

08_5571

A Synopsis of Tasmania's Pilbara of Carbonates and Silica Resources Ow

Mineral Holdings Australia Proprietary Limited*

Thomas, N.M.

RL9/1997

MINERAL HOLDINGS AUSTRALIA PTY LIMITED

A.C.N. 004 759 853
A.B.N. 19 004 759 853

Correspondence to:

11 KENT COURT,
TOORAK, VICTORIA, AUSTRALIA 3142
TELEPHONE: (61 3) 9822 0077
FAX: (61 3) 9824 7617
Email: tominex@iinet.net.au

A SYNOPSIS OF TASMANIA'S 'PILBARA'
OF CARBONATES AND SILICA RESOURCES
OWNED BY MHA IN NORTH WEST TASMANIA
(TOTAL LICENSED AREA 1436 SQ KMS PLUS 42 HECTARES)
AS AT 1ST DECEMBER 2006.

MINERAL RESOURCES		
FILE REF:	DOC. REF:	
RL9709(2)		
- 3 JAN 2008		
OFFICER	FOR ACTION	FOR INFO
RL9709(2)		
SEE FOLIO 6A		

08_5571

A Synopsis of Tasmania's Pilbara of Carbonates and Silica Resources Ow
Mineral Holdings Australia Proprietary Limited*
Thomas, N.M.
RL9/1997

MINERAL HOLDINGS AUSTRALIA PTY LIMITED

A.C.N. 004 759 853
A.B.N. 19 004 759 853

Correspondence to:

11 KENT COURT,
TOORAK, VICTORIA, AUSTRALIA 3142
TELEPHONE: (61 3) 9822 0077
FAX: (61 3) 9824 7617
Email: tominex@iinet.net.au

**A SYNOPSIS OF TASMANIA'S 'PILBARA'
OF CARBONATES AND SILICA RESOURCES
OWNED BY MHA IN NORTH WEST TASMANIA
(TOTAL LICENSED AREA 1436 SQ KMS PLUS 42 HECTARES)
AS AT 1ST DECEMBER 2006.**

INTRODUCTION

Mineral Holdings Australia Pty Ltd ("MHA") is a private mineral exploration company registered in Victoria and is owned by Mr Neil M. Thomas (Chairman) and his family.

Over the past 20 years, MHA and various partners have spent over \$7 million exploring for and proving up a wide range of minerals in Tasmania. As a result of these efforts the company has assembled a valuable portfolio of deposits capable of immediate and future open cut mine development and commercial exploitation.

Several of these deposits have already been developed and others to the stage where mining is now commercially attractive. MHA must either assemble the necessary management and financial resources to proceed with this development, seek joint venture assistance or dispose of their interest in order to realise the underlying potential of the remaining deposits.

This memorandum has been prepared for the purpose of briefly outlining the extent of the mining resource and the development potential of the non-metallic minerals with a view to attracting partners capable of assisting with the exploitation or development of the carbonates of dolomite, dolomitic limestone, limestone and magnesite and the silicas of quartzite, silica sand and silica flour and talc. All these nearby resources could now be developed in "parallel".

BACKGROUND

These licences are now under consideration by major Australian mining companies who have shown significant interest in the MHA areas. Over the period 1968 to 1987 substantial exploration was directed by Mr P.B. Nye (ex Chief Geologist Tasmania and ex Director of Bureau of Mineral Resources of Australia) with the assistance of Mr W. Manson (ex Chief Metallurgist of the Mines Department, Tasmania). The current portfolio of leases and licences represents their consolidation and the results of these activities are a credit to their foresight. (See summaries of Retention Licences, Exploration Licences and Mineral Leases and Carbonate Reports and Attachment 1 of 20th November 2006 and Attachment 2 of 18 February 2003 as Updated November 2004).

The funding of MHA has been provided by the Thomas family interests for exploration and development and a number of companies contributed through joint venture arrangements. Subsequently MHA has actively sought market outlets by negotiating agreements in principle for exploitation or development.

The leases are very favourably located with a view to accessibility, infrastructure with natural gas, hydro and Bass Link thermal power on site. Fortunately the development of the major deposits will not attract significant environmental review due to their location. The ores are located near seaboard, marble-ised and therefore have minimal dust in transport. The Tasmanian Government is most supportive to see that the resources are taken to the commercialisation stage. The Federal Government Freight Equalisation Scheme ensures freight reductions of 50% on all containerised freight over the Ports of Burnie and Stanley to all Australian states.

SUMMARY OF MAJOR PROSPECTS AND PROJECTS

In 1980 MHA independently explored and discovered these carbonates and extensive exploration continued under a joint venture with CRA in 1996. MHA is presently reducing the areas and converting them to retention licences for development (see Attachment 2, a report prepared by Tom Dickson (ex Chief Geologist South East Region Australia, with CRA), dated 18th February 2003, 'Carbonate Rocks in North-West Tasmania').

Brief details of these licences and the potentials for development are as follows:

Dolomite, dolomitic limestone, limestone and Lime-sand

RL 10/1997 (previously EL 33/90) and EL 15/2005 (previously EL 31/90) cover our discovery of pre-Cambrian crypto-crystalline dolomite at Togari and RL 9/1997 (previously EL 31/90) covers the Pre-Cambrian dolomite and dolomitic limestone and Tertiary limestone at Carbonate Hills, Redpa and the open cut lime-sand discovery at Montagu.

These huge marble-ised carbonate resources are exposed or have very little overburden and have a huge potential to economically open cut mine a high-grade dolomite and magnesia enriched limestone (dolomitic limestone), limestone and lime-sand. Our initial successful exploration and drilling programme has confirmed excellent very high-grade ore. Several local companies and overseas companies desire contracts and a joint venture is now proposed to develop these resources for Australian and Pacific Rim Markets. Being very high-grade it is most suitable for many industries including steel, glass, refractory, chemical, fertiliser and alumina production (see Attachment 1).

Magnesia Enriched Limestone or Dolomitic Limestone

These massive Pre-Cambrian crypto-crystalline marble-ised magnesium-enriched limestone deposits (dolomitic limestone) are very high grade deposits with very low impurities and estimated by Tasmanian Mines Department Reports to exceed 800,000,000 tonnes. This mag-rich limestone ore is especially suitable for Thiosorbic Lime as a chimney scrubber to reduce CO₂ pollution and as an already blended carbonate of MgCo₃ and CaCo₃ for a steel flux. It has been proved by Nippon Steel to be an alternative low cost calcining product that is already naturally blended (10% MgCo₃ average) needing only one calcining heat for more economic calcining direct introduction into the sinter machine feed for B.O.F. furnaces.

Nippon Steel will review their existing more expensive practise of two separate calcinations at different temperatures of limestone and dolomite and then mixed in the blending machine for introduction into the sinter. Other companies have a review of this economy in process.

Togari Dolomite

In the Togari Licence RL 10/1997 and its recent licence extension of EL 15/2005 to the Bass Strait seaboard, it now covers a continuation north of this very high-grade crypto-crystalline dolomite with very low sulphur, manganese, silica, iron and other impurities. It is now considered to be some of the best dolomite available in Australia. The reserves have been estimated to exceed 900,000,000 tonnes. Licence RL10/97 covers a flat-bedded, open-cut deposit with only half a metre of overburden located about 35 kilometres from the bulk ports at Stanley (20,000 tonnes capacity) or Port Latta (100,000 tonnes capacity) and both enjoy a full infrastructure of sealed roads, rail, labour, water, natural gas, and hydro and Bass Link thermal power. The deposits (refer photographs in Attachment 1) are well suited as a high-grade dolomite with excellent furnace-ability for the production of steel, alumina, fertilisers, refractories, magnesium, paper and other industries and brief details of three of these usages are as follows:-

NB:

- a. In one area recent drilling at Togari outlines a huge high-grade non-fragile ore resource of much whiter dolomite and tests prove encouraging with potential as an alternative low priced filler for paper/plastics and chemicals.
- b. Following successful refractory brick tests of our Togari dolomite by Baker Dolomite, USA, for the cement kilns, we were enthused and submitted (Togari) samples to National Refractories Minerals of California, who provided results of their tests (refer copy of their letter of 28th June 1996, Togari Dolomite, in Attachment 1).
- c. MHA proposes the usage of dolomite or dolomitic limestone instead of limestone to reduce scaling and for the removal of long chain organics from the Bayer Plant liquors thereby increasing by at least 2% the production of alumina (see memorandum of 6th September 2001, by D. Zani – Laboratory Cyclic Tests for Removal of Long Chain Organics from Bayer Plant Liquors using Dolomite - Attachment No. 1). The resultant red tail (MgO/CaO) is much more environmentally acceptable and promotes vegetation growth.

Limestone

Our open cut surface deposits of Tertiary and Pre-Cambrian limestone without overburden at RL. 9/97 and EL 15/2005 are excellent very high-grade flat-bedded deposits that outcrop prominently over 3 kilometres at Redpa and Montagu respectively. Tests have proven large reserves that are non-fragile (marble-ised) ore having minimal dust and a very good low furnace cost performance with minimal decrepitation in the furnace. These surface deposits, after initial drilling have indicative proven reserves of 20,000,000 tonnes (plus) with the potential to very substantially increase reserves in both areas at depth. They overlay the larger Pre Cambrian dolomites and the magnesium enriched limestone or dolomitic limestone that have huge reserves to depths of 300 metres (plus).

Lime-sand

In January 2006, we located an open cut discovery of lime-sand with similar values as Coffin Bay sand presently used by One Steel/Blue Scope for furnace analysis and presently under test.

Phosphorite

The Smithton dolomite at Togari, licence RL 10/1997, Redpa, licence RL 9/1997 and Montagu, licences EL 15/2005 and SEL 40/2005, is a late Precambrian carbonate formation, about 1500 m thick, all found in the Smithton Basin, a synclinal structure in north-west Tasmania. The formation is mostly dolomite, but there are substantial intervals of limestone and magnesian enriched limestone. A feature of the formation that makes it of interest as a source of industrial minerals is the generally low levels of terrigenous impurities (insolubles), often less than 1%. However, the formation is poorly exposed, being for the most part covered by 1 – 2 metres of alluvial gravels in low-lying valley floors. More drilling is needed to fully test the potential of the Smithton dolomite for industrial carbonates. The upper part of the formation is particularly poorly known.

The Smithton dolomite is thought to be of Ediacaran to possibly Early Cambrian age (approximately 570 – 530 m.y.). This was a time of generation of large phosphorite deposits in many parts of the world (e.g. northern Australia, India, China etc.). The Smithton dolomite is the right age and palaeo-environment (shallow-marine carbonate) to be prospective for phosphorite, but again this can only be fully tested by drilling.

An older Precambrian carbonate unit, the Black River dolomite, is also found in the Smithton Basin. It is thinner (500 m) than the Smithton dolomite, but is also considered prospective for industrial carbonates and phosphorite. [C. Calver, Mineral Resources Tasmania, 30.11.2006.]

Arthur/Pinner/Lyons River Magnesites

MHA reduced four of the exploration licences to the two retention licences, RL 17/1987 and RL 18/1987, covering the full extent of their mineral discovery. These magnesite licences are now scheduled for joint venture to be mined and developed for Australian and world markets.

Previous costs of exploration by the MHA /CRA joint venture drilling expenditures on these retention licences exceeded \$2,500,000 proving up substantial magnesite reserves. Further exploration by Crest Magnesium expended more than A\$14,500,000 to further prove up these huge magnesite resources with potential for 800,000,000 tonnes (plus).

The resources, discovered by MHA in 1972, are now considered a major world discovery of very high-grade Pre-Cambrian crypto-crystalline marbleised magnesite. The deposits outcrop prominently over many kilometres with very little overburden. There are now reserves of 40,000,000 tonnes of open cut proven resource of 43.8% MgCO₃.

Magnesite diamond drill cores totalling more than 8500 metres are available for inspection. The drill core is available in stores in Wynyard and Hobart, Tasmania. The areas are known as the “Arthur and Lyons River/Pinner” prospects and have solid intersections of over 300 metres of mineralisation of magnesite across the ore body and extend over 2 kms. Within the licences are substantial elevated outcrops with no overburden and have the potential to substantially increase the reserves by further drilling. The high grades of magnesite with excellent one heat furnace-ability to dead-burning are suitable to produce magnesia for the chemical, acid-neutralisation, fertiliser, nickel, refractory, magnesia metal, steel, fluxes and paper filler industries. There is some dolomite to the south of these deposits.

Part of the Arthur River magnesite resource RL 8718 is known as the M1 area. It is easily accessible by a made road and this area is under application for a mining lease No. ML 16M/2006. The object is for MHA to arrange the development of a pilot mine operation for initial bulk ore tests and for a semi pilot 150,000 tpa magnesite calcining operation.

This mine and the calciner will act as the forerunner of a much larger proposed later development for the huge remaining magnesite ore body to the south at the Arthur and Lyons River resources.

Sampling

Many of MHA's excellent analytical results of our field sampling analysis have been re-confirmed by other companies taking their own field samples and analysing. An example is as follows:

In 2004 we invited Unimin to a field visit to take their own check large field samples of our dolomite, magnesite and silica sand. The results of the Unimin analytical report No. R04/639, 21.4.2004, refer copy in Attachment 3, which endorses our very high-grade results with very low impurities in our licences.

Calcining and Beneficiation Potential for Development

Recent processing and chemical tests on the marbled magnesite ore has revealed that the silica in the magnesite is uniquely non-soluble in hydro-chloric acid so the SiO₂ remains out of solution, making it ideal for the electrolytic process to produce magnesium metal and other products.

After very successful reactivity tests our calcined 90% MgO (calcined at 800°C) is now proven to accelerate the lateritic production process and extract impurities in the Cawse Nickel and Ravensthorpe Nickel smelting operations in Western Australia. The Cawse world patent has huge potential for reactive MgO for many other lateritic nickel world markets. Also hard burnt 90% MgO (hard burnt at 1350°C) for gunning mix for world steel furnaces.

The crypto-crystalline magnesite ore calcines at 800°C and hard-burns at 1350°C and dead-burns at 1800°C. All these products calcine in the first pass in the furnace with minimal decrepitation and achieve low energy costs. Most other world magnesite resources, including most of the Chinese deposits, are coarser grain macro-crystalline magnesites that usually powder-ise early in the first furnace pass and need to be pelletised for the second furnace pass consuming more energy to achieve more expensive hard or dead-burnt products.

Beneficiation Test

Mr. David Zani's magnesite calcining and beneficiation tests, No. R 902, Part IX, of 22.5.90, (refer copy in Attachment 4) proved that after calcining, the simple screening off of 19% of the fines of -1.18 mm proved that 81% of the coarse fraction + 1.18 mm is substantially upgrading the MgO by 2.5% and substantially reduces the impurities of SiO₂, CaCO₃, and Fe₂O₃.

Calcining Costs

Mr. David Zani, ex Kaiser Engineering executive now retired at Burnie, Tasmania, estimated the mining and calcining costs in Tasmania of magnesite would be around A\$85 per tonne FOB Port Latta. I believe the calcining cost could be lower in a large vertical calciner, which is now able to utilise natural gas on site. However, there is such a good profit margin the unexpected should be amply covered in the estimate.

Mine Development

Mineral Strategies Pty Ltd. are negotiating a plan to mine the M1 area and initially develop magnesite ore exports for inter-state shipments for early profits. They are negotiating with contracting companies with finance to supply mined ore to an existing calciner in W.A. Another company also plans to construct a Universal Vertical Calciner in Tasmania to calcine larger quantities of all carbonates for export to Australian States and the Pacific Rim markets. We expect developments in early 2007.

Marketing and Contracts on Offer for Magnesite

We have details of our successfully researched large magnesite markets including one for a gunning mix for relining steel B.O.F. furnaces and another for high-grade refractory production and also as a water purifier.

