flotation.

The use of flotation would require treatment for the concentrates which would possibly result in additional losses.

The method that will give maximum recovery from ore of this type and character, therefore, is straight cyanidation.

No tungsten minerals were detected in the shipment. A trace of arsenic was detected in a flotation concentrate.

In the absence of hand specimens of the ore from which to make polished sections, in this investigation no microscopic examination of the shipment was made to determine the character of the ore.

The results of the investigation apply only to ore similar to that submitted in the shipment.

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