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BENEFICIATION TESTS ON A SAMPLE OF BARITE-FLUORITE FROM MEMRAMCOOK, N.B. SUBMITTED BY MR.WM.PAPKE

by

R.A. Wyman

Industrial Minerals Division

Note: This report applies essentially to the samples received. The report and related correspondence may not be used at any time in whole or in part, for publicity or advertising purposes.

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The sample reached us originally in November of 1956 and a report of heavy media separation trials on it went out at the end of January 1957. Enough additional work has since been done to show that the barite content may be readily recovered. Fluorite in this sample is too low to be profitably worked.

Mineralogy

An examination of the sample indicated that the barite content would be around 50% with 5-7% fluorite the rest being quartz with a small amount of iron oxide and a copper mineral, Cu_2S, the two latter accounting for less than 1% of the whole.

Test Work

Two groups of flotation trials were made, the first including concentration of both barite and fluorite, the second concentrating barite only since the fluorite content had proved too small for profitable working.

Representative trials from the first group are given as Table I. Analysis of the feed material gave a $BaSO_4$

content of 42.5% and a CaF_2 content of 4.5%. In each test barite rougher concentrate was cleaned once and fluorite rougher concentrate was cleaned once.

TABLE I

Concentration of Barite & Fluorite

Test No.	Feed (MOG)	Barite Circuit (Reagents)	Fluorite Circuit (Reagents)	Barite Conc. $BaSO_4$%	Rec.%	Fluorite Conc. CaF_2%	Rec.%
1	-35	Sod.Silicate, Quebracho, Citric Acid, Alkyl sod. Sulphonate.	Sod.Carbonate, Quebracho, Oleic Acid.	93.8	59	10.0	20
2	-65	Sod.Silicate, Barium Chloride, Citric Acid, Alkyl Sod. Sulphonate.	Sod.Silicate, Sod.Carbonate, Oleic Acid.	85.6	93	9.5	17
3	-65	Sod.Silicate, Barium Chloride, Citric Acid, Oceno1 Sulphate.	Sod.Silicate, Oleic Acid.	86.7	92	33.2	39

Despite the low fluorite content of feed a considerable concentration was obtained in Test 3. High recovery of moderate grade barite was obtained in Tests 2 and 3. Obviously some further cleaning would produce high grade in either test. The specific gravity of concentrate from Test 3 was 4.16.

The second group of tests concentrated on production of barite and depression of the small amount of fluorite. Feed was ground through 65 mesh and the reagent system sodium silicate, citric acid and alkyl sodium sulphonate was used throughout. Typical trials are given in Table II. In Test 4 two cleaning steps were used with no additional reagents. In Test 5 three cleaning steps were used with citric acid added to each.

TABLE II

Concentration of Barite

Test No.	Cleaners	Product $BaSO_4$%	CaF_2%	Cu%	Sp.Gr.	Reflectivity %	Recovery %
4	2	93.9	0.60	0.012	4.22	81	75
5	3	94.8	0.54	0.013	4.31	81	77

As seen the barite concentrate can be readily upgraded by cleaning. A sharp drop in recovery is indicated, but the difference remains in cleaner tails and of this a good deal would be recoverable. Reflectivity was found to be rather low and in an effort to improve this some of the concentrates from Tests 4 and 5 were leached with nitric acid in order to reduce flecks of copper sulphide and iron oxide, and bleach the barite. Leached product from Test 4 had a $BaSO_4$ content of

94.7%, CaF_2 had dropped to 0.10% and Cu to 0.01%, the specific gravity went up to 4.34 but the reflectivity went up only to 84%. Leached product for Test 5 had a $BaSO_4$ of 95.4%, CaF_2 of 0.18 and Cu of 0.01%. Specific gravity went up to 4.42 and reflectivity to 85%.

CONCLUSIONS

A good barite concentrate may be made from this material with a high anticipated recovery. The product would be acceptable for drilling muds but it is doubtful if it could be sold for pigment due to the low reflectivity. Reflectivity of 92 or more is usually required. Individual companies might purchase this product for special uses.

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R.A.Wyman,
Head,Milling Section.