MHA now has a number of large contract enquiries (refer attached 'Summary of Enquiries' Attachment 6) under negotiation from companies planning to ship substantial quantities of magnesite ore and later calcined magnesite and some details are as follows:

1. Cookson and Plibrico (Vesuvius) advised MHA that they would offer a 10-year contract for 300,000 tpa of gunning mix hard burnt quality magnesite of 89/90% MgO (calcined at 1350°C). This grade is easily achievable from the resource and could prove very profitable at their indicative price of \$US160 tonne FOB Port Latta or Burnie or Stanley Ports (refer their letter of 7th June 2001, in 'Summary of Enquiries').
2. Cawse Nickel and Ravensthorpe Nickel projects in W.A. after successful reactivity tests seek total contracts for 150,000 tpa of a similar grade of 90% MgO but calcined only at 800°C, with an attractive indicative price of around A\$400 per tonne FOB.

World Patent for Production of Carbothermic Magnesium Metal with Off-Gas of Co for Polyethylene and Hydrogen Production

The crypto-crystalline magnesite ($MgCO_3$) when calcined to MgO is the most economic base feed to produce MgH_2 for process by the M.T.L. technology patent.

M.T.L.'s new world patent for new carbothermic furnacing of MgO to produce magnesium metal (Mg) creates off-gas furnace tails of Co suitable for polyethylene and syngas for other products. The tail of hydrogen is presently under R & D review by M.T.L. Plc, Copenhagen, for car fuels and energy markets.

Also, in the U.S.A. the General Motors and Ford research teams are presently co-operating with MTL Plc with their R & D initiatives to produce a 'safe hydrogen slurry' for cars and energy markets.

I quote an extract from Jens Frederiksen, M.T.L., email of 30th November 2006 as follows:

"There are many uses of syngas. During the production of magnesium metal we create per kg Mg produced about 1.7 kg CO gas. This gas is very pure and through addition of steam we can form syngas which can be used for a number of purposes such as synthetic hydro-carbon liquids, hydrogen, methanol and ammonia. I am also researching the idea to produce polyethylene but this requires further rather complicated development so may be it would be best to stop at syngas and use that for whatever purposes would be

prudent at the particular site. This is a very quick explanation, which needs much more elaboration to be presentable. The CO₂ emanated mixed with water at a temperature about 1000 °C will also produce syngas so may be this is the way to get the CO₂ tied into something useful.” (Refer to the website for Nexant which explains the many uses of syngas)

[Contact details for Jens Frederiksen, PF&U Mineral Development ApS,
Kullinggade 31. DK-5700 Svendborg. Denmark.
telephone 45 6280 0042, fax 45 6280 0009, email pfu.aps@mail.tele.dk]

Silicas

Review of Tests, Analysis and the Mining of Pre Cambrian Quartzite Ore and Sand and Silica Flour at Thomas Mountain Mine Licence RL 1/2005 and Meunna Licence RL 1/2001 (EL 11/92) in N.W. Tasmania (1 July 2006 - see Attachment 4).

Quartzite

The silica deposits in the licences have been estimated after drilling to have indicative reserves exceeding 15,000,000 tonnes plus of very high-grade quartzite ore with low impurities. Past and recent drilling costs exceeding \$1,000,000 have proved up part of these substantial silica deposits. These large deposits consist of non-fragile quartzite rock with low decrepitation in the furnaces now proved for the production of high grade ferro-silicon, silicon metal, fused silica, green silicon carbide and other products.

Bulk Testing of Silica for Ferro-Silicon/Silicon/Silicon Carbide

1. Norton Abrasives, at Lillesand, Norway, have successfully completed a seven day bulk furnace trial (costing \$500,000) to produce green silicon carbide from our 300 tonne delivery of, as mined, Thomas Mountain Mine bulk sand sample (un-beneficiated) and shipped to them at their plant at Lillesand in Norway.
2. Dow Corning, USA, successfully tested our Thomas Mountain quartzite for silicon metal (chemical grade) and they endeavoured in 2000 to revive the Victorian Kaiser-Bismark silicon project with Federal and Victorian Government support. The Kaiser-Bismark 1980 Silicon Metal Project (30,000 tpa) at Geelong, Victoria, was based on successful trials of our quartzite from the Thomas Mountain Mine in Tasmania. Although the feasibility study was viable the project was aborted by Kaiser as the power was not available and too expensive at that time. As economic power/gas is now available on site the project is worthy of a review for a location at the mine site in Tasmania.
3. Details are available of BHP's successful bulk trial of a 4,000 tonne of Thomas Mountain quartzite to produce ferro silicon at Temco, Bell Bay, Tasmania. The trial proved to be an excellent ferro silicon consuming around 10% less energy and purer than the quartz ore supplied for many years from the BHP 7 Mile quarry in South Australia.
4. The Pechiney/Pioneer project successfully bulk tested 2,000 tonnes of Thomas Mountain Mine quartzite to produce alloy and chemical grade silicon metal at Snug, Tasmania, but the old plant was subsequently closed due to its environmentally sensitive location. An ideal new location is on site at the Thomas Mountain mine at Montumana. A review is warranted as we now have natural gas on the mine site.

Silica Sand

Abutting the quartzites are 50,000,000 tonnes, plus, of very high-grade spherical grain silica sand deposits and nearby 5,000,000 tonnes of extremely high-grade silica flour deposits that have all been bulk tested very successfully for products such as plate glass, crystal ware, chemicals, sodium silicates, industrial fillers, fibreglass, fibre optics, iron casting sand ceramics.

Most recent tests by Stim-Labs confirm our Thomas Mountain spherical grain sand proved to be suitable as a “frac” sand for methane gas recovery projects in the coalfields in N.S.W. and Queensland. We note the huge increasing Australian production of methane gas as it now supplies 25% of Queensland’s total gas consumption (see Stim-Lab’s Report SL 3643 of June 1994 as Attachment 4).

In addition, please note the sand as mined (graded 99.82% SiO₂) has been bulk tested successfully as a glass sand and for injection sand in crucibles in steel production. It is also excellent for the production of foundry moulds and as golf bunker sand.

Silicas

The following silica reports will support the exploration and drilling and testing of these silica sands, quartzite and silica flour (see Attachment 4).

“Application for a Retention Licence as a Flow On Title From EL 38/2002, Previously EL 43/1970 and MLS 8M/1989 and IW 1988 – Dip Range N.W. Tasmania”, Compiled by D. McP Duncan, 21st February 2005.

AMMTEC Report No. A 4281 “Treatment of a High Grade Silica Sand for Gwalia Consolidated Ltd.” August 1994.

Silica Flour

Nearby we have in our licences at Champion Road RL 2/1996 (EL.24/88), and Cann Creek EL: 10/2003 (all 100% owned by MHA) high-grade silica flour deposits naturally occurring as an open cut, extremely fine grain silica flour with 50% less than 75 microns. It has an un-beneficiated, as mined, very high grade chemical analysis of 99.85% SiO₂, very low Fe₂O₃ and other impurities and is easily beneficiated to even higher grades. It is now proven for optical glass, solar panels, TV screens and ceramics. Also as a finer high-grade silica flour ideal for blending with silica fume for cement and especially for oil well drilling cement.

It is interesting that the Champion Road silica flour is a finer grain than the silica flour mine at Corinna and it is in demand to blend. There are also silica flour deposits at the Meunna and Cann Creek Licences awaiting exploration and development

Many Australian and overseas companies in USA, Japan, E.E.C. and Korea have successfully tested and processed these high-grade silicas and details are available.

Local and Overseas Sales of Quartzite Ore and Wood Chips

MHA has received many overseas enquiries for quartzite. A Kuwait enquiry, after successful tests, was for 60,000 tpa of quartzite and 50,000 tpa of wood chips and it was planned to be jointly shipped to effect shipping freight economies. There are many other companies in the

Pacific Rim interested in our high-grade quartzite silica sand and silica flour at Thomas Mountain mine.

Infrastructure and Power

These near seaboard silica deposits are very well located with an existing full infrastructure and are within twenty miles of two large bulk loading port facilities of 35,000 tonnes at Burnie or Stanley and 100,000 tonnes bulk facility at Port Latta, N.W. Tasmania.

There is a surplus of hydropower or natural gas now available on site and ample water, rail, sealed roads, airport and experienced labour near the towns of Wynyard and Burnie. We believe the existing infrastructure and the economic viability of mining and shipping over these ports and the Federal Government 50% freight subsidy to all mainland ports of containerised cargo will reduce freight costs and add to early development of these 'world class' silicas.

Additional even lower freight economies will also be achievable by back bulk loading on returning MT bulk shipments regularly traversing Bass Strait on the Australian coast.

Marble, Composite and Dimensional Stone

These carbonate resources of magnesite, dolomite, dolomitic limestone and limestone are all excellent marble occurring in our licences RL.8717, RL.8718 and RL 10/1997 and RL 9/1997. The colours of grey, pink, red, white and oatmeal are very attractive for dimensional stone and composite productions. Pit areas will be available for selected marble mining in parts of the open cut mines when under development as a mine. It is proposed to market as a brand name "Tasmatine" marble.

Natone Granite

Recently our beautiful Natone Granite in ML.1293P/M was mined (see Attachment 5) by Boral and successfully cut and polished giving it an excellent colour as a dimensional granite stone for building slabs. More than one hundred tonnes of this pink, green and brown Natone granite was mined, cut and polished by Boral, of Sydney, as a dimensional stone and laid on the floor and walls of the Sydney Taxation building at Parramatta, NSW, where it can be inspected.

We wish to negotiate a separate joint venture partner to parallel mine some selected areas of the open cut mines of granite. We envisage production of dimensional stone, composites and terrazzo products of exceptional quality.

Presently we are negotiating a 500,000 tonne contract to re-supply Natone granite rock bunding and armour rock to extend the existing breakwater at Burnie, Tasmania. Previously Natone granite was used in the existing breakwater and is a proven rock bunding.

Summary of the Economic Considerations and Infrastructure

Our near seaboard Tasmanian mines or prospects are well located near bulk ports in north-west Tasmania with access to reliable labour and adequate infrastructure, including natural gas and power that will enhance their low cost development. This infrastructure includes excellent sealed roads, water, a railway line that traverses the prospects in the north- west areas, and serviced by bulk ports at Stanley, Burnie and Port Latta and by the Wynyard Airport, near Burnie. The Government hydroelectric and Bass Link thermal power and natural gas are all now near or "on site" ensuring low energy costs.

All these carbonate prospects have established roads equidistant of around 35 kilometres from these bulk ports of Stanley, Burnie or Port Latta. Port Latta has capacity for 110,000 tonne vessels (loading rate 2000 tph) with bulk-loading facility and it has excess capacity of 8,000,000 tpa availability with potential to double this capacity to 16,000,000 tpa and also to construct a piped vacuum loader for calcined products for loading to dedicated vessels.

Federal and State Governments Incentives

Indications are that the Governments are keenly supporting the proposed new mines and the proposed erection of a Universal jumbo calcining plant to be established at Burnie or Port Latta, Tasmania. Incentives are available and some development would qualify for part funding by the Federal Government "Invest in Australia Programme" or the State Government's subsidies of infrastructure.

As the Tasmanian Labor Government majority governs in its own right until 2010 with a policy of pro-development, thereby governing with minimal environmental problems they offer full encouragement for accelerated development of these projects.

Estimated Reserves of Carbonates and Silicas

The following is a list giving some idea of the estimated reserves of high-grade ores within our licences as at 1st May 2005, near seaboard in North West Tasmania. Much of it is delineated and proven by very substantial drilling and reported in previous Tasmanian geological reserve estimates and reports that are available from this company and the Mines Department:-

<u>Resources</u>	<u>Estimated Reserves (tonnes)</u>	<u>Possible Increasing Reserves (tonnes)</u>
Magnesite Crypto-Crystalline (Pre-Cambrian)	800,000,000	2,000,000,000
Marble – Various colours (Pre-Cambrian)	10,000,000	Medium potential
Quartzite Rock (Pre-Cambrian)	2,000,000	25,000,000
Quartzite Sand and Flour (Pre-Cambrian)	10,000,000	25,000,000
Dolomite Crypto-Crystalline (Pre-Cambrian)	500,000,000	Very Large potential
Crypto Crystalline Magnesite Rich Limestone Or Dolomitic Limestone (Pre-Cambrian)	500,000,000	Very Large potential
Limestone (Tertiary)	50,000,000	Medium potential

SHIPMENTS – CRUSHED ORE

1. All Tasmanian container or pallet shipments receive a 50% freight deduction to all Australian States.

(See attached Federal Treasurer's announcement dated 21st March 2006, No. 011, 'Productivity Commission to Review Containerised and Bulk Shipping between the Australian Mainland and Tasmania')

2. Indicative bulk shipment quotations as follows:

- A. Hardy Pacific Chartering 26/5/06. Pt Latta to Pt Kembla. Part Cargo. US\$7 to 8 per tonne. Qty 8-10,000 tonnes.
- B. BHP. Bulker type with cranes and grabs vessel. Pt Latta to Pt Hedland. US\$11 per tonne. Qty 43,500 tonnes.
- C. Jebsens.

22.5.06	Burnie – Port Kembla	US 14.25 tonne
	Burnie – Adelaide	US 14.75 tonne
	Burnie – Kwinana	US 24.30 tonne

NB: Regular back bulk freight vessels will be available at substantially reduced rates particularly for dedicated vessels.

TASMANIA'S PILBARA OF CARBONATES

The foregoing synopsis is an attempt, after 25 years of exploration and expenditure of many millions of dollars, to summarise our very successful discoveries of these huge near seaboard resources of carbonate and silicas in north-west Tasmania. These Carbonate Resources now qualify for assessment for bulk development as Tasmania's 'Pilbara' of carbonates, initially as ore shipments to achieve early profits and later as Tasmanian processed products for export to the Australian and Pacific Rim and World markets.

NEIL M. THOMAS.
CHAIRMAN.

DISCLAIMER

This is not a Prospectus document.

Every care has been taken by Mineral Holdings Australia Pty Limited to ensure that information contained is correct and complete, no warranty is offered that it is.

The potential geological and geophysical situations, the opinions, interpretations and estimates contained in this report are speculative and high risk.

Interested parties should form their own opinions from independent enquiries and research and do their own due diligence as to the completeness, accuracy thereof of all data made available for review.

ATTACHMENT 1

**INFORMATION DATA ON THE CARBONATE PROJECT
LICENCES IN NORTH WEST TASMANIA HELD BY
MINERAL HOLDINGS AUSTRALIA LIMITED.**

MHA brings to the Joint Venture the following resources and the excellent fortuitous near seaboard locations of our resources in N.W. Tasmania, with a full infrastructure of sealed roads, hydro-electricity and natural gas 'on site' and experienced labour, all available for utilisation.

A. CARBONATES

RESOURCES

LICENCE		LOCATION	DEPOSITS	SQ KM	EXPIRY
R.L. 9/1997 (Prev. E.L.31/90)	N.W.TAS	Redpa (Carbonate Hills)	Limestone Dolomite Dolomitic Limestone & Industrial minerals	3	8 May 2008
R.L.10/1997 (E.L.33/90)	N.W. TAS	Togari (B.S.)	Dolomite and Industrial minerals	5	8 May 2008
EL 15/2005	N.W. TAS	Montagu (Togari Resource)	Dolomite, Limestone, Lime- sand & Non Metallic Minerals	59	31.December 2010
RL 2/2006 [Previously E.L 10/2003]	N.W. TAS	Cann Creek	Magnesite & Silica & Talc & Non Metallic Minerals	10	12 TH March 2009
SEL 40/2005	N.W. TAS	Smithton Basin	Phosphate	1350	14 TH June 2011
ML 16 M/2006, (M 1 Area in RL 8718) (previously EL 43/70)	N.W. TAS	Keith River Area	Copper, Zinc, Silver, Lead, Gold, Magnesite, Dolomite	42 hectar es	Pending
TOTAL AREA					1427 sq kms
Plus					42 hectares

- B. The Federal/State Government's are considering 50% of the cost of erection of an R & D 5,000 tonne p.a. bulk pilot calciner to develop trial lots of calcined carbonates, ranging from 750°C to 1850°C for Australian and the Pacific Rim markets.

