Ottawa, April 3, 1919.

Report of Ore Dressing & Metallurgical Laboratories.

Test No. 115.

A shipment of four bags, shipping weight 300 lbs., of fluorite, calcite and barite was received on Feb. 12, 1919 from Gavin. M. Wallbridge, manager of the Wallbridge Mine, Madoc, Ont. The shipment had been taken from a vein on the West ½ of Lot 1, Con. 1, Madoc Tnp., County of Hastings.

The shipment consisted of a natural mixture of fluorite, calcite and barite, the individual grains of mineral ranging in size from about 1½" down to very small crystals, and a separation of the three minerals from each other was desired.

The following table shows the weighing in of the shipment.

Gross weight,	292 lbs.
Weight of 4 bags,	5 lbs.
Net weight,	287 lbs.
2 specimens,	7 lbs.
Remainder,	280 lbs.

This remainder of 280 lbs. was crushed to pass ½" and a combined moisture and head sample taken out for analysis. This sample gave the following results.

Moisture	4.00% of the wet ore.
Barite ($BaSO_4$)	9.40% " " dry " .
Fluorite (CaF_2)	48.35% " " " " .
Calcite ($CaCO_3$)	40.00% " " " " .
Silica (SiO_2)	3.10% " " " " .
Alumina + Iron Oxides	1.60% " " " " .

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As a preliminary test 17 lbs of the ore were dried and crushed to pass 20 mesh, and then run over the small laboratory Wilfley table. This test gave a very poor separation

due to the great range in size of the material.

The products of the above test were dried mixed and screened on 30, 40 & 50 mesh. This produced four sizes of material and all these sized were run over the small table separately. In each case a good separation of the barite from the flourite and calcite was effected, and a somewhat fair separation of the flourite from the calcite.

From the results of the preliminary tests it was decided to crush all the ore to pass 20 mesh and screen on 35 and 80, and to run each size separately over the large Wilfley table.

The main lot of ore was dried and crushed to pass 20 mesh, and the products from the preliminary tests were dried and added in. Screening on 35 and 80 mesh was then done, and each lot was sampled for analysis and weighed. The lots were then run separately over the large Wilfley table making a barite, flourite and calcite product, and where it was deemed advisable these products were rerun over the table and split into a head and a tail. All the products were dried, weighed and sampled for analysis.

The weights, analyses and results of the final test are tabulated in the accompanying table.

Conclusions,-

1. To effect a good separation and attain good products the ore will have to be ground to about 80 mesh.

2. The slime loss in the separation of the

-80 product is very heavy due to two causes; the poor design of the boxes used to catch the products from the table, and the dry crushing to pass 20 mesh and screening on 35 and 80, all the slimes produced going either into the -80 material, or into the as dust. With the use of a wet ball mill to grind all the ore to be separated on the table the -80 mesh less slimes would result and nothing would be lost as dust. If tanks were used to catch and dewater the products from the table there would result a further saving, although this would be mostly in calcite, it being the mineral which shows the greatest tendency to slime.

3. If the slime loss could be kept down to 10%, then, using the data from the treatment of the -80 mesh product, there would result the following recoveries and grades of products,—

Mineral.	Recovery %.	Grade %.
Barite	75.5	81.85
Flourite	65.2	74.8
Calcite	63.7	59.20

4. On tabling the ore less material could be taken off as the flourite product and this would give a better grade of flourite, but the recovery would be lowered.

5. The original ore is rather low in barite and Mr. Wallbridge is of the opinion that the average run would be much higher. If this is so there would result a much better grade of barite from the separation.

SEPARATION OF -20 +35 PRODUCT

PRODUCT	WT. LBS.	ANALYSIS $BaSO_4$	ANALYSIS CaF_2	ANALYSIS $CaCO_3$	CONTENT $BaSO_4$	CONTENT CaF_2	CONTENT $CaCO_3$	PERCENTAGES $BaSO_4$	PERCENTAGES CaF_2	PERCENTAGES $CaCO_3$
BARITE HEADS	3.0	36.90	50.60	6.90	1.09	1.52	.19			
BARITE TAILS	4.0	6.60	77.20	10.90	.26	3.09	.44			
FLOURITE	47.0	.90	64.20	27.60	.42	30.17	12.97			
CALCITE	34.0	.04	27.90	60.00	.01	9.49	20.40			
SLIME LOSS	4.5	17.56	54.00	26.00	.79	1.44	.16			
TOTALS	88.5	2.90	51.65	38.60	2.57	45.71	34.16	100.00	100.0	100.0

SEPARATION OF -35 +80 PRODUCT

BARITE HEADS	2.0	75.10	20.00	2.36	1.50	.40	.05			
BARITE TAILS	1.5	52.25	37.20	5.08	.78	.56	.08			
FLOURITE	20.5	2.60	75.10	18.50	.53	15.40	3.79			
CALCITE HEADS	50.0	.20	52.20	42.20	.10	26.10	21.10			
CALCITE TAILS	17.0	.00	16.10	73.60	.00	2.74	12.51			
SLIME LOSS	.5				.66	- .46	.03			
TOTALS	91.5	3.90	48.90	41.05	3.57	44.74	37.56	100.0	100.0	100.0

SEPARATION OF -80 PRODUCT.

BARITE	3.5	81.85	12.64	2.25	2.86	.44	.08	56.4	1.1	.2
FLOORITE	11.0	6.60	82.00	7.15	.73	9.02	.79	14.4	22.5	2.2
CALCITE HEADS	13.0	.00	68.60	27.70	.00	8.92	3.60	.0	22.2	10.0
CALCITE TAILS	21.0	.00	33.90	59.20	.00	7.12	12.43	.0	17.7	34.7
SLIME LOSS	39.0	3.79	37.59	48.64	1.48	14.66	18.97	29.2	36.5	52.9
TOTALS	87.5	5.80	45.90	41.00	5.07	40.16	35.87	100.0	100.0	100.0

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