AWATTO

March 30th, 1942.

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# REPORT

of the

## ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1194.

Gold Ore from Claim 1724, Guillet Township, Bellsterre Mining Area, County of Temiskaming, Quebec.

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DEPARTMENT of MINES AND RESOURCES MINES AND GEOLOGY BRANCH

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

OTTAWA March 30th, 1942.

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Gold Ore from Claim 1724, Guillet Township, Belletorre Mining Area, County of Temiskaming, Quebec.

Shipment:

A shipment of 300 pounds of gold ore was received on December 28th, 1941, from A. Cook, Box 39, 44 Cochrane Road, Bartonville, Ontaric. The ore was taken from a test pit on the vein in Claim No. 1724, Guillet township, in the Belleterre mining area of Temiskaming county, Quebec. - Page 2 -

#### Purpose of the Investigation:

The investigation was made to determine a method of treatment for the ore.

#### Character of the Ore:

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

### Gangue -

In the polished sections gangue material proponderates over metallic mineralization and consists of finetextured, grey quartz containing a small amount of carbonate as tiny, disseminated grains and narrow, irregular stringers.

## Metallic Minerals -

In their approximate order of decreasing abundance, the metallic minerals present in the sections are: pyrite, sphalerite, galena, chalcopyrite, and native gold. These minerals are seattered unevenly through gangue as small masses and coarse to fine irregular grains which, in places, form irregular stringers (probably arranged along lines of weakness which formed channelways for the ore-bearing solutions).

The pyrite occurs largely as coarse to fine irregular grains which appear to have been deposited earlier than the other metallies. It contains occasional small inclusions of gangue and the other sulphides. The masses and grains of sphalerite, galena, and chalcopyrite are often intimately admixed with each other and associated with pyrite.

Twenty-two grains of gold, ranging from LOS microns (-100+150 Tyler mesh) down to 16 microns (-800+1100 Tyler mesh) in size, are contained in five of the six polished sections. Twenty occur in gangue; two in sphalerite. Some of the grains in gangue are alone but most of them are against grains of (Metallic Minerals, cont'd) ~

sulphide; both grains enclosed in sphalerite are associated with inclusions of gangue. While most of the gold visible in the sections is associated with the sulphides in this way, there is no evidence that it was deposited contemporaneously with them. Hence it is not probable that the sulphides carry any appreciable quantity of gold in submicroscopic sizes.

#### Sampling and Analysis:

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

Gold (Au)	~~	2.15	oz./ton
Silver (Ag)	6. <b>4</b>	6.75	18
Coppor (Cu)	6/3	0.11	per cent
Lead (Pb)	<b>47</b>	0,66	19
Zine (Zn)	m	0.43	19
Iron (Fe)	43	3.25	11
Arsenic (As)		None	detected.
Sulphur (S)	(C)	1.58	per cent
Tungsten			
trioxide (WO3)	rap-	None	<i>detected</i> .

#### Investigative Procedure;

The one was concentrated by flotation and by jigging followed by flotation and cyanidation. The jig concentrates were barrel-amalgamated. The one also was tested by straight cyanidation.

An infrasizer test was made on a sample of cyanide tailing to observe the distribution of gold in the various sized particles.

## Results of the Test Work:

76 per cent of the gold and 80 per cent of the silver were recovered in a flotation concentrate assaying 44 ounces of gold, 200 ounces of silver, 3.4 per cent copper, 16 per cent lead, and 12.8 per cent zinc per ton. The ratio of concentration was 36:1. A second, pyrite, concentrate assayed 3.5 - Page 4 -

(Results of the Test Work, contid) -

ounces of gold and 12 ounces of silver per ton with a ratio of concentration of 22:1.

27 per cont of the gold in the ore was recovered by amalgamation, at a grind of 92 per cent.

85 per cent of the gold was extracted by straight cyanidation, at a grind of 90 per cent minus 200 mesh, within 72 hours.

Amalgamation followed by cyanidation resulted in an overall recovery of 95 per cent of the gold within 24 hours and 96 per cent within 48 hours, without appreciable fouling of the solutions.

