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Preliminary Testwork Report on a Sample of Iron Ore from Julian Deposit Using the Jones High Intensity Wet Magnetic Separator for Canadian Javelin Ltd.

Ferro-Magnetics Ltd.
(NPL)

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A Subsidiary of Magnetics International Ltd.

PRELIMINARY TESTWORK REPORT

ON

A SAMPLE OF IRON ORE

FROM

JULIAN DEPOSIT

USING

THE JONES HIGH INTENSITY WET MAGNETIC SEPARATOR

FOR

CANADIAN JAVELIN LIMITED

Prepared by: J. A. Bartnik, P.Eng.
Exec. Vice-President

Date : May 24, 1973

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PRELIMINARY TESTWORK REPORT

FOR

CANADIAN JAVELIN LTD.

INTRODUCTION

Canadian Javelin Ltd. submitted to Ferro-Magnetics Ltd. an iron ore sample described as "Iron Ore from Julian Deposit" for preliminary tests using the Jones High Intensity Wet Magnetic Separator.

Due to the number of variables, the preliminary tests can only indicate whether or not a full scale test program is warranted. From a very wide experience, we interpret the preliminary results to project the type of separation that would result from a full scale test program.

From the correspondence, the following is our understanding:

a) The sample represents iron ore from Julian deposit located in Labrador close to Wabush deposits.

b) The sample is damp, in lump form - 4 inches.

c) The objective is not known in detail, so approximate maximum limits for both grade and recovery should be determined.

CONCLUSIONS

1) Already in the preliminary tests from feed of 37.8% Fe, a concentrate of 64.02% Fe was produced.

2) A recovery of over 95% of the iron values was obtained.

3) A systematic detailed test program is now necessary to tie the grade and recovery together. It is likely that the results would be in the order of 65% Fe and over 80% recovery and even possibly over 90% recovery at slightly finer grind.

4) A detailed systematic test program is now necessary to optimize the operating variables such as grind, intensity, gap, % solids, feed rate, plates, passes, wash water, dispersion etc. and correlate this data for efficient commercial operation.

RECOMMENDATIONS

The Jones Separator is efficient, well proven, simple and most probably the cheapest process for beneficiation of Labrador iron ore.

Based on the excellent preliminary tests, we strongly recommend that Ferro-Magnetics Ltd. conduct a detailed systematic test program in order to determine optimum operating conditions which will enable selection of the most desirable process.

The full scale test program will cover the effect of all variables such as gap, intensity, plates, percent solids, feed rate, passes, dispersion wash water, recirculation, and correlate the data for efficient commerci operation.

The proposal for a full scale test program will follow shortly under separate cover.

MATERIAL TESTED

The sample weighing about ten pounds marked iron ore/Julian deposit was received at Ferro-Magnetics laboratory on May 2, 1973. This material represented iron ore from Julian deposit in Labrador near Wabush Mines.

No information was given regarding the mineralogical composition.

The material was damp, dark hard rock crushed - 4" and assayed

Fe %	Al_2O_3 %	TiO_2 %	P_2O_5 %	S %	CaO %	MgO %	MnO %	SiO_2 %
38.73	0.09	0.09	0.22	0.002	0.002	0.02	0.05	43.44

OBJECTIVES

The objectives were not known in detail, so the purpose of the preliminary tests was to establish data that would indicate the possibility of production of an acceptable grade iron concentrate in a full scale test program.

Hence the preliminary test was designed to demonstrate:

a) Grade of concentrate that is readily attainable at coarse grind.

b) Maximum iron recovery possible.

NOTE:

The preliminary tests were not designed to demonstrate the above in the same test.

To tie the combination together is the objective of a full scale test program.

TESTWORK

Attached are test data records giving details of the testwork performed.

The preliminary tests were designed to establish if the objective of a full scale test program was attainable.

The sample was tested at various intensities. All magnetics were assayed for Fe content. Also one set of all products were assayed to give a calculated head. A complete analysis was done on test concentrate # 773-7 and # 773-20 as well as head sample.

RESULTS

Already from a feed of 38.73% Fe, an iron concentrate was produced in test #5 with 64.02% Fe.

In test #1, 95.7% of the iron was recovered in the magnetic fraction.

