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O T T A W A July 10th, 1940.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 863.

Concentration Tests on a Sample of Barite Ore from Lavant Township, Lanark County, Ontario.

BUREAU OF MINES
DIVISION OF METALLIC MINERALS
ORE DRESSING AND
METALLURGICAL LABORATORIES

CANADA
DEPARTMENT
OF
MINES AND RESOURCES
MINES AND GEOLOGY BRANCH

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Shipment:

A shipment of barite ore, net weight 450 pounds, was received on May 3rd, 1940. The shipment was submitted by F. D. Burkholder, 119 Bank Street, Ottawa, Ontario.

Location of Property:

The property is located on lot 20, concession 8, near Clyde Forks railway station in Lavant township, Lanark county, Ontario.

Character of the Ore:

Six polished sections were prepared and examined under the reflecting microscope for the purpose of determining the character of the ore.

Gangue -

The gangue consists largely of a white to grey mineral which, from its high specific gravity and lamellar structure in hand specimens, appears to be barite. Enclosed in the barite are small patches of siliceous greenish-grey material containing abundant finely disseminated carbonate. These inclusions probably represent remnants of country rock.

Metallic minerals -

The metallic mineral content of the sections is small and is represented chiefly by tetrahedrite. Other metallic minerals present, in their approximate order of decreasing abundance, are: pyrite, chalcopyrite, pyrrhotite, arsenopyrite, marcasite, and "limonite".

Tetrahedrite is present as small masses and irregular grains unevenly distributed throughout gangue. Pyrite and chalcopyrite occur in almost equal amounts as coarse to fine disseminated grains in gangue, in tetrahedrite, and in each other. Both minerals contain

inclusions of gangue and some pyrite grains are slightly fractured and the fractures filled with gangue, more rarely with "limonite". Small quantities of pyrrhotite and arsenopyrite are present as medium to fine disseminated grains and crystals, the former mineral usually being associated with chalcopyrite. Very small, fine-grained masses of marcasite are visible in one section. "Limonite" occurs along fractures in pyrite as already mentioned, and also as rare tiny grains in gangue.

Sampling and Assaying:

The shipment was sampled, assayed, and reported as follows:

$BaSO_4$	-	88.00 per cent
Copper	-	0.40 "
Iron	-	0.40 "
Zinc	-	0.03 "
Lead	-	Nil.
Gold	-	0.005 oz./ton
Silver	-	1.08 "

Experimental Tests:

A series of small-scale tests and one large-scale test were conducted to determine the grade of barite concentrate that could be produced from this ore. Table concentration coupled with flotation to remove metallic sulphides was the method used.

Typical tests are described in detail as follows:

(Continued on next page)

Test No. 1.

A sample of the ore was dry-crushed to pass through a 14-mesh screen and then screen-sized into 35, 48, 65 and 100 mesh. The screened fractions were then concentrated on a table with first middlings being re-treated to produced concentrate and tailing. The tailing from the fraction finer than 100 mesh was kept separate from that of the coarser fractions. All concentrates were bulked together and floated to remove metallic sulphides. The final products were assayed for $BaSO_4$ and in addition to this copper and iron determinations were made on the flotation tailing from the table concentrates. Gold and silver were determined in the flotation concentrate.

Summary of Results:

Product	Weight, per cent	Assays Oz./ton Au	Assays Oz./ton Ag	Per cent Fe	Per cent Cu	Per cent $BaSO_4$	Distribution of $BaSO_4$, per cent
Flot. concentrate	0.82	0.06	55.32			30.14	0.29
Flot. tailing	61.82			0.19	0.09	96.88	70.49
Table tailing, +100 mesh	14.40					46.40	7.86
Table tailing, -100 mesh	22.96					79.04	21.36
Feed sample (cal.)	100.00					84.97	100.00

The flotation tailing contained a small amount of metallic sulphides such as pyrite and tetrahedrite, as well as some coloured siliceous material. The latter was sufficient to give the finished product a decidedly yellowish colour. The loss in the minus 100 mesh material is high.

Test No. 2.

The remainder of the ore was dry-crushed to pass through a 14-mesh screen and then the material finer than 100 mesh was screened out. The -14 +100 fraction was treated on a full-size table and a sample of the table concentrate was reground and floated to remove metallic sulphides. The flotation tailing was still decidedly off-colour.

Summary of Results, Test No. 2:

Table Concentration.

Product	Weight, per cent	Assay, $BaSO_4$, per cent	Distribution of $BaSO_4$, per cent
Table concentrate	29.7	94.6	32.3
Table middling	62.8	87.9	63.5
Table tailing	7.5	48.6	4.2
Table feed (cal.)	100.0	86.9	100.0

Flotation of Table Concentrate.

Product	Weight per cent of orig. feed	Assays -- Oz./ton Au	Oz./ton Ag	Per cent $BaSO_4$	Per cent Fe	Per cent Cu	Distribution, per cent Au	Distribution, per cent Ag	Distribution, per cent $BaSO_4$
Table conc.	29.7	0.005	1.14	94.60			29.7	31.5	32.3
Flot. conc.	2.0	0.02	17.0				8.1	31.5	2.2
Flot. tailing	27.7			96.74	0.19	0.01	21.6	Nil.	30.1

Conclusions:

From the results of tests conducted it seems improbable that a product can be made that would be acceptable for use in the paint industry, owing to the

presence of a small amount of highly coloured siliceous material which gives the final product a decidedly yellowish colour.

The table concentrate has a specific gravity of 4.35 and the table middling 4.17. The two products combined would have a specific gravity of 4.23 and this would be suitable for use in the drilling industry.

A low recovery in the concentrate resulted when the large table was used because the sample was not large enough to provide the required amount of feed for a full-size table. In a commercial operation there should be no difficulty in duplicating the results obtained on the small table.

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