Details of the Tests:

Test No. 1. - Straight Flotation.

This test was made to determine the grade of concentrate that could be recovered by straight flotation.

A sample of the ore was ground in water with 1.2 pounds of lime and 0.1 pound of sodium cyanide per ton at a dilution of 4 parts solids to three parts of water. The grind was 77 per cent minus 200 mesh.

The pulp was transferred to a flotation machine.

# Reagents to float chalcopyrite:

Lb./ton

Sodium ethyl zanthate	(Z-4)	ũ	0.04
Reagent No. 301	•	÷	0.02
Pine oll		604	0.10

The concentrate recovered was designated No. 1. The pulp was then conditioned with 1.0 pound of copper sulphate per ton. Then 0.1 pound of amyl manthate per ton was added and a second concentrate was recovered.

(Test No. 1, cont'd) -

The products were assayed for gold and copper.

Results:

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	; por	cont :	oz./tor	1:5	per cent		Au s	Cu :	tration
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Feed	0 6	100.00:	8.03	5 01	0.11	0	1.00.00:	100.0:	
Conc. No. 1	01 D	3.02:	52,68	0	2.49	80 0	78.42:	68.4:	33:1.
Conc. No. 2	a a	4,14:	3,34	8 9	0.46	0 0	6,82:	17.3:	24:1.
Combined conc <sup>®</sup>	:7.16	au 9	24,15	\$		;85.24	e °	7 0	14:1.
Flot, tailing	8	92.84:	0.32	20	0.02	0	14.76:	14.3:	
ATTINISTICST UNITATING AND	P 0	o o Alexandra Barana Barana	( Margaret Margaret St. 2005)		en men a manage	o o minimum filmentere	o o numericiti i i i i i i i i i i i i i i i i i	NAMAN-MANAGAN	nenneritettettet

<sup>©</sup> Calculated values.

Lead in Conc. No. 1. - 13.15 per cent.

Microscopic examination of the flotation tailing disclosed some particles of coarse free gold that had not been recovered by flotation. The coarse particles of gangue conteined sulphide particles which were very small. The tailing assay indicated that the ore was not ground fine enough to liberate the values.

The presence of free gold in the tailing indicated the necessity of recovering the coarse gold prior to flotation by jigs, blankets or traps.

## Test No. 2. - Jig Concentration; Amelgamation of the Jig Concentrate; and Flotation of the Jig Tailing and Amalgamated Concentrate.

This test was made to determine the recovery of gold by jigging and emelgamation followed by flotation.

A sample of ore was ground in water, dilution 4:3, to give a product 77 per cent minus 200 mesh.

The pulp was passed over a Denver laboratory mineral jig.

The jig concentrate was barrel-amalgamated and after separating the amalgam, the amalgamated concentrate (Test No. 2, cont'd) -

was roturned to the jig tailing. The amalgam was assayed.

The jig tailing was then filtered and repulped in a flotation machine to 30 per cent solids.

The pulp was conditioned with 2.0 pounds of soda ash per ton for 15 minutes. Then 0.4 pound of potassium butyl xanthate (Z-8) per ton was added in stages with 0.1 pound of pine oil and the concentrate was removed.

The concentrate was recleaned with 10 pounds of lime per ton.

Results:

## Amalgamation.

Assay of original feed	2	2.15	oz./ton.
Assay of flotation feed = amalgemetion tailing	-23	1.71	10
Recovery by amalgamation	æ	0.44	\$8
Recovery by amalgamation	c	20.5 p	er cent.
Gold remaining in flotation feed	2	79.5	50
		* 00 0	
		100.0	