SUMMARY OF RESULTS

TEST NO.		MAGNETICS		
			% Fe	% Fe Dist.
1	(Combined Magnetics)	#1	59.83	57.1)
		#2	51.89	29.9) 95.7
		#3	33.72	8.7)
2			62.49	71.2
3			60.44	81.5
4		#1	62.66	56.1)
		#2	55.63	33.9) 95.5
		#3	32.08	5.5)
5			64.02	71.1
6			61.38	86.4

COMMENTS

Material for a full scale test program should be sent wet as the original sample was.

The results from the preliminary tests show that this material responds excellently to separation by the Jones Machine. Iron recovery of over 95% has been shown in tests 1 and 4. Grade has produced around 64% Fe. Finer grind to liberate iron values should result in superior grade and recovery.

Consequently, it has been demonstrated that very high recovery is possibl and the concentrate grade well over 64% Fe can be produced at coarse grin

A systematic detailed test program is essential to optimize the operating variables, especially liberation of iron values and most likely attain a grade of 65% +Fe with over 90% recovery.

It appears from test 1-3 (grind -10 mesh) as compared to test 4-6 (grind -20 mesh) that no advantage would be gained by finer grinding. However, it is probable that an acceptable separation could be made at the existing grain size.

From the above, it is likely that the exact specifications of Canadian Javelin could be met when they are outlined in detail. The susceptibility of virtually all the iron values would give great flexibility to a test program directed towards any one of a number of acceptable metallurgical combinations of grade and recovery.

It is now essential for experienced personnel to establish in the laborato ry, the effect of all variables such as gap, intensity, plates, % solids, feed rate, passes, wash water, grind, dispersion, etc. and correlate the data for efficient commercial operation.

EXPLANATION OF TERMS ON TEST DATA SHEETS

On the 'Summary of Test Data' sheets some explanation of the terms used may be helpful to the reader.

INTENSITY - AMPS

The laboratory Jones Separator on which the work was conducted has a maximum of 40 amperage that can be applied to the coils. From the amperage used on the laboratory machine, the size of the coils necessary for a commercial separator can be derived.

% SOLIDS

This is % solids of the slurry feed to the separator.

CAPACITY INDEX

This is an index unit in the laboratory from which the capacity of a commercial separator can be deduced.

WASH WATER

This is classified as Light (L), Medium (M), Medium/Heavy (M/H), and Heavy (H). From the results wash water requirements for a commercial machine can be deduced. Wash water removes entrapped non-magnetics usually with some magnetic minerals, thus wash product may be considered as middling product.

PLATES

There are generally two types of plates: salient pole and high extraction. Their composition can vary.

DISPERSANT

Some materials need a dispersant and this is usually presented as lbs./ton if used.

PASSES

This is the number of times a product has been passed through the laboratory separator. Deductions are then made for the flow sheet of a commercial operation.

