

002

470

455

435

475

55

556

Little Donaldson River

450

450

450

450

450

450

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450

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450

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450

450

450

450

EL 28789

Little Donaldson River

Mineral Holdings Ltd

BERTHA

DONALDSON

1:25000 31/96

38/96

5 cm

CROWN LAND

Pineapple Creek

457003

20

18

16

52

53

54

55

56

Introduction

The licence area lies in State Forest east of the Savage River pipeline which crosses the NW corner. The only access is by the pipeline road, 12km north of Savage River.

Geology

Precambrian amphibolite, schist and carbonate rocks of the Arthur lineament form the bedrock of the area, partly overlain (in the west) by Permian Beds and Tertiary basalt. The area is thickly timbered with very little outcrop except for stream bed exposures and occasional outcrop on steep valley slopes.

Exploration

Field work to date has been restricted to stream traverses and sampling. Magnesite float in a tributary of the Little Donaldson River was sampled and analysed and also an isolated outcrop (?) on the valley slopes above the stream sample. The analyses of these samples were:

	Lab No.	MgO %	CaO %
Float Sample	882990	34.6	10.0
Outcrop Sample	896039	42.59	4.47

Due to the classification as Recommended for Protection, the area has not been investigated further, but some beneficiation tests have been carried out on material already collected.

Beneficiation Tests

A series of crushing, grinding and calcining tests were conducted by the D.O.M. laboratory in Launceston on behalf of the licence holder.

In summary, these tests, carried out on both Arthur River and

Little Donaldson River magnesites, show that marginal increases in grade can be effected by crushing, screening and calcining sequences in certain size fractions.

At this stage it is not known what significance to attach to these results.

Exploration Programme for 1990-91

It is proposed to continue field traverses to determine if magnesite crops out elsewhere in the area and also to formulate a prospecting programme which meets the guidelines for evaluating mineral deposits in such areas.

Appendix 1



CRA EXPLORATION PTY. LIMITED

INC. IN N.S.W. A.C.N. 000 057 126

54 RAGLAN STREET, PRESTON, VICTORIA 3072, AUSTRALIA

457007

PO BOX 508
NORTH HAVEN CENTRAL 2072
7111 GRAYS CRYLA
7111 BRONL 457 126
4RL 3 001 11
111 613 454 111

IN FILED PLEASE QUOTE

DATE: 12th June, 1991
NOTE TO: File
FROM: T.W. Dickson
SUBJECT: Magnesite Outcrops
Little Donaldson River Tasmania

To be incorporated into TCR 90-3162 as an appendix O

A magnesite occurrence within EL 28/89 adjacent to the Savage River Pipeline Road was brought to our attention by Mr. Neil Thomas of Nargun Pty. Ltd.. A visit to the site was made on 25th April 1991 in company with Mr. Kevin Pinner a prospector working for Nargun Pty. Ltd..

The magnesite crops out on an unnamed branch of the Little Donaldson River which crosses the Savage River Pipeline Road at a road distance of 41.3 km south of the Arthur River Bridge. The magnesite is a further 1.4 km upstream at 353250mE and 5419200mN on the Australian Map Grid.

The location is within the Arthur Lineament and is directly along strike between the Lyons River occurrence and the Savage River Mine. The area is almost completely covered by Tertiary Basalt but a tight bend in the creek has exposed patches of magnesite below the basalt in a crescent shaped area of about 65m x 65m.

The magnesite occurs as a series of small outcrops in the bed and banks of the creek. Three larger outcrops to 3 x 8 metres and 2.5 metres in height occur along the outermost (eastern) bend of the stream and two larger outcrop lie some 30 metres further east and some 20 metres above river level.

The material is strongly iron stained, is yellow-orange in colour and has the texture of a fine sugary marble. The outcrop are fairly massive with occasional flat lying jointing and a weak steeply dipping foliation (?bedding) trending 014° magnetic is developed in some outcrops.

As is typical of all the western Tasmanian magnesites the outcrop is very poor with small "islands" of yellowish magnesite occurring in a "sea" of brownish coloured clay. Total strike length exposed is 65 metres and a similar distance occurs across strike between the easternmost and westernmost exposures.

The scatter of outcrops within the creek would suggest that at depth the western-most 30 metres would be solid magnesite but it is possible a number of shale bands could occur in the eastern 30 metres. To the north, east, and south the magnesite is covered by deeply weathered basaltic scree and the full extent of the deposit is unknown. Nargun Pty. Ltd have prospected the creek to the north of the deposit which runs roughly along the projected strike extent of the magnesite without any success. They have not explored to the south but the two deeply incised branch creeks which cross the projected line of strike at 0.6 and 1.5 km to the south should be carefully prospected for any extension to the zone.

Four chip samples were taken from the largest outcrop and a copy of the assay results are attached. MgO content varies from 30.9 to 40.5% with CaO 2.42 to 15.7%, SiO₂ 0.45 to 1.42% and Fe₂O₃ 3.74-7.05%.

In comparison to surface samples at Arthur River and Lyons River the Little Donaldson River magnesite has much less silica but a considerably higher iron content and is typical of the magnesites south of Savage River. The material is variably dolomitised but the dolomitic material is fully intermixed and is visually indistinguishable from the magnesite.

Although the magnesite is within 1/2 km of the Pipeline Road the area would be very difficult to access and it lies within the Savage River Rainforest RAP (Recommended Area for Protection). This does not exclude exploration activity but any work must be referred to the Interdepartmental Mineral Exploration Working Group and would be severely conditioned and certainly in the early stages restricted to hand held techniques.

In summary the Little Donaldson magnesite is exposed over a semi circular area 65 x 65 metres with its full extent unknown at this stage. The material is variably dolomitised and is of only average quality with low silica but very high iron content. There could also be major environmental problems in further exploration of the zone.



I.W. DICKSON

CRA EXPLORATION PTY. LIMITED

FILE NAME: LITTLE DONALDSON R

R

SAMPLE NUMBER	LOCATION				ROCK TYPE		MINERALIZATION					METAL CONTENT p.p.m. OR % WHERE INDICATED										GEOLOGICAL OBSERVATION		
	CO-ORDS.		TYPE	WIDTH (M)	MAJ.	MIN.	ALTERATION	VISIBLE	STYLE	MAJOR	MINOR	MINOR	Mo	K ₂ O	CaO	SiO ₂	Fe ₂ O ₃	Al ₂ O ₃	MnO	MgO	P ₂ O ₅		TiO ₂	LOI
	E	N											ppm %	%	%	%	%	%	%	%	%		%	%
2769 728	353250	5419200	2	4	22								40.5	0.04	2.4	1.25	5.30	0.21	0.26	0.04	0.02	0.02	49.6	yellow-orange stained magnetite
729	"	"	2	4	22							32.00	0.01	11.3	1.42	7.05	0.06	0.31	0.02	0.02	0.01	47.5	"	
730	"	"	2	6	22							30.9	0.03	15.7	0.45	3.74	0.05	0.23	0.01	0.02	0.01	48.3	"	
731	"	"	2	6	22							34.80	0.01	8.20	1.06	6.65	0.01	0.26	0.02	0.03	0.01	48.3	"	

457003

GEOCHEMICAL ROCK SAMPLING LEDGER

DETECTION LIMIT 0.01%
ANALYTICAL METHOD ICP

SAMPLED BY: T.W.D. DATE: 25/4/91
D.P.O. No.: 46448
MAP OR PHOTO REF.: BURNIE SK55-3

LABORATORY USED: CLASSIC
SCALE, PLAN No.s, ZONE: VV 62014
APPENDIX No: _____ PAGE: _____ OF: _____

PROJECT: LITTLE DONALDSON RIVER
TENEMENT NAME: EL 28/89
AREA OR PROSPECT: _____

KEY TO GEOCHEMICAL ROCK SAMPLING LEDGER

SAMPLE No.

CRAE 7 digit number

SAMPLE TYPE

1. Channel sample
2. Chip sample
3. Gossan sample
4. Grab sample - single
5. Grab sample - multiple
6. Mineralised float
7. Mineral identification

LOCATION

Co-ordinates Australian
Metric Grid ReferenceWidth of sample zone in metres

ROCK TYPE

1. Conglomerate
2. Breccia
3. Greywacke
4. Arkose
5. Sandstone
6. Siltstone
7. Shale
8. Black shale
9. Mudstone
21. Limestone
22. Dolomite
23. Banded Iron Formation
24. Carbonatic Shale
25. Chert
31. Pegmatite
32. Granite
33. Porphyritic Granite
34. Adamellite

35. Diagenodiorite

36. Diorite

37. Gabbro

38. Peridotite

51. Rhyolitic lava

52. Rhyolitic pyroclastics

53. Trachyte

54. Andesitic lava

55. Andesitic pyroclastics

56. Basaltic lava

57. Basaltic pyroclastics

58. Dolerite

66. Quartzite

67. Hornfels

68. Marble

69. Slate

70. Phyllite

71. Schist

72. Amphibolite

73. Gneiss

86. Quartz veins

87. Gneissen

88. Gossan

89. Ironstone

90. Laterite

ALTERATION

1. Argillization
2. Albitization
3. Carbonatization
4. Chloritization
5. Dolomitization
6. Propylitization
7. Pyritization
8. Sausurilitization
9. Sericitization
10. Silicification

11. Zeolitization

MINERALISATION

Visible: 1. Not visible

2. Gossan

3. Visible associates of
possible mineralization

4. Minor visible mineralization

5. Obvious visible mineralization

Style: 1. Veins

2. Shear zones

3. Stratabound disseminated

4. Stratabound massive sulphide

5. Disseminated

6. Pipes

7. Stockworks

8. Stratabound veins/vein swarm

9. Irregular

10. Skarn

Minerals:

1. Argentite
2. Arsenopyrite
3. Bauxite
4. Bismuthinite
5. Bornite
6. Cassiterite
7. Chalcocite
8. Chalcopyrite
9. Cinnibar
10. Chromite
11. Covellite
12. Corellite
13. Cuprite
14. Energitte
15. Galena
16. Gold
17. Haematite

18. Ilmenite

19. Magnetite

20. Marcasite

21. Molybdenite

22. Native Copper

23. Native Silver

24. Pentlandite

25. Pitchblende

26. Proustite

27. Pyrite

28. Pyrrhotite

29. Pyrolusite

30. Rutile

31. Scheelite

32. Siderite

33. Sphalerite

34. Stannite

35. Silblite

36. Tetrahedrite

37. Wolframite



CLASSIC LABORATORIES LTD

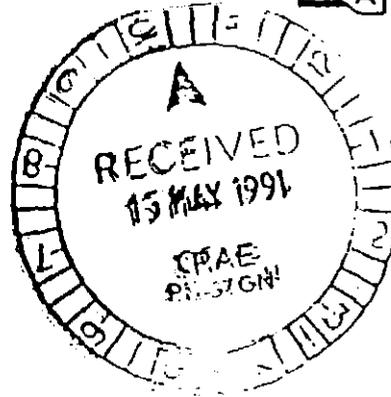
Incorporated in WA, a wholly owned subsidiary of Amoel Ltd
ACN 009-078-555

Osman Place, Thebarton, South Australia 5031
Telephone: (08) 43 5722 Facsimile: (08) 234 0321



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457011



Mr R D Rickards
CRA Exploration Pty Limited
54 Raglan Street
PRESTON
VIC 3072

FINAL ANALYSIS REPORT

Your Order No: 46448

Our Job Number : 1AD1234B

Samples received : 01-MAY-1991

Results reported : 13-MAY-1991

No. of samples : 4

Report comprises a cover sheet and pages 1 to 2

This report relates specifically to the samples tested in so far as that the samples as supplied are truly representative of the sample source.

