O T T A W A September 7th, 1944.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1707.

Concentration Tests on a Sample of Molybdenite Ore from the La Corne Molybdenum Project at La Corne, Quebec.

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Shipments:

A sample of ore, weighing 400 pounds, was received on March 29th, 1944. A sample of mill tailing, net weight 300 pounds, was received on April 17th, 1944. Another of mill tailing had been received on March 23rd, 1944, but was rejected because of a damaged container. This sample was superseded by the one received on April 17th. The samples were submitted by Wartime Metals Corporation, La Corne Molybdenum Project, Val d'Or, Quebec.

Location of Property:

The La Corne Molybdenum project, operated by Wartime Metals Corporation, consists of 1,225 acres situated at the intersection of LaMotte, La Corne, Varsan and Malartic townships, in northwestern Quebec.

Purpose of the Tests:

These tests were conducted to find answers to the following questions:

(1) Will more cell capacity reduce the tailing loss at the present grind?

(2) Is conditioning necessary ahead of flotation?

(3) Can better results be obtained by another reagent combination?

(4) Is a finer grind necessary?

Sampling and Assaying:

The sample of ore submitted was assayed and reported as follows:

Molybdenite	-	0.85 per cent.
Bismuth	-	0.03 "
Iron	-	1.63 "
Copper	-	0.01 "

A screen analysis was made of a sample of mill tailing, as follows:

Size	Weight, per cent	Assay, MoS_2, per cent	Distribution of MoS_2, per cent
+35 mesh	0.48	0.15	0.82
-35+48 "	1.46	0.045	0.75
-48+65 "	7.84	0.048	4.30
-65+100 "	14.72	0.06	10.08
-100+150 "	20.46	0.06	14.02
-150+200 "	12.46	0.048	6.83
-200	42.58	0.13	63.20
Average tailing -	100.00	0.07	100.00

Experimental Tests:

Flotation tests were conducted on samples of the ore, to see if any improvement in recovery could be effected, but the results appeared to check closely with those now being obtained at the mine. Flotation tests conducted on samples of the mill tailing gave no additional recovery since no froth could be raised on the pulp at all.

CONCLUSIONS:

The results of tests conducted on these samples of ore and tailing indicate that fine molybdenite is being lost in the tailing, the greater part of which is in the minus 200 mesh sizes. The addition of more pine oil to the cells might result in the recovery of more of this fine mineral.

Conditioning is not necessary ahead of flotation, so long as the reagents are ground with the ore in the ball mill. The tests indicate, further, that the present grind is fine enough for practical purposes.

Owing to the fact that no froth could be raised on the tailing sample submitted, it is impossible to say what benefit would result from an increase in cell capacity. While the pulp is fresh in the circuit, some additional recovery might be obtained from extra cells but it is not likely to amount to very much. An attempt was made to wash the old reagent out of a sample of tailing by the use of steam and then refloat with fresh reagent, but the result was the same.

We have been unable to show any improvement in recovery by using other reagent combinations, but the tailing assays are so low in all cases that it is almost impossible to show any significant difference from test to test in small-scale runs. A point seems to have been reached where the mill might be operated for a period of a month or more on different

(Conclusions, cont'd) -

reagent combinations and efficiency calculated on average assays over that period. As regards the use of Arctic Syntex "M" as practised by the Climax Molybdenum Co., see Technical Paper 1675 in Mining Technology, American Institute of Mining and Metallurgical Engineers, for January 1944. This reagent, in proper balance with pine oil, will help to bring up coarse middling but the present problem seems to be one of recovering fine mineral.

Character of the Ore:

The gangue is composed of translucent white to grey quartz and highly siliceous rock material. In one section it is severely fractured and transected by narrow sinuous cracks.

Metallic mineralization is comparatively sparse and is represented very largely by molybdenite as medium coarse to fine plates and small aggregates unevenly disseminated through quartz. Very small quantities of pyrite and chalcopyrite are visible in gangue, as small irregular grains and subhedral crystals.

In one section there is visible in quartz a poorly polished metallic patch about 550 microns (-28+35 mesh) in size. Under a high-power, oil-immersion objective this small patch is seen to consist of at least three, and possibly four, minerals which are very intimately intergrown. One is chalcopyrite but the others could not be identified. However, their physical properties and qualitative microchemical reactions are very similar to the unknown bismuth minerals which were reported in a former sample.

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DETAILS OF INVESTIGATION:

A number of typical tests are described in detail:

Test No. 1.

A sample of the ore was ground 41 per cent finer than 200 mesh and floated with the following reagents:

		Lb./ton
To Ball Mill -		
Nujol	-	1.0
Pine oil	-	0.025
Arctic Syntex "M"	-	0.01
To Cell -		
Pine oil	-	0.025
Arctic Syntex "M"	-	0.01

The concentrate was cleaned once without additional reagents.