This pilot calciner may qualify the erection of a jumbo calciner, say, 500,000 tpa in N.W. Tasmania to process all carbonates including dolomite, dolomitic limestone, limestone and magnesite.]

C. ENERGY

Energy available 'on site' includes natural gas, hydro-electricity and the opportunity to utilise surplus Port Latta pellet off-gas.

- D. A long-term sales contract (10 years) for around 200,000 tpa (plus) of 89/90% D.B. magnesite at around US\$170 per tonne FOB Port Latta. Other enquiries are held for sales contracts for carbonate ore or calcined products of magnesite, dolomite, limestone and dolomitic limestone. Minor equity in the project could be offered to companies with captive markets for these products.
- E. Further knowledge of these resources are available by contacting Dr. David Duncan (Tasmanian Government Geologist, Hobart, retired), Mr. John Collier (Engineer, Melbourne) ex Rio-Tinto, Mr. Tom Dickson (Field Geologist) ex CRA, and Mr. Kevin Pinner (Pit Manager for Tasmania Mines and our Prospector for over 25 years) and the writer.
- F. Also, MHA brings its every extensive geological, drilling and analytical reports, maps etc. compiled over more than twenty years available for inspection at its offices.
- G. MHA holds the sole Agency for the MTL carbothermic patent technologies for magnesium metal production in Australia and New Zealand (see attached 'MTL Process – A Carbothermic Route to the Projection of Magnesium Metal').

20th November 2006.



TOGARI DOLOMITE NORTH-WEST TASMANIA

MINERAL HOLDINGS

AUSTRALIA PTY LTD

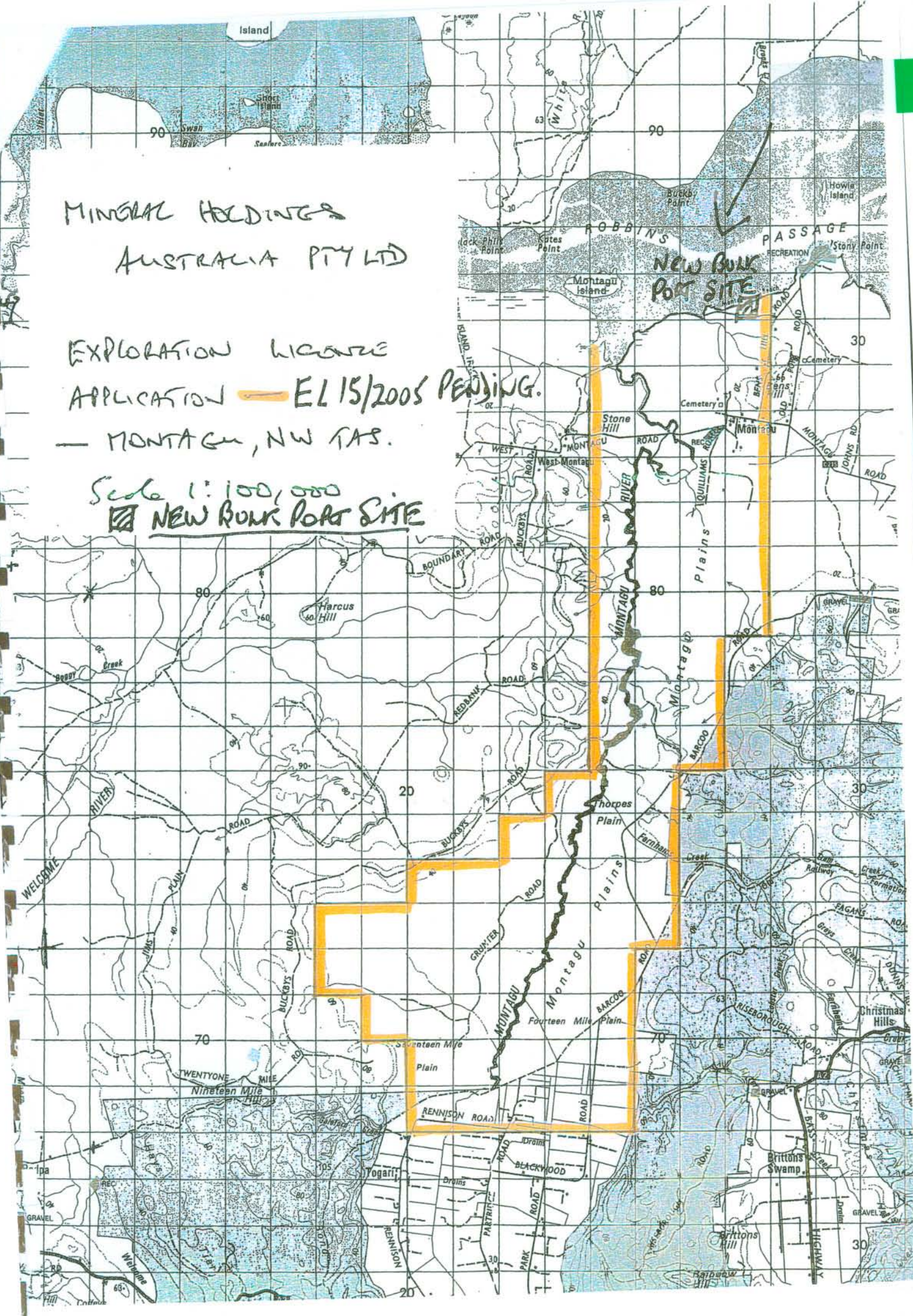
EXPLORATION LICENCE

APPLICATION — EL 15/2005 PENDING.

— MONTAGU, NW TAS.

Scale 1:100,000

NEW BUNK PORT SITE



TOGARI RL 10/1997 ((Km²) Approximately 70 Km from Port Latta.

Explored solely for Pre- Cambrian Dolomite.

- 41 shallow backhoe pits were dug to provide depth of soil overburden and to provide samples of the dolomite.
- 5 hammer drill holes along existing track

The Togari area lies on the steeply dipping east limb of a major anticline and with a stratigraphic thickness well in excess of 1000 metres very large reserves are certainly available. However the dolomite is generally low lying, covered by a thin soil layer, and is usually only exposed in drainage trenches. Where it can be seen the dolomite is greyish in colour, and is a hard massive fine grained marble. An average assay of the material is...

TOGARI DOLOMITE ANALYSIS
(weight percentage)
(All numbers are average % composition)

SiO ₂	0.44
TiO ₂	0.01
Al ₂ O ₃	0.54
Fe ₂ O ₃	0.24
MnO	0.005
MgO	19.62
CaO	32.86
Na ₂ O	0.08
K ₂ O	-
P ₂ O ₅	--
SO ₃	-
L.O.I	46.16

This compares more than favourably with average grades of existing suppliers...

Supplier	Togari	BHP Ardrossan	ACI Mt Gambier
SiO ₂	0.44	2.00	1.0
TiO ₂	0.01	0.01	
Al ₂ O ₃	0.54	0.39	0.5
Fe ₂ O ₃	0.24	0.80	0.21
MnO	0.005	0.14	
MgO	19.62	21.00	18.8
CaO	32.86	29.00	33.7
Na ₂ O	0.08		
K ₂ O	-	0.048	
P ₂ O ₅	-	0.05	
SO ₃	-	0.15	
LOI	46.1	46.40	

GORDON L. BARNA
Vice President
Corporate Quality and Engineering

Mr. Neil M. Thomas, Chairman
Tominex Pty. Ltd.
2nd Floor
135 Collins Street
Melbourne, Vic., Australia 3000

June 28, 1996

Fax: 011-613-9650 3855

RE: TOGARI DOLOMITE
RETENTION LICENCE RL 10/1997

Dear Mr. Thomas:

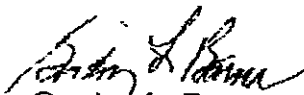
Reference to the above subject covered in your letter of June 27th, I have reviewed all the XRF data provided. I further eliminated samples TPI 11-15M washed and unwashed as statistical outliers, and then averaged all the remaining data

The attached data sheet then compares washed to unwashed versus National's dolomite mined at our Natividad Plant in California. Note that the mineralogy calculations assume a stoichiometric CaO/MgO dolomite, whereas most dolomites can be enriched with either oxide. Thus, in this table I have shown the excess CaO as calcite which could mean this is calcite or enriched lime-dolomite.

The Togari dolomite shows very similar chemistry and mineralogy to National's. The difference between the washed v.s. unwashed is the reduction in quartz. For steel mill applications, washed v.s. unwashed would be unnoticed, since the silica ends up in the slag.

(Looks like you have a very high purity dolomite!)

Best Regards,


Gordon L. Barna

DOLOMITE - MINERALOGY NORMATIVE CALCULATIONS FROM CHEMISTRY

6/27/96

Oxide Mineral	MgO	CaO	Al ₂ O ₃	SiO ₂	Fe ₂ O ₃	LOI	Total	Sample
								TOGARI Washed
Dolomite	19.58	27.41				43.25	90.22	90.22
Calcite		5.09				4.00	9.09	9.09
MA Spinel								0.00
Pyrite					0.14	0.07	0.21	0.21
Anorthite		0.07	0.13	0.15			0.35	0.35
Quartz				0.13			0.13	0.13
Totals	19.58	32.57	0.13	0.28	0.14	47.32	100.02	100.00

Oxide Mineral	MgO	CaO	Al ₂ O ₃	SiO ₂	Fe ₂ O ₃	LOI	Total	Sample
								Togari unwashed
Dolomite	19.52	27.12				42.82	89.25	89.25
Calcite		5.48				4.27	9.73	9.71
MA Spinel								
Pyrite					0.17	0.09	0.26	0.26
Anorthite		0.08	0.14	0.16			0.38	0.38
Quartz				0.57			0.57	0.57
Totals	19.52	32.65	0.14	0.73	0.17	46.98	100.19	100.17

Oxide Mineral	MgO	CaO	Al ₂ O ₃	SiO ₂	Fe ₂ O ₃	LOI	Total	Sample
								NRMC Natividad
Dolomite	20.91	29.08				45.87	95.84	95.85
Calcite		2.28				1.79	4.07	4.05
MA Spinel							0.00	
Pyrite					0.13	0.07	0.20	0.20
Anorthite		0.05	0.09	0.11			0.25	0.25
Quartz				0.49			0.49	0.49
Totals	20.91	31.39	0.09	0.60	0.13	47.63	100.64	100.65

TOGARI DOLOMITE (EL.33/90) TASMANIA)

28-Jun-98

<u>Chemistry</u>	<u>Togari Washed</u>	<u>Togari Unwashed</u>	<u>NRMC Nativity</u>
CaO	32.57	32.85	31.39
MgO	19.56	19.52	20.91
SiO ₂	0.28	0.73	0.60
Fe ₂ O ₃	0.14	0.17	0.13
Al ₂ O ₃	0.13	0.14	0.09
LOI	48.00	47.32	48.84
Total	100.68	100.53	99.98

Mineralogy

Dolomite	90.22	89.25	95.85
Calcite	9.09	9.71	4.08
Pyrite	0.21	0.28	0.20
Anorthite	0.35	0.38	0.25
Quartz	0.13	0.57	0.49
Total	100.00	100.17	100.65

Re: Testings of Australian Dolomite Drill Core (RL 10/1997 Togari)
Drill Holes TP 1 and TP 2

The received samples of Australian dolomite TP1 and TP2, their quantity being 2 x 1 kg, together with the enclosed letter are characterized by chemical analyses (mass %):

	CaO	MgO	SiO ₂	Fe ₂ O ₃	Al ₂ O ₃	TiO ₂	MnO	P ₂ O ₅	Na ₂ O	K ₂ O
TP1	32.8	19.3	0.26	0.11	0.12	0.01	0.06	0.02	0.1	0.01
TP2	33.3	19.3	0.47	0.11	0.09	0.01	0.08	0.01	0.1	0.01

According to these results it can be stated that the dolomite, as far as the contents of SiO₂, Fe₂O₃, Al₂O₃ and other oxides is concerned, even compared to our home dolomites, is exquisitely pure. Only as for the contents of CaO it shows a bit higher values (of about 3%). For the purpose of putting the analyses in an accord with our laboratories the analysis of both samples was performed. The results of chemical compositions are as follows: (mass %):

	CaO	SiO ₂	Fe ₂ O ₃	Al ₂ O ₃	G.Ž.	MgO*
TP1	33.17	0.10	0.05	0.17	47.05	19.46
TP2	32.75	0.42	0.05	0.21	47.02	19.55

* Determined by calcule by subtract

By comparing the obtained results with the chemical compositions of the samples stated in the Letter enclosed it can be said that they are in accord.

The sample TP2 underwent the mineralogic testing, having in mind that neither of the two samples shows any considerable differences, neither in chemical analyses nor in microscopic characteristics.

On the piece of the sample TP2 a microscopic preparation was made for the XRD test and it was determined that it is the crypto to microcrystalline carbonate. For the very poor quality of preparation for this kind of material, it was hard to state anything else. Nothing was seen as far as other present materials are concerned.

By performing XRD testing on TP2 sample powder it was noticed that the major material is dolomite and the second present one is calcite. There are some indications that in addition to these two carbonates there is a little bit of magnesite.

According to our experience so far in the domain of the study of these materials and the possibilities of their application for our needs, we are of the opinion that, for the reason of the presence of somewhat higher contents of calcium, i.e. its follower - calcite mineral,

there is a scareness for appearance of free CaO non-integrated in sintered dolomite, after heat treatment. Also, for testings of other technological parameters, we are of the opinion that it is necessary to be engaged in a larger scale /bigger quantity of sample/ as compared to the sample of 2 x 1 kg.

Research Executive

Mr. Vladimir Krstić, Eng.

REFRACTORY MATERIALS

INSTITUTE

Mr. Ljubomir Vasković, Eng.

MINERAL HOLDINGS AUSTRALIA PTY. LIMITED

A.C.N. 004 759 853

Correspondence to:

2nd Floor.
135 COLLINS STREET.
MELBOURNE, VIC., AUSTRALIA 3000
TELEPHONE: (61 3) 654 7999
FAX: (61 3) 650 3855

1.1.99

ANALYSIS OF UNBENEFICIATED CRYPTO- CRYSTALLINE DOLOMITE ORE SURFACE SAMPLES TASMANIAN EXPLORATION LICENCE 33/90. TOGARI

Analysis	CaO	MgO	SiO ₂	Fe ₂ O ₃	Al ₂ O ₃	TiO ₂	MnO	P ₂ O ₅	Na ₂ O	K ₂ O
T.P.1	32.8	19.3	0.26	0.11	0.12	0.01	0.06	0.02	<0.1	0.01
T.P.2	33.3	19.3	0.47	0.11	0.09	0.01	0.08	<0.01	<0.1	0.01
# Av. T12-41	32.86	19.62	0.30	0.24	0.09	0.01	0.005		0.08	

Average of surface samples: T25 not included. TP1 & TP2 50kg surface samples

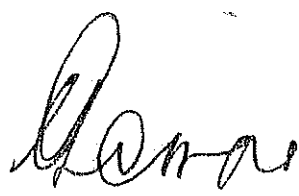
ANALYSIS METHOD: XRF MgO + CaO. ICP remainder.

NB THESE CRYPTO CRYSTALLINE DOLOMITES HAVE EXCELLENT
FURNACE-ABILITY WITH MINIMAL DECREPITATION.

THE TOGARI AREA IS APPROXIMATELY 50 KILOMETRES FROM PORT LATTA AND IS
IDEALLY LOCATED AS AN OPEN CUT AS IT IS A FLAT BEDDED DEPOSIT WITH ONLY ONE
METRE OF SURFACE OVERBURDEN.