Note:

If you have any enquiries please contact Miss Anne Reed quoting the above job number.

Approved Signatory:

John Waters
Technical Manager - Adelaide

CC	Admin Officer	Preston
CC	CRA Exploration	ACT
MM	Mr S Robertson	Preston

Report Codes:

N.A. - Not Analysed.
L.N.R. - Listed But Not Received.
I.S. - Insufficient Sample.

Distribution Codes:

CC - Carbon Copy
EM - Electronic Media
MM - Magnetic Media

"RELIABLE ANALYSES AT COMPETITIVE COST"



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Job: 1AD1234B
O/N: 46448

457012

ANALYTICAL REPORT

Sample	MgO	K2O	CaO	SiO2	Fe2O3	Al2O3	MnO
2769728	40.5	0.04	2.42	1.25	5.30	0.21	0.26
2769729	32.0	0.01	11.3	1.42	7.05	0.06	0.31
2769730	30.9	0.03	15.7	0.45	3.74	0.05	0.23
2769731	34.8	0.01	8.20	1.06	6.65	0.01	0.26
Units	%	%	%	%	%	%	%
DL	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Scheme	ICP5	ICP5	ICP5	ICP5	ICP5	ICP5	ICP5



CLASSIC LABORATORIES LTD

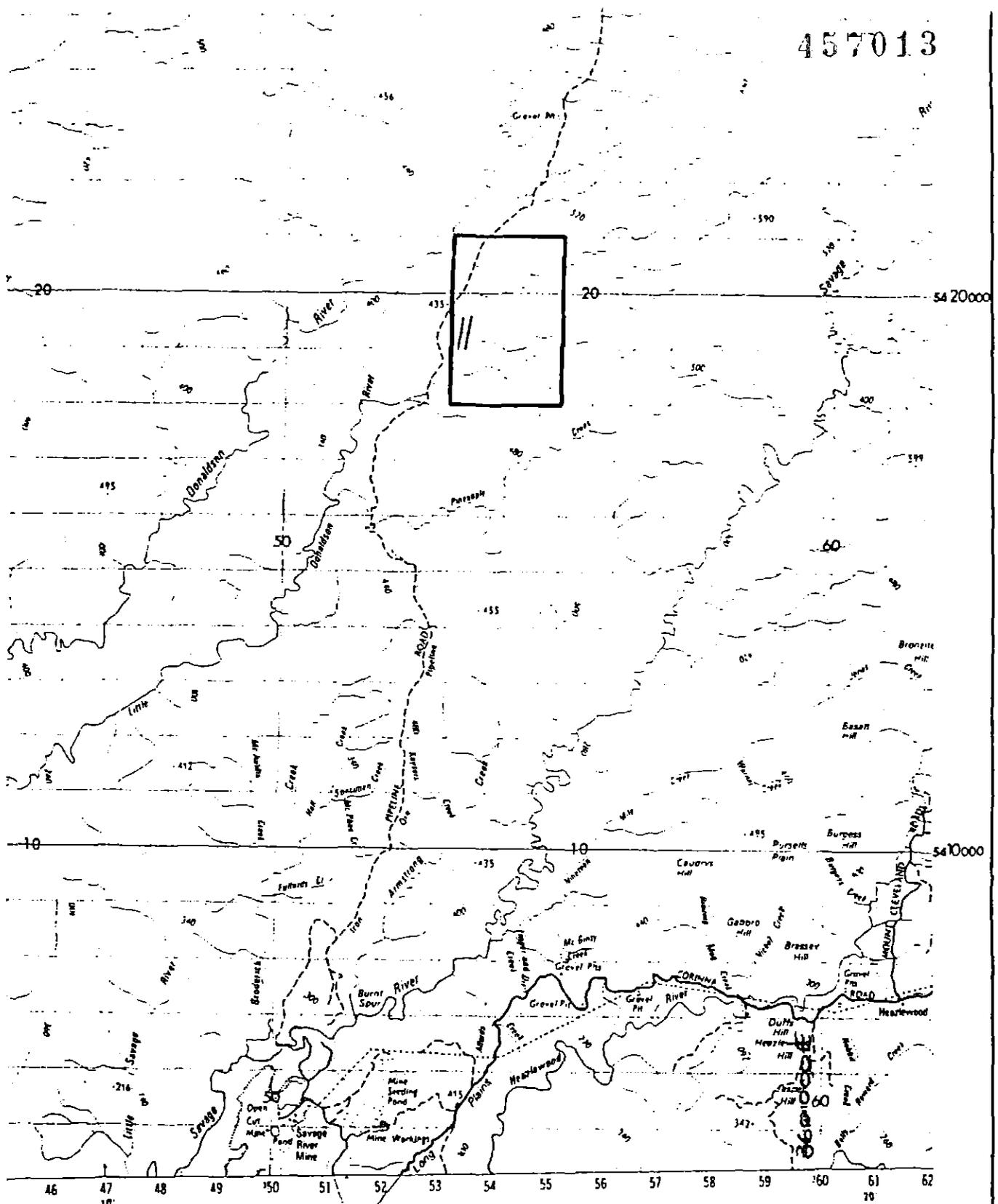


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Job: 1AD1234B
O/N: 46448

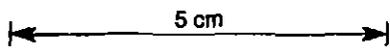
ANALYTICAL REPORT

Sample	Na2O	P2O5	TiO2	LOI
2769728	0.04	0.02	0.02	49.6
2769729	0.02	0.02	<0.01	47.5
2769730	0.01	0.02	0.01	48.3
2769731	0.02	0.03	<0.01	48.3
Units	%	%	%	%
DL	0.01	0.01	0.01	0.01
Scheme	ICP5	ICP5	ICP5	ICP5



SAVAGE RIVER 2 km

// MAGNESITE

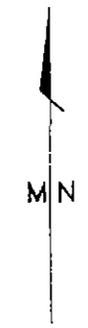
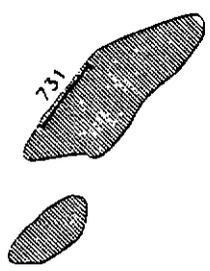
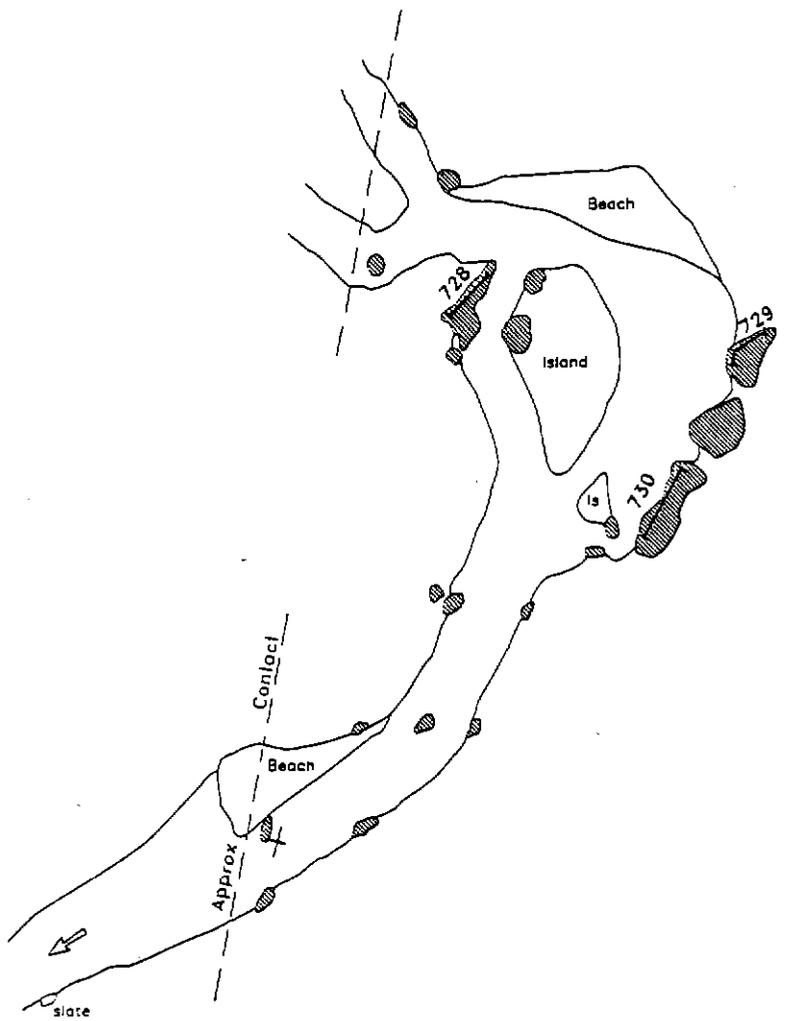


CRA EXPLORATION PTY. LIMITED

LITTLE DONALDSON RIVER
EL 28/89

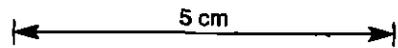
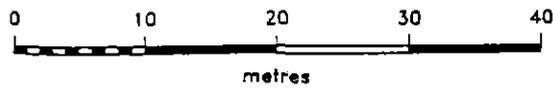
LOCALITY PLAN
MAGNESITE

Ref.: SK 55 - 3	Scale: 1:100 000
Author: T.W.DICKSON	Report No.:
Drawn: A.J. MAY 1991	Plan No.: Vv 6296



- 731 Sample (2769)..731
-  Magnesite Outcrop
-  Slate

457014



CRA EXPLORATION PTY. LIMITED	
MAGNESITE OUTCROPS Little Donaldson River TASMANIA	
Ref.: SK 55 - 3	File: TOM\LittDon
Scale: 1 : 400	Date: 13th. May 1991
Author: T.W. Dickson	Report No.:
Drawn: R. Traverso	Plan No.: W 6294

MINERAL HOLDINGS AUSTRALIA PTY. LIMITED

INC. IN VIC.

