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R+N Iron Colonial Mines

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CONCENTRATION TESTS ON 3 SAMPLES

OF MAGNETITE ORE

SUBMITTED BY

COLONIAL MINES LIMITED

(4)

PROPERTY FILE

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Consulting and Research Metallurgist

CONCENTRATION TESTS ON THREE SAMPLES OF MAGNETITE ORE

submitted by

COLONIAL MINES LIMITED

INTRODUCTION

Six samples of magnetite ore were received from Mr L.R.Fanning of Colonial Mines Limited on May 16th, 1962. Small-scale magnetic separation tests were carried out on five of the samples, using a Davis tube, and the results were reported in reports dated May 28th and June 27th, 1962.

Instructions were received from Mr Fanning on August 2nd to carry out a larger-scale test on a composite of samples 2, 3 and 4, with the object of producing a high-grade concentrate which would be suitable for pelletising. It was agreed to grind the rougher concentrate, made by magnetic separation after crushing the ore to minus 10 mesh, to about 85% minus 325 mesh before final magnetic separation.

Instructions were received on August 7th to proceed with an additional test on the same composite sample but grinding the rougher concentrate to only minus 100 mesh (nominal) before final magnetic separation.

Details of test-work

(1) Assay of composite head sample (calculated).

(Composite of equal weights of samples 2, 3 and 4).

42.60% acid-soluble iron (Fe)

(2) Production of high-grade concentrate (69% Fe).

A composite sample was made up by taking 500 grams each of samples 2, 3 and 4 and treated in a Sala laboratory wet drum magnetic separator. The concentrate was cleaned by retreatment in the same machine, filtered and dried. It weighed 918 grams, or 61.2% of the weight of ore taken. A 750 gram sample of the concentrate was then ground in three stages in a Denver laboratory ball mill, the minus 325 mesh material being removed by screening at the end of the first and second periods. The fractions were combined and concentrated in the Sala machine and the concentrate was cleaned twice. It was then allowed to settle and the supernatant water and a small amount of gangue slime was decanted off, in order to reproduce the effect of thickening in a full-scale plant. The final concentrate was filtered, dried and weighed (586 grams). A sample was screened and found to contain 85.4% of minus 325 mesh material. A further sample was passed to Coast Eldridge Engineers and Chemists for assay of the iron content as received and for complete analysis after mixing with 1% bentonite and roasting at 1050° C under oxidising conditions. (This was intended to reproduce the effect of pelletising the concentrate.) - See attached reports.

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ENGINEERS & CHEMISTS LTD.

125 EAST 4TH AVE., VANCOUVER 10, B.C.

TELEPHONE: TRINITY 6-4111

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REPORT OF: Iron Concentrates Project B 6 # 1063

Final Con # 234

AT Vancouver Laboratory

ORDER No.

PROJECT:

DATE August 20, 1962

REPORTED TO: Mr. John Britton
755 Beatty Street
Vancouver, B. C.

FILE 2257

We have made tests on the sample of iron concentrates submitted August 9, 1962 and report as follows:

TOTAL IRON (Fe) ----- 69.16 %

The concentrate was thoroughly mixed with 1 % bentonite (Western) and heated in an oxidizing atmosphere at 1050° C for 15 minutes. Gain in weight after calcination was 2.5 %. The calcine was then analyzed with the following results:

ANALYSIS OF CALCINE

| | | |
|---|-------|---------|
| Total Iron (Fe) | ----- | 66.92 % |
| Silica (SiO ₂) | ----- | 2.51 % |
| Alumina (Al ₂ O ₃) | ----- | 0.73 % |
| Manganese (Mn) | ----- | 0.20 % |
| Copper (Cu) | ----- | 0.012 % |
| Sulphur (S) | ----- | 0.03 % |
| Phosphorus (P) | ----- | 0.005 % |

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H. Sharples

H. Sharples
PROVINCIAL ASSAYER

*ps

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REPORT OF: Iron Concentrate Project B 6 # 1063
 Final Con # 234
 AT Vancouver Laboratory
 PROJECT: Semi-Quantitative Spectrographic Analysis
 REPORTED TO: Mr. John Britton
 755 Beatty St.
 Vancouver, B. C.

ORDER No.

DATE August 20, 1962

FILE 2257

We have tested the sample of iron concentrate submitted August 9, 1962 and report as follows:

Preparation of Sample:

The concentrate was thoroughly mixed with 1 % bentonite (Western) and heated in an oxidizing atmosphere at 1050° C for 15 minutes. Gain in weight after calcination was 2.5 %. The calcine was then analyzed with the following results:

SEMI-QUANTITATIVE SPECTROGRAPHIC ANALYSIS

| | | |
|-----------|-------|--------------|
| Iron | ----- | 69.0 % |
| Silicon | ----- | 1.5 % |
| Aluminum | ----- | 0.4 % |
| Calcium | ----- | 0.5 % |
| Magnesium | ----- | 0.5 % |
| Sodium | ----- | 0.1 % |
| Copper | ----- | 0.01 % |
| Titanium | ----- | 0.02 % |
| Zirconium | ----- | 0.02 % |
| Manganese | ----- | 0.2 % |
| Chromium | ----- | 0.0008 % |
| Tin | ----- | 0.0007 % |
| Zinc | ----- | 0.01 % |
| Nickel | ----- | 0.001 % |
| Cobalt | ----- | 0.001 % |
| Arsenic | ----- | Not detected |

COAST ELDRIDGE

J. G. Smith
CHIEF CHEMIST

*ps

(2) Production of high-grade concentrate (cont.)

Weights of products:

Rougher concentrate 61.2% of ore
Final concentrate 47.8% of original ore

$$\underline{\text{Overall iron recovery}} \quad \frac{47.8 \times 69.16}{42.60} = 77.6\%$$

The grade of the final concentrate (69.16% Fe before roasting) was very high and the impurities were all within the usually-accepted limits.

(3) Production of minus 100 mesh concentrate

In order to produce the 5 kilogram sample of concentrate required, a 12 kilogram composite sample of minus 10 mesh ore was made up, using equal weights of samples 2, 3 and 4 as before. The sample was concentrated in the Sala machine and the concentrate was cleaned once. It was then thickened, filtered, dried and weighed. (7330 grams = 61.1%).

Three 2400 gram samples of the rougher concentrate were ground at 70% solids in the Denver mill, each for periods of 30 minutes. They were then combined, concentrated in the Sala machine and the concentrate was cleaned twice before thickening, filtering and drying. The moisture content of the wet filter cake was determined (12.7%). A sample was then submitted to Coast Eldridge for chemical analysis in the dry but unroasted condition (see page 6).

(3) Production of minus 100 mesh concentrate (cont.)

Weights of products:

Rougher concentrate 61.1% of ore

Final concentrate 5874 grams from 7200 grams
of rougher concentrate, equivalent to 49.9% of the weight of ore.

Overall iron recovery $\frac{49.9 \times 67.06}{42.60} = 78.6\%$

Screen size of final concentrate 98.9% minus 100 mesh.

John W. Britton, P. Eng.
John W. Britton, P. Eng.

755 Beatty Street,

Vancouver 3, B.C.

August 21st, 1962

JWB/b