Recently we arranged for some crypto-crystalline dolomite samples to be laboratory tested in Japan for
B.O.F. and E.A.F. Furnace usage. Details of the successful test are as follows and I quote. "We are pleased
to inform you of the Dolomite samples test as follows:-

Ignition Loss	46.16%
SiO ₂	0.58%
Fe ₂ O ₃	0.19%
CaO	33.64%
MgO	19.35%
S.	NIL
P.	0.003%





Division of Minerals
(Institute of Minerals, Energy and Construction)
339 Williamstown Road, Port Melbourne
PO Box 124, Port Melbourne, Victoria, 3207, Australia
Telephone: (61-3) 647 0211 Fax: (61-3) 646 3223

To: Neil Thomas From: Bob Flann
Company: Mineral Holdings P/L Date: 15/6/95
Fax No: 650 3855 File No.: mhaix695
No. of Pages (incl. this page): 1

RE: Analysis of Togari dolomite samples

Sample description: Lump dolomite (~50mm) apparently blended T7 and T9 ore.
Sample weight: Approximately 2kg.
Work requested: Crush ore to -20mm and separate into two fractions -20 + 1mm, and -1mm. Analyse using XRF techniques.

The sample was crushed in a Jaques jaw crusher to -20mm and the -1mm fraction screened off. The -20 +1mm fraction was then split to obtain a representative sample which was crushed prior to the resultant samples being milled in preparation for XRF analysis.

Analyses results:

Fraction	MgO	SiO ₂	Al ₂ O ₃	P ₂ O ₅	CaO	MnO	Fe ₂ O ₃	Na ₂ O	SO ₃	LOF	SUM
-1mm	19.92	0.43	0.03	0.006	32.19	0.016	0.05	<LLD	<LLD	47.35	100.01
-20 + 1mm	20.12	0.16	0.04	0.014	32.18	0.018	0.08	<LLD	<0.001	47.51	100.12

All figures are shown as %.

Sample fraction weights:

-1mm	96.05g
-20 +1mm	1943.4g
Total weight	2039.45g

The sample supplied was of unknown quality with respect to the original orebody and extreme caution should be exercised before making any conclusions based on the analysis of a single sample.

Cost: Sample preparation \$200. Analysis: \$60ea Total \$320.00 (Invoice to follow).

R.C. Flann
Project Manager, Industrial Refractories Group.

CC MH,File.

If this fax has been sent to you by mistake, please ring us and arrange to return the fax to us by post at our expense. This fax may

Andrew Graham - Principal
3 Seville Place
Golden Grove, SA, 5125
Mobile: 0414 648 754
Ph/Fax: 08 8251 5356
Email: amgraham@arcom.com.au

Mineral Strategies Pty Ltd

ABN 42 092 160 944



Mineral Holdings Australia Pty Limited
11 Kent Court
Toorak, Victoria
Australia, 3142

September 17, 2003

Re: Carbonate Resources and Associated Issues

Dear Neil

Following our discussions over the last few days I am pleased to send you my thoughts in relation to some of the major issues we discussed. Given the considerable demands on my time I am unable to be as comprehensive as I would like but most of the critical issues have been addressed to some extent.

Firstly, I believe that the carbonate resource(s) that you currently hold are world-class in terms of their chemical and physical make-up and do provide very real market-capture opportunities across the whole product scope (i.e. raw materials through to tertiary processing end-products).

Independent Study

As you are well aware I am in the latter stages of producing my own independent study into the carbonate markets and have, to date, identified markets in forty-eight (48) distinct industries over eight (8) major sectors for eight (8) carbonate or carbonate derived products. This study is well in excess of 400 pages and has identified and categorised over 1.5 million tonnes of annual product sales.

Industry Opportunities

As far as MHA's resource(s) are concerned your blessing could also be your curse without the right focus. Having all three major carbonates – magnesite, dolomite and limestone – present certainly provides a great many development options but this needs to be tempered with a strong conviction as to which market sectors will become the primary focus following development.

This will, of course, be determined by a great many factors not least of which is, what demands already exist and what demands will be created in the short to medium term.

For example, the HIs melt plant (currently being constructed) in Kwinana, Western Australia not only represented (past tense as contract has already been awarded) an excellent market opportunity (will ultimately require 150,000 tonnes per annum of low silica, dolomite) but it flags the strong likelihood that the steel industry (in a global sense) will undergo some major shifts in the next few years.

The HIs melt Process is essentially a Direct Ironmaking process that consists of a vertical, water cooled Smelt Reduction Vessel (SRV) that can be considered as a replacement for a traditional blast furnace. The SRV provides the opportunity to utilise low grade iron ores that would otherwise be unacceptable feed stock for a blast furnace as well as enabling environmentally sensitive sinter plants and coke ovens to be eliminated all together.

In addition, the Asian market place is growing rapidly in terms of the electric arc furnace industry and as such the SRV represents a means by which high quality, low cost iron metallic feedstock can be produced.

Why is this important?

It is important because the current and new generation SRV's will require high grade dolomite as a direct injection raw feed and it will target those dolomite resources that are able to provide a low silica material with appreciable magnesium units. As further explanation I have attached a brief article on the use of dolomite and dolomitic quicklime in the steel industry.

OneSteel's Ardrossan Dolomite

The Hismelt operation in Kwinana will be sourcing its dolomite from the OneSteel dolomite operation near Ardrossan on S.A.'s Yorke Peninsula. The dolomite will be supplied as a minus 11mm rubble (i.e. not single sized) and will be shipped from the Ardrossan port facility in parcel sizes of around 20,000 tonnes. The initial contract period is likely to be two (2) years.

As discussed I have some mixed feelings in relation to this supply contract as I was responsible for developing the grade control model (1991) for the Ardrossan operation following almost five months of systematic grade control drilling and feel that there are some inconsistencies in the information that has come to hand.

Whilst the Ardrossan dolomite would generally be considered as a high grade resource, the development drilling did determine that there was considerable variation in the magnesium content and the presence of a well developed karstic topography meant that large sinkholes with free flowing sands and other associated contamination issues were common. In addition, it is my view that the high water flows that were experienced during the drilling campaign will hinder production in the future.

One additional independent study and one commissioned study that I undertook in February, 2003 focussed on liming agents (*) and dolomite fines (**) respectively and analyses received from the Ardrossan operation on their minus 11mm product were certainly much higher grade than I had experienced during my considerable involvement with that operation. This may reflect a greater tendency to "high-grade" the pit which would significantly affect the life of the resource (needs further investigation).

(*) *A Discussion on the Major Liming Agents in South Australia and the Associated Commercial Opportunities, February, 2003.* (8 major products were analysed and discussed).

(**) *Domestic and Export Sales Opportunities for Dolomite Fines from CSR Readymix (S.A.) Operations at Riverview and Montacute Quarries, February, 2003.*

Quicklime Industry

As discussed the quicklime industry offers a lot of scope for those who are able to see the true opportunities. All the major players would have us believe that the market is well and truly locked away and in some cases over-supplied. This is not a true reflection of what is occurring as my current investigations are indicating.

Let's consider the Western Australian market place. There are four major lime producers in Western Australia who provide approximately 900,000 tonnes to the market place. The largest of these operations (and one of the largest quicklime plants in the world) is owned by Cockburn Cement and is located at Munster approximately 30 kilometres south of Perth. This plant currently produces in the region of 400,000 tonnes of quicklime annually from lime shells dredged from Cockburn Sound.

It should be noted that not only is the dredging an environmentally sensitive issue that has received considerable opposition but the quicklime plant is unable to operate using any other raw material source (i.e. purpose built).

Virtually all of the current quicklime production in Western Australia is of a low grade form with calcium oxide values often around 70 per cent. Nevertheless, quicklime users in W.A. are considered to be paying (typically) 10 – 20% more for their lime (on an equivalent CaO basis) than in other developed countries. Current prices are around AUD\$100 – AUD\$120 per tonne implying that the W.A. market is worth in the vicinity of AUD\$100 million per annum.

Current production capacity is thought to be around 1.2 million tonnes per annum.

The Exmouth Limestone deposit has been touted as the saviour in terms of providing a raw material for high grade quicklime manufacture but it has never gotten off the ground for a number of operational and managerial issues that I will not go into at this stage.

In terms of end users the alumina industry (via Alcoa) is the largest quicklime consumer with approximately 500,000 tonnes being consumed annually. Alcoa primarily use the quicklime as a "cheap" means by which they can recover caustic (sodium hydroxide) from their process stream for re-use in the plant. The Alcoa operations in W.A. are some of the largest alumina operations in the world and as such are flagships for the Alcoa Corporation. However, environmental issues have been more prevalent in recent years and have placed further pressures on the W.A. government in terms of approving the latest upgrade plans at the Pinjarra operation.

The Pinjarra operation wants to expand by another 400,000 tonnes per annum which could potentially see another 50,000 tonnes of quicklime enter the market place.

What is the importance here?

The environmental issues surrounding the alumina industry include the efficiency at which the caustic can be recovered. This in turn is a direct reflection on the ability of the quicklime to facilitate the recovery process. The lower grade the quicklime the less efficient the recovery (this also has a major cost implication as caustic is a very expensive reagent).

This offers a major opportunity to the right group. The W.A. quicklime market could be significantly affected by the introduction of a very high grade quicklime (which requires a high grade limestone) as Alcoa would be willing to make the switch in order to improve their caustic recoveries and address some of their environmental issues.

The reason it hasn't occurred to date is simply because of Cockburn Cement. They have a 400,000 tonne quicklime plant which cannot operate on any other raw material than the lime shells dredged from Cockburn Sound. They have a vested interest in maintaining the industry exactly where it is despite the fact that the quicklime consumers have to be content with a low grade product.

This statement is borne out by the fact that Cockburn Cement have a near new Maerz twin shaft regenerative lime kiln of approximately 80,000 – 100,000 tpa capacity sitting idle at their Kwinana operation.

The question is not so much as to whether the market should be shaken up but whether the quicklime is best produced locally or closer to the desired raw material source (e.g. Port Latia). There are obviously a range of logistic and commercial issues attached to this decision.

A new player in the market place would be aided by the current inflated prices and the very real distinction that they would be the only high grade quicklime provider in the state.

Magnesia Opportunities

There has been a lot of talk in recent years regarding magnesium metal manufacture and at one stage there were 8 new magnesium metal plants being proposed for development in Australia (the world market could sustain 2 – 3 plants in Australia). However, given the extremely poor performance of the AMC project in Queensland the entire industry has received a lot of bad press and has been somewhat tarnished in the eyes of potential investors.

This has made discussions around magnesia related issues somewhat more difficult as people often do not make the distinction between the various end products.

I have very little interest in the magnesium metal industry but I have considerable interest in the various magnesia products including magnesium bicarbonate and magnesium hydroxide and in fact Mineral Strategies is a leading organisation in the development of specialist magnesium based cements and binders.

The capital required to launch a magnesium metal operation is generally between AUD\$850 and \$1,200 million depending on the size and configuration. However, for a fraction of that cost a calcining operation (and possibly additional on-processing streams) could be established to produce various magnesia grades whilst still realising a reasonably significant proportion of the sale price attributable to magnesium metal.

In other words, why risk the producing Mg metal when the economics (not to mention the much lower risk) of producing the precursor materials are far more attractive.

In this regard, MHA hold a significantly attractive resource in terms of raw material quality as well as access to natural gas and a deep port facility which are major considerations for establishing a calcining facility and tapping into the significant export market opportunities (have identified numerous opportunities via my independent market study / analysis).

Conclusions

The carbonate market is alive and well and there are numerous opportunities in both the domestic and international market place. However, a focussed approach is necessary and as such I would advocate that 3 or 4 primary markets be singled out for attention and fully developed through to an investor-ready status.



Andrew Graham
BAppSc MEconGeol QMCert MAusIMM MIQ

Attachment: Overview of dolomite and dolomitic lime in the steel industry.

An Overview of Dolomite and Dolomitic Quicklime as Fluxing Agents in the Steel Industry (Inc. Hlsmelt)

In order to provide adequate protection to the refractories used in the steel industry there are two (2) critical factors that must be controlled:

1. Slag Basicity – which is the ratio of the quicklime (CaO) component to the combined silica (SiO₂) and alumina (Al₂O₃) components, and is generally expressed as $B_3 = \%CaO / (\%SiO_2 + \%Al_2O_3)$, and
2. The maintenance of a slag saturated with magnesium (8 – 15%).

In many steel plants around the world these two (2) factors are attended to through the addition of quicklime (CaO) and magnesite (MgCO₃) to the reaction vessel. These raw materials are referred to as fluxing agents.

Numerous studies have been conducted, worldwide, in relation to fluxing agents in the steel industry with the manner and rate of dissolution of the fluxes emerging as primary considerations. Fortunately, the rate of dissolution of magnesite and dolomite are essentially the same for similar conditions indicating that substitution is possible.

Studies conducted in the United States have shown that as long as the basicity is below about two, dolomite should readily replace magnesite in the fluxing process whilst also contributing important calcium oxide (CaO) units.

As far as the Hlsmelt (Kwinana, W.A.) slag is concerned it has the following properties:

Calcium Oxide (CaO)	36.8 %
Silica (SiO ₂)	29.4 %
Alumina (Al ₂ O ₃)	17.4 %

This gives a basicity (B_3) = $36.8 / (29.4 + 17.4) = 0.79$ which is less than the critical value of 2 for which dolomite can readily substitute for magnesite.

Further to this, studies have also shown that dolomitic quicklime (calcined dolomite) is also well able to substitute for magnesite as well as providing direct CaO units to the fluxing process (i.e. partial substitution for quicklime). Not only is this technically feasible but the cost down benefits are often substantial according to the numbers stated in various studies. In fact, some researchers claim that the cost benefit from using dolomitic quicklime as a fluxing agent may be as high as 20 per cent.

If appreciable tonnes of dolomitic quicklime can be produced then the Group would have the opportunity to market the product to other steel plants / producers as a superior fluxing agent. This factor is of significant importance given the fact that the quicklime currently available in Western Australia is generally of a low grade and is considered by users to be about 10 - 20% more expensive than in other developed countries.

Considerations in relation to the calcination of various carbonates

Introduction

World wide more than a 120 million tonnes of quicklime (lime) and dolomitic lime are produced every year. In addition, around 11 million tonnes of magnesite rock is mined every year for producing various magnesium based materials (i.e. Mg-oxide, Mg-hydroxide, Mg-chloride, Mg-sulphate and magnesium metal).

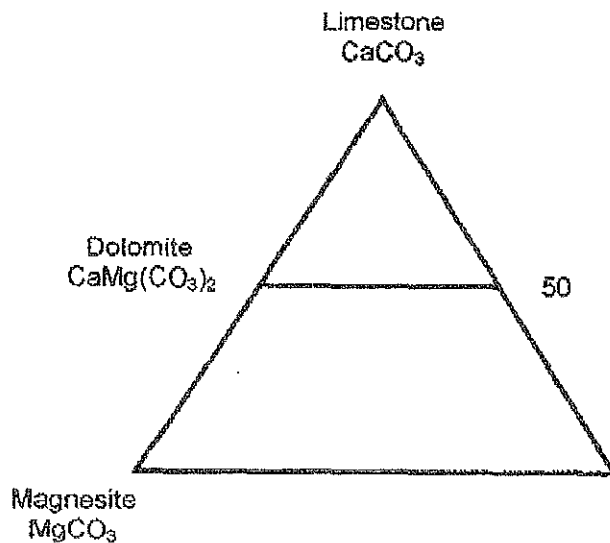
High purity limestone contains between 97 and 99% calcium carbonate (CaCO_3) whilst high quality dolomite contains approximately equal parts of calcium carbonate (CaCO_3) and magnesium carbonate (MgCO_3). High purity magnesite is similar to limestone in that it contains between 97 and 99% magnesium carbonate (MgCO_3).

