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OTTAWA November 16th, 1940.

REPORT

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

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Investigation No. 919.

Mill Tailing from the Madsen Red Lake Gold Mines Limited, Madsen, Ontario.

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BUREAU OF MINES DIVISION OF METALLIC MINERALS ORE DRESSING AND METAILURCICAL LABORATORIES

DEPARTMENT OF MINES AND RESOURCES MINES AND GEOLOGY BRANCH

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suggestion and street student

Origin of Sample and Purpose of Investigation:

A 10-pound representative sample of mill tailing was received on October 3rd, 1940, from the Madsen Red Lake Gold Mines Limited, Madsen, Ontario, per L. H. Van Loon, Mill Superintendent.

This sample was forwarded for the purpose of examination to determine the form and distribution of the gold in the cyanide mill tailing. - Page 2 -

Procedure of Investigation:

The sample as received was assayed and then recyanided. The recyanided tailing was screened on 200 mesh and the minus 200 mesh portion was infrasized and each product was superpanned. Assays made on the products show that there is no fixed relationship between the sulphides and the gold values. Fifty-one per cent of the gold in the recyanided sample was found to be in the plus 200 mesh portion. No free or tarnished gold particles were observed.

The arsenopyrite apparently contains more values than the pyrite. The major amount of the gold in these mill tailings appears to be held along sulphide-gangue contacts, protected against attack by cyanide. When the sulphides are removed by aqua regia, the gold is freed also to attack by acid.

Results:

Assay of sample as received;

Gold	8	S0°0	oz./ton
Iron	5	8.37	per cent
Sulphur	-	3.26	\$0

Screen analysis of sample as received:

Mosh	Weight, per cent	Assay, Au, oz./ton
+100 -100+150 -150+200 -200	1.9 11.6 14.4 72.1 100.0	0.03 0.035 0.03 0.015

A sample of the mill tailing was recyanided: Feed = 0.02 Au oz./ton, Recyanided tailing = 0.015 Au oz./ton, Extraction = 25 per cent.

(Continued on next page)

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(<u>Madsen</u>) (Results, cont'd) -

A sample of the recyanided tailing was screened on 200 mesh and the minus 200 tailing was infrasized. The infrasizer fractions were analysed.

Results	C A	Screening on &	200 mosh	
ç	Weight,	: Assay,	Distribution of	
Mesh :	<u>per cent</u>	<u>: Au oz./ton</u>	<u>; gold, per cent</u>	2646323303
~~~	<b></b>	<b>•</b> • • • •		
4-800	28.7	0.03	51.8	
-200	72.5	0.0115	48.8	
	100.0		300.0	

		ní	<u>resizi</u>	Ng	z of Mu	nus	200	Mes	h Pori	ilon.	1710000
Product	• •	00 00 00	Veight, per cent	8	Ass Au, 2./ton	8.7.8 ; ; ()0)	S, F cox		Distri per Au	.bution, cont	
-200 mesh +56 m -56+40 -40+28 -28+20 -28+20 -20+14 -20+14 -14+10	1 13.67018 11 11 11 11 11 11 11 11 11 11 11 11 1	00 00 00 00 00 00 00	4.2 19.6 17.4 14.9 10.3 8.2		0.04 0.02 0.01 0.01 0.01 0.01 0.005	8	0.31 4.13 5.08 2.58 2.29 2.20		14.6 34.1 15.1 13.0 8.6 3.6	24.4 23.2 15.3 11.0 6.8 5.2	
-10 Total	17 L S	00 00 00 	25.4 100.0		0.005 0.0115	\$*\$ 7:y¥2n=c ⊎urut=ury2 7:	1.94 3.49		11.0 .00.0	14.1 100.0	

Samples of the -56+40 and -40+28 infrasizor products were treated with aqua regia. In both cases, the acid-treated residues contained 0.0025 ounce gold per ton.

A second portion of the recyanided sample was screened on 200 mesh and the minus 200 mesh portion was infrasized. Each fraction was then superpanned. In panning, arsonopyrite, pyrite and a small quantity of pyrrhotite were observed. Microscopic examination of the concentrate failed to detect free gold.

(Continued on next page)

(Madson Results, cont'd) -

The tips of the concentrate bands from the +200 mesh and -200 mesh +56 micron fractions consisting essentially of arsenopyrite were removed, combined, and assayed. The concentrates from the finer sizes were combined.

Rø	នា	u1	t	s	0

	81	Neight,	00	Asse	ys		Distribution
Product	ş	per	3	A12.9.	:Por	cont :	of gold,
	ŝ	cont	81	<u>sa ./tor</u>	18 8	8 AS 3	per cent
	0	alle finn an an Arbanan - Affrikan	a. (4.36	#1910308862-195199-0.00108.2081	وردواردا بسريه والتاري الافرامين	ar 97 goudan , 7 5 card 90 27 2 1	Truerry and an and the second s
Arsonopyrite conc. from	8			•			4 5
+200, -200+56 microns	8	8.0		0.324	¢.3	ct <b>p</b>	201
	00						
Pyrite concentrate from	8	£1 c2		<b>A A</b>			0.0
+200, -200+56 microns	00	7.20		0.07	C.1	<b>C</b> 2	0.0
	00						
Concentrate from	8	<b>17</b> 1 (17)		0.04			6 0
-56-10 microns	ŝ	2.4		0.03	9	1221	0.0
	8	00.0		0 000	ററാ	0 00	A 15 192
Pannor tailing +200	ŝ	28°8		0.080	0.07	0.08	430°0 8 0
~200 +56 microns	8	2.4		0.080	8.20	0.08	0.8
-56+40	60	12.0		0.01	7.72	0.07	7.9
-40+28 "	5	17.9		0.01	1.30	20.0	1.2
=28+20 "	00	10.4		0.01	1.04	80.0	0.0
-20+14 "	0	7.0		0.01	1.40	0.05	4:04:
-14+10 "	0	5.5		0.005	189	0.11	1.07
-10 "	8	17.5		0.005	1.68	0.15	0.0
Totals	8 0 0	1.00.0		0.0159	a ta	o too to ca ca in the same of the same	1.00.0

A portion of the sample after recyanidation was superpanned, and the tip of the concentrates was examined microscopically. No free gold was seen. This arsonopyrite concentrate was then treated with hydrochloric acid to clean any rusty or coated particles of gold that might be present. This failed to disclose any gold particles.

The panner tailing was then leached with hydrochloric acid and re-panned. Again no gold was detected in the concentrate.

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#### Summary and Conclusions:

Recyanidation of the semple extracts an additional 25 per cent of the gold values. 51.2 per cent of the values in this recyanided product are in sizes coarser than 200 mesh.

Analysis of the superpanner products shows that the arsenopyrite contains approximately 0.32 ounce gold per ton while the coarser pyrite concentrate contains 0.07 ounce The finer-sized concentrate is lower in grade per ton. than the coarser.

The fine-sized (-14 microns) portions of the sample have the lowest gold content.

Treatment by aqua regia of the intermediate sizes leaves a residue of 0.0025 ounce per ton.

A study of the analyses of the superpanner tailings shows that there is no definite relation between the gold content and the sulphur or arsenic. Some of the values are within sulphides, as indicated by the assays of the concentrates. The remainder therefore must be with the cangue. As aqua regia treatment extracts the major amount of this gold, it can be assumed that the gold is not entirely surrounded by gangue but lies along sulphide-gangue contacts.

Finer grinding in the present milling operations is indicated by the screen analysis made on the sample.

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