

~~FILE COPY~~

O T T A W A

June 28th, 1940.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 857.

Cyanidation Tests on a Sample of Gold Ore
submitted by the Central Cadillac Mines Limited.

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



CANADA
DEPARTMENT
OF
MINES AND RESOURCES
MINES AND GEOLOGY BRANCH

O T T A W A

June 28th, 1940.

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

Investigation No. 857.

Cyanidation Tests on a Sample of Gold Ore
submitted by the Central Cadillac Mines Limited.

Shipment:

=====

A shipment of gold ore, gross weight 225 pounds, was received on June 21st, 1940. The shipment was submitted by G. A. McTeigue, President, Central Cadillac Mines Limited, 712 Transportation Building, St. James Street West, Montreal, Quebec.

Purpose of the Investigation:

The investigation was made to determine the extraction of gold by straight cyanidation.

Characteristics 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 Material -

The gangue consists of an assemblage of dark greenish-grey to black schistose rock, smoky grey quartz, and abundant finely disseminated carbonate.

Metallic Minerals -

The metallic minerals, listed in general order of abundance, are: arsenopyrite, pyrite, pyrrhotite, and chalcopyrite. These occur largely in the rock material.

Arsenopyrite preponderates greatly as small granular masses and irregular disseminated grains which are predominantly medium to coarse in size. A very minor quantity of pyrite is mixed with the arsenopyrite as small disseminated grains. Pyrrhotite is visible in small amount as medium to fine irregular particles scattered unevenly through gangue. Rare tiny grains of chalcopyrite occur in gangue and in pyrite.

Nothing was learned as to the mode of occurrence of gold, since neither native metal nor gold minerals were observed in the sections.

Sampling and Analysis:

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

Gold	-	0.30 oz./ton
Silver	-	0.06 "
Copper	-	Trace.
Iron	-	2.11 per cent
Arsenic	-	0.63 "
Sulphur	-	0.57 "
CaO	-	2.32 "
Insoluble	-	88.28 "

Investigative Procedure:

The ore was treated by cyaniding for different periods of time at different grinds.

Results of the Investigation:

The maximum recovery, of 96.7 per cent of the gold, was obtained at a grind of 88 per cent minus 200 mesh within 24 hours' agitation.

Details of the Tests:

Tests Nos. 1 to 6. - Straight Cyanidation.

Samples of the ore were ground in ball mills at a dilution of 4 parts of solids to 3 parts of cyanide solution containing 1.0 pound NaCN per ton and lime to give protective alkalinity to the solutions.

The ground pulps were diluted to 1 part solids to $1\frac{1}{2}$ parts of solution made up to 1.0 pound NaCN per ton. Each grind was made in duplicate, one being agitated for 24 hours and the other for 48 hours.

At the conclusion of the agitation period the pulps were filtered. The tailings were sampled

and assayed and a screen test was made to determine the degree of grinding for each. The reducing power of the solution was also determined.

Results of Straight Cyanidation:

24-Hour Period.									
Test No.	Grind per cent	Assays, Au oz./ton	Extraction of gold, Feed:Tail-: of gold, ing per cent	Final titration, lb./ton	Reagents consumed, lb./ton	R.P., [⊙] c.c. N/10 KMnO ₄ per litre			
1	72.0	0.30	0.015	95.0	1.08 0.14	0.68 3.80	102.0		
2	88.0	0.30	0.01	96.7	1.00 0.10	0.80 3.85	126.0		
3	93.0	0.30	0.01	96.7	1.00 0.16	0.80 4.36	132.0		

48-Hour Period.									
Test No.	Grind per cent	Assays, Au oz./ton	Extraction of gold, Feed:Tail-: of gold, ing per cent	Final titration, lb./ton	Reagents consumed, lb./ton	R.P., [⊙] c.c. N/10 KMnO ₄ per litre			
4	72.0	0.30	0.01	96.7	1.08 0.12	0.89 5.40	136.0		
5	88.0	0.30	0.01	96.7	1.04 0.10	0.95 5.45	164.0		
6	93.0	0.30	0.01	96.7	1.00 0.08	1.00 5.50	178.0		

[⊙] Reducing power of the solution.

Screen Test on the Cyanide Tailing:

Mesh No.	Weight, per cent		
	Test No. 1.	Test No. 2.	Test No. 3.
+ 65	0.1	-	-
- 65 +100	2.9	0.1	-
-100 +150	9.8	3.1	1.1
-150 +200	15.5	9.0	5.7
-200	71.7	87.8	93.2
	100.0	100.0	100.0

Conclusions:

The investigation shows that a grind of 88 per cent minus 200 mesh will give an extraction of 96.7 per cent within 24 hours. Grinding to 93 per cent minus 200 mesh and agitating for 48 hours did not increase the recovery.

The ore is apparently of a type that lends itself to treatment by straight cyanidation.

oooooooooooo
oooo
oo

WSJ:PES.