		Flot	ation.	ಬಗಗತ್ರಮಾತ್ರವು (ಹಾಲ್ಲೇವರ್ ಮತ್ತು ಮತ್ತು ಸರ್ವತನಗಳ ಹಲ್ಲಿದಾ ಫೆಸಿ	ananyist nooming and a north other of the state
ertenselasi ana dan kana kara tara tara kara kara kara kara kar	: Weight.	Å SS& VS	: Distribu ; per ce	ition, mt	: Retio
Product	: per : cent	: Au, : Cu, • oz./: Der	2 The Statement of the	° (713	: of : concen-
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Feed	:1.00.00	: 1.71:0.11	: :100.00: 79.5	: 100.0	5 9 6
Rough conc.	; ; 26	:19,17:1.19	81,53:64,8	:86.1	: 13.8:1.
Cleanor " Middling	: 3,78	: 4,88:0,23	; 9.82; - 7.1	3: - 8.0	: 28,7:1.
Flotation	3	: 	: . 10 17 14 7 14 '	*	ว ถ น
varring	; 56.74			T G KAN YA Q YA YANKA ANYA KAYA YANA YANA Q Quantu da amama da sama kaya anya sa	A B B Contraction of the state

Calculated values.

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Lead in cleaner concentrate - 9.74 per cent.

- Page 7 -

(Test No. 2, cont'd) -

Summary of Test:		
TO ELIMINITY A BOX TO BUT FLOW TO FAMOLOGICAL LOSS STATEMENTS		Por cont
Recovery of gold by amalgametion	وه	20,5
Recovery of gold in the flotation	conc, -	57.0
		1777 55
Gold in the flotation middling	e7	7.8
Gold in the flotation tailing	6.3	14.7
		GLUF BLUE AND BL
Total	<b>C</b> 22	100.0

Microscopic examination of the tailing shows particles of sulphides, varying in size from coarse to very tiny, adhering to or included within particles of gangue. This grind was not fine enough to liberate the values.

## Test No. 3. - Jir Concentration; Amalgamation of Jig Concentrate; and Flotation of the Jig Tailing and Amalgamated Concentrate.

The sample of ore was ground 92 per cent minus 200 mesh and jigged. The jig concentrates were barrelamalgamated. The amalgamated concentrates and jig tailing were filtered and repulped in a flotation machine.

The pulp was conditioned with the following reagents and a copper concentrate was recovered (Concentrate No. 1.):

## Lb./ton

Soda ash		8.0
Sodium cyanide	69 60	0.1
Sodium ethyl xanthate	C73	0.04
Pine oil	<b>n7</b>	0.05

The pH of pulp was 8.2.

- Page 8 -

(Test No. 3, cont'd) ~

To float the pyrite the following reagents were added:

Copper sulphate - 1.0 lb./ton. Potassium amyl xanthate - 0.1 " No pine oil was required. (Concentrate No. 2.).

Rosults:

	Flotation,											
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duct	: cent	D C	Au	: A.E	5 3	; Cu	: Pb	: Zn	: Au	: Ag	e Cu :	Pb : tration
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Feed	:100.0	0: :	1.57	: 6,	,79;	31.0	: 0.56	: 0.43	:100.0	:100.0	:100.0:	100.0:
Conc.	0 0	6		e e	0		4 1	0 0	n 0	\$	о е а а	۲ ۲
No.l.	: 2.7	2:4	4.16	:200.	,42 ;	3.40	:16,34	:12.87	: 76.7	: 80.3	: 77.73	78,3:36,7:1,
Conc.	6 2	9		e 1	c c	3	<b>3</b> 6	2 0	9 2	\$ \$	e 5 6 4	a t
No.2.	: 4.4	7: 3	3.58	: 12,	0	81,0	: 1,10	: 0,78	: 10,3	: 7.9	: 6.7:	8,7:22,4:1,
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© Calculated value.

Summary of the Test; Ama.	lgamation	Û	
Foed	Contractor and contractor and	2,15	oz./ton.
Amalgamation teilin. = flotation feed	fi	1.57	83
Recovery	بحن	27.0	per cent.
		P	er cent
Gold remaining in flotati	beet no	€.7	73.0
Recovery by Flot. Conc. N	0. 1.	- 5	6.0
Recovery by Flot. Conc. N	o. 2,	,	7.5
Combined concentrat	е	e#1	63,5
Flotation tailing		ata Mirena da	9,5 9,5
		7	3.0 73.0
Recovery by amalgam	ation	en 2	7.0
Total		- 10	0.0

(Details of Tests, contid) -

#### Test No. 4. - Jig Concentration; Amalgamation of Jig Concentrate; and Flotation of the Jig Tailing and Amalgamated Concentrate.

