

Duplicate

19th. November, 1937

N^o 10

SAMPLE LAB. REGD. NO. 1221.

Mt. Cleveland Tin Ore received from the Mt. Bischoff Co.

Scope of Investigation:

This was limited to examination of the ore, analysis and separation of the sulphide minerals from the non-sulphide gangue and cassiterite.

No responsibility is taken for the results except in so far as they apply to the sample tested.

PRELIMINARY.

Mineragraphic:

The predominant sulphide is pyrrhotite; chalcopyrite and pyrite are also present. Quartz, siderite (Maniferous) fluorite and a pale green radiating mineral are the major non-sulphide minerals. Particles observed on three slides generally ranged from 10 to 400 microns.

Two samples were prepared for examination of particle size of cassiterite, and the sizes observed were as follow:

Under 25 microns	21	observed
Over 25 "	78	"
" 64 "	25	"
" 100 "	14	"
" 160 "	9	"
" 200 "	19	"

The largest particles observed were (microns) 416x224, 445x364, 512x256 and 512x320.

Sample and Assay.

A sample of approximately 1 cwt. was crushed to minus 10 mesh for flotation tests.

A portion of this sample was ground for assay purposes.

The following assay results were obtained:

Tin	1.3%
Sulphur	13.6%
Iron	27.1%
Copper	0.5%
Acid Insoluble	41.55%

Flotation.

Owing to the comparatively fine cassiterite the samples tested were ground to ensure the mechanical freeing of cassiterite from gangue minerals.

A screening analysis of a flotation concentrate indicates the degree of grinding:

+85 mesh (B.S.)	0.32%
120 "	0.70%
150 "	1.08%
200 "	1.84%
-200 "	96.06%

Various methods of separation and reagents were tested, including floating the sulphide in two stages, a bulk flotation with a re-float and a single float only. Potassium Ethyl Xanthate, with and without copper sulphate utilizing Cresylic Acid as a frother & various Aerofloats were also tested. Little preference was observed in the method of flotation, although with slightly excessive flotation conditions re-cleaning the concentrate improved the tin distribution 3.38%

The tin content of the flotation concentrate ranged from 0.1 to 0.2% tin, and the percentage of tin in the flotation tailings ranged from 95 to 97.3%.

The best flotation was obtained with the use of Potassium Ethyl Xanthate and Copper Sulphate, details as below

Reagents, Lb./ton.

Soda Ash	1.0	Time conditioning	Copper Sulphate: 5 min.
Copper Sulphate	1.0	" "	Xanthate: 5 minutes
Pot. Ethyl Xanthate	0.2	" flotation	5 "
Cresylic Acid	0.1	pH value of pulp	8.0
		Solid:solution ratio	1:5

<u>Product</u>	<u>% Weight</u>	<u>% Tin</u>	<u>% Sulphur</u>	<u>% Distribution Tin.</u>
Head	100	1.3	13.6	
Concentrate	35.2	0.1	37.6	2.7
Tailings	64.8	1.95	0.7	97.3

SUMMARY.

The sulphide minerals can be satisfactorily separated from the cassiterite and non-sulphide gangue by flotation.

The particle size of the cassiterite indicates that efficient separation will require comparatively fine grinding, and further work would be essential to ascertain the degree of grinding required. A complete investigation would necessarily include concentration tests with the tin bearing flotation tailings.

GOVERNMENT CHEMIST & ASSAYER.