From Figure 1 below it can be seen that limestone, magnesite and dolomite form part of a solid solution series where there is, theoretically, any combination from 100% calcium carbonate to 100% magnesium carbonate with a pure dolomite at the 50:50 position.

Between the dolomite and the limestone we have intermediaries known as dolomitic limestone and magnesian limestone, and, between the dolomite and the magnesite we have magnesian dolomite and dolomitic magnesite.

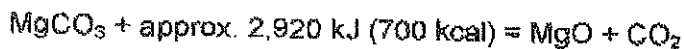
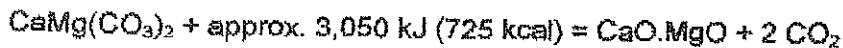
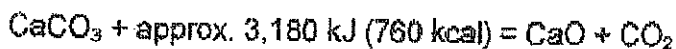
When comparing various carbonate materials we need to take into account the chemical differences and how these can affect the calcination process.

Figure 1: Phase diagram showing the solid solution series between limestone and magnesite.



Calcination Process

The calcination or burning of limestone, dolomite and magnesite is a simple chemical process. When heated the carbonates thermally decompose according to the following equations:



The decomposition temperature depends on the partial pressure of the carbon dioxide present in the process atmosphere. In a combustion gas atmosphere of normal pressure and 25% CO₂, the dissociation of limestone commences at 810 °C. In an atmosphere of 100% CO₂, the initial dissociation temperature would be 900 °C. Dolomite decomposes in two stages starting at approximately 550 °C for the MgCO₃ portion and approximately 810 °C for the calcium carbonate (CaCO₃). A high purity magnesite (MgCO₃) will begin to thermally decompose as low as 350 °C.

It requires approximately 1.8 tonnes of limestone, comprising 98% CaCO₃, to produce one (1) tonne of quicklime (CaO); approximately 2.0 tonnes of dolomite, comprising equal parts of CaCO₃ and MgCO₃ to make one (1) tonne of dolomitic lime (CaO.MgO) and 2.15 tonnes of magnesite, comprising 98% MgCO₃, to produce one (1) tonne of magnesia (MgO).

In order to fully calcine the stone (whether it is limestone, dolomite or magnesite) and to have no residual core, heat supplied to the stone surface must penetrate via conductive heat transfer to the core. A temperature of 900 °C has to be reached in the core at least for a short period of time since the atmosphere inside the material is pure CO₂. The stone surface must be heated to greater than 900 °C to maintain the required temperature gradient and overcome the insulating effect of the calcined material on the stone surface. When producing soft-burnt lime (including dolomitic lime) the surface temperature must not exceed 1,100 to 1,150 °C as otherwise recrystallisation of the CaO or CaO.MgO will occur and result in lower reactivity and thus reduced slaking properties of the burnt product.

A certain retention or residence time is required to transfer heat from the combustion gases to the surface of the stone and then from the surface to the core of the stone. Larger stones require longer time to calcinate than smaller ones – which also has implications from a production aspect depending on the strength of the stone and its tendency to break down into smaller size fractions (additional energy cost). In principal, calcining at higher temperatures reduces the retention time needed. However, too high temperatures will adversely affect the reactivity of the product. The relation between burning temperature and retention time required for different stone sizes is shown in the following table.

Stone Size [mm]	Calcining temperature [°C]	Approx. residence time [hours]
50	1,200	0.7
50	1,000	2.1
100	1,200	2.9
100	1,000	8.3

The grain size and the crystal habit of the stone is also very important in terms of the calcining dynamics. Heat transfer is more effective when the stone is fine grained or cryptocrystalline as compared to a coarse grained or macrocrystalline material. The boundaries between the individual grains are also important as these markedly affect the heating dynamics in terms of heat transfer efficiency. These grain size characteristics are somewhat affected by the depositional environment but are particularly affected by any regional metamorphic events that may have occurred. Temperature and pressure (metamorphism) changes result in recrystallisation and under certain conditions will result in a major change in the grain size of the stone.

For example, the Penrice Marble Unit in South Australia was the result of a limestone that underwent high grade regional metamorphism (amphibolite facies) and became a coarse grained (saccharoidal) marble with both intra-granular (some of the grains were large enough that they lost internal strength) and inter-granular strength losses.

Depending on the exact nature of the metamorphic event the grain boundaries may become highly strengthened (sutured grain boundaries) or somewhat weakened (retrograde

metamorphism). The heat transfer characteristics of the stone will be dictated to by these grain size characteristics.

When heating the stone there is a tendency for some stone types to break down along minute fracture systems or even for the grain itself to break (thermal shock) and become part of a granular mass that no longer contributes to the calcining process. In fact, if enough of this material is generated it can have a highly adverse affect on the total heating dynamics within a kiln. This tendency of carbonate materials to break down in a kiln environment is called decrepitation.

The decrepitation potential of a carbonate material is directly proportional to its grain size and both the intra-granular and inter-granular (boundary) strengths which can be quite well represented by the overall compressive strength of the stone. A material that has a tendency to decrepitate will have a significantly detrimental impact on the overall performance of the stone. A decrepitating stone will create heat shifts within the kiln (by interrupting the air flow dynamics) and as such some of the stone will become hard-burnt and some of the stone will be under-burnt. In both cases the reactivity of the final lime product is affected.

Conclusion

The ideal carbonate material is one that exhibits a fine or cryptocrystalline grain size and which has a high compressive strength. This material will have a tendency to remain intact throughout the heating process (little or no decrepitation) and will result in a superior end product due to more complete calcining in a lesser residence time.

When assessing any carbonate material and especially its impact in terms of CO₂ emissions these factors must be taken into consideration.

To Neil Thomas, Chairman
Mineral Holdings Australia Ltd
Private and confidential

Svendborg August 1, 2006

Dear Neil,

Subject: MTL magnesium project

Subsequent to our conversation today I would like to clarify the issues raised concerning production of Magnesium metal and other potentials inherent in our patented method:

Magnesium metal

Magnesium Technologies Ltd. (MTL) own all rights to exploit our original international patent (text can be retrieved among others in EPO 668 935; USP 5,803,9476 and AU 680 403). The patent was originally applied for by Mineral Development International A/S, Denmark. The patent and process have been independently evaluated in a US Department of Energy (DOE) funded study to find the most economic method to produce magnesium metal. According to the study performed by Dr Robert Odle, Metallurgical Viability, the production cost for MTL method is estimated to be between 28 and 32 US cents per lb finished metal, as against Chinese production prices, which are about twice as high, using the labour and energy intensive Pidgeon method. Investment costs are estimated to be less than half the cost to set up an equal size electrolytic plant.

The method is presently in the process of being proved up to industrial scale, and this work will be carried out with assistance from Oak Ridge National Laboratory near Knoxville, Tennessee.

Magnesium hydride

Apart from the conventional magnesium metal markets now mainly being served by Chinese producers, the work carried out under the auspices of a DOE was dedicated to prove fundamental economic parameters as part of the intense work to use magnesium hydride as the energy carrier for hydrogen based fuel cells and motor engine drive trains. Magnesium hydride (MgH_2) has a sufficient energy density to be a real alternative to gasoline when suspended as fine particles in mineral oil. The resulting fluid can be handled and pumped as safely as any of the present hydrocarbon fuel and does not need to be contained in pressurized containers. The mixture will react with water, gasifying the hydrogen contained in the magnesium hydride and half the hydrogen contained in the water, $(\text{MgH}_{2(\text{solid})} + \text{H}_2\text{O}_{(\text{liquid})} = \text{Mg(OH)}_{2(\text{solid})} + 2\text{H}_{2(\text{gas})}$ – hence the high energy density.

The magnesium hydroxide from used fuel is readily regenerated using MTL technology. The inherent process features in the carbothermic reduction of magnesium minerals makes it possible to produce very fine magnesium powders injected directly into a mineral oil, i.e. no need for tedious grinding of metal (this has been tried on industrial scale already). On a speculative basis the metal vapor could also subject to simultaneous hydrogenation as part of the reduction process, i.e. direct production of magnesium hydride.

Raw materials

Magnesium is by no means a rare metal, but high costs of extraction have hitherto limited its use.. Using the MTL magnesium process, metal production prices could be on level with aluminum. For many constructional uses magnesium is a lighter and stronger alternative so a cheaper method would open up a huge market. Raw feed for the MTL process can be both magnesium carbonate and magnesium silicate and 10% contained silica in a magnesite seems to provide an optimum feed stock.

We are aware of the great potential in Tasmanian magnesites and magnesium silicates but need to concentrate our resources to industrialize the production plant. MTL is however interested and will also be open for offers to participate in this work if the right party comes along at this time where the company structure is being adjusted.

I do hope that this clarifies the issues we discussed, but further details can of course be provided as needed.

Kind regards

Jens Frederiksen
Director, MTL

MEMORANDUM

RECEIVED - 6 SEP 2001

To: Neil Thomas
From: David Zani
Subject: LABORATORY CYCLIC TESTS FOR REMOVAL OF LONG-CHAIN ORGANICS FROM BAYER PLANT LIQUORS USING DOLOMITE

Long chain organics are formed in Bayer plant liquors from the organic carbon in the bauxite. The amount formed depends on the type of bauxite used, digestion temperature and time, and caustic soda concentration.

Dolomite was used in digestion at Guillini to successfully increase production by removal of long chain organics. This can be simulated in the laboratory by doing the following cyclic tests:

- Bulk sample of Bauxite
- Bulk sample of Bayer Liquor
- Bulk sample of Alumina Hydrate
- Bulk sample of Dolomite

Digest bauxite in laboratory autoclave with spent liquor and dolomite

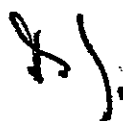
Cool to 95°C and filter

Cool liquor to temperature for precipitation. Add hydrate and precipitate alumina for requisite hours. Filter to separate hydrate from spent liquor.

Analyse spent liquor for organic carbon, oxalates or other long chain organics and alumina to caustic ratio.

Recycle spent liquor to digestion. Carry out ten recyclic tests.

The organic carbon in the recycled spent liquor should decrease as the cycles increase and the alumina to caustic ratio should decrease.



* KAISER PRODUCTION MANAGER.

ATTACHMENT 2

CARBONATE ROCKS

IN

NORTH-WEST TASMANIA

BY

TOM DICKSON

18TH FEBRUARY 2003.

**CONTACTS SHOULD
YOU SO DESIRE**

**TELEPHONE
ADDRESS**

**Tel: 9840 1171
5 Crouch Court
DONCASTER VIC 3108**

UPDATED NOVEMBER 2004.

GEOLOGICAL SEQUENCE N-W TASMANIA

Recent cover, beach sands and river gravels.

Tertiary Basalt

- Sub basalt limestone and gravels.

Unconformity

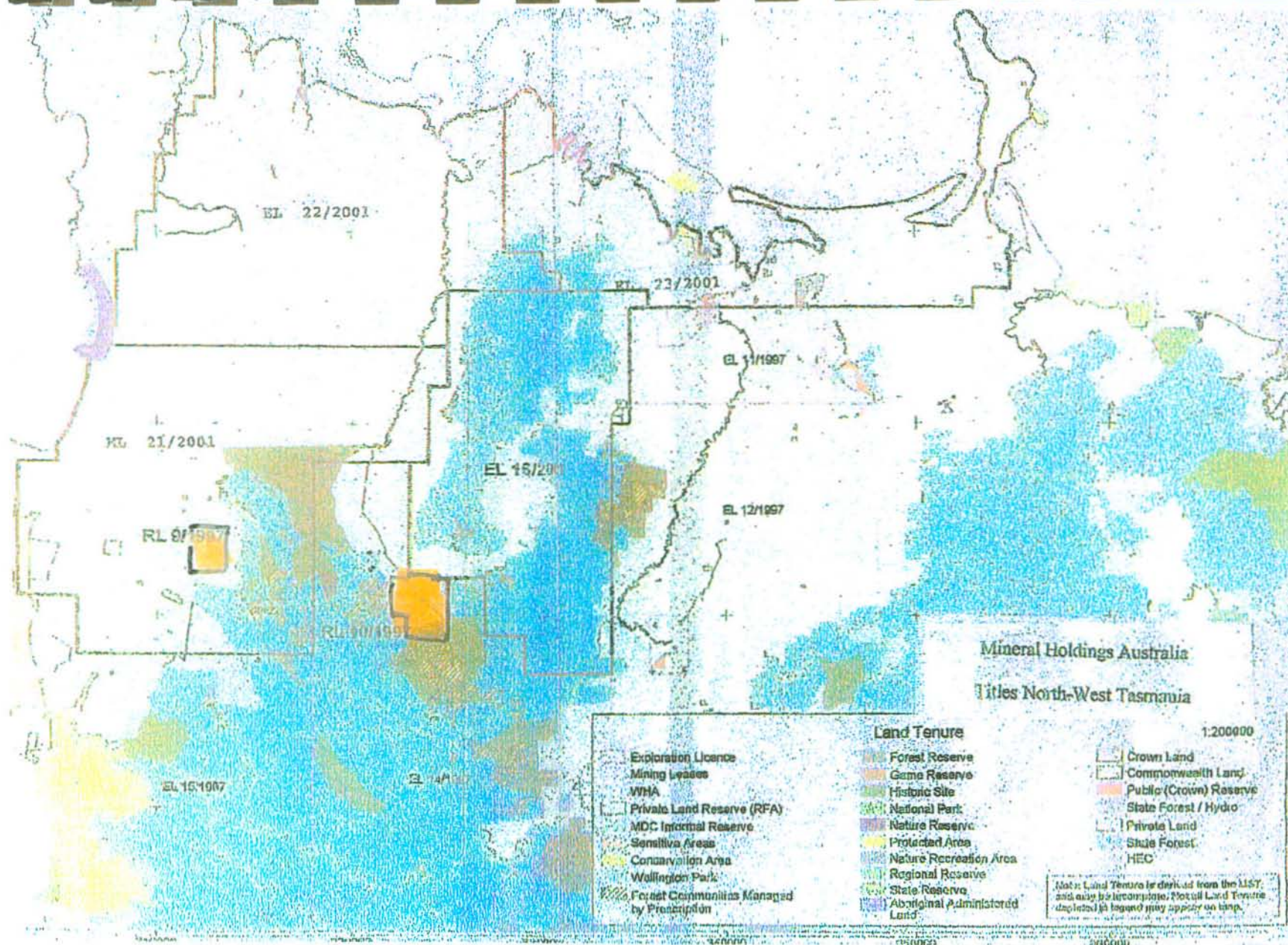
Smithton Trough

- Dundas Group Equivalents, basalt, tuffs and mudstones.
- Smithton Dolomite
- Crimson Creek equivalents, basalt, tuffs and mudstones.
- Black river Dolomite and Forest Conglomerate.

Unconformity

Rocky Cape Group, Pre- Cambrian Sandstones siltstones and shales includes

- Arthur Lineament , with magnesite- iron formation horizon.



MHA - RL 9/1997 AND RL 10/1997

REDPA RL 9/1997 (6Km²) Approximately 90Km from Port Latta.

Explored extensively for Tertiary Limestone
Pre-Cambrian Magnesian Limestones and
Pre-Cambrian Dolomites.

Evaluation work has included

- 23 hand samples,
- 26 hammer drill holes for 257 metres (mostly in limestone)
- 7 shallow diamond drill holes (mostly testing dolomite)
- 10 shallow hammer holes (to test the magnesian limestones)
- Several 250 tonne bulk samples for furnace testing.

The limestone was originally a wide spread sheet over a relatively flat lying Pre-Cambrian basement. It now occurs as a series of remnant hills around the edge of an extensive basalt sheet and most probably extending under the basalt cover.

The limestone is white to pink in colour and is generally dense and compact in texture. There are occasional cavities and the limestone can be sugary immediately adjacent to the cavity. Thickness from the drilling ranges from 1 to 18 metres and averages around 10 metres.