This test was made to determine the recoveries of gold and silver in a bulk concentrate.

The sample of one was ground 92 per cent minus 200 mesh and jigged. 'The jig concentrate was barrelsmalgamated.

The jig tailing and amalgamated concentrate were floated with the following resgents;

Soda ash - 2.0 lb./ton.) (pH, 8.2) Aerofloat No. 31 - 0.1 N) Condition 5 minutes. Potassium amyl xanthate - 0.1 lb./ton. Pine oil - 0.05 " Flotation time, 5 minutes. Conditioned the pulp with: Copper sulphate, 1.0 lb./ton. Potassium amyl ranthate, 0.1 N Pine oil, 0.05 N

Flotation time, 5 minutes.

The combined concentrates were cleaned without

reagents.

Results:

Flotation,									
\\[D\\$>>>==\$\_77\$	:Weight,	3 ASS8	lys, :	Distribu	tion, :	Ratio of			
froduct	: per	: 02.	/ton :	per ce	13.t ***	concen-			
	: cent	s Als	: Ag :	AD 3	AS 3	tretion			
EXEMPTIAL CONTRACTORS AND AND CONTRACT AND	G O	26220112102210234+-1448-2222994	Charles and a state of the second of the sec	and a state of the second s					
Feed	: 100.00	1.57	6,85	100.0	100.0	OT PRIMA MACHINE TO STATE			
Rough conc.	; 9,85	14,36	63.73	90,2	91.7	10.2:1.			
Cleaner conc.	; 5,01	26,66	118.02	85,2	86.4	20.0:1.			
Middling	: 4.84	1,62	7.54	5.0	5.3	20,7;1.			
Flot, tailing	2 90,15	0.17	0,63	9,8	8,3				
e film hind was ne wis and an in the second of the state of the second	C C Destant of the second seco	and a state of the	u Bhu Thuai Linu Dan Ghur da Maria Malamala Ing ang That Tha da Ing Th	- 그리 리 (MLI 사용 및 보험사람) 제시가 NELED 가슴 관용 드것이 1979 ( 사용 1 에 드 M 시트컵 ( 시코, ~ 4 다가 사 리 사용 감사 가락 전체)	2473 5 % - 1276 5 % 1273 6 % 2 % 2 % 2 % 2 % 2 % 2 % 2 % 2 % 2 %	ער אין אין איז איז ער איז			

Calculated values.

(Continued on next page)

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(Test No. 4, cont'd) -

Summary of the Test:

	Amalgam	ation.			
Ĩ <sub>b</sub> o	ed	ŝ	2,15	oz.	/ton.
Amalgamation tai = flotation fee	ling d	c <del>3</del>	1.57	<b>ş</b> ş	
Recovery of	gold	13	27.0	per	cent.
				Per	cent
Gold remaining in fl	otation	feed	ಫ	73	0,0
Recovery of gold in	rough co	ncontrate	}≕ 6	5.9	
Recovery of gold in	oleaner	conc.	Ð		62.2
Gold in m	iddling		2.0		3.7
Gold in f	lotation	talling	17.7 1911 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1	7.1	7.1
			۴Ÿ	3.0	73.0
Recovery by am	algamati	.0n -	2	7.0	

In this test stronger reagents are used for collecting gold, without depressants such as sodium cyanide. This resulted in a higher recovery of gold. No attempt was made to separate copper (chalcopyrite) or lead from the pyrite.

Total

# Test No. 5. - Jig Concentration: Amalgametion of Jig Concentrate; and Flotation of the Jig Tailing and Amalgameted Concentrate.

4.4

100.0

This test was made similarly to Test No. 4 except that the ore was ground 97 per cent minus 200 mesh.

The pulp was jigged. The jig concentrate was barrel-amalgameted.