Screen Analysis of Flotation Tailing, Test No. 1:

Size	Weight, per cent	Assay, MoS_2, per cent	Distribution of MoS_2, per cent
+ 48 mesh	2.10	0.16	4.39
- 48+ 65 "	6.95	0.049	4.45
- 65+100 "	13.65	0.085	15.17
-100+150 "	21.65	0.049	13.87
-150+200 "	14.30	0.049	9.16
-200 "	41.35	0.098	52.96
Average tailing -	100.00	0.077	100.00

This analysis would indicate that the grind is fine enough for practical purposes although it might well all be finer than 48 mesh.

The minus 200 mesh fraction seems to hold some fine molybdenite that might be recovered by the addition of more pine oil.

(Continued on next page)

(Test No. 1, cont'd) -

Results of Test No. 1:

Product	Weight, per cent	Assays, per cent		Distribution, per cent	
		MoS_2	Bi	MoS_2	Bi
Concentrate	1.01	71.98	1.58	87.45	53.47
Middling	1.33	2.19	0.31	3.50	13.81
Tailing	97.66	0.077	0.01	9.05	32.72
Feed (cal.)	100.00	0.83	0.03	100.00	100.00

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Test No. 2.

In this test the hydrocarbon was divided between the ball mill and the cell while the pine oil was all added to the cell. A larger quantity of Arctic Syntex "M" was used and this was divided between the ball mill and the cell. The concentrate was cleaned once without additional reagents.

Reagents to Ball Mill -

Nujol	-	0.50 lb./ton.
Arctic Syntex "M"	-	0.025 "

Reagents to Cell -

Nujol	-	0.50 lb./ton.
Arctic Syntex "M"	-	0.025 "
Pine oil	-	0.075 "

Results of Test No. 2:

Product	Weight, per cent	Assays, per cent		Distribution, per cent	
		MoS_2	Bi	MoS_2	Bi
Concentrate	1.04	80.71	1.63	87.06	41.77
Middling	0.63	4.20	0.63	2.74	9.78
Tailing	98.33	0.10	0.02	10.20	48.45
Feed (cal.)	100.00	0.96	0.04	100.00	100.00

This test shows a slightly higher tailing assay than Test No. 1 although the difference is very small. Recovery is just about the same as in Test No. 1.

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(Details of Investigation, cont'd) -

Test No. 3.

This test was a duplicate of Test No. 2 except that a sample of kerosene sent from the property was used in place of Nujol. The tailing assay was again in the neighbourbood of 0.10 per cent MoS_2 but recovery in the clean concentrate was low due to poor operation in the cleaning circuit.

Results of Test No. 3:

Product	Weight, per cent	Assays, per cent		Distribution, per cent	
		MoS_2	Bi	MoS_2	Bi
Concentrate	0.77	89.96	0.93	81.30	26.11
Middling	0.89	7.30	0.73	7.62	23.69
Tailing	98.34	0.096	0.014	11.08	50.20
Feed (cal.)	100.00	0.85	0.027	100.00	100.00

A number of other tests were conducted but in all cases the tailing assays were in the neighbourhood of 0.08 to 0.10 per cent MoS_2 and it was impossible to say definitely that one reagent combination had any advantage over another.

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Test No. 4.

A number of tests were conducted on the sample of mill tailing submitted, to see if any further recovery could be obtained by reflotation. All these tests were unsuccessful, as it was found impossible to get any froth live enough to overflow the lip of the machine. This was true even after the tailing had been washed with steam to remove the old reagents. In one of these tests the molybdenite which came to the surface was skimmed off and assayed. The results of this test are given in the table below:

(Continued on next page)

(Test No. 4, cont'd) -

Screen Analysis of Refloated Tailing, Test No. 4:

Size	Weight, per cent	Assay, MoS_2, per cent
+ 65 mesh	8.55	0.015
- 65+100 "	14.50	0.044
-100+150 "	19.95	0.076
-150+200 "	13.00	0.066
-200 "	44.00	0.129
Average tailing -	100.00	0.088

Results of Test No. 4:

Product	Weight, per cent	Assay, MoS_2, per cent	Distribution of MoS_2, per cent
Concentrate	0.08	11.01	9.11
Tailing	99.92	0.088	90.89
Feed (cal.)	100.00	0.097	100.00

While the results of tests conducted here would indicate no beneficial result from more cell capacity, it is possible that while the pulp is fresh in the circuit some small additional recovery might be obtained from an increase in cell capacity.

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