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CANADA

DEPARTMENT OF MINES AND TECHNICAL SURVEYS

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MINES BRANCH INVESTIGATION REPORT IR 63-60

MINERALOGICAL COMPOSITION OF A FLOTATION CONCENTRATE FROM THE ROSS MINE OF HOLLINGER CONSOLIDATED MINES LTD.

by

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EXTRACTION METALLURGY DIVISION

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SUMMARY

The metallic mineral content of the flotation concentrate consists mainly of pyrite (86%), chalcopyrite (9%) and sphalerite (4%). Smaller amounts of tennantite, galena and native gold-silver alloy are present.

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INTRODUCTION

A 56 lb sample of concentrate was received by the Extraction Metallurgy Division from Hollinger Consolidated Gold Mines Ltd. on May 17, 1963, and was assigned our reference number 5/63-7. The sample was reported to be a bulk flotation concentrate from the Company's Ross Mine, Hislop Twp., Ont. A 200 gram sample of the concentrate was submitted to the Mineralogy Section on May 23, 1963. It was requested that the sulphide mineral composition be determined.

PROCEDURE AND RESULTS

The submitted sample was wet screened on 325 mesh and the coarser fraction (comprising about 26% of the sample) was washed with alcohol and ether to remove any residual flotation reagent. It was then fractionated on a Haultain Superpanner. The results of the separation are shown in Table 1.

TABLE 1

Superpanner Separation +325 mesh Material

Fraction	Weight, %
Tip	1.1
1st Middling	11.7
2nd Middling	16.5
Tailing	70.7

Polished sections were prepared of each of the Superpanner products. Microscopic examination of the polished sections showed that pyrite is the main metallic mineral. Smaller amounts of chalcopyrite, sphalerite, tennantite, gold and galena are also present. The gold, which was observed in the tip and first middling, occurs mainly as irregular, free grains ranging in size from less than 10 microns to approximately 120 microns. One particle of gold was observed attached to chalcopyrite and one attached to pyrite. The light yellow colour of the gold indicates that it probably contains an appreciable proportion of alloyed silver.

A point count analysis was performed to determine the mineralogical composition of each Superpanner separate. The results are shown in Table 2. The overall composition of the plus 325 mesh material is shown in Table 3.

TABLE 2

Approximate Composition of Superpanner Fractions

Mineral	Tip		Middling 1		Middling 2		Tailing	
	Count	Wt, %	Count	Wt, %	Count	Wt, %	Count	Wt, %
Pyrite	509	93	652	92	578	85	38	7
Chalcopyrite	11	2	28	3	57	7	14	2
Sphalerite	--	--	9	1	22	3	8	1
Tennantite	1	Tr	1	Tr	4	1/2	--	--
Gold	1	1/2	1	1/2	--	--	--	--
Galena	7	2	1	1/4	--	--	--	--
Gangue minerals	23	2	34	3	55	4	906	90
Totals	552	100	726	100	716	100	966	100

TABLE 3

Approximate Composition of Plus 325 Mesh Material

Mineral	Weight, %
Pyrite	31
Chalcopyrite	3
Sphalerite	1
Tennantite	Trace
Gold	Trace
Galena	Trace
Gangue minerals	64

CONCLUSIONS

A point count analysis of the plus 325 mesh fraction of flotation concentrate shows that pyrite is the main sulphide mineral. Smaller proportions of chalcopyrite and sphalerite are present and trace amounts of tennantite, gold-silver alloy and galena.

The high proportion of gangue minerals, in the sample investigated, suggests that more selective flotation may be possible.

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