The limestone averages 54.02% CaO, 0.9% MgO, 0.66% SiO₂, 0.17% TiO₂, 0.28% Al₂O₃, 0.61% Fe₂O₃, 0.03% MnO₂, less than 0.01% alkalies, 0.096% P₂O₅, 0.595% SO₃, and 45.11% LOI.

Some 5Mt of high quality limestone is available in the Redpa area and additional resources would be available along and under the basalt margin to the north and south.

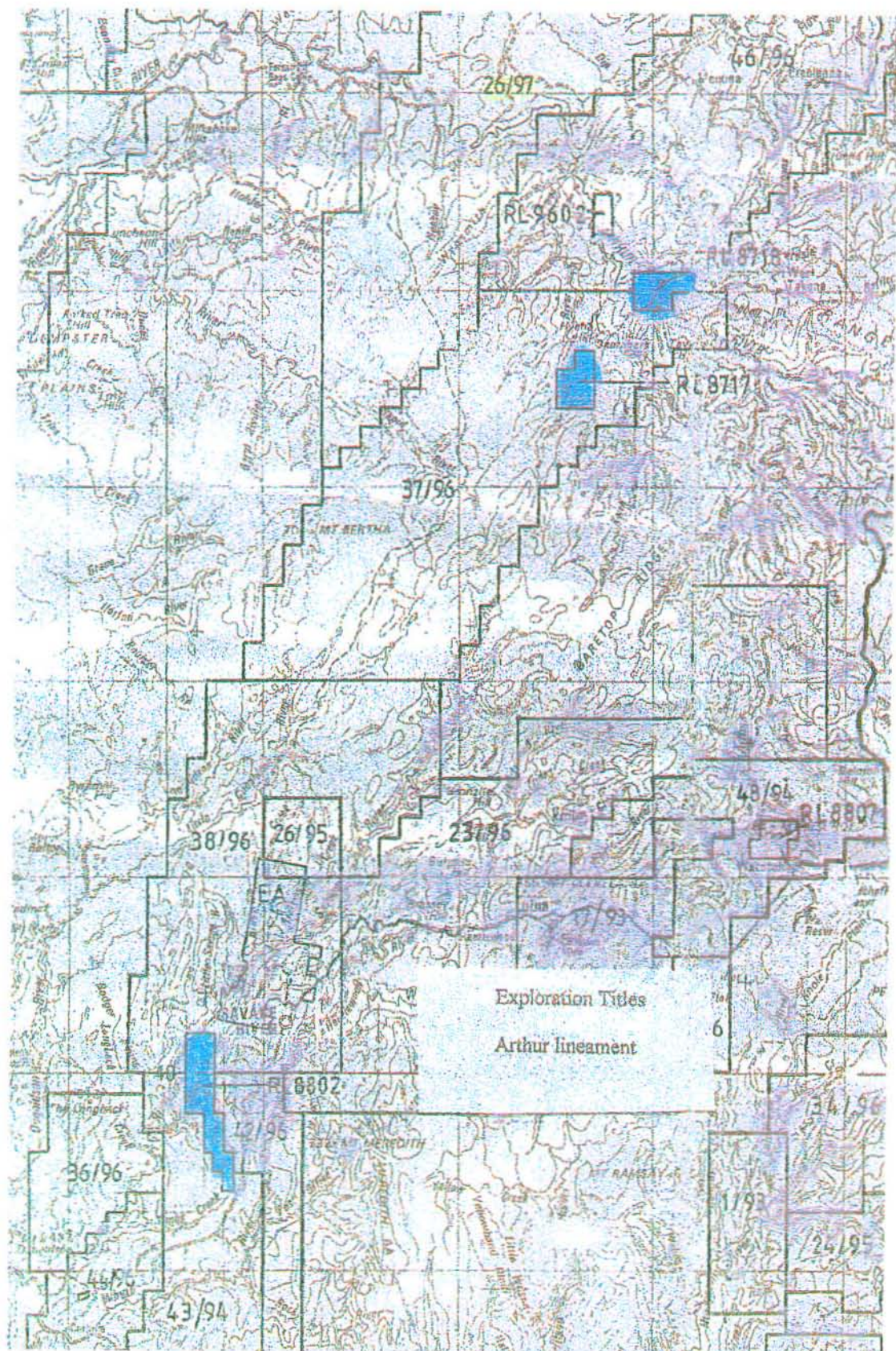
Furnace tests on the limestone at 1150 to 1350° C indicated the material remained hard with no tendency to crumble or powder and that it would maintain integrity in a shaft kiln.

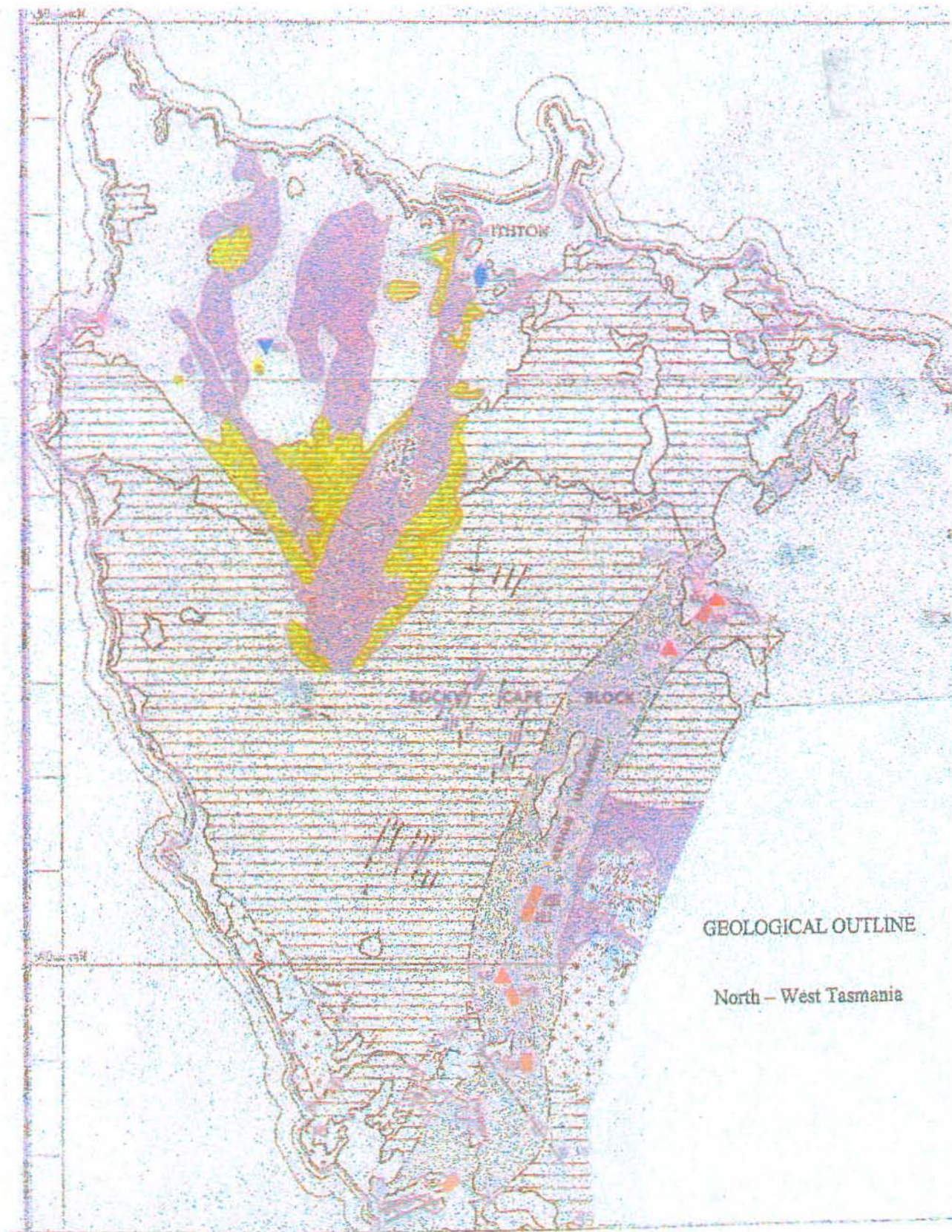
Magnesian limestone and dolomite occur as subcrop throughout the Redpa Retention Licence. The rock is hard and marbleised but is very fine grained dense and massive in appearance. It is usually light grey in colour but some of the magnesian limestones tend to be lighter in colour and this difference is believed to increase with depth. From the limited amount of shallow drilling it appears the magnesian limestones predominate at Redpa but the true distribution is not yet clear.

The structure in the basement rocks appears to be a broad shallow syncline and at least 1000 metres of section is present. Any resource of dolomite or magnesian limestone is therefore very large.

The dolomite ranges from 31 to 32% CaO and 18.8 to 19.5% MgO. Silica is generally below 0.2% although occasional spikes to 10% do occur.

The Magnesian limestone contains 36-50% CaO, 5-16% MgO, 0.2 - 1.4% SiO₂. All other oxides are very low and LOI is 43.5-46.5%.





GEOLOGICAL OUTLINE

North - West Tasmania

MINERAL HOLDINGS AUSTRALIA PTY. LIMITED

A.C.N. 004 759 853

Correspondence to:

2nd Floor,
135 COLLINS STREET,
MELBOURNE, VIC., AUSTRALIA 3000
TELEPHONE: (61 3) 654 7999
FAX: (61 3) 650 3855

DOLOMITE SPECIFICATION

TASMANIAN RETENTION LICENCE RL 19/1997

	King	Edward	
CaO	31.5	32.3	29.7-32.5%
MgO	20.9	19.0	20.0-22.4%
SiO ₂	0.74	0.21	0.75% max
Fe ₂ O ₃	0.062	0.08	.15% max
Al ₂ O ₃	0.04	0.10	0.25% max
H ₂ O			0.20% max
LOI	46.48	46.96	45.10- 51.30%

U.S. Screen*	ISO MM**	% Retained
20	0.850	25 max
100	0.150	70 max
140	.106	10 max
200	0.075	3 max
PAN		3 max

Material to have less than 6.0% Decrepitation

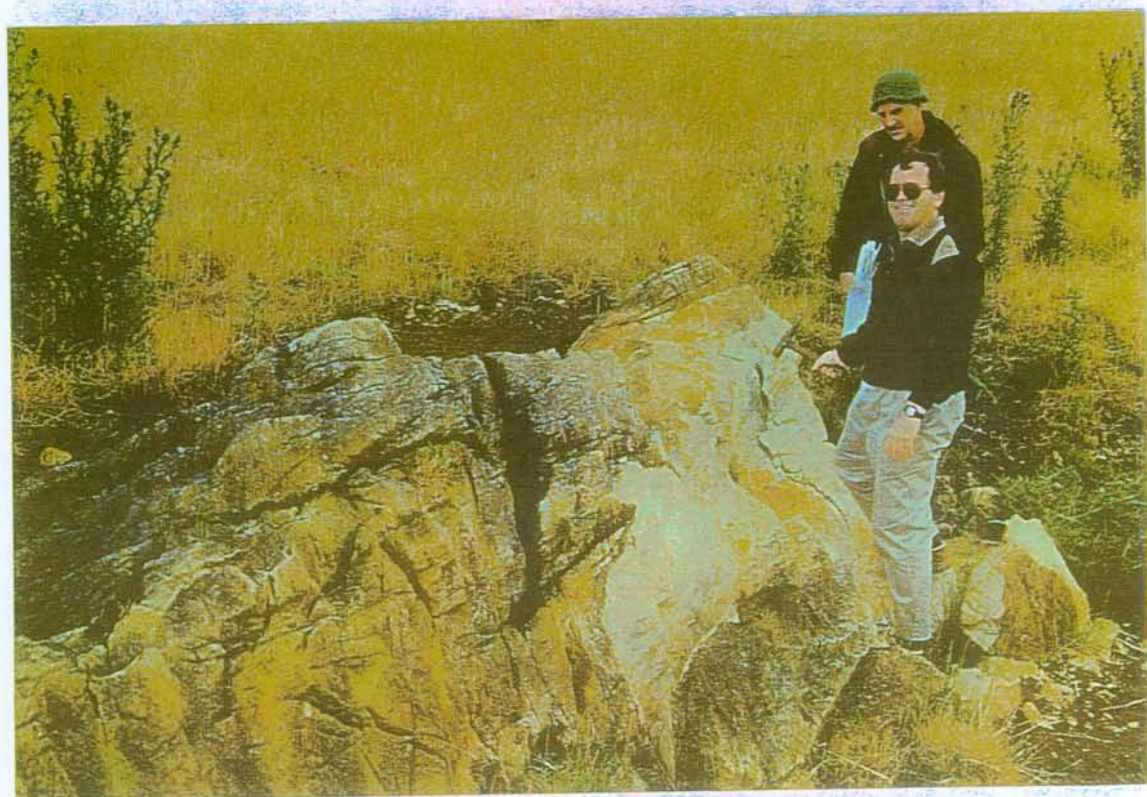
* ASTM E-11-61

** ISO 656:1983

**RETENTION LICENCE – RL 9/1997
HIGH GRADE PRE-CAMBRIAN
DOLOMITIC LIMESTONE – REDPA**



SURFACE OUTCROPS AT CARBONATE HILLS



SURFACE OUTCROP AT CARBONATE HILLS

RETENTION LICENCE – RL 9/1997
HIGH GRADE TERTIARY
LIMESTONE – REDPA



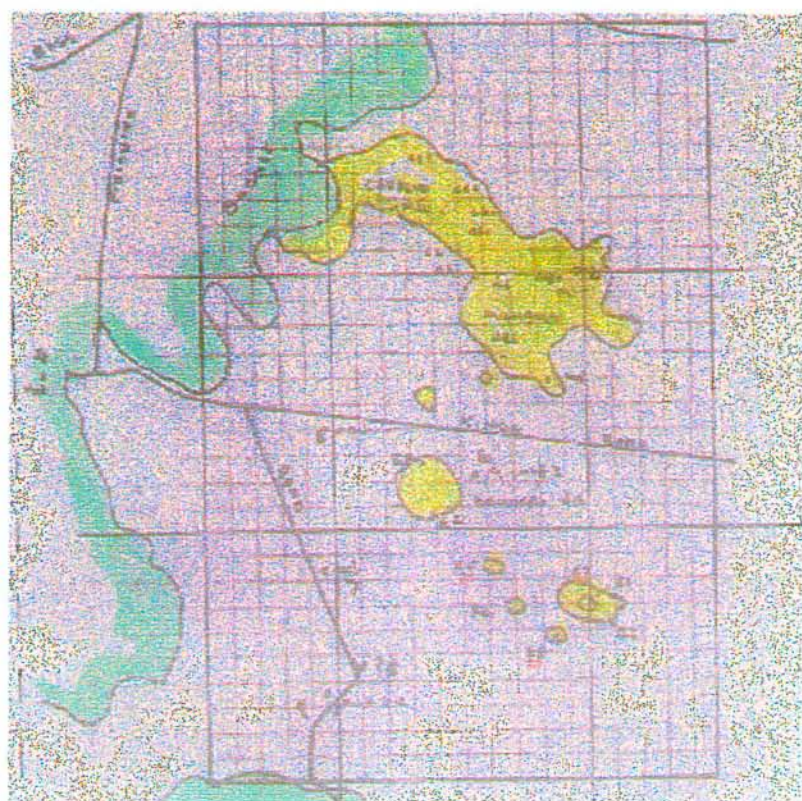
SURFACE OUTCROPS AT CARBONATE HILLS



SURFACE OUTCROPS AT CARBONATE HILLS

REDPA DOLOMITE, LIMESTONE AND DOLOMITIC-LIMESTONE ANALYSIS
(weight percentage)
(All numbers are average % composition)

