

O T T A W A

June 9th, 1942.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1248.

Preliminary Flotation Tests on a Graphite
Ore from Buckingham Township, Quebec.

(Copy No. 11.)



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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Ore from Buckingham Township, Quebec.

Shipment:

A shipment of 70 pounds of graphite ore was received on May 23rd, 1942, from R. F. Kelly, Lord Elgin Hotel, Ottawa, Ontario.

Location of Property:

The shipment was said to have been taken from the H. H. Vaughn property, located on the north half of lot 8A, in Buckingham township, province of Quebec.

Purpose of the Investigation:

The investigation was made to determine the grade and character of concentrate that could be produced from the ore.

Character of the Ore:

The ore consisted of weathered surface material, stained by iron oxides and containing graphite abundantly disseminated through the sample.

Sampling and Analysis:

The shipment was crushed and sampled by standard methods and was found to contain:

Carbon (C) - 20.77 per cent.

Investigative Procedure:

The ore was treated by flotation and a portion of the flotation concentrate was passed over a Wilfley table.

The concentrates were dried and screened on 65- and 120-mesh screens, giving the following products:

+65	mesh concentrate,	No. 1	flake.
-65+120	" "	No. 2	"
-120	" "	No. 3	"

Each product was sampled and assayed.

Results:

62.4 per cent of the graphite was recovered in a concentrate, assaying 80.7 per cent carbon with a ratio of concentration of 6:1, which on screening yielded 3.8 per cent

(Results, cont'd) -

of No. 1 flake containing 93.6 per cent carbon, 4.8 per cent of No. 2 flake containing 89.7 per cent carbon, and 7.6 per cent of No. 3 flake containing 66.1 per cent carbon.

Wilfley table concentration of the above concentrates raised the grade of concentrate to 85.2 per cent carbon, giving an overall recovery of 42.4 per cent and produced 5.4 per cent of No. 1 flake, containing 92.9 per cent carbon; 5.8 per cent of No. 2 flake, containing 84.7 per cent carbon; and 5.1 per cent of No. 3 flake, containing 66 per cent carbon.

Details of the Tests:

Test No. 1. - Flotation of the Ore and Table
Concentration of the Flotation
Concentrate.

A sample of the ore was ground 75 per cent minus 200 mesh with 0.5 pound of kerosene, 2.0 pound of sodium silicate, and 0.10 pound of cresylic acid per ton. The pulp was floated with 0.20 pound of cresylic acid per ton.

The rougher concentrate obtained was reground with 1.0 pound sodium silicate per ton and floated without any addition of frother.

The concentrate obtained was recleaned in two operations at a dilution of approximately 12 per cent solids. No reagents were added to the cleaning operation.

The final flotation concentrate recovered was then split, and one portion was concentrated on a Wilfley table.

The flotation and table concentrates were dried and screened on 65- and 120- mesh screens and the products were assayed. The tailing from the reground concentrate was designated Middling No. 1, and from the two cleaning operations the

(Test No. 1, cont'd) -

tailings were combined and designed Middling No. 2. In practice, the two middling products would return to the re-grinding circuit.

Results:

Flotation of the Ore.						
Product	Weight, per cent	Assays, per cent		Distribution, per cent		Ratio of concentration
		Carbon	Insol.	Carbon	Insol.	
Feed	100.00	21.1		100.0		
Cleaner conc.	16.32	80.7	12.36	62.4		6.1:1.
Middling No. 1	20.76	8.6		8.5		4.8:1.
" No. 2	12.36	48.3		28.2		8.1:1.
Flot. tailing	50.56	0.39		0.9		

Table Concentration of the Flotation Concentrate.						
Table feed	Weight, per cent	Assays, per cent		Distribution, per cent		Ratio of concentration
		Carbon	Insol.	Carbon	Insol.	
Table feed	16.32	80.7	14.1	100.0	100.0	
" conc.	10.35	85.2	9.9	68.0	44.5	1.6:1.
" middling	0.98	26.3	58.1	2.0	24.5	16.7:1.
" tailing	4.99	78.0	14.3	30.0	31.0	

Screening Flotation Cleaner Concentrate.						
Feed	Weight, per cent	Assays, per cent		Distribution, per cent		Ratio of concentration
		Carbon	Insol.	Carbon	Insol.	
Feed	16.32	80.7	14.8	100.0	100.0	
+65 mesh	3.84	93.6	2.8	27.7	4.5	4.25:1.
-65+120 mesh	4.84	89.7	6.8	33.4	13.7	3.4:1.
-120 mesh	7.64	66.1	25.8	38.9	81.8	

Screening Wilfley Table Concentrate.						
Feed	Weight, per cent	Assays, per cent		Distribution, per cent		Ratio of concentration
		Carbon	Insol.	Carbon	Insol.	
Feed	16.32	80.7	12.6	100.0	100.0	
+65 mesh	5.42	92.9	3.6	37.8	9.4	3:1.
-65+120 mesh	5.82	84.7	10.2	37.0	29.7	2.8:1.
-120 mesh	5.08	66.2	25.1	25.2	61.9	

The results obtained by flotation may be summarized as follows:

(Continued on next page)

(Test No. 1, cont'd) -

Summary of Flotation Results:

Product	Weight, per cent	Assay, carbon, per cent	Distribution of carbon, per cent
Feed	100.0	21.1	100.0
No. 1 Flake	3.8	93.6	17.3
No. 2 Flake	4.8	89.7	20.8
No. 3 Flake	7.6	66.1	24.5
Middling No. 1	20.8	8.6	8.5
Middling No. 2	12.4	48.3	28.2
Flotation tailing	50.6	0.39	0.9

Conclusions:

The investigation indicates that the ore represented by the sample can be concentrated by flotation.

The microscopic examination shows that a portion of the No. 1 flake has gangue particles attached, some of which are embedded in the flakes.

The sample submitted for the investigation was severely weathered and oxidized, indicating that it had been taken from the surface of the deposit.

In these preliminary tests, made to obtain samples of the three grades of concentrate, no attempt was made to determine the correct grind necessary to produce the maximum quantity of No. 1 flake.

As the sample submitted apparently was surface material, the results of this investigation can apply only to ore of a similar character.

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