The flotation feed was treated in the same manner with the same reagents and amounts as in Test No. 4. The

(Test No. 5, contid) -

products were assayed for copper, lead, and zinc to note the recoveries of these metals.

Results:

	e, e.	48140-018 A 19900000,788760	*** *			Flots	ation.						
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Pro-	a tra	bet.	; Oz./	/ton	; P02	o cent			Ţ	er cer	1t		
duct	) <u>é</u>	lent	AN	AB	s Cu	Pb :	: Zn	, A11 ;	$\Lambda g$ ;	Cu g	Pb :	Zn	
Wood	1		7 435	A CO		Contraction Containing	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						2.4
Ponch	5		tree is the state	0.07	.V.10	U.00	30.01	110.03	1100.03	100.03			• • •
conc.	6 6	11,92	12,31	: :53,32	: :1.30:	: 4.80	3,10	; 91.3	92.2:	94.6	86.7	98,8	
Clea-	8 8	(1999) (1999)		0 1 1,200025.6(1494.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.		*###2#################################	) 	n Sanaan di Sanaan di Sanaan Sana Sanaan di Sanaan Sanaan Sanaan Sanaan Sanaan Sanaan Sanaan Sanaan Sanaan Sanaa Sanaan Sanaan Sanaa	1	nie weinen wie eine eine eine eine eine	Q Distant for the second s	2017-1222/22220224-4-5-27 1036-91222 	·r.
ner	9			n s	2 2		> ·		• c	4 5	2		
conc.	6	5.03	27,78	120,14	3,00;	10,42;	7.34	86.9;	87.7:	92.1:	79.4:	98.6	
Midd-	20				0 5 3		>	\$	, o				
ling	š	6,89;	1,02;	: 4.54	;0,06;	0.70	0.01	4.4:	4.5:	2.5:	7.3:	0.2	
Flot.	8	2			8	: i	5	a a		0		1	
tail-	1) 8	\$		0	n c S d		4	2 e 2 t	, 3 1 9		5 0		
lng	ĉ	88,08;	0,16;	: 0.61;	s O , O]. :	0.10	0,005	8.7	7,8;	5.4:	13.3:	1.2	
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# Ratios of Concentration:

Rough concentrate	-57	8.4:1.
Cleaner concentrate	фП	19.9:1.
Middling		14.5:1.

© Calculated values.

Summary of the Test:

## Amalgamation.

	Feed	421)	2,15	oz./tor	3.0
Amolgametion = flotstion	talling feed	تع ا	1,61	11	
Recover	r of gold	£	35,1	per cer	16.
			azad	Per cent	] 
Gold remaining is	A flotation fo	ed			74,9
Recovery of gold	in rough cone	entrate	- (	58,3	
Recovery of gold	in cleaner co	nc.	сэ		65.0
Gold d Gold d	in the middlin In the tailing	£	مته مته	6.6	3,3 6,6
Secovery by	amelgamation	<del>ب</del> ت	5 ******	74.9 25,1	74,9
	No tel	***	](	0.00	

0 0

- Page 12 -

(Test No. 5, cont'd) -

The cleaner concentrate assayed;

Gold (Au)	e120	27.78	oz./ton.
Silver (Ag)	250x	120.14	18
Copper (Cu)		3.00	per cent.
Lead (Pb)	-	10.42	14
Zinc (An)	1000	7.34	65
Iron (Fe)	100	27.13	
Insoluble	W/rs	22.83	6.5

The silver is apparently associated with the galena, as none was recovered by amalgamation.

## Test No. 6, - Straight Cyanidation, Infrasizer Test on the Minus 200 Mesh Cyanide Tailing.

Samples of ore were ground in cyanide solution at a dilution of 4:3 to give a product of 90 per cent minus 200 mesh. The strength of the solution was 2.0 pounds of sodium cyanide per ton. Lime was added to give protective alkalinity to the pulp.

The pulp was agitated for 72 hours at a dilution of 1 part solids to 12 parts of solution which was made up to 2.0 pounds of NaCN per ton. The solutions were kept up to strength during the period of agitation.