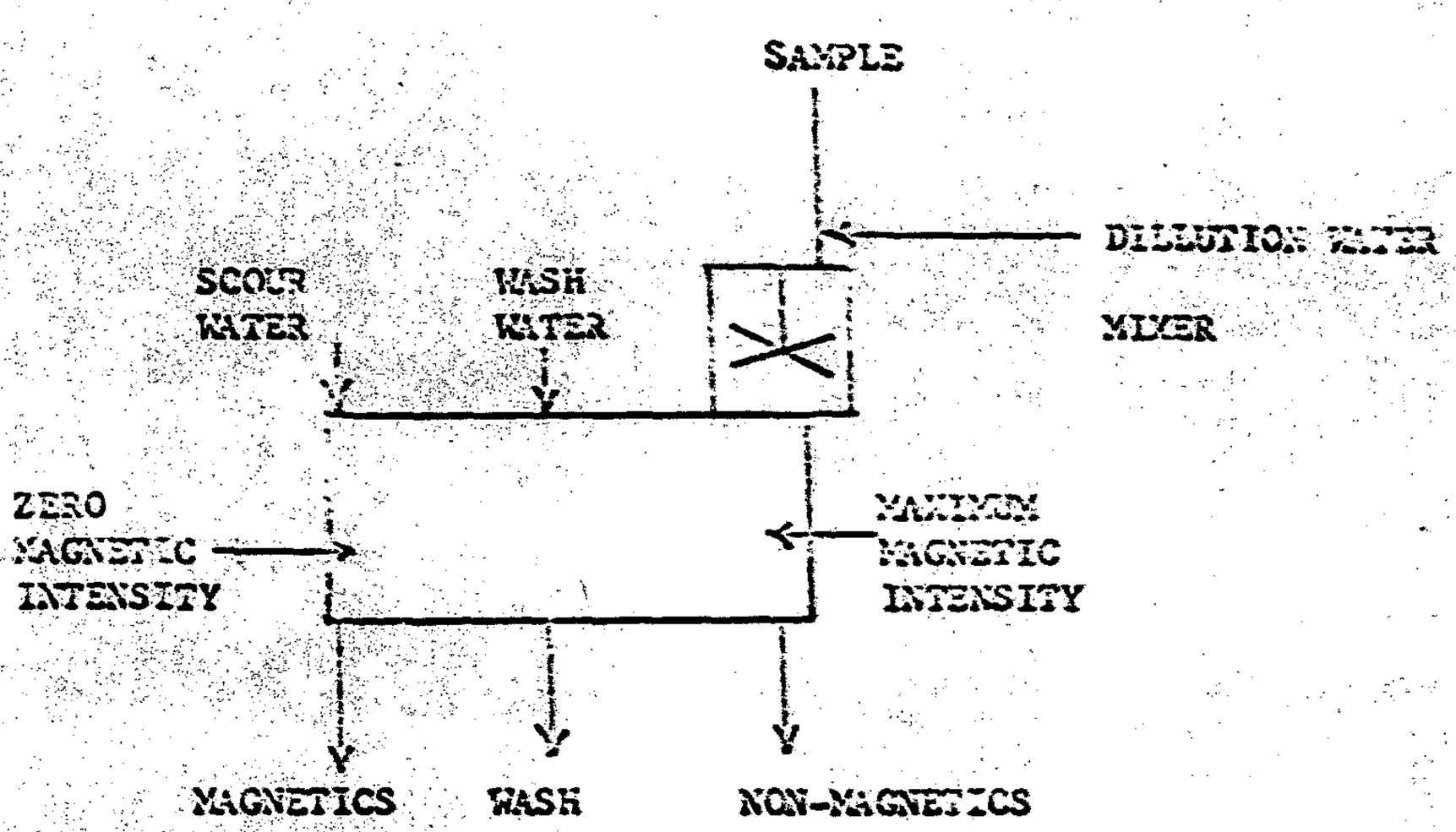
GAP

The air gap between the plates can be varied, usually up to a maximum of 3.0 mm. This data collected determines the gap setting on a commercial separator.

GENERAL

The above items are the result of working out certain factors in the laboratory and applying these factors to determine the parameters for a commercial separator.

TEST PROCEDURE



FERRO-MAGNETICS LTD.

SUMMARY OF TEST DATA ---- JONES SEPARATOR

COMPANY Canadian Javelin MATERIAL Julian Lake Ore OBJECTIVE + 65% Fe DATE May 10/73