Correspondence to:

2nd FLOOR,
100 COLLINS STREET,
MELBOURNE, AUSTRALIA, 3000
TELEPHONE: (03) 654 7999
TELEX: AA31317
FAX: (03) 650 3855

2nd February, 1990

Mr. V. Threader
43 Kingston Heights
KINGSTON BEACH, TAS. 7050

Dear Vic,

EL.28/89 LT. DONALDSON RIVER

Further to your letter of 15th September, 1989 and your views, I arranged through the Mines Department Launceston for a 2 kg sample for calcining "basket" tests to be done at the Savage River Calciners with the following results:

(4) Test 4Sample No 896039 - $\frac{1}{4}$ inch + 5/32 (4.0mm) Little Donaldson River

	<u>% MgO</u>	<u>% CaO</u>
Sample before calcining	42.59	4.47
Sample after basket test	74.87	9.47

Screen Analysis of Sample from Basket

<u>μm</u>	<u>% Weight</u>	<u>% MgO</u>	<u>% CaO</u>	
+ 9530	7.43	68.5	15.0	4.87
-9530 + 5600	38.40	81.1	9.8	5.3
-5600 + 4750	4.20	78.4	11.0	5.1
-4750 + 2800	29.84	78.6	10.3	5.6
-2800 + 2360	3.24	65.6	5.1	5.0
-2360 + 1180	8.27	56.2	6.0	5.4
-1180 + 850	1.82	61.9	4.0	5.5
- 850 + 600	1.12	64.3	5.6	5.5
- 600 + 500	0.49	64.6	4.7	5.5
- 500	5.19	57.0	4.5	5.7
<hr/>				
Total (Average)	100.00	74.87	9.47	

That fractions coarser than 2800 μ m showed an increase of 3.98% MgO compared to the total average and comprised 79.87% of the total sample calcined.

457016
DEPARTMENT OF MINES

Recd 11/2/89



TASMANIA

Launceston Office:
Chemical and Metallurgical
Laboratory,
287 Wellington Street,
LAUNCESTON 7249

Enquiries:
Phone:
Your ref.:
Our file:

R900

24.11.89

Mineral Holdings Ltd

Reg No 893391 893482

Introduction :

Mr Neil Thomas of Mineral Holdings Pty Ltd requested that some samples of Arthur River magnesite be subjected to particle size thermal degradation tests.

Samples

Analysis of riffled head samples gave the following results:

(a) 893391 "Tasmantine" sample

MgO 38.0%

CaO 4.2%

(b) 893482 "Second" sample

MgO 42.8%

CaO 1.1%

Method

1. The two samples were separately crushed to -5600µm in a laboratory jaw crusher.

2. The two crushed magnesite samples were each riffled into eight equivalent portions of approximately 200 grams.

3. The riffled portions of each sample were then subjected to heat treatment at the following temperatures for one hour, cooled, then sized by dry screening only.

(a) room temperature (head sample)

(b) 600° C

(c) 800° C

(d) 1000° C

(e) 1100° C

(f) 1200° C

(g) 1250° C

4. Sized fractions of the magnesite samples which were subjected to 1000° C for 1 hour were analysed for MgO and CaO.

Results Obtained

(a) - 893391 "Tasmantine" Sample

One Hour Dwell Time at Temperature Indicated

Fraction µm	No Heat Cum % Mass	600°C Cum % Mass	800°C Cum % Mass	1000°C Cum % Mass	1100°C Cum % Mass	1200° Cum % Mass	1250°C Duplicate Cum % Mass	1250°C Results) Cum % Mass
-5600 + 4750	4.3	2.0	0.5	Nil	Nil	Nil	Nil	Nil
-4750 + 2800	42.4	34.4	20.2	7.8	8.5	9.4	8.7	8.5
-2800 + 2360	52.1	43.6	28.4	13.0	14.0	15.5	15.1	14.5
-2360 + 1180	79.2	73.7	60.5	47.2	47.9	48.4	50.3	48.0
-1180 + 850	88.6	84.3	72.2	60.7	61.8	62.4	65.0	62.7
- 850 + 600	95.0	91.3	79.9	70.0	71.4	72.0	75.2	73.2
- 600 + 500	98.6	95.4	84.0	75.4	77.1	77.7	80.5	79.2
- 500	100.	100	100	100	100	100	100.	100
Head	-	-	-	-	-	-	-	-
% L.O.I.	-	2.8	36.6	47.0	46.8	47.4	47.4	47.5

457017

(b): 893482 Second SampleOne Hour Dwell Time at Temperature Indicated

Fraction µm	No Heat	600°C	800°C	1000°C	1100°C	1200°C	1250°C (Duplicate	1250°C Results)
	Cum % Mass	Cum % Mass						
-5600 + 4750	1.7	1.7	0.3	0.2	Nil	Nil	Nil	Nil
-4750 + 2800	20.9	24.8	13.9	10.4	10.5	8.4	7.5	7.2
-2800 + 2360	28.8	32.6	20.2	15.8	16.8	13.5	11.6	12.5
-2360 + 1180	63.1	65.5	56.2	50.2	48.6	45.8	44.2	45.1
-1180 + 850	78.4	78.8	71.1	65.2	63.4	60.7	60.0	60.2
- 850 + 600	89.2	88.7	81.6	75.9	74.5	72.0	71.9	71.7
- 600 + 500	95.5	94.5	87.8	82.0	81.2	79.0	78.9	78.9
- 500	100	100	100	100	100	100	100	100
Head	-	-	-	-	-	-	-	-
% L.O.I.	-	4.3	46.8	49.2	49.6	49.7	49.5	49.7

(c) Reg. No 893391 - 1 hour dwell time 1000°C

(Tasmantine Sample)

Fraction µm	Percent Mass	Percent		Percent Distribution		Cumulative Percent Distribution	
		MgO	CaO	MgO	CaO	MgO	CaO
-5600 + 4750	Nil	-	-	Nil	Nil	Nil	Nil
-4750 + 2800	7.8	68.2	3.7	7.4	7.7	7.4	7.7
-2800 + 2360	5.2	70.3	2.4	5.1	3.3	12.5	11.0
-2360 + 1180	34.2	71.6	2.6	34.0	23.7	46.5	34.7
-1180 + 850	13.5	70.7	3.7	13.2	13.3	59.7	48.0
- 850 + 600	9.3	71.8	3.7	9.3	9.1	69.0	57.1
- 600 + 500	5.4	72.1	4.8	5.4	6.9	74.4	64.0
- 500	24.6	75.2	5.5	25.6	36.0	100	100
Calc. head	100	(72.1)	(3.8)	100	100	-	-

(d) Reg. No 893482

1 Hour dwell time 1000°C(Second Sample)

Fraction µm	Percent Mass	Percent		Percent Distribution		Cumulative	Percent Distribution
		MgO	CaO	MgO	CaO	MgO	CaO
-5600 + 4750	0.2	87.1	1.5	10.9	8.3	10.9	8.3
-4750 + 2800	10.2						
-2800 + 2360	5.4	83.3	1.8	5.4	5.2	16.3	13.5
-2360 + 1180	34.4	83.3	1.8	34.3	33.0	50.6	46.5
-1180 + 850	15.0	83.0	1.5	14.9	12.0	65.5	58.5
- 850 + 600	10.7	83.2	2.2	10.7	12.6	76.2	71.1
- 600 + 500	6.1	84.0	1.8	6.1	5.9	82.3	77.0
- 500	18.0	82.1	2.4	17.7	23.0	100	100
Calc. Head	100	(83.5)	(1.9)	100	100	-	-

Discussion

1. An examination of the two samples submitted has shown that the "Tasmantine" sample (893391) was composed of approximately 80 percent magnesite and approximately 8 percent calcite whilst the "second" sample (893482) was found to be approximately 90 percent magnesite and only approximately 2 percent calcite.

2. Dry particle size analysis of samples subjected to heat treatment indicates that for both samples maximum size reduction by thermal degradation occurs at a temperature of approximately 1000°C. At a temperature greater than 1000°C fusion appears to commence.

3. One hour dwell time for each sample at 1000°C has given the following results.

Sample	Percent		
	MgO	CaO	L.O.I.
893391 (Tasmantine)	72.1	3.8	47.0
893482 (Second)	83.5	1.9	49.2

Further the particle size distribution of the CaO in the two samples follows fairly closely the particle size distribution of the respective MgO.

Conclusion

A temperature of approximately 1000°C was found to cause the maximum particle size reduction or thermal degradation on the two samples submitted.

Metallurgist. *K. Austin*

K. Austin

David Zani
(D. Zani)

Chief Chemist & Metallurgist



TASMANIA

Launceston Office:

Chemical and Metallurgical
Laboratory,
287 Wellington Street,
LAUNCESTON 7249R 902 Part 1

28.11.89

Enquiries:

Phone:

Your ref.:

Our file:

Introduction

Mr. Neil Thomas of Mineral Holdings Pty Ltd, requested that some sized fractions of crushed magnesite be calcined in 'baskets' in the Shaft Furnace at Port Latta. After calcining, the sample from the baskets was screened at various sizes and each fraction weighed and analysed for % MgO and % CaO.

Samples

One sample No 896038 was from the Arthur River deposit and three basket tests were carried out at different size fractions on this. The other sample ~~No 896039~~ was from the Little Donaldson River and one basket test was done on the one size fraction.

Method

A portion of sample No 896038 was crushed to minus 3/4 inch and screened on a 1/2 inch, 3/8 inch and 5/32 inch screen. A portion of the oversize fraction retained on the screens were sent to Port Latta for basket tests in the shaft furnace.

A portion of sample No 896039 was crushed to minus 1/2 inch and screened on a 5/32 inch screen. A portion of the oversize fraction retained on the screen was sent to Port Latta for a basket test.