After sampling the cyanide tailings, a portion was screened on a 200-mesh screen. The minus 200 mesh fraction was classified into various fractions by means of the Haultain infrasizer.

Each fraction was assayed for gold.

#### Results:

onnyezzaka neurokani kanaka kanaka na ka	Strai	ight Cyan	idation.	n alber samalandar i hali in sina katalan ingkalandar katalan di Shakara	1945 - 2049 - 107 - 177 - 178	a ana amin'ny soratra dia mandritr'i Santa dia ma
Assays, :	Extrac-	Finel ti	tration,	Reagents	consumed,	:R.P.
Au oz / ton :	tion,	:1b./ton	solution	; 1b./ton	OTO	· Mno4
Feed ; Tailing ;]	per cent	: NACN :	CaO	: NACN :	0.8.0	: ter Titne
2,15 0,32	85.1	2.0	0,55	1.40	10.2	100.0

\* Reducing power of the solution in terms of one-tenth normal solution of potassium permanganate solution and is the amount of fouling in the solution. - Page 13 -

(Test No. 6, cont'd) -

Intrasizer Test on M:	1m	18 200	Mesn Cyanide	railing.
	3	Weight	.;: Assays,;	Distribution of
Product	0	per	: Au :	gold,
	4 13	cent	:02./ton :	per cent
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-200 mesh +56 microns	80	6.0	3.87	53 <b>.</b> 8
- 56 microns +40 "	32	27.7	0.35	29 ° S
- 40' " +28 "	c o	23.9	0.13	ទុះខ
- 28 " +20 "	3	13.9	0,08	3.3
- 20 " +14 "	a	7.7	0,05	1.2
- 14 " +10 "	0	3.0	0,08	0.7
- 1.0 "	5	8.1	80,0	S.0
*200 mesh	0	9.7		20.5
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Feed	0 C	100.0	0.33	1.00,0
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Infrasizer Data:

l inch = 25.4 millimetres. l millimetre = 1,000 microns. Length of test, 8 hours. Drops per minute, 63. Height of drop, 5/16 inch. Differential pressure, 19 inches of water. Standard golf balls used.

2.0 per cent of the gold in the tailing was found to be in the minus 10 micron size particles.

Straight cyanidation of this ore is not a suitable method of extraction of gold as indicated by the tailing. The larger particles did not apparently dissolve within 72 hours.

The ore requires grinding to about 28 microns to obtain a minimum tailing.

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(Details of Tests, cont'd) -

## Test No. 7. - Jig Concentration; Amalgamation of Jig Concentrate; and Cyanidation of Jig Tailing and the Amalgamated Concentrate.

Samples of ore were ground in water, dilution 4:3, to give a product 90 per cent minus 200 mesh.

The ore was jigged and the jig concentrate was amalgamated.

The jig tailing and amalgamated concentrate were filtered and sampled.

Portions of the filter cake were repulped in cyanida solution, at a dilution of one part solids to two parts of solution. In one group of samples the solution was made up to 0.5 pound of NaCN per ton; in the other group of samples the solution was made up to 1.0 pound of NaCN per ton. Onehalf of each group of samples was agitated for 24 hours and the remainder for 48 hours.

## Results of Cyanidation:

	24-Hour Tests.																							
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Recovery of gold by amalgamation - 22.3 per cent.

(Test No. 7, cont'd) -

Summary of the Test:

Amalgamation.

Feed	6	Λι,	2.15	oz./ton.
Amalgamation tailing = feed to cyanidation	Ð		1.67	63
Recovery of gold	¢	ć	22.3 I	per cent.

Fig. C'-111700.00 -11190	Ovoi	all Recov	eries of Gold.	
	:Reco	wery by	:Extraction by:	Overall.
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7D	9	22.3	72.6	94.9
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Reducing power of the solution after 48 hours:

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in 72 hours.

