Report No. 262

Experimental tests on a special sample of cyanide tailings from Dome Mines Limited, South Porcupine, Ont.

by J. S. Godard

Shipments: One shipment of 350 pounds was received December 10, 1926

Characteristics of sample: The sample consisted of a special high grade cyanide tailing from the Dome Mine mill. It consisted of about 10 per cent sulphides as pyrite, and assayed 0.027 oz/ton gold.

Purpose of tests: The purpose of these tests is to ascertain if the pyrite, which contained the gold, could be concentrated by flotation.

Experimental Tests: Two small scale flotation tests were made in a laboratory Ruth machine.

Results:

Test No	Product	% Weight	Assay Au oz/ton	Per cent of values
1	Concentrate	13.1	0.18	57.6
	Tailing	86.9	0.02	42.4
2	Concentrate	11.1	0.20	55.5
	Tailing	88.9	0.02	44.5

Reagents used:

Test No.1 -	Soda ash	2.0 lb/ton	Ground 15 minutes in ball mill
	Xanthate	0.15 "	" "
	Xylidine	2 drops	" "
	Copper sulphate	0.40 lb/ton	Added to cell
	Pine oil	0.10 "	" "
Test No.2 -	Soda hydroxide	1.0 lb/ton	
	Soda ash	1.0 "	
	Xanthate	0.20 "	
	Copper sulphate	0.50 "	
	Pine oil #5	0.05 "	All ground 15 minutes in mill

Test No. 3 was made on 180 pounds of the tailings. This was fed to a small grinding unit and a rougher concentrate made in a Callow machine. The rougher concentrate was cleaned in batch lots in a small Ruth machine. Results:

Test No	Product	Weight %	Assay Au oz/ton	Per cent of values
#3	Concentrate	9.4	0.14	49.3
	Middling	13.4	0.03	15.1
	Cleanup	10.4	0.04	15.6
	Tailing	66.8	0.008	20.0

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Reagents:			
Soda ash 50 Caustic soda 50	2.0 lb/ton	Added to mill	
Copper sulphate	0.5 "	"	"
Xanthate	0.2 "	Added to head of cell	
Pine oil	0.1 "	"	"
Xanthate	0.1 "	For cleaning	
Pine oil	0.05 "	"	"

Conclusions: The flotation of these tailings was successful in that a concentrate assaying 0.14 oz/ton and a concentration ratio of 10:1 was obtained. The final tailing was 0.008 oz/ton. In continuous operation with the return of the middling to the regrinding circuit, a recovery of 65 per cent should be obtained.

The addition of soda ash is at present considered an essential reagent for the flotation of a cyanide tailing. It serves two purposes. One - it acts as a precipitant for the lime, and lime is detrimental to flotation, producing a voluminous white froth that films the sulphide particles and inhibits their flotation; and second, it aids in brightening the sulphides, thus permitting the other reagents to function.