(1) Test 1

Sample No 896038 - 3/8 inch + 5/32 (4.0mm) (Arthur River)

	<u>MgO %</u>	<u>CaO %</u>
Sample before calcining	39.10	1.8
Sample after calcining (From basket test)	79.51	2.4

Screen Analyses of Sample from Basket

<u>μm</u>	<u>% Weight</u>	<u>% MgO</u>	<u>% CaO</u>
+ 5600	4.10	78.9	7.9
-5600 + 4750	11.50	90.5	1.8
-4750 + 2800	42.64	85.7	2.4
-2800 + 2360	3.32	62.4	2.2
-2360 + 1180	10.65	72.6	2.4
-1180 + 850	3.60	79.6	2.8
- 850 + 600	2.85	78.4	2.6
- 600 + 500	1.38	80.2	3.3
- 500	19.96	67.3	1.5
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Total (Average)	100.00	79.51	2.4

This sample showed that it can be calcined in a shaft furnace. That fractions coarser than 2800 μm showed an increase of 6.6% MgO compared to the total average. The fraction coarser than 2800 μm comprised 58.24% of the total sample calcined.

(2) Test 2

Sample No 896038 - $\frac{1}{2}$ inch + $\frac{3}{8}$ inch (Arthur River)	<u>% MgO</u>	<u>% CaO</u>
Sample before calcining	42.90	3.10
Sample after basket test	71.79	2.36

Screen Analyses of Sample from Basket

<u>μm</u>	<u>% Weight</u>	<u>% MgO</u>	<u>% CaO</u>
+ 9530	15.05	75.9	2.2
-9530 + 5600	45.07	74.7	2.6
-5600 + 4750	1.47	88.7	1.5
-4750 + 2800	13.63	76.7	2.0
-2800 + 2360	2.39	51.9	2.0
-2360 + 1180	6.90	49.8	2.4
-1180 + 850	2.37	57.8	3.3
- 850 + 600	1.84	61.6	3.3
- 600 + 500	0.90	82.0	3.3
- 500	10.39	67.7	1.8
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Total (Average)	100.00	71.79	2.36

That fractions coarser than 2800 μ m showed an increase of 3.78% MgO compared to the total average. The fraction coarser than 2800 μ m comprises 75.21% of the total weight of the sample calcined.

(3) Test 3

Sample No 896038 - 3/4 inch + 1/2 inch (Arthur River)

	<u>% MgO</u>	<u>% CaO</u>
Sample before calcining	41.90	2.70
Sample after basket test	81.42	3.68

Screen Analysis of Sample from Basket

<u>μm</u>	<u>% Weight</u>	<u>% MgO</u>	<u>% CaO</u>
+ 12700	33.37	82.0	5.1
-12700 + 9530	22.05	87.3	2.7
- 9530 + 5600	17.65	88.9	2.2
- 5600 + 4750	0.64	95.4	1.1
- 4750 + 2800	6.97	73.3	1.6
- 2800 + 2360	1.34	58.8	2.0
- 2360 + 1180	4.86	68.6	4.5
- 1180 + 850	1.91	74.4	4.9
- 850 + 600	1.56	76.5	3.8
- 600 + 500	0.77	74.7	4.0
- 500	8.88	68.5	5.1
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Total (Average)	100.00	81.42	3.68

That fraction coarser than 4750 μ m showed an increase of 3.93% MgO compared to the total average. The fraction coarser than 4750 μ m comprises 73.71% of the total weight of the sample calcined.

(4) Test 4

Sample No 896039 - 1/2 inch + 5/32 (4.0mm) Little Donaldson River

	<u>% MgO</u>	<u>% CaO</u>
Sample before calcining	42.59	4.47
Sample after basket test	74.87	9.47

Screen Analysis of Sample from Basket

<u>µm</u>	<u>% Weight</u>	<u>% MgO</u>	<u>% CaO</u>
+ 9530	7.43	68.5	15.0
-9530 + 5600	38.40	81.1	9.8
-5600 + 4750	4.20	78.4	11.0
-4750 + 2800	29.84	78.6	10.3
-2800 + 2360	3.24	65.6	5.1
-2360 + 1180	8.27	56.2	6.0
-1180 + 850	1.82	61.9	4.0
- 850 + 600	1.12	64.3	5.6
- 600 + 500	0.49 <i>20.0g</i>	64.6	4.7
- 500	5.19	57.0	4.5
<hr/>			
Total (Average)	100.00	74.87	9.47
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That fractions coarser than 2800 µm showed an increase of 3.98% MgO compared to the total average and comprised 79.87% of the total sample calcined.

Discussion

The basket tests have shown that Magnesite can be calcined in a shaft furnace such as at Port Latta. These furnaces may need modifying by lowering the bustle so that the hot oil gases enter at a lower point in the furnace so as to improve the efficiency and reduce the oil usage required for calcination.

There is a good indication that crushing the calcined magnesite to 95 30 µm and screening out the -2800 µm fines will increase the MgO by about 4.5% in the + 2800µm fraction.

However, because the samples from the wire mesh baskets were contaminated by the iron oxide pellets, the results in this report must be used with caution. If anymore basket tests are done at Port Latta then possibly the magnesite sample would need to be enclosed to prevent contamination but at the same time allow the hot gases to contact the magnesite.

Therefore, before the next basket tests the following steps need to be taken.

1. Address above contamination problem.
2. Deliver about 20 kgms of Magnesite to the Mines Dept. as we do not have enough sized fractions left for a basket test.
3. A muffle test at 1000 to 1350°C should be done on the sized fractions at the Mines Dept. as no contamination can occur.

After the sized fractions of Magnesite are calcined in the muffle furnace they would then be screened to see if impurities reported to the finer fractions.

The cost of the basket work is \$634.00, attached is your letter of 22.11.89.

L.O.I. results to follow.

David Zani

(D. Zani)

Chief Chemist & Metallurgist



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DEPARTMENT OF MINES

Rcvd. 20/12/89
457027

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R902 - Part II

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Our file: Introduction

12.12.89

Mr. Neil Thomas of Mineral Holdings requested that Magnesite Tiles from the Arthur River deposit be fractured at varying compression and the resulting samples screened and each screen fraction be analysed to see if any upgrading occurred in some size fraction.

Samples

A tile of magnesite approximately 2cm thick and 0.25m² in area from the Arthur River magnesite deposit and marked sample No 896038.

Method

The samples were sent to the H.E.C. laboratory for fracturing at varying compressions and the procedure is outlined in their attached report. 12 specimen sections were fractured at varying compressions. The fractured samples were returned to the Launceston Mines Department for screen analysis and chemical analysis of the screen fractions

Test 1

Sample No 896038 Specimen No 1 -2

This specimen crushed at 494 Megapascals = 71630 P.S.I.

Table 1

Mines Dept No	Screen Size μm	Wt. %	Chemical Analyses							%	
			L.O.I.	Mgo	CaO	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MnO	
Z45	+ 5600	14.63	50.92	45.32	1.91	1.2	<0.01	0.05	0.98	0.06	
Z46	-5600 + 4750	5.59	50.80	45.47	1.12	1.5	<0.01	0.03	0.97	0.06	
Z47	-4750 + 2800	7.05	50.12	44.92	1.77	2.5	<0.01	0.05	0.98	0.06	
Z47A	-2800 + 2360	2.12	50.12	44.92	1.77	2.5	<0.01	0.05	0.98	0.06	
Z48	-2360 + 1180	13.96	50.51	43.30	1.64	1.9	<0.01	0.01	0.97	0.06	
Z49	-1180 + 850	7.05	50.59	45.41	1.67	1.7	<0.01	0.05	1.00	0.06	
Z50	- 850 + 600	5.98	50.55	45.06	1.90	1.9	<0.01	0.07	1.01	0.06	
Z51	- 600 + 500	3.06	50.73	45.55	1.78	1.6	<0.01	0.04	0.98	0.07	
Z51A	- 500 + 250	9.18	50.30	45.19	2.28	2.0	<0.01	0.04	1.00	0.06	
Z52	- 250	31.38	50.55	45.44	2.64	1.1	0.02	0.09	1.12	0.07	
Head		100.0	50.56	45.03	2.05	1.53	<0.01	0.06	1.02	0.06	

That fraction coarser than 850 μm comprised 50.4% of the head and was 0.37% lower in CaO 0.04% lower in Fe₂O₃ and 0.14% higher in SiO₂ when compared to the head sample. the mgO did not show any significant difference.

This specimen of magnesite tile fractured at 494 megapascals or 71630 P.S.I. and gave a fine product on fracturing.

Test 2Sample No 896038Composite of Specimens 1-1, 1-3, 1-4, 1-5, 1-6.

The composite sample crushed at 255.4 Megapascals = 37033 P.S.I.

Table : 2

Mines Dept No	Screen Size μm	Wt %	Chemical Analyses							%	
			L.O.I.	MgO	CaO	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MnO	
Z54	+ 5600	30.79	50.40	45.91	0.63	2.6	0.01	0.06	0.98	0.06	
Z55	-5600 + 4750	6.33	50.38	45.66	0.85	2.4	<0.01	0.10	0.98	0.07	
Z56	-4750 + 2800	14.43	50.09	45.89	0.73	1.9	0.02	0.07	1.07	0.06	
Z57	-2800 + 2360	3.82	50.33	45.82	0.77	2.6	0.01	0.03	1.00	0.06	
Z58	-2360 + 1180	18.09	50.80	46.56	0.74	2.0	0.02	0.18	1.04	0.06	
Z59	-1180 + 850	5.85	50.77	46.15	0.77	1.7	<0.01	0.07	1.03	0.07	
Z60	- 850 + 600	3.97	50.82	46.30	0.82	1.6	0.01	0.03	1.02	0.06	
Z61	- 600 + 500	1.78	50.77	46.00	1.03	1.8	0.04	0.07	1.03	0.07	
Z62	- 500 + 250	4.23	50.51	45.73	1.21	2.1	0.02	0.08	1.05	0.07	
Z63	- 250	10.71	50.25	45.01	1.45	1.9	0.02	0.15	1.41	0.07	
Head		100.0	50.54	45.93	0.82	2.18	0.02	0.095	1.06	0.063	

That fraction coarser than 850 μm comprised 79.31% of the head and was 0.11% lower in CaO, 0.05% lower in Fe₂O₃ and 0.07% higher in SiO₂ when compared to the head sample. The MgO did not show any significant difference.

These specimens of magnesite tile fractured at an average compression of 255.4 megapascals or 37033 P.S.I.