GENERAL SUMMARIES OF TESTS:

Test No. 1. Straight flotation resulted in a concentrate assaying 52.6 ounces of gold, 2.5 per cent copper and 13 per cent lead per ton. The ratio of concentration was 33:1. A second, pyrite, concentrate assayed 3.3 ounces of gold and 0.46 per cent of copper per ton. Free coarse flakes of gold were found in the flotation tailing. The Grind was 77 per cent minus 200 mesh.

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(General Summaries of Tests, cont'd) -

Test No. 2. Jigging and amalgamation prior to flotation resulted in 20.5 per cent of the gold being amalgamated. 57 per cent of the remaining gold was floated in a concentrate assaying 32.3 ounces of gold and 2.1 per cent of copper per ton, with a ratio of concentration of 26.5:1. The grind was 77 per cent minus 200 mesh. Microscopic examination of the tailing discloses that the sulphides were not separated from the gangue at this grind.

<u>Test No. 3.</u> Jigging at 92 per cent minus 200 mesh resulted in a recovery of 27 per cent of the gold by amalgamation. Flotation of the tailing resulted in a concentrate assaying 44 ounces gold, 200 ounces silver, 3.4 per cent copper, 16 per cent lead and 12 per cent zinc per ton. 56 per cent of the remaining gold is represented in this concentrate. A second, pyrite, concentrate assayed 3.5 ounces gold, 12 ounces silver per ton. 7.5 per cent of the gold was in this concentrate. The tailing assayed 0.22 ounces gold per ton.

Test No. 4. This test used the same grind and gave the same recovery by amalgamation. The change in flotation reagents resulted in a higher recovery but a lower grade of concentrate.

<u>Test No. 5.</u> The ore was ground 97 per cent minus 200 mesh and the recovery by amalgamation was 25 per cent. The use of Aerofloat No. 31 resulted in a slightly higher recovery of gold. The assays show very small emounts of copper, lead and zinc in the flotation tailing. The assay of the cleaned concentrate shows 22.8 per cent of insoluble present. The higher recovery of metals is at the expense of a lower grade of concentrate and a lower ratio of concentration.

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(General Summaries of Tosts, contid) -

<u>Test No. 6</u>. Straight cyanidation exhibits the same results as straight flotation in that the coarse gold can be found in the tailing after 72 hours of agitation. A recovery of 85 per cent of the gold was realized at a grind of 90 per cent minus 200 mesh.

<u>Test No. 7</u>. Taking out free gold by jigging and amalgamation at a grind of 90 per cent minus 200 mesh prior to cyanidation resulted in an overall extraction of 95 per cent of the gold and 75.6 per cent of the silver within 24 hours and of 96.3 per cent of the gold and 86.4 per cent of the silver within 48 hours.

No silver was recovered by amalgamation.

The infrasizor test shows that 2.0 per cent of the gold remains in the minus 10 micron sized particles, which assayed 0.08 ounce of gold per ton.

#### CONCLUSIONS:

The visible gold in the polished sections varied in size from 108 microns to 16 microns. The tests indicate gold in particles of one below 10 microns in size which assay 0.08 ounce of gold per ton.

This was the lowest assay obtained on a pulp ground to 90 per cent minus 200 mesh and cyanided for 48 hours. It will probably be about the minimum tailing obtained on an ore of this grade and character.

Some means of removing free coarse gold from the circuit, such as traps, blankets, or a mineral jig, should

(Conclusions, cont'd) -

be used.

The flotation tailing at a grind of 97 per cent minus 200 mesh contained 0,16 ounce of gold per ton after removing and amalgamating the free gold from the feed.

The amount of cyanicides present, such as copper sulphide (chalcopyrite), appears to have only a very slight effect on the consumption of reagents. No arsenopyrite was reported in the assay.

The reducing power of the solution after 48 hours was 106 ml. N/10  $KMnO_A$  per litre.

The ore could be treated by the normal practice of cyanidation after the removal of the coarse gold. The copperbearing concentrates could not be cyanided without a very high consumption of cyanide and would have to be shipped to a smelter.

In order to determine the best method of treatment, the sample on which the investigation is made should be representative of the proposed mill feed. This shipment is high-grade ore and the results obtained from this investigation will apply only to ore of similar grade and character.

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