O T T A W A August 19th, 1941.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1071.

Crushed Graphite Crucibles from the
Canadian Foundry Supply and Equipment Company,
Montreal, Quebec.

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BUREAU OF MINES
DIVISION OF METALLIC MINERALS
ORE DRESSING AND
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CANADA
DEPARTMENT
OF
MINES AND RESOURCES
MINES AND GEOLOGY BRANCH

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Shipment:

A shipment of crushed graphite crucibles, weighing 25 pounds, was received on July 21st, 1941. The shipment was submitted by A. R. Woods, Canadian Foundry Supply and Equipment Company, Montreal, Quebec, to G. C. Bateman, Metals Controller, Department of Munitions and Supply, Ottawa, Ontario.

Purpose of the Investigation:

On account of the shortage of graphite, the investigation was made to determine whether this material could be used for foundry facings.

Character of the Material As Received:

The material consisted of a mixture of graphite, gangue minerals, and metallic globules. The microscope showed that there had not been a complete separation of the graphite from the gangue. The gangue varied from coarse to fine material. The finely divided gangue minerals appeared to be the clay mixture used in the manufacture of the crucibles.

Some black shiny particles had the appearance of slag. The metallic particles were acid soluble and were apparently copper or brass.

Sampling and Analysis:

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

		Per cent
Carbon	=	39.20
Copper	=	1.34
Zinc	=	1.62
Iron	=	0.65
Lead	=	Nil.
Insoluble	=	55.96

The following screen test shows the degree of grinding:

Mesh	Weight, per cent.
+ 20	0.2
- 20 + 28	0.5
- 28 + 35	1.3
- 35 + 48	2.8
- 48 + 65	5.4
- 65 +100	7.9
-100 +150	11.4
-150 +200	10.1
-200	60.4
	100.0

Investigative Procedure:

Samples of the material were concentrated by flotation. Fusion tests were made on the material as received and on one cleaner concentrate.

The results of the test work show that a cleaner concentrate contained 50 per cent carbon and fused at a temperature of 2930° F.

The material as received fused at a temperature of 2850° F.

DETAILS OF THE TESTS:

Several tests were made using various amounts of reagents. The best results obtained were the following:

Test No. 1. - Flotation.

A sample of the material was conditioned in a flotation machine with 4.0 pounds of sodium silicate per ton for 10 minutes. Then 1.0 pound of kerosene oil per ton was added. The kerosene was dispersed in a 5 per cent solution with Emulsol X-1.

It was noted that the graphitic material floated in large flocs without the addition of a frother. After removing all the concentrate appearing in the froth the tailing was removed and examined. It contained the coarse sandy material and most of the metallic content of the feed.

The concentrate was recleaned in a flotation machine by the addition of 2 pounds of sodium silicate per ton. No oil was added to the cleaning operation.

Examination of the cleaner tailing disclosed that it contained some coarse graphitic material and sand, clay, slag and metal particles.

(Continued on next page)

(Test No. 1, cont'd) -

Microscopic examination of the cleaner concentrate shows that the gangue particles are extremely fine, some being attached to the graphite.

Results:

Flotation.

Products	Weight, per cent	Assays, per cent		Distribution, per cent		Ratio of concentration
		Carbon	Copper	Carbon	Copper	
Feed*	100.00	37.82	1.28	100.00	100.00	
Rougher conc.	74.99	46.87	0.13	92.91	7.84	1.33:1
Cleaner conc.	62.62	50.68	0.10	83.89	0.49	1.60:1
Cleaner tailing	12.37	27.57	0.76	9.02	7.35	
Flotation tailing	25.01	10.73	4.71	7.09	92.16	

* Feed assays calculated from the products of the test.

Assay of the Cleaner Concentrate:

	Per cent
Carbon	50.68
Copper	0.10
Zinc	Nil
SiO_2	34.12
Al_2O_3	14.40

Fusion temperature - 2950° F.

The results indicated that practically all of the coarse gangue and metallic particles were eliminated from the cleaner concentrate.

The finely divided material was not removed in appreciable amount.

The test work was discontinued and the company now proposes to determine the grade that can be made by air elutriation methods.

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