Test 3Sample No 896038Composite of specimens 1-7, 1-8, 1-9, 1-10, 1-11, 1-12

The composite sample crushed at 218.8 Megapascals. = 31726 P.S.I.

Table 3

Mines Dept No	Screen Size μm	Wt %	Chemical Analyses							
			L.O.I.	MgO	CaO	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MnO
Z64	+ 5600	35.23	50.05	45.16	1.20	2.8	0.02	0.02	1.05	0.07
Z65	-5600 + 4750	7.74	50.39	45.46	0.56	2.4	<0.01	0.03	1.03	0.07
Z66	-4750 + 2800	13.42	50.55	45.35	1.18	2.0	<0.01	0.02	1.02	0.07
Z67	-2800 + 2360	4.05	50.24	45.52	0.90	2.4	<0.01	0.01	1.09	0.07
Z68	-2360 + 1180	16.33	50.33	44.87	1.27	2.2	<0.01	0.01	1.05	0.07
Z69	-1180 + 850	5.26	50.65	42.43	1.05	1.6	<0.01	0.05	1.05	0.08
Z70	- 850 + 600	3.48	50.55	45.75	1.22	1.8	<0.01	0.04	1.05	0.07
Z71	- 600 + 500	1.70	50.68	45.75	1.31	1.4	<0.01	0.02	1.28	0.08
Z72	- 500 + 250	4.12	50.46	43.69	1.43	1.6	0.02	0.04	1.12	0.07
Z73	- 250	8.67	50.58	45.45	1.66	1.2	0.02	0.07	1.24	0.08
Head		100.0	50.32	44.93	1.19	2.24	<0.01	0.026	1.07	0.07

That fraction coarser than 850 μm comprised 82.03% of the head and was 0.07% lower in CaO, 0.03% lower in Fe₂O₃ and 0.17% higher in SiO₂ when compared to the head sample. The MgO did not show any significant difference.

These specimens of magnesite tile fractured at an average compression of 218.8 Magapascals or 31726 P.S.I.

Discussion

The Magnesite tile specimen tested fractured between a low of 187 Megapascals and a high of 494 megapascals.

In the three tests that screen fraction coarser than 850 μ m showed a small decrease in % CaO and Fe₂O₃ and a small increase in % SiO₂. The MgO did not change significantly.

The following table 4 shows the average weight percent coarser than 850 μ m and the average decrease in CaO and Fe₂O₃ and increase in SiO₂.

Table 4

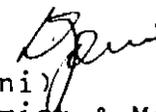
Weight fraction coarser than 850 μ m	70.6 %
Decrease in CaO	0.18%
Decrease in Fe ₂ O ₃	0.04%
Increase in SiO ₂	0.13%

The average head assay for the 12 specimens fractured was as follows:

L.O.I.	50.47 %
MgO	45.30 %
CaO	1.35 %
SiO ₂	1.98 %
Fe ₂ O ₃	1.05 %

From the above average head assay a calcined product would expect to have the following analyses.

L.O.I.	0.2 %
MgO	91.1 %
CaO	2.7 %
SiO ₂	4.0 %
Fe ₂ O ₃	2.1 %


(D. Zani)
Chief Chemist & Metallurgist

DEPARTMENT OF MINES



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Mineral Holdings R902 - Part IIIIntroduction

Mr Neil Thomas of Mineral Holdings requested that a magnesite tile from the Arthur River deposit be crushed and screened and the screen fractions be analysed to see if any upgrading occurred in some size fraction.

Sample

A portion of a tile of magnesite approximately 2cm thick and 0.1m² in area from the Arthur River Magnesite Deposit and marked sample number 896038 - Speciman 13.

Method

The magnesite tile was stage crushed to - $\frac{3}{8}$ inch and screened so as to produce screen fractions of

- $\frac{3}{4}$ " + $\frac{1}{2}$ "
- $\frac{1}{2}$ " + $\frac{3}{8}$ "
- $\frac{3}{8}$ " + $\frac{5}{16}$ "
- $\frac{5}{16}$ " + 1.18mm
- 1.18mm

Each fraction was weighed and analysed and the results are shown in table 1.

(see page 2)

(2)

Sample No 896038 Specimen 13. Tiles crushed to $-\frac{1}{4}$ inch and screened.

TABLE 1

Mines Dept No.	Screen Size	Weight %	CHEMICAL ANALYSIS								
			LOI %	MgO %	CaO %	SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	MnO %	Au g/tonne
Z125	$-\frac{3}{4}'' + \frac{1}{2}''$	23.0	49.34	45.94	0.80	2.79	0.01	0.08	1.81	0.11	<0.01
Z126	$-\frac{1}{2}'' + \frac{3}{8}''$	19.6	49.84	44.31	1.17	2.75	<0.01	<0.01	1.76	0.11	<0.01
Z127	$-\frac{3}{8}'' + \frac{5}{32}''$	29.97	49.20	44.76	1.19	3.06	<0.01	<0.01	1.84	0.11	<0.01
Z128	$-\frac{5}{32}''$ + 1.18mm	16.53	49.93	44.90	1.19	2.47	<0.01	<0.01	1.93	0.12	<0.01
Z129	- 1.18mm	10.90	49.88	43.88	1.34	2.52	<0.01	<0.01	1.91	0.22	0.03
Head		100.00	49.55	44.86	1.11	2.78	<0.01	0.02	1.84	0.12	<0.01

That fraction coarser than 1.18mm which comprises 89.1% of the head was 0.14% higher in MgO, 0.02% lower in CaO, 0.01% lower in Fe₂O₃, and 0.03% higher in SiO₂. The analysis of that fraction coarser than 1.18mm is shown below in table 2.

TABLE 2

Mines Dept No.	Screen Size mm	Weight Retained %	CHEMICAL ANALYSIS								
			LOI %	MgO %	CaO %	SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	MnO %	Au g/tonne
Z125 Z126 Z127 Z128	1.18	89.1	49.51	45.08	1.09	2.81	<0.01	0.028	1.83	0.11	<0.01

Discussion

Table 2 shows that fractions coarser than 1.18mm comprised 89.1% of the head sample and was

0.14% higher in MgO

0.02% lower in CaO

0.01% lower in Fe₂O₃,

0.03% higher in SiO₂

The above improvements in grade for the + 1.18mm fractions are only within the accuracy of the chemical analytical methods used and as such the improvement in grade of the + 1.18mm material is not significant.

(3)

It is possible that after calcining, if the material is then screened, this may show a larger percentage of impurities reporting to the -1.18mm fraction and a greater improvement in the grade of the + 1.18mm fraction.

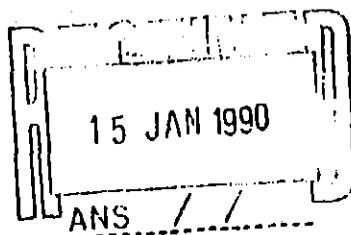

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Mineral Holdings R902 - Part IVIntroduction

Mr Neil Thomas of Mineral Holdings requested that screen fractions from crushed Arthur River Magnesite calcined in the Laboratory muffle at 1350°C.

Sample

A portion of a tile from the Arthur River Magnesite deposit and registered as sample No. 896038 - Specimen 14.

Method

The tile was stage crushed to - $\frac{1}{4}$ inch and screened on a $\frac{1}{2}$ inch screen, a $\frac{3}{4}$ inch screen (4.0mm) and on a 1.18mm screen. Each fraction resulting from the screening was placed in a muffle furnace at 300°C and the temperature brought up to 1350°C in 30 minutes. The samples were held at 1350°C for $1\frac{1}{2}$ hours and then cooled slowly to room temperature. The samples were then screened on a 4.0mm screen and 1.18mm screen, each fraction was then weighed and analysed. The results are tabulated in table 1, 2, 3, 4 and 5.

Screen Fraction Calcined at 1350°C in Laboratory

TABLE 1

Screen Size Fraction	Weight %	CHEMICAL ANALYSIS							
		LOI %	MgO %	CaO %	SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	MnO %
$\frac{1}{4}$ " - $\frac{1}{2}$ "	23.00	0.43	88.2	1.22	5.86	<0.01	<0.01	3.8	0.20
- $\frac{1}{2}$ " + $\frac{3}{4}$ "	49.57	0.52	88.7	2.55	4.94	<0.01	<0.01	3.5	0.21
- $\frac{3}{4}$ " + 1.18mm	16.53	0.38	90.08	2.00	4.45	<0.01	<0.01	3.5	0.21
- 1.18mm	10.89	0.10	87.36	2.67	5.02	<0.01	<0.01	3.8	0.44
Head	100.00	0.43	88.67	2.17	5.08	<0.01	<0.01	3.6	0.24

N.B. You will appreciate we have selected a "low grade" magnesite for this beneficiation test so that a higher "head grade" of impurities would be processed; i.e. we have much better magnesite than 88-90 MgO (calcined).

(2)

- 1" - 1/2" Fraction Calcined at 1350°C in Laboratory

TABLE 2

Mines Dept No.	Screen Size Microns	Weight %	CHEMICAL ANALYSIS							
			LOI %	MgO %	CaO %	SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	MnO %
2137	-4000	68.1	0.33	89.65	1.10	5.36	<0.01	<0.01	3.27	0.16
2138	-4000									
	-1180	12.0	0.54	85.31	1.28	7.67	<0.01	<0.01	3.29	0.19
2129	-1180	19.9	0.71	84.46	1.58	6.53	<0.01	<0.01	3.92	0.25
	- 1" - 1/2" fractions	100.00	6.43	68.2	1.22	5.85	<0.01	<0.01	3.6	0.20

The weight percentage and analysis of the material coarser than 1180µm of the calcined - 1" - 1/2" fractions is shown in Table 2A below. Table 2A indicated that 80.1% of the material is coarser than 1180µm and is higher in grade than the average.

That is the MgO is 1.0% higher, the CaO is 0.09% lower, silica is 0.17% lower and Fe₂O₃ is 0.53% lower.