	Limestone	Mag-rich Limestone (Dolomitic Limestone)	Dolomite
SiO ₂	0.66	0.95	0.40
TiO ₂	0.17	0.04	0.013
Al ₂ O ₃	0.28	0.21	0.31
Fe ₂ O ₃	0.61	0.09	0.23
MnO	0.03	0.01	0.006
MgO	0.90	13.95	21.40
CaO	54.02	38.31	30.41
Na ₂ O	<0.01	0.23	0.12
K ₂ O	<0.01	0.07	-
P ₂ O ₅	0.096	0.037	-
SO ₃	0.59	0.51	-
CuO	-	-	0.0005
Cr ₂ O ₃	-	-	0.0009
L.O.I	45.11	45.33	46.97



Limestone Outcrops Redpa area.
(limestone – yellow, basalt – green, Basement dolomites and
magnesian limestones uncoloured)

ATTACHMENT 3

**LYONS RIVER
PRE-CAMBRIAN MAGNESITE
TASMANIA**

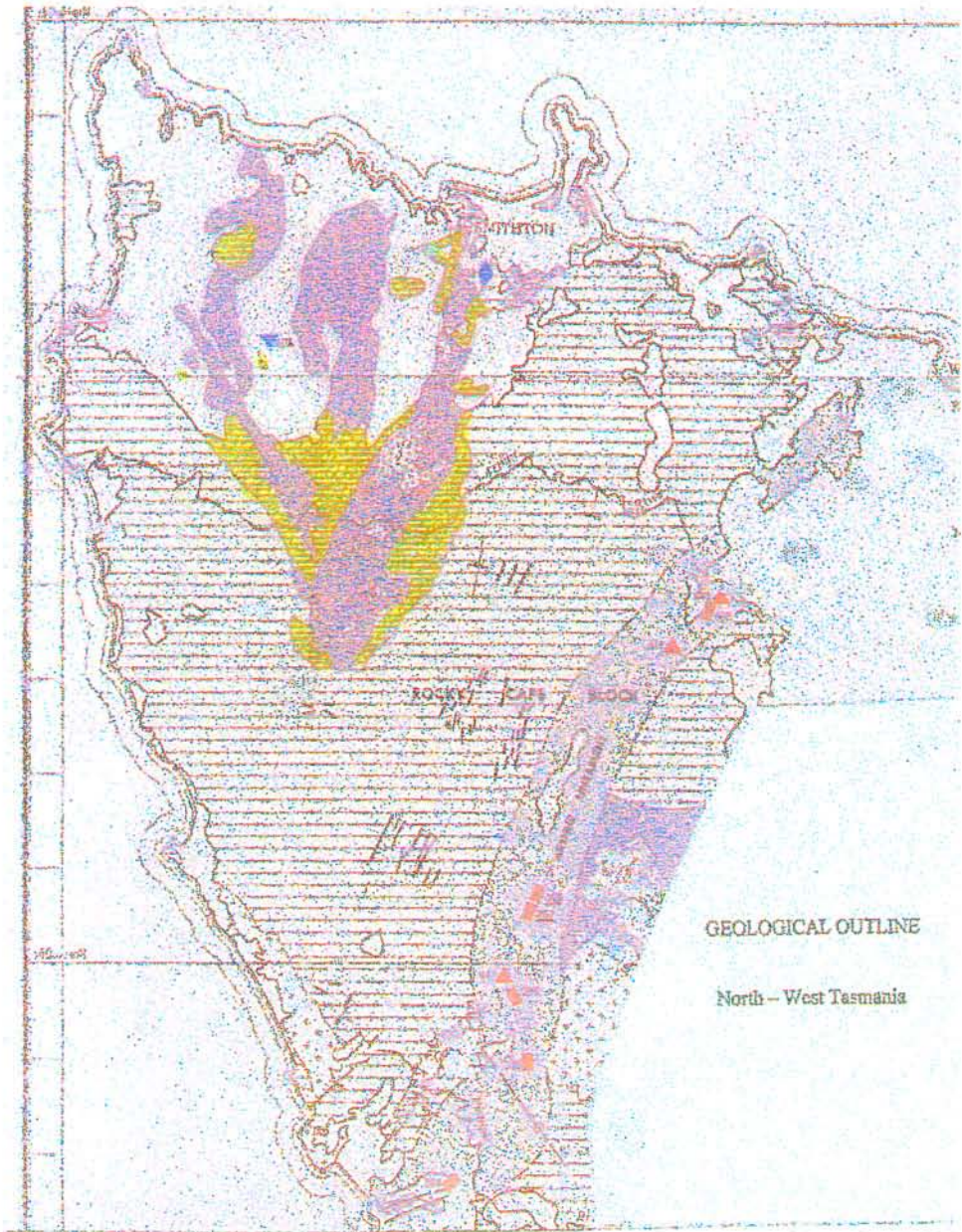


**LYONS RIVER
PRE-CAMBRIAN MAGNESITE
TASMANIA**



MAGNESITE DEPOSITS

The magnesite deposits of the Arthur-Lyons River area and the Savage River area are situated in a NNE striking belt of deformed and metamorphosed rocks known as the Arthur Lineament. The Lineament is from 8 to 15 Km wide and extends from Wynyard on the north coast to Granville Harbour on the west coast. The individual magnesite /carbonate bodies are strung out along the Lineament in the same stratigraphic horizon as a series of magnetite / sulphide bodies like that at the Savage River Mine.



The Arthur River deposit (RL18/1987), the most northern body, is covered by a veneer of alluvial gravels from 6 to 20m thick. It occurs over a strike length of 3500 m and ranges in thickness from 150 to 400 m. Between 1982 and 1984 CRAE investigated the deposit with 7 diamond drill holes for 1643m outlining a total carbonate resource in the order of 3 million tonnes per vertical metre. The body

extends to at least 200 m depth and zones of high grade magnesite(+40% MgO) within the deposit average 1.57% Fe₂O₃, 2.17% CaO and 6.35% SiO₂. The resource of +40% MgO material was estimated at 30Mt to 100m depth.

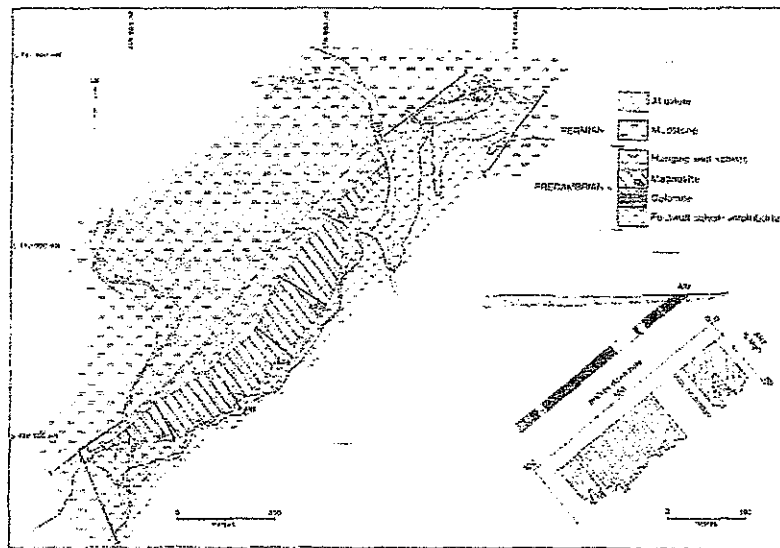
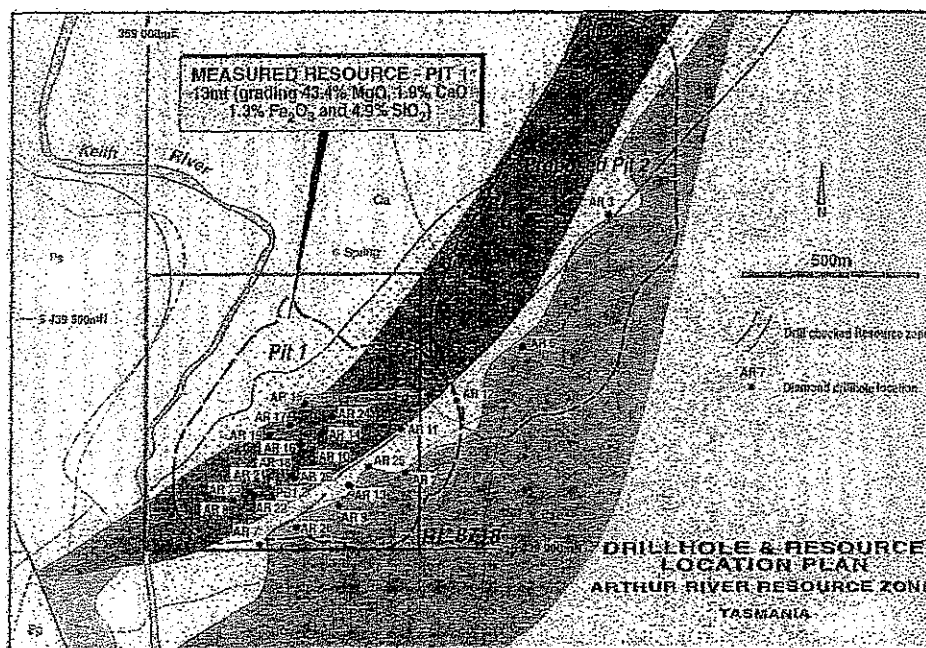


Fig. 2—Geological plan, Arthur River magnesite deposit.

In 1997 Tasmania Magnesite NL (a wholly owned subsidiary of Indcor) commenced a check drilling program of 7 holes (1254m) confirming the earlier work and suggesting an inferred resource of 29 Mt at an average grade of 42.8% MgO and 5.3% SiO₂, existed in the south west corner of the Licence.

Upon acquiring the project in 1988, Indcor carried out an infill drilling program of 2760 m in 15 holes. Using cut-off grades of 38% MgO, 4% CaO, 6% Fe₂O₃, and 12% SiO₂ a measured resource was identified over a 250 metre strike length to an average depth of 145 metres. **This measured resource was 13 million tonnes grading 43.4% MgO, 1.9% CaO, 1.3% Fe₂O₃, and 4.9% SiO₂.**



The Lyons river deposit (RL 17/1987) is 4 Km along strike to the south is poorly exposed below a thick residual soil cover. The body is up to 400m thick over a strike length of 2000m. It grades to dolomite to the south and pinches out under basalt to the north. The magnesite is exposed over a vertical height of 130m and is proved to a further 300m by drilling. The deposit has been tested by 11 drill holes totalling 2635m and the average of all +40% MgO material contains 1.09% Fe₂O₃, 3.4% CaO and 7.25 SiO₂. The resource of this +40% MgO material is estimated at 30 Million tonnes down to the level of Lyons River.

A further 25 holes for 822m were developed in the Pinner area of the Lyons River deposit during 1989 to develop the area as a bulk sample site. Siliceous magnesite was encountered east of the Pinner pit with better quality magnesite below the dolomite to the west.

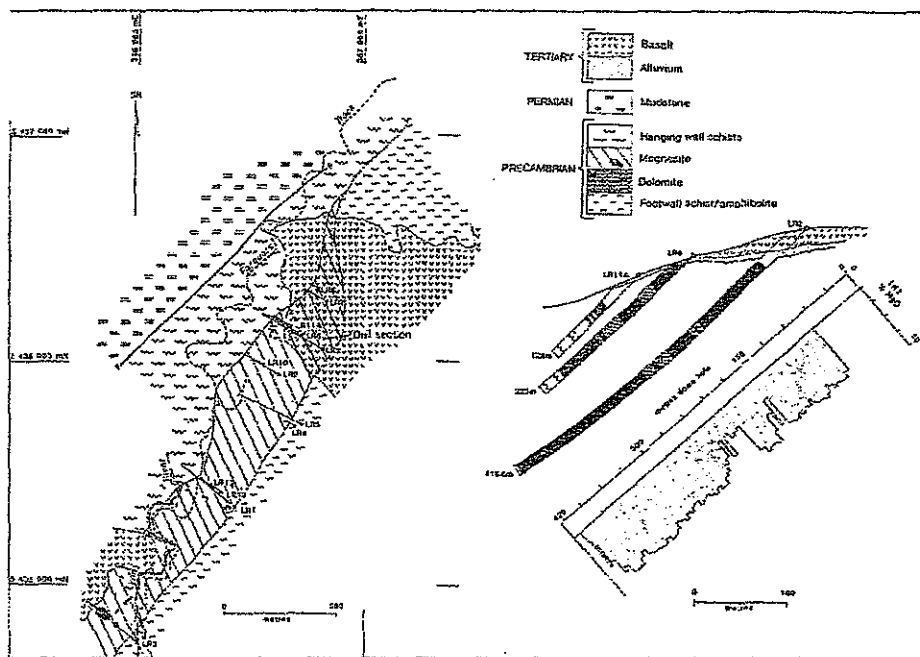


Fig. 3—Geological plan, Lyons River magnesite deposit.

The mineralogy of both deposits is simple with most samples being mixtures of magnesite and dolomite with minor quartz, pyrite and occasional silicate minerals such as talc and chlorite.

Magnesite commonly constitutes 70% of the deposits and is usually creamy white, having the texture of a very fine grained marble. The magnesite is easily distinguished from the dark grey dolomite, which occurs as distinct bands or as the matrix of dolomite magnesite breccias. Five distinct primary textures are recognised.

- Massive grey dolomite
- Angular magnesite breccia
- Wispy magnesite breccia
- Cruciform magnesite
- Massive magnesite.

Typical white magnesite separated from the breccias assay 46.0% MgO, 0.45CaO, 0.74% SiO₂, 0.59% Fe₂O₃ and 51.6% LOI. Typical grades of other oxides within the

areas of interest are $\text{B}_2\text{O}_3 < 0.05\%$; MnO , $\text{Na}_2\text{O} < 0.1\%$; SO_3 , K_2O , TiO_2 , P_2O_5 , PbO , ZnO , CuO , NiO , $\text{BaO} < 0.01\%$.

As a general rule magnesite near the surface has a much higher silica content and this is particularly obvious in the shallow drilling in the Pinner pit area.

Numerous beneficiation and evaluation studies have been carried out on both the Lyons River and the Arthur River magnesites. Bulk samples were tested by CRA (AMS) and KHD Humboldt Wedag for beneficiation by floatation. CRA produced a burnt magnesite product with 97.6% MgO , 1.29% CaO , less than 0.5% SiO_2 and 1.29% Fe_2O_3 although recoveries were considered low. After a grind to 100% less than 0.12mm KHD were able to produce a magnesite concentrate with 96-97% MgO and 0.5% SiO_2 (related to burnt magnesite) by a two stage floatation with concentrate recovery of 63.5%.

Heavy media separation of silica and calcite / dolomite from the magnesite was quite successful in trials by AMS (CRA) and OMAG but the method was not continued with as most of the trials aimed especially at reducing the iron content to levels acceptable to the refractory industry.

More recent work by the Tasmanian Department of Mines has suggested simple crushing and screening will remove some contaminants (concentrated in crystalline dolomite veins) with a further upgrade during calcining. The coarser dolomite fragments during calcining whereas the fine grained magnesite retains its form. Work by David Zanni of TDM indicated simple calcining and screening off of the fines resulted in

MgO	+2.3% higher
CaO	-0.15% lower
SiO_2	-1.68% lower
Fe_2O_3	-0.4% lower.

CRA also carried out successful upgrading trials by colour sorting but the process was not continued.

In 1987 two 30 tonne samples from the Pinner area were sent to Norsk Hydro in Norway and MPLC in England for testing as a source of magnesium metal. Results were reported as satisfactory.

A series of calcination tests have been carried out by OMAG, MINTEQ, AMDEL. The results were all satisfactory for both kiln behaviour and soundness of the finished product. AMDEL suggested the magnesite can be calcined to form a very reactive product, with a surface area of 75 to 95 m^2/g , which reacts quickly with acid liquors. Heavy metals virtually completely precipitated. Reactivity appears highest when CaCO_3 lowest and most reactive when silica content was high.

