

O T T A W A

February 2, 1946.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1989.

Report on Jigging Tests Performed on Minus $1\frac{1}{4}$ -inch
Fluorspar Fines from the Millwood Fluorspar
Mines Limited, Madoc, Ontario.

=====

(Copy No. 6.)

O T T A W A

February 2, 1946.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1989.

Report on Jigging Tests Performed on Minus $1\frac{1}{4}$ -inch
Fluorspar Fines from the Millwood Fluorspar
Mines Limited, Madoc, Ontario.

=====

Shipment:

A shipment of 25 bags, 2,680 pounds, of minus $1\frac{1}{4}$ -inch fluorspar ore was received at these Laboratories on December 13, 1945. In a covering letter, Mr. H. C. Millar, President, Millwood Fluorspar Mines Limited, Madoc, Ontario, stated that this was a sample of the undersize from the $1\frac{1}{4}$ -inch screen in the plant at the Bailey property and requested that jigging tests be undertaken in an attempt to reduce the silica content of the ore.

Chemical Analysis:

A head sample cut from the shipment analysed as follows:

| <u>CaF₂,</u> <u>per cent</u> | <u>BaSO₄,</u> <u>per cent</u> | <u>CaCO₃,</u> <u>per cent</u> | <u>SiO₂,</u> <u>per cent</u> |
|--|---|---|--|
| 62.04 | 2.86 | 30.19 | 1.44 |

Test Work:

The ore, as received, was fed at approximately 800 pounds per hour to a two-compartment James jig. Visual examination showed the test to be a complete failure, primarily due to oversize pieces of ore blocking the jig gates. (Many pieces examined measured two to three inches in two dimensions.)

All products from the test were dried and thoroughly mixed, and the whole shipment was passed through a jaw crusher set to one inch. This reduced all oversize lumps of ore to the proper size for jigging. The minus 1-inch ore was then fed to the James jig at approximately 800 pounds per hour. Details regarding the operation of the jig were as follows:

10-mesh screen on both compartments.

| | <u>Stroke</u> | <u>Strokes per minute</u> |
|--------------------|---------------|---------------------------|
| No.1 compartment - | 5/8 inch | 240 |
| No.2 compartment - | 1/2 inch | 210 |

Table I shows, in detail, the results obtained in the jigging test.

(Table I follows,
on Page 3.)

(Test Work, cont'd) -

TABLE I. - Results of Jigging Tests.

| Product | Weight, per cent | Analysis, per cent | | | | Distribution, per cent | | | |
|--------------------------|---------------------|--------------------|-------------------|-------------------|------------------|------------------------|-------------------|-------------------|------------------|
| | | CaF ₂ | BaSO ₄ | CaCO ₃ | SiO ₂ | CaF ₂ | BaSO ₄ | CaCO ₃ | SiO ₂ |
| No. 1 hutch: | 25.8 | 77.04 | 4.08 | 15.59 | 0.08 | 31.54 | 48.52 | 13.56 | 1.69 |
| No. 1 con- centrate : | 26.9 | 71.04 | 2.76 | 22.34 | 0.96 | 30.32 | 29.11 | 20.28 | 21.14 |
| No. 2 hutch: | 8.7 | 71.28 | 1.06 | 25.18 | 0.68 | 9.84 | 4.84 | 7.39 | 4.85 |
| No. 2 con- centrate : | 7.1 | 60.84 | 0.62 | 30.82 | 1.44 | 6.85 | 2.31 | 7.39 | 8.37 |
| Tailing : | 31.5 | 42.92 | 1.70 | 48.34 | 2.48 | 21.45 | 15.22 | 51.38 | 63.95 |
| Heads (calc.) | 100.0 | 63.02 | 2.43 | 29.64 | 1.22 | 100.00 | 100.00 | 100.00 | 100.00 |

Results of Tests:

From the results shown in Table I the best fluorspar concentrate to be obtained by jigging this ore would consist of a combination of the following three products:

No. 1 hutch,
No. 1 concentrate,
No. 2 hutch.

These three products, combined, would give a fluorspar concentrate analysing^(x):

| CaF ₂ , per cent | BaSO ₄ , per cent | CaCO ₃ , per cent | SiO ₂ , per cent |
|--------------------------------|---------------------------------|---------------------------------|--------------------------------|
| 73.6 | 3.1 | 19.9 | 0.5 |

The fluorspar recovery would be 71.7 per cent.

Conclusions:

Jigging successfully lowered the silica and calcite contents while raising the fluorite and barite contents of this ore. Any relatively large pieces of ore that were predominantly barite would tend to report in the fluorspar concentrate, thus increasing the barite content and hence the total sulphur content of the final concentrate. This would be an undesirable

(x)

Analysis and recovery calculated from Table I.

(Conclusions, cont'd) -

feature of jigging the Bailey ore.

The main diluent in the ore, as received, was calcite, and as calcite and fluorspar have very similar specific gravities (CaCO_3 , 2.72; CaF_2 , 3 to 3.2), it would not be possible to effect good separation by jigging, hence the maximum grade of fluorspar obtainable from this ore by jig concentration would appear to be 70 to 75 per cent CaF_2 .

For the above reasons, it would appear doubtful that a satisfactory fluorspar concentrate is obtainable from this ore by jigging.

oooooooooooo
ooooooo
ooo

ELC:LB.