TABLE 2A

Mines Dept No.	Screen Size Microns	Weight %	CHEMICAL ANALYSIS							
			LOI %	MgO %	CaO %	SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	MnO %
2137										
2138	-1180	80.1	0.36	89.2	1.13	5.69	<0.01	<0.01	3.27	0.16

- $\frac{1}{2}$ " - 1.18mm Fraction Calcined at 1350°C

TABLE 4

Mines Dept No.	Screen Size Microns	Weight %	CHEMICAL ANALYSIS							
			LOI %	MgO %	CaO %	SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	MnO %
Z146	-1180	78.7	0.36	90.17	1.81	4.54	<0.01	<0.01	3.29	0.20
Z147	-1180	21.3	0.44	89.74	2.54	4.12	<0.01	<0.01	4.04	0.24
		100.0	0.38	90.08	2.00	4.45	<0.01	<0.01	3.50	0.21

Table 4 shows that 78.7% of the calcined material is coarser than 1180µm and is higher in grade than the average. That is the MgO is 0.09% higher, the CaO is 0.19% lower, the SiO₂ is 0.09% higher and the Fe₂O₃ is 0.21% lower.

- 1.18mm Fraction Calcined at 1350°C

TABLE 5

Mines Dept No.	Screen Size Microns	Weight %	CHEMICAL ANALYSIS							
			LOI %	MgO %	CaO %	SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	MnO %
Z149	-1180	100.0	0.01	87.36	2.67	5.02	<0.01	<0.01	3.8	0.44

Discussion

Table 2 and 2A showed that when a $-\frac{3}{4}$ " $+$ $\frac{1}{2}$ " fraction of crushed magnesite was calcined 1350°C and then screened on a 1.18mm screen, 80.1% of the $-\frac{3}{4}$ " $+$ $\frac{1}{2}$ " fraction was recovered as oversize and a grade improvement resulted in this oversize as follows.

MgO	1.0% higher
CaO	0.09% lower
SiO ₂	0.17% lower
Fe ₂ O ₃	0.53% lower

Table 3 and 3A showed that when a $-\frac{1}{2}$ " $+$ $\frac{3}{4}$ " fractions of crushed magnesite was calcined at 1350°C and then screened on a 1.18mm screen, 80.9% of the $-\frac{1}{2}$ " $+$ $\frac{3}{4}$ " fraction was recovered as oversize and a grade improvement resulted in this oversize as follows.

MgO	0.7% higher
CaO	0.2% lower
SiO ₂	0.23% lower
Fe ₂ O ₃	0.20% lower

Table 4 showed that when a $-\frac{3}{4}$ " $+$ 1.18mm fraction of crushed magnesite was calcined at 1350°C and screened on a 1.18mm screen, 78.7% of the $-\frac{3}{4}$ " $+$ 1.18mm fraction was recovered as oversize and a grade improvement resulted in this oversize as follows.

MgO	0.09% higher
CaO	0.19% lower
SiO ₂	0.09% higher
Fe ₂ O ₃	0.21% lower

This report therefore shows that when magnesite sample No 896038 - Specimen 14 was crushed to $-\frac{3}{4}$ " and screened on a 1.18mm screen, then calcined at 1350°C for $1\frac{1}{2}$ hours and again screened on a 1.18mm screen, 71.5% of the sample was recovered as 1.18mm oversize and this oversize can be calculated to analysis as follows in Table 6 below.

<u>Table 6</u>							
<u>LOI</u>	<u>MgO</u>	<u>CaO</u>	<u>SiO₂</u>	<u>TiO₂</u>	<u>Al₂O₃</u>	<u>Fe₂O₃</u>	<u>MnO</u>
0.42	89.48	1.94	4.93	<0.01	<0.01	3.29	0.19

The analysis of the + 1.18mm oversize material in Table 6 shows an improvement in grade when compared to the analysis of the calcined head sample in Table 1. The grade improvement can be summarised below as.

MgO	0.81% higher
CaO	0.23% lower
SiO ₂	0.15% lower
Fe ₂ O ₃	0.31% lower

The improvement in grade as shown above by crushing, screening, calcining and screening again on a 1.18mm screen is significant but this increase in grade of the + 1.18mm oversize may not be significant enough for the client. However a reduction in Fe_2O_3 of 0.3% is worth chasing and its value could depend on the head grade i.e. if the head grade is 3.6% Fe_2O_3 and the calcined screened oversize is 3.3% Fe_2O_3 , would not be as significant as if the head grade was 0.7% Fe_2O_3 , and the calcined screened oversize analysed 0.4% Fe_2O_3 .

Future work which should be completed is:-

1. Attrition tests with magnesite to see if impurities can be removed.
2. Crushing, calcining and screening of magnesite at 800°C to reduce the friability of the calcined magnesite.
3. Work with 15 kilos of drill core from the 1990 drilling programme at Arthur River.

(D Zani)


CHIEF CHEMIST & METALLURGIST

457041



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DIVISION OF MINES & MINERAL RESOURCES

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18.5.90Mineral Holdings Ltd
2nd Floor
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Melbourne 3000Attent. Mr. N. ThomasSubject Summary of Research Report R902 Part IV

When magnesite sample No 896038 from Arthur River was crushed to -3/4 inch and screened on a 1.18 mm screen, then calcined at 1350° for 1½ hours in a laboratory muffle furnace, cooled then again screened on a 1.18 mm screen, 71.5% of the original head sample was then recovered as calcined 1.18 mm oversize.

The analysis of the + 1.18 mm calcined oversize material and a sample of the calcined head is shown in table 1.

The analysis of all of the -1.18 mm material after calcining is calculated and shown in table 1.

TABLE 1
Calcined Products

Screen Fraction	%								
	Weight	L.O.I.	Mgo	CaO	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MnO
+ 1.18 mm	71.5	0.420	89.48	1.94	4.93	<0.01	<0.01	3.29	0.19
- 1.18mm (Calc)	28.5	0.456	86.63	2.74	5.47	<0.01	<0.01	4.39	0.36
Head	100.0	0.430	88.67	2.17	5.08	<0.01	<0.01	3.60	0.24

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The analysis of the + 1.18mm oversize material in table 1 above shows an improvement in grade when compared to the calcined head sample as follows:

MgO	0.81%	higher	0.9
CaO	0.23%	lower	10.6
SiO ₂	0.15%	lower	2.9
Fe ₂ O ₃	0.31%	lower	8.6

The uncalcined magnesite sample used for the tests in table 1 had the following crystal size.

<u>Micron</u>	<u>%</u>
- 1	3
+ 1 - 10	62
+ 10 - 50	17
+ 50 - 1000	13
+ 1000	5


(D. Zani)
Chief Chemist & Metallurgist

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P.2/2



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4 January 1990

Mineral Holdings R902 - Part V

Introduction

Mr Neil Thomas of Mineral Holdings requested that a portion of the Little Donaldson River magnesite sample that had been crushed and screened for the Port Latta basket tests have each screen fraction assayed for gold.

Sample

Registered Sample Number 896039 from the Little Donaldson River Magnesite Deposit.

Method

A portion of the following screen fractions were digested in nitric acid, filtered, washed, dried and the residue assayed for gold. The acid digest was to remove the MgO and CaO so the residue could be fluxed and fire assayed.

The results are shown in Table 1.

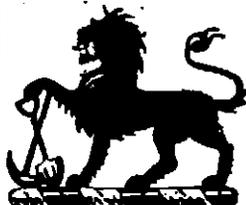
TABLE 1

Gold Assays - Little Donaldson Magnesite - Reg. No. 896039

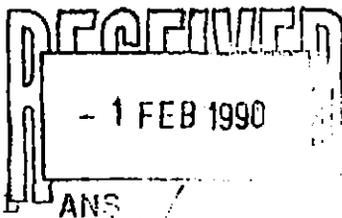
Mines Dept Number	Description Screen Analysis	Weight %	Gold Assay gram/tonne
Z130	- ½ + 4.0mm	67.7	<0.01
Z131	- 4.0mm + 1.18mm	20.3	<0.01
Z132	- 1.18mm	12.0	0.015
Calculated Head		100.0	<0.01

(D Zani)
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Mineral Holdings R902 Part VI

Introduction

Mr. Neil Thomas of Mineral Holdings requested that a crushed sample of Magnesite from the Arthur River Deposit be attrited in a mill and the coarse and fine fractions analysed.

Sample

A portion of a tile from the Arthur River Magnesite deposit and registered 896038 - Specimen 15.

Method

The portion of tile was crushed to -3/4" and screened on a 1.18 mm screen. The +1.18 mm material was attrited in a tumbling mill for 2½ hours. The attrited material was screened on a 1.18 mm screen and the oversize and undersize analysed. The results are tabulated in Table 1.

The L.O.I. was determined on the magnesite and the chemical analysis reported on a L.O.I. free basis.

1: INTERESTING GAIN IN FINES OF THE MgO,
AFTER ATTRITED. *G.*

2:

TABLE 1

Reg. No 896038

Mines Dept No.	Screen Size	Weight %	L.O.I. %	Chemical Analysis - L.O.I. Free Basis						
				MgO%	CaO%	SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	MnO%
Z150	-3/4"+1.18mm	90.9	49.93	86.76	6.17	4.51	<0.01	0.04	3.16	0.21
Z150	-1.18mm	9.1	50.49	90.19	3.37	3.77	<0.01	0.23	3.14	0.20
Head		100	50.0	87.06	5.92	4.44	<0.01	0.06	3.16	0.21

Discussion

The above table shows that the -1.18mm material which comprised 9.1% of the head had a higher grade than the head as follows.

TABLE 2

	<u>Raw Magnesite</u> %	<u>Magnesite on a L.O.I. Free Basis</u> %
MgO Higher	1.56	3.13
CaO Lower	1.30	2.55
SiO ₂ Lower	0.33	0.67
Fe ₂ O ₃ Lower	0.01	0.02

The results in Table 2 are significant but the question which needs to be answered is what do you do with the 9.1% fine -1.18mm higher grade material.

The results from attriting and screening Arthur River magnesite are different from crushing and screening.

In the attriting and screening test the -1.18mm gave a higher grade material compared to the head whereas in the crushing and screening test and in the crushing, calcining and screening test the + 1.18mm material gave the higher grade material. As the latter product would be a more usable product it does not appear if attriting could be put to a useful means to upgrade Arthur River Magnesite. The attriting tests suggest that the Magnesite is softer than the dolerite.



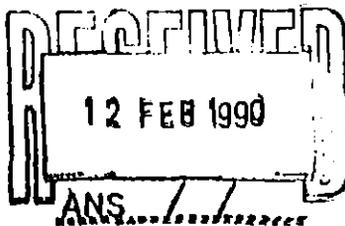
(D. Zani)
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R902 Part VII

Introduction

Mr. Neil Thomas of Mineral Holdings requested that a Magnesite sample from the Little Donaldson River be fractured at varying compressions and the resulting samples be screened and analysed to see if any upgrading occurred in some size fractions.