The Cann Creek deposit lies in a small parallel belt of carbonate 4.5 Km to the west of the main Arthur River line. It occurs as a bold outcrop. The carbonate horizon was fairly extensive north of the Arthur River but the magnesite was restricted to a series of tors around Cann Creek. The material had extremely low iron contents (0.02 to 0.05% Fe_2O_3 and although one hole 100m below the outcrop and a second 400m to

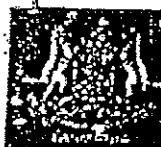
the south intersected mostly dolomite it is possible a shallow plunging shoot could still exist at Cann Creek with a limited tonnage of extremely high grade magnesite.

Several small outcrops of magnesite occur at **Little Donaldson River** to the north of the Savage River mine. No drilling has been carried out to date although the location is adjacent to the Savage River Port Latta pipeline.

In the old **Savage River Pit** a thin seam of magnesite could be seen on the hanging wall of the ironstone. It continued north and bulged out at the Savage river crossing into of several million tonnes. This material has since been mined out in the extension of the pit to incorporate the northern ironstone body. The magnesite was stockpiled and is used as a neutralising material on sulphide rich dumps.

A Large magnesite body every bit as large as the Lyons River zone occurs on **Main Creek** a tributary of the Savage River about 8 km south of Savage River Mine. The body has been extensively drilled but data is not available at this stage. The deposit is at least 400m in width and at least 1Km in length. Assays range up to 42.3% MgO , 3.89% CaO, 1.2% SiO₂, and 2.09% Fe₂O₃.

A further large magnesite body occurs at **Long Plains** another 2km to the south. The body is closely associated with the Long Plains ironstone but again details are lacking.



Department of Resources & Energy

DIVISION OF MINES & MINERAL RESOURCES

287 Wellington Street
MELBOURNE 3000
TASMANIA 7249

tel (003) 44 2131
fax (003) 44 6565

22.5.90

Mineral Holdings Ltd
2nd Floor
100 Collins Street
Melbourne 3000

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

n ion	%							
	Weight	L.O.I.	Mgo	CaO	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃
8 mm	81.27	0.40	91.58	2.49	2.86	<0.01	<0.01	2.57
8mm (Calc)	18.73	0.84	79.01	3.33	11.83	<0.01	<0.01	4.69
	100.0	0.49	89.23	2.64	4.54	<0.01	<0.01	2.97
			2.35					

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	2.35%	higher
CaO	0.15%	lower
SiO ₂	1.68%	lower
Fe ₂ O ₃	0.40%	lower

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

Micron	%
- 1	3
+ 1 - 10	62
+ 10 - 50	17
+ 50 - 1000	13
+ 1000	5


(D. Zani)
Chief Chemist & Metallurgist

N968GE04 Assay Results for Lyons River

ANALYTE	DESCRIPTION		DETECTION LIMIT	UNITS
	Lyons River +1.18mm	Lyons River -1.18mm		
Ag	0.3	0.2	0.1	ppm
As	<0.5	2.0	0.5	ppm
Bi	1.2	0.2	0.1	ppm
Cd	<0.1	<0.1	0.1	ppm
Ce	3.0	4.0	0.5	ppm
Co	0.7	0.8	0.2	ppm
Cs	<0.1	<0.1	0.1	ppm
Cu	8.0	20.5	0.5	ppm
Ga	0.4	0.4	0.1	ppm
In	<0.05	<0.05	0.05	ppm
La	1.5	2.0	0.5	ppm
Mo	0.1	0.6	0.1	ppm
Nb	2.0	<0.5	0.5	ppm
Ni	6	6	2	ppm
Pb	3.5	12.5	0.5	ppm
Rb	0.3	0.8	0.1	ppm
Sb	130	98	0.5	ppm
Se	<0.05	<0.05	0.5	ppm
Sr	21.0	30.5	0.1	ppm
Te	<0.2	<0.2	0.2	ppm
Th	5.00	3.60	0.02	ppm
Ti	<0.1	<0.1	0.1	ppm
U	0.13	0.10	0.02	ppm
W	0.1	0.3	0.1	ppm
Y	1.70	2.10	0.05	ppm
Zn	23.0	39.5	0.5	ppm
Dy	0.45	0.52	0.02	ppm
Er	0.20	0.20	0.05	ppm
Eu	0.19	0.22	0.02	ppm
Gd	0.55	0.60	0.05	ppm
Hf	0.80	0.40	0.05	ppm
Ho	0.07	0.08	0.02	ppm
Lu	<0.02	<0.02	0.02	ppm
Nd	2.30	2.80	0.02	ppm
Pr	0.50	0.60	0.05	ppm
Sm	0.69	0.79	0.02	ppm
Tb	0.09	0.10	0.02	ppm
Tm	<0.05	<0.05	0.05	ppm
Yb	0.15	0.15	0.05	ppm

N968GE04 Assay Results for Lyons River

4PE1704

N968GE04	071004Pt	Pd	Rh	Ru	Ir	Os	Au
UNITS	ppb	ppb	ppb	ppb	ppb	ppb	ppb
DETECTION	1	5	1	1	1	2	1
METHOD	FA4	FA4	FA4	FA4	FA4	FA4	FA4
LYONS RIVER +1.18	14	8	3	57	3	0	54
LYONS RIVER -1.18	5	0	4	71	4	3	24

MINERAL HOLDINGS AUSTRALIA PTY. LIMITED

A.C.N. 004 759 853

Correspondence to:

10th Floor,
100 COLLINS STREET,
MELBOURNE, VIC., AUSTRALIA 3000
TELEPHONE: (61 3) 9654 7999
FAX: (61 3) 9650 3855

28.3.1996.

EFFECTIVE BENEFICIATION of CRYPTO-CRYSTALLINE MAGNESITE
with 98% dead-burning in the first pass in the furnace and only 2% of fines.

Our crypto-crystalline magnesite has excellent furnace-ability. It is very suitable for an EAF bottom mix where good sintering in the furnace must be fast. It would also be a very good slag-conditioner where operators pay attention to basicity in the B.O.F. furnace and an excellent gunning mix for furnaces.

PERIGLASE REFRACTORY NORM

FOR THE CHEMICAL ANALYSIS: (AUSTRALIA 8/18/95 MINERAL HOLDING PTY LTD)

Sample supplied from Licence RL.8718 (Arthur River)

Item	OXIDE	MgO	CaO	Al ₂ O ₃	Fe ₂ O ₃	SiO ₂	B ₂ O ₃	
1.	WT. %	91.58	2.49	0.01	2.57	2.86	0.00	Unbeneficiated (Head Grade)
2.	WT. %	94.74	2.11	-	1.86	1.03	-	The coarse fraction is beneficiated by crushing and screening off fines

MICRON -1. -3%
SIZE +1 - 10 -62%
+10 - 50 -17%
+50 -1000 -13%
+1000 - - 5%

THE NORMATIVE MINERAL COMPOSITION of
our MAGNESITES AS FOLLOWS: WT. %

PERICLASE (M)	88.88
SPINEL (MA)	0.01
MAGNESIOFERRITE (MF)	3.22
MONTICELLITE (CMS)	6.95
FORSTERITE (M2S)	0.45
TRICALCIUM BORATE (C3E)	0.00

BENEFICIATION

NB 1. It is very interesting to note Item 1 that further beneficiation of the coarse fraction of ore is effected by crushing magnesite and screening off fines. Also much greater beneficiation is effected after the calcined product is crushed to <19mm to >1.18mm and the screening off of the >1.18mm fines. The total effect is that the MgO in the coarse fraction is increased by 3.16% and also a reduction is effected of the impurities of Fe₂O₃ 0.71%, CaO 0.38% and SiO₂ 1.83%.

Further selective mining in this huge deposit of "sweet spots" would enable the processing of ores of a higher head grade than 91.58% Mgo, effecting even better beneficiation results.

As these beneficiation processes of crushing and screening are normal processing of ore procedures there is no additional costs involved to effect beneficiation for world standard grades.

CALCINE CIRCULAR

TASMANIAN CRYPTO-CRYSTALLINE (MARBLE-ISED) MAGNESITE ANALYTICAL, BENEFICIATION AND INDUSTRIAL TESTS 31.1.1996.

Our crypto-crystalline magnesite has excellent furnace-ability with only 2% as fines after dead-burning. It is very suitable for an EAF bottom mix where good sintering in the furnace must be fast. It would also be a very good slag-conditioner where operators pay attention to basicity in the B.O.F. furnace and an excellent flux in the sinter machine for B.O.F. Furnaces.

Our magnesite tests in USA reveal:-

PERIGLASE REFRACTORY NORM

FOR THE CHEMICAL ANALYSIS: (AUSTRALIA 8/18/95 MINERAL HOLDING PTY LTD)

Item	OXIDE	MgO	CaO	Al ₂ O ₃	Fe ₂ O ₃	SiO ₂	B ₂ O ₃	
1.	WT. %	91.58	2.49	0.01	2.57	2.86	0.00	Unbeneficiated (Head Grade)
2.	WT. %	94.74	2.11	-	1.86	1.03	-	Beneficiated by crushing and screening off fines

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

NB 1. It is very interesting to note that further beneficiation of Item 1 is effected by normal processing by crushing magnesite and screening off fines.

2. Also further beneficiation is effected of the calcined product when it is crushed to <19mm to >1.18mm and the screening off of the >1.18mm fines. The total effect is that the MgO is increased by 3.16% and a reduction is effected of the Fe₂O₃ 0.71%, CaO 0.38% and SiO₂ 1.83% impurities. See attached D.R. & E. Report of 22.5.90 No. R.902 Part IX.

Selective mining would enable the processing of areas of a higher head grade of ore than 91.58% Mgo, with even better beneficiation results.

THE NORMATIVE MINERAL COMPOSITION of
our MAGNESITES AS FOLLOWS: WT. %

PERICLASE (M)	88.88
SPINEL (MA)	0.01
MAGNESIOFERRITE (MF)	3.22
MONTICELLITE (CMS)	6.95
FORSTERITE (M2S)	0.45
TRICALCIUM BORATE (C3E)	0.00

HIGHLY REACTIVE MAGNESITE.

Recent tests showed that the results confirmed the magnesite calcined readily at temperatures up to 800°C to produce highly reactive products with high specific surface area values.

SOLUBILITY IN H₂O.

The magnesite was found to be readily soluble in Hydro-chloric Acid.

N.B. Polished Sample of Crypto-Crystalline Magnesite is available if you so desire.

CALCINED MAGNESITE
ARTHUR RIVER M1 AREA BY
MINTEQ U.S.A. 6.7.1995.

The calcination at 1800°C and the subsequent analyses have been completed on the following magnesite samples:

Laboratory Designation
3487-16-1

Sample Description
Tasmanian Magnesite - Arthur River

The heating/cooling profile for the calcination consisted of the following steps:

1. Ramp up to 1800°C in 6 hours.
2. Soak at 1800°C for 2 hours.
3. Cool to room temperature in 18 hours.

The measure of decrepitation would be the amount of material passing a 6 mesh sieve (3.35mm) after calcination. The results of this study are listed in the table below:

SAMPLE #	DESCRIPTION	WT. % -6 MESH
3487-16-1	Arthur River	2.1

X-ray Diffraction (XRD) Analysis was performed on the calcined samples in order to confirm that the calcination step was completed, as well as to determine the chemical phases present. Based upon the absence of Carbonate phases, it appears these samples were fully calcined. The estimates for the percentage of the phases are listed below.

The chemical analysis on each of the magnesite samples was performed via XRF. The resultant data are listed in the following table.

Estimated Percentage

	3487-16-1 ARTHUR RIVER	3487-16-2 PINNER	3487-16-3 LYONS RIVER
% MgO	91.85	87.62	91.03
% Fe ₂ O ₃	1.93	1.25	1.91
% Mn ₂ O ₃	0.17	0.14	0.16
% TiO ₂	0.01	0.01	0.01
% CaO	1.36	4.80	3.74
% SiO ₂	4.59	6.07	3.06
% Al ₂ O ₃	0.09	0.11	0.09

There was no LOI detected in any of the above samples.

X-ray Diffraction (XRD) Analysis was performed on the calcined samples in order to confirm that the calcination step was completed, as well as to determine the chemical phases present. The estimates for the percentage of the phases are listed below.

Estimated Percentage

CRYSTALLINE PHASE	3487-16-1 ARTHUR RIVER	3487-16-2 PINNER	3487-16-3 LYONS RIVER
Periclase	89-91	91-94	90-95
Forsterite/Olivine	2-4	2-4	nd
Monticellite	2-4	2-4	2-4
MgFe ₂ O ₄	nd	nd	1-2
Merwinite	nd	0.5-1	1-2
Ca Silicate-type	nd	nd	1-2

*nd: not detected.

TECHNICAL SERVICES DIVISION
49-55 Woodlands Drive, Braeside VIC 3195
Private Bag 11, BRAESIDE VIC 3195 Australia

Phone : +61 3 9586 5400
Fax : +61 3 9586 5413

Laboratory Report

Page: 1 of 2

Sample Provider:	I. Campbell, Unimin Tasmania	Date Received	22/04/04
Sample Identification:	Sample from Tasmania	Ref No.	R04/639
	Dolomite from Togary deposit	Report No.	648.04
	Silica Sand from Thomas Mountain	File No.	M14.3
	Magnesite from Aurthur/Keith River Area		

The as received samples of Dolomite and Magnesite were crushed and split to obtain a representative portion that was milled to nominal 75µm.

The as received Silica sample was dried at 105°C and riffle split to obtain two representative portions. One portion was milled to nominal 75µm. Dry Screen Analysis was performed on the other portion and % Wt Retained reported. Chemical Analysis, Moisture and Loss on Ignition were performed on milled samples.

Test	TSD Method
Sample Preparation	1.4
Chemical Analysis by XRF	8.5 (on a dried basis)
Loss on Ignition	2.3 (on a dried basis)
Moisture	2.2(a)
Dry Screen Analysis	2.5(a)

		Dolomite	Magnesite	Silica Sand
% Silica	SiO ₂	0.16	0.07	99.68 (By balance)
% Ferric Oxide	Fe ₂ O ₃	0.08	0.64	0.012
% Titania	TiO ₂	<0.01	<0.01	0.080
% Alumina	Al ₂ O ₃	0.08	<0.01	0.039
% Lime	CaO	33.1	5.2	0.01
% Magnesia	MgO	19.4	43.2	0.01
% Soda	Na ₂ O	0.03	<0.01	<0.01
% Potash	K ₂ O	0.01	<0.01	0.01
% Chromium Trioxide	Cr ₂ O ₃	<0.001	0.001	0.0001
% Moisture	105°C	0.16		
% Loss on Ignition	1000°C	46.4	50.8	0.16

28 April 2004

Date Issued

Checked By

Signatory

Note: These results pertain to samples as received.

ATTACHMENT 4

MINERAL HOLDINGS AUSTRALIA PTY LIMITED

A.C.N. 004 759 853
A.B.N. 19 004 759 853

Correspondence to:

11 KENT COURT,
TOORAK, VICTORIA, AUSTRALIA 3142
TELEPHONE: (61 3) 9822 0077
FAX: (61 3) 9824 7617
Email: tominex@iinet.net.au

LICENCES NORTH WEST TASMANIA SILICAS AS AT 1ST JULY 2006.

LICENCE	LOCATION	DEPOSITS	SQ KM	EXPIRY
RL 2/1996	Champion Road	Silica	2	28.03.2009.
RL 1/2001 (Previously EL 11/92)	Meunna & Hebe River	Silica	2	01.03.2010.
RL 1/2005. (Previously Dip Range EL 38/2002, ML 8M/1989 and IW/88)	Hogarth Creek	Silica	5	15.06.2011.

**APPLICATION FOR A RETENTION LICENCE AS A FLOW