

O T T A W A

December 1, 1945.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1965.

Interim Report on the Concentration of  
Barytes from Canadian Industrial  
Minerals Limited, Walton, N.S.

Note:

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Shipment:

A shipment of two bags, total weight approximately 335 pounds, of barytes ore was received at these Laboratories on October 5, 1945, having been submitted by Canadian Industrial Minerals Limited, Walton, Nova Scotia. In an accompanying letter, Mr. A. D. Dickson, manager of the Company, stated that the sample had been cut from the discharge pipe from their No. 2 screen (10 or 12 mesh), settled in a 45-gallon drum, decanted, and dried. He requested that concentration tests be made on the sample in an effort to produce a final barytes concentrate analysing 94 per cent  $\text{BaSO}_4$  (minimum) and 2 per cent  $\text{SiO}_2$  (maximum).



Test Work:

Washing tests and sized tabling tests were made on the ore, the latter method resulting in a high-grade barite concentrate being obtained. This concentrate analysed 95 per cent to 96 per cent BaSO<sub>4</sub> and less than 1 per cent SiO<sub>2</sub>.

An analysis of the head sample cut from the shipment as received is shown in Table I. Table II shows the results of a screen test on a portion of the head sample.

TABLE I. - Head Sample Analysis.

	Per Cent
SO <sub>4</sub> (as BaSO <sub>4</sub> )	- 92.05
SiO <sub>2</sub>	- 1.96
Fe <sub>2</sub> O <sub>3</sub>	- 1.66
Al <sub>2</sub> O <sub>3</sub>	- 0.78
MnO	- 0.24

TABLE II. - Screen Analysis on Head Sample.

Mesh	W e i g h t		Assays, : Distribution,			
	Per	Cumulative	per cent	per cent	per cent	per cent
	cent	per cent	BaSO <sub>4</sub> :SiO <sub>2</sub>	BaSO <sub>4</sub>	SiO <sub>2</sub>	SiO <sub>2</sub>
+4:	0.5	0.5	92.60	1.35	0.5	0.3
-4 +6:	1.2	1.7	92.52	1.30	1.2	0.7
-6 +8:	2.6	4.3	93.70	1.03	2.7	1.2
-8 +10:	9.8	14.1	94.78	1.04	10.3	4.7
-10 +14:	15.6	29.7	93.48	1.09	16.1	7.8
-14 +20:	12.0	41.7	92.00	1.37	12.2	7.6
-20 +28:	12.2	53.9	91.78	1.37	12.4	7.7
-28 +35:	10.8	64.7	88.56	1.41	10.6	7.0
-35 +48:	7.7	72.4	88.58	2.05	7.5	7.3
-48 +65:	5.8	78.2	88.00	2.03	5.6	5.4
-65 +100:	3.9	82.1	88.04	2.33	3.8	4.2
-100 +150:	4.4	86.5	85.52	4.87	4.2	9.9
-150 +200:	3.1	89.6	86.52	5.86	3.0	8.4
-200 :	10.4	100.0	86.06	5.80	9.9	27.8
Totals :	100.0	100.0	90.44	2.17	100.0	100.0

Following the above screen analysis the shipment sample was divided into two parts by dry screening on a 14-mesh screen. Washing and sized tabling tests were then made on the -14 mesh portion of the sample.

The most satisfactory test was Test No. 6, detailed below:

(Continued on next page)



(Test work, cont'd) -

The -14 mesh ore was fed at approximately 30 pounds per hour to a two-spigot, Richards type sizer, the sizer overflow passing to an Allen type cone. This resulted in three spigot products and a cone overflow being obtained. The three spigot products were each tabled on a laboratory-sized Wilfley concentrating table. The results of this test work are shown in Tables IV and V. Table III shows the results of screen tests on the various spigot products and the cone overflow. Table VI summarizes the results obtained.

TABLE III. - Screen Tests.

Mesh	NO. 1 SPIGOT		NO. 2 SPIGOT		CONE CONCENTRATE		CONE OVERFLOW	
	Wt. %	Cum. %	Wt. %	Cum. %	Wt. %	Cum. %	Wt. %	Cum. %
+20	10.2	10.2	0.5	0.5				
-20 +28	38.4	48.6	3.5	4.0				
-28 +35	33.2	81.8	10.6	14.6				
-35 +48	13.7	95.5	16.8	31.4				
-48 +65	1.7	97.2	16.4	47.8				
-65+100	1.6	98.8	20.6	68.4				
-100+150	0.1	98.9	15.6	84.0	0.2	0.2	0.3	0.3
-150+200	0.1	99.0	10.5	94.5	6.8	7.0	0.6	0.9
-200	1.0	100.0	5.5	100.0	93.0	100.0	99.1	100.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE IV. - Spigot Products.

Product	Weight, per cent of feed	BaSO <sub>4</sub> , per cent	SiO <sub>2</sub> , per cent
No. 1 spigot	33.3	95.32	0.64
No. 2 spigot	44.5	89.14	2.42
Cone conc.	13.0	85.14	
Cone overflow	9.2	77.66	
Total	100.0		

TABLE V. - Spigot Products, Tabled.

	NO. 1 SPIGOT PRODUCT		NO. 2 SPIGOT PRODUCT		CONE CONCENTRATE		
	Table conc.	Table tailing	Table conc.	Table tailing	Table conc.	Table sand	Table slime
Weight, per cent	96.8	3.2	68.1	31.9	45.9	28.1	26.0
BaSO <sub>4</sub> , per cent	97.36	69.60	96.30	65.20	96.58	76.38	82.60
SiO <sub>2</sub> , per cent	0.52		0.70		0.70		



(Test Work, cont'd) -

TABLE VI. - Summary of Results.\*

Product	:Weight, : per : cent	Assays, : per cent		:Distribution : of BaSO <sub>4</sub> , : per cent
		BaSO <sub>4</sub>	SiO <sub>2</sub>	
+14 mesh	: 29.7	93.87	1.08	30.8
-14 mesh	: 70.3	89.02		69.2
No. 1 Spigot - table conc.	: 22.6	97.36	0.52	24.3
- table	:			
tailing	: 0.8	69.60		0.6
No. 2 Spigot - table conc.	: 21.3	96.30	0.70	22.7
- table	:			
tailing	: 10.0	65.20		7.2
Cone conc. - table conc.	: 4.2	96.58	0.70	4.5
- table sand	:			
tailing	: 2.6	76.38		2.2
- table slime	:			
tailing	: 2.3	82.60		2.1
Cone overflow	: 6.5	77.66		5.6
Calculated feed	: 100.0	90.46		100.0

\*

Calculated from Tables II to V.

#### Conclusions and Recommendations:

The sample as submitted was concentrated to give a barytes concentrate analysing

BaSO<sub>4</sub> - 95.70 per cent,  
SiO<sub>2</sub> - 0.80 per cent.

The barite recovery was 82.3 per cent.

From the above data it will be noted that no test work was undertaken on the +14 mesh material other than removing it from the sample by dry screening.

Table IV shows that the barytes concentrate obtained from the No. 1 Spigot of the sizer is satisfactory as to grade of barite and silica.

It would appear possible to obtain even better results on tabling both the No. 2 Spigot product and the cone concentrate if sufficient material were available to cut a middling product from the table for recirculation. This would allow a smaller quantity to be cut from the table as a tailing and in all probability increase the grade of the table concentrates



(Conclusions and Recommendations, cont'd) -

and the overall recovery of barite.

If a further shipment, of 500 to 1000 pounds, of the ore is submitted we will carry out this plan, using a quarter-deck concentrating table with circulation of middling products. A final report will be submitted following this work.

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