Sample

A lump sample of Magnesite from the Little Donaldson River and registered as No 896089.

Method

The sample was sent to the H.E.C. Laboratory for fracturing at varying compressions and the procedure is outlined in their Report No 11072-1.

The fractured samples were returned to the Launceston Mines Dept. for screen analysis and chemical analysis of the screen fractions.

The results are shown in Table 1, 2, 3. The L.O.I. is determined on the magnesite and after the L.O.I. is removed the chemical analysis is carried out and results of the chemical analysis of the magnesite reported on a "L.O.I. free basis".

Sample No 896039 Specimen 2 - 1

This Specimen fractured at 198 MPa or 28710 lbs/square inch.

Table 1

Mines Dept No	Screen Size µm	Weight %	Chemical Analysis - L.O.I. Free Basis							
			L.O.I. %	MgO %	CaO %	SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	MnO %
Z 75	+ 5600	48.60	50.16	80.89	10.99	0.64	<0.01	0.10	6.90	0.43
Z 76	- 5600 + 4750	6.51	49.82	75.32	16.67	1.45	<0.01	0.27	6.90	0.44
Z 77	- 4750 + 2800	6.65	50.36	82.98	9.94	1.49	<0.01	0.25	7.19	0.45
Z 78	- 2800 + 2360	2.66	49.99	82.50	9.07	1.78	<0.01	0.27	6.87	0.42
Z 79	- 2360 + 1180	12.74	50.09	80.95	10.47	1.46	<0.01	0.16	6.64	0.45
Z 80	- 1180 + 850	4.62	50.29	82.61	9.58	1.40	<0.01	0.23	6.78	0.44
Z 81	- 850 + 600	3.50	50.41	84.85	9.02	0.82	<0.01	0.11	7.01	0.46
Z 82	- 600 + 500	1.61	50.51	84.78	8.76	0.65	<0.01	0.05	6.94	0.46
Z 83	- 500 + 250	4.22	50.27	86.31	8.51	0.90	<0.01	0.15	6.92	0.46
Z 84	- 250	8.89	50.24	82.19	9.70	1.42	<0.01	0.30	7.54	0.45
Head		100.00	50.15	81.34	10.77	1.00	<0.01	0.16	6.94	0.44

The weight percentage and analysis of material finer than 1180 µm of the above fractured Magnesite is shown in Table 1A below. Table 1A indicates that 22.84 of the material is finer than 1180 µm and is higher in grade than the average grade. That is the MgO is 2.29% higher, the CaO is 1.53% lower, the SiO₂ is 0.17% higher and the Fe₂O₃ is 0.2% higher.

Sample No 896039

Table 1A

Mines Dept No	Screen Size μm	Weight %	Chemical Analysis - L.O.I. Free Basis							
			L.O.I. %	MgO %	CaO %	SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	MnO %
Z80 to Z84	-1180	22.84	50.2	83.63	9.24	1.17	<0.01	0.21	7.14	0.45

Sample No 896039 Specimen 2 - 2

This specimen fractured at 295 MPa = 42775 lbs/square inch

Table 2

Mines Dept No	Screen Size μm	Weight %	Chemical Analysis - L.O.I. Free Basis							
			L.O.I. %	MgO %	CaO %	SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	MnO %
Z 85	+ 5600	45.48	49.32	70.77	21.66	1.10	<0.01	0.23	6.79	0.43
Z 86	- 5600 + 4750	5.92	49.13	67.33	25.11	1.36	<0.01	0.33	6.59	0.42
Z 87	- 4750 + 2800	9.97	49.26	69.64	22.44	1.12	<0.01	0.26	6.55	0.42
Z 88	- 2800 + 2360	2.70	49.41	69.23	21.09	1.13	<0.01	0.28	6.74	0.45
Z 89	- 2360 + 1180	12.05	49.52	72.84	19.88	0.92	<0.01	0.23	6.62	0.44
Z 90	- 1180 + 850	4.05	49.55	73.33	18.83	0.72	<0.01	0.18	6.85	0.47
Z 91	- 850 + 600	3.11	49.55	74.13	18.24	0.64	<0.01	0.14	6.78	0.46
Z 92	- 600 + 500	1.45	49.58	73.74	17.39	2.45	<0.01	0.57	6.73	0.45
Z 93	- 500 + 250	4.15	49.70	75.15	16.93	1.00	<0.01	0.23	6.93	0.46
Z 94	- 250	11.12	49.63	76.26	15.76	0.76	<0.01	0.17	7.35	0.47
Head		100.00	49.40	71.72	20.58	1.04	<0.01	0.23	6.80	0.44

The weight percentage and analysis of material finer than 1180 μm of the above fractured magnesite is shown in Table 2 A below. Table 2A indicates that 23.88% of the material is finer than 1180 μm and is higher in grade than the average. That is the MgO is 3.45% higher, the CaO is 3.7% lower, the SiO₂ is 0.15% lower and the Fe₂O₃ is 0.32% higher.

Sample No 896039

Table 2A

Mines Dept No	Screen Size μm	Weight %	Chemical Analysis - L.O.I. Free Basis							
			L.O.I. %	MgO %	CaO %	SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	MnO %
Z 90 to Z 94	-1180	23.88	49.6	75.17	16.88	0.89	<0.01	0.20	7.12	0.46

Sample No 896039

Specimen 2 - 3

This specimen fractured at 141 MPa = 20445 lbs/square inch

Table

Mines Dept No	Screen Size μm	Weight %	Chemical Analysis - L.O.I. Free Basis							
			L.O.I. %	MgO %	CaO %	SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	MnO %
Z 95	+ 5600	35.10	50.46	86.13	5.77	1.25	<0.01	0.08	6.92	0.42
Z 96	- 5600 + 4750	7.94	50.50	86.79	4.89	0.32	<0.01	0.11	7.85	0.45
Z 97	- 4750 + 2800	7.40	49.98	89.40	2.34	4.96	<0.01	0.12	3.55	0.20
Z 98	- 2800 + 2360	2.82	50.66	82.43	6.03	0.08	<0.01	0.02	7.18	0.48
Z 99	- 2360 + 1180	13.23	50.34	86.86	6.06	0.10	<0.01	0.04	7.25	0.47
Z 100	- 1180 + 850	5.29	50.54	85.89	5.94	0.28	<0.01	0.13	7.36	0.46
Z 101	- 850 + 600	4.06	50.59	86.90	5.39	0.43	<0.01	0.21	7.17	0.46
Z 102	- 600 + 500	1.94	50.56	88.10	5.26	0.40	<0.01	0.03	7.24	0.48
Z 103	- 500 + 250	6.00	50.47	87.26	5.14	0.59	<0.01	0.30	6.98	0.47
Z 104	- 250	16.22	50.13	85.15	6.26	0.90	<0.01	0.43	7.69	0.46
Head		100.00	50.37	86.38	5.51	0.74	<0.01	0.16	6.97	0.43

The above table does not show any significant increase in grade of that material finer than 1180 μm .

Discussion

The work carried out in this report is outlined in the attached letter from Mineral Holdings.

The three specimens tested fractured from a low of 141 Mega pascals to a high of 295 Mega pascals. The screen analysis of the fractured samples showed an improvement in grade of the 23.66% of the material that was finer than 1180 μm (or 1.18mm) when compared to the average grade for 2 out of the 3 specimens tested. This improvement in grade of the Magnesite can be summarised as follows:

Table 4

	<u>Raw Magnesite</u>	<u>Magnesite on a</u>
	<u>%</u>	<u>L.O.I. Free Basis</u>
	<u>%</u>	<u>%</u>
MgO Higher	1.44	2.89
CaO Lower	1.31	2.62
SiO ₂ Higher	0.005	0.01
Fe ₂ O ₃ Higher	0.13	0.26

The above improvement in grade of the -1180 μm material represented only 23.66% of the head sample whereas the Arthur River magnesite deposit gave an improvement in grade of the + 1180 μm material which represented 71.5% of the head sample.

The Little Donaldson River samples tested also gave a lower grade overall when compared to the Arthur River deposit.



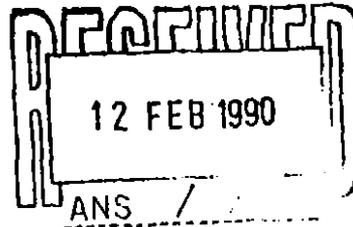
(D. Zani)
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R902 Part V111

Reg. No 896038

Introduction

Mr. Neil Thomas of Mineral Holdings Pty Ltd requested that a sample of crushed magnesite be calcined in a laboratory muffle furnace at 800°C and 1350°C and at similar conditions to the Port Latta Shaft Furnace and a screen analysis be run on the calcined product.

Sample

A portion of a tile from the Arthur River Magnesite Deposit and Reg. No 896038 - Specimen 16.

Method

A portion of tile was crushed to -3/4" and screened on a 1.18mm screen. Half of the -3/4" + 1.18mm fraction was placed in a muffle furnace at 800°C and the other half in a muffle furnace at 1350°C. The fraction was held 'at temperature' for 1 1/4 hours and then cooled to 500°C in 3 1/2 hours. The fraction was then taken out of the muffle, allowed to cool to room temperature and then screened on a 1.18mm and 0.5mm screen. The results are shown in Table 1.

Table 1

	<u>800°C</u>	<u>1350°C</u>
	<u>Weight %</u>	<u>Weight %</u>
+ 1.18 mm	70.2	77.6
+ 0.5 mm	16.9	10.5
- 0.5 mm	12.9	11.9
Total	100.0	100.0
L.O.I.	49.3	50.2

Discussion

The above table shows that the magnesite calcined at 800°C gave a calcined product slightly finer but much lighter in colour than the magnesite calcined at 1350°C.

Previous tests have shown that the material calcined at 800°C is much more reactive than that calcined at 1350°C and therefore should be a better product for agricultural uses and for neutralizing industrial wastes and effluents.



(D. Zari)
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Department of Resources & Energy

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Attent. Mr. N. Thomas

Subject: Port Latta Basket Test with an Asbestos Sock

R902 Part IX

When a portion of Magnesite sample No 896038 from Arthur River was crushed to -3/4 inch, screened on a 1.18mm screen then calcined in an Asbestos Sock inside an inconel basket in a Port Latta shaft furnace at 1350°C, cooled and the calcined product screened on a 1.18 mm screen, 81.27% of the original head sample was recovered as calcined 1.18mm oversize.

The analysis of the + 1.18 mm calcined oversize material and a sample of the calcined head is shown in Table 1.