Test	Description	Number	Weight %	Assays % Fe	Distribution %	Grind Mesh	Intensity Amps	% Solids	Capacity Index	Wash Water	Plates	Dispers.	Passes	Gap	Comments
	HEAD	773-1	100.0	38.73		Al_2O_3 - 0.09		TiO_2 - 0.09		P_2O_5 - 0.22		S - 0.002	CaO - 0.02	MgO - 0.02	MnO - 0.0 SiO_2 - 43
1	Magnetics *1	773-2	36.4	59.83	57.1	-10	4	10	80	MH	S.P.Ch.	—	1 Each Intensity	2.5	
	Magnetics *2	773-3	22.0	51.89	29.9 (95.7)		8								
	Magnetics *3	773-4	9.9	33.72	8.7		16								
	Wash	773-5	2.8	11.66	.9										
	Non Magnetics	773-6	28.9	4.48	3.4										
2	Magnetics	773-7	44.1	62.49	71.2	-10	8	10	80	MH	S.P.Ch.	—	2 of Mags	2.5	
	Wash *1	773-8	7.1			Al_2O_3 - 0.12		TiO_2 - 0.19		P_2O_5 - 0.03		S - 0.002	CaO - 0.05	MgO - 0.02	MnO - 0 SiO_2 - 9.
	Wash *2	773-8A	3.2												
	Non-Magnetics *1	773-9	40.1												
	Non-Magnetics *2	773-9A	5.5												
3	Magnetics	773-10	60.9	60.44	81.5	-10	12	10	80	MH	S.P.Ch.	—	2 of Mags	2.5	
	Wash *1	773-11	7.4	31.30	6.1										
	Wash *2	773-12	2.5	43.93	3.9										
	Non-Magnetics *1	773-13	33.6	7.62	6.8										
	Non-Magnetics *2	773-14	5.6	18.40	2.7										
4	Magnetics *1	773-15	34.2	62.66	56.1 (95.5)	-20	4	10	80	MH	S.P.Ch.	—	1 Each Intensity	2.5	
	Magnetics *2	773-16	23.3	55.63	33.9		8								
	Magnetics *3	773-17	6.6	32.08	5.5		16								
	Wash	773-18	2.3	10.34	.6										
	Non-Magnetics	773-19	33.6	4.28	3.8										
5	Magnetics	773-20	43.0	64.02	71.1	-20	8	10	80	MH	S.P.Ch.	—	2 of Mags	2.5	
	Wash *1	773-21	6.3			Al_2O_3 - 0.13		TiO_2 - 0.12		P_2O_5 - 0.04		S - 0.002	CaO - 0.06	MgO 0.03	MnO 0 SiO_2 7
	Wash *2	773-21A	5.3												
	Non-Magnetics *1	773-22	40.5												
	Non-Magnetics *2	773-22A	4.9												

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SUMMARY OF TEST DATA ---- JONES SEPARATOR

COMPANY Canadian Javelin MATERIAL Julian Lake Ore OBJECTIVE +65 % Fe DATE May 10/73

Test #	Description	Number	Weight %	Assays %	Distribution %	Grind Mesh	Intensity Amps	% Solids	Capacity Index	Wash Water	Plates	Dispers.	Passes	Gap	Comments
6	Magnetics	773-23	53.2	61.38	86.4	-20	12	10	80	MH	S.P Chr.	-	2 of Mags	2.5	
	Wash *1	773-24	6.3	32.66	5.4										
	Wash *2	773-25	1.0	30.25	.8										
	Non-Magnetics *1	773-26	36.5	6.51	6.3										
	Non-Magnetics *2	773-27	3.0	13.11	1.1										

REPORT OF ANALYSIS

RECEIVED MAY 10 1973

No. : 0531328 to 0531351
Date : May 7, 1973
Client : Ferro-Magnetics Limited

Ferro-Magnetics P.O. number : 90

NO. CERTIFICATE	NO. SAMPLE	% Fe	% SiO_2	% Al_2O_3	% TiO_2	% P_2O_5	% S	% CaO	% MgO	% MnO
0531328	773-1	38.73	43.44	0.09	0.09	0.22	<.002	0.02	0.02	0.05
0531329	773-2	59.83								
0531330	773-3	51.89								
0531331	773-4	33.72								
0531332	773-5	11.86								
0531333	773-6	4.48								
0531334	773-7	62.49	9.69	0.12	0.19	0.03	<.002	0.05	0.02	0.06
0531335	773-10	60.44								
0531336	773-11	31.30								
0531337	773-12	43.93								
0531338	773-13	7.62								
0531339	773-14	18.40								
0531340	773-15	62.66								
0531341	773-16	55.63								
0531342	773-17	32.08								
0531343	773-18	10.34								
0531344	773-19	4.28								
0531345	773-20	64.02	7.68	0.13	0.12	0.04	<.002	0.06	0.03	0.04
0531346	773-23	61.38								
0531347	773-24	32.66								
0531348	773-25	30.25								
0531349	773-26	6.51								
0531350	773-27	13.11								
0531351	773-28	61.66								

"The above results apply only to the submitted sample. Having no control on the initial sampling and on the use of these results, we decline all responsabilities for damage resulting from their utilisation."

Metriclab Inc.

H Blais
Henri Blais