The analysis of all of the -1.18 mm material after calcining is calculated and shown in Table 1.

The low loss on ignitions of the calcined products in Table 1 show that a shaft furnace can calcine magnesite.

TABLE 1
Calcined Products

Screen Fraction	%								
	Weight	L.O.I.	Mgo	CaO	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MnO
+ 1.18 mm	81.27	0.40	91.58	2.49	2.86	<0.01	<0.01	2.57	0.17
- 1.18mm (Calc)	18.73	0.84	79.01	3.33	11.83	<0.01	<0.01	4.69	0.23
Head	100.0	0.49	89.23	2.64	4.54	<0.01	<0.01	2.97	0.18

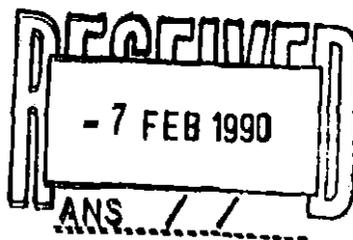
The analysis of the + 1.18mm oversize material in table 1 above shows an improvement in grade when compared to the calcined head sample as follows:

~~0.35% higher~~
~~0.15%~~
~~2.10% lower~~
~~2.3%~~ lower

The uncalcined magnesite sample used for the tests in table 1 had the following crystal size.

<u>Micron</u>	<u>%</u>
- 1	3
+ 1 - 10	62
+ 10 - 50	17
+ 50 - 1000	13
+ 1000	5


 (D. Zani)
Chief Chemist & Metallurgist



TO NEIL THOMAS

FROM D Zawi Mines DEPT.

SUBJECT: CALCINATION TESTS AT 800°C AND 1350°C .

CALCINATION TESTS AT 800°C AND 1350°C TO SIMULATE A SHAFTE FURNACE OPERATION SUCH AS AT PERT LATHA GAVE VERY SIMILAR SCREEN ANALYSES. A SAMPLE OF $-75^{\circ} + 101\text{B}$ WAS BROUGHT UP TO TEMPERATURE IN 6 MINUTES, HELD AT EITHER 800°C OR 1350°C FOR $1\frac{1}{4}$ HOURS THEN COOLED TO 500°C IN $3\frac{1}{2}$ HOURS.

THE $-0.5\mu\text{m}$ MATERIAL RESULTING FROM THE TESTS WERE AS FOLLOWS.

AT 800°C	12.9%	$-0.5\mu\text{m}$
AT 1350°C	11.9%	$-0.5\mu\text{m}$

THE COLOUR AND APPEARANCE OF THE PRODUCTS WERE VERY DIFFERENT, THE 800°C MATERIAL WAS A PALLID BROWN COLOUR WHEREAS AT 1350°C THE PRODUCT WAS VERY DARK BROWN.

TESTS DONE PREVIOUSLY HAVE SHOWN THAT THE 800°C MATERIAL WILL REACT BETTER WITH ACID THAN AT 1350°C . MATERIAL FORMED AT 800°C IS THE BASIS OF 'CAUSTIC MAGNESITE' WHICH IS USED FOR FERTILIZERS AND A COMMON USE IS IN NEUTRALIZING INDUSTRIAL EFFLUENTS AND TO REMOVE HEAVY METALS FROM THE EFFLUENT.

BOTTRELL HAS NOT FINISHED HIS WORK YET ON CRYSTALLOGRAPHY AND X-RAY CRYSTALLOGRAPHY.

HYDRO-ELECTRIC COMMISSION

REPORT No. 11072-1 457059

ENGINEERING AND SCIENTIFIC SERVICES DEPARTMENT

Birdwood Avenue, Moonah, Tasmania
Telephone (002) 71 6355 Telex 58091 Fax (002) 71 6409

MINERAL HOLDINGS AUSTRALIA P/L
MAGNESITE
COMPRESSION CRUSHING TEST

KEYWORDS: Mineral Holdings, Magnesite, Crushing

CLIENT: Mineral Holdings Australia Pty Ltd
C/- Mines Dept. Laboratory
287 Wellington Street
LAUNCESTON 7249

Order No.: Letter (Dept Mines) Date of Order: 27 September 1989

REPORT BY: L G Polglase

REVIEWED BY:

UNIT HEAD: L G Polglase

AUTHORISED FOR ISSUE:


MANAGER

DATE OF ISSUE:

11 4 NOV 1989

MINERAL HOLDINGS AUSTRALIA P/L

457060

MAGNESITECOMPRESSION CRUSHING TESTREPORT NO. 11072-1INTRODUCTION

The Department of Mines sent two samples of magnesite (ex Mineral Holdings Australia P/L) to the Engineering & Scientific Services Department for compression crushing.

The samples were identified as:

No. 1 Reg No. 896038 Polished magnesite tile ex Lyons River
No. 2 Reg No. 896039 Lump magnesite ex Little Donaldson River

SAMPLE PREPARATION

A diamond saw was used to cut three slab specimens from the lump sample No. 2 of similar thickness to the tile sample No. 1. They were numbered specimen Nos. 2-1, 2-2 and 2-3.

Twelve square (approx) specimens were then cut from the tile sample No. 1 such that their cross-sectional area was approximately that of the average of specimens Nos. 2-1, 2-2 and 2-3. They were numbered specimen Nos. 1-1 to 1-12.

The various specimens were tested in either the air dried condition (24 hours air drying in laboratory) or the saturated surface dry condition (water submerged for 24 hours followed by wiping away surface moisture).

TESTING

The specimens were weighed and then crushed in a 150mm diameter aggregate crushing cylinder (AS 1141) using an Avery 1800 kN compression machine.

RESULTS

Table 1 presents the results of the testing.

It should be noted that specimen No. 1-2 remained intact following initial fracture and withstood a relatively high load before crushing to a fine powder.

CONCLUSION

The Department of Mines collected the individual crushed specimens and the surplus sample material for continued testing and analysis.

ATTACHMENT: Table 1

cc Client (2)
File 11072
Geomechanics

Specimen No.	Thickness mm	Cross-sectional Area mm ²			Mass g	Density t/m ³	Condition	Crushing Load kN	Crushing Strength MPa
		length	width	area					
1-1	18.4	55.7	54.2	3019			air dried	1070	354
1-2	18.5	55.5	54.0	2997			air dried	1480	494
1-3	18.4	58.2	52.5	3056			air dried	740	242
1-4	18.5	55.0	52.9	2910			air dried	720	247
1-5	18.4	56.0	52.8	2957			air dried	630	213
1-6	18.4	58.3	50.4	2938			air dried	650	221
1-7	18.4	55.2	52.2	2881			saturated, surface dry	730	253
1-8	18.5	53.6	52.8	2830			saturated, surface dry	660	233
1-9	18.5	51.2	53.2	2724			saturated, surface dry	550	202
1-10	18.5	55.7	48.1	2679			saturated, surface dry	500	187
1-11	18.4	54.7	49.9	2730			saturated, surface dry	630	231
1-12	18.5	53.4	57.8	3087			saturated, surface dry	640	207
		top	bottom	mean					
2-1	19.38	2725	3950	3338	189.14	2.92	saturated, surface dry	660	198
2-2	17.86	4025	4050	4038	211.11	2.93	air dried	1190	295
2-3	17.94	1725	2525	2125	109.12	2.86	air dried	300	141

TABLE 1

RESULTS OF TESTING MAGNESITE SPECIMENS

457061

2

Sample No 896038 (ARTHUR RIVER)
 (Composite of Specimens 1-1, 1-3, 1-4, 1-5, 1-6)

The Composite Sample Crushed at an average
 of 255.4 Mega Pascals = 37033 LBS/Inch.

Screen Analysis of Composite Crushed Sample

	% wt	% MgO	% CaO
+5600 Micron (7/32")	30.79	42.91	2.24
+4750 " (3/16")	6.33	43.39	2.01
+2800 "	14.43	43.87	2.24
+2250 "	3.82	43.87	1.79
+1100 "	18.09	44.19	1.34
+850 "	5.85	43.71	1.56
+600 "	3.97	42.75	2.01
+500 "	1.78	44.51	1.79
+250 "	4.23	45.32	2.01
-250 "	10.71	45.64	1.10
TOTAL (Average)	100.00	43.81	1.85

This composite sample which crushed at an
 average compressive strength of 255.4 Mega
 Pascals showed that the fraction of
 -600 micron gave an increase in %MgO
 compared to the total average. This increase
 in %MgO in the fines for these specimens
 is contrary to the other reported results
 from the other specimens.

WHY WAS THIS FEED 42% MgO!
 Higher than feed to Cariner. 38% MgO!
 NB. CaO comes down 80% from 2.24% to 1.3%?

DEPARTMENT OF MINES



TASMANIA

Launceston Office:

Chemical and Metallurgical
Laboratory,
287 Wellington Street,
LAUNCESTON 7249

Enquiries: Mineral Holdings P/L
Phone: 2nd Floor
Your ref.: 100 Collins Street
Our file: Melbourne

4.1.90

Attent. Mr. N. Thomas

Reg. No 897259

Mag. Conc

Dear Sir,

1.3 grams of Magnetic material removed from a sample of Magnesite by N. Thomas. The sample under the microscope appeared to be Magnetite and Quartz and on assaying contained 1.4 grams Au/tonne.

Analyses by *L.M. Hoy*

Yours faithfully,

(S. J. Zani)
Chief Chemist & Metallurgist

Fee \$12.00

896038 Mineral Headings

Magnesite \approx 300 ml. 6% HNO_3 / 100 g.

Residue to fire assay for Au

Fig. No.	Pet No.	Wt.	Vol.	Wt. of acid treated residue	mg/g Au	g/t Au	Rept. g/t Au
$\frac{3}{4}'' + \frac{1}{2}''$	Z 125 1	100	10	3.65	0.03	0.003	<0.01
$\frac{1}{2}'' + \frac{3}{8}''$	Z 126 2	1	1	3.05	0.02		<0.01
$\frac{3}{8}'' + 4mm$	127 3			3.37	0.02		<0.01
4mm + 1.18mm	128 4			2.72	0.04		<0.01
1.18mm	129 5	100		2.89	3.53	0.353	0.35
$\frac{1}{2}'' + 4mm$	130 6	86		0.61	0.07	0.008	<0.01
4mm + 1.18mm	131 7	100		0.41	0.01		<0.01
1.18mm	Z 132 8	100		1.69	0.15	0.015	0.015
Blank.	9	10			± 0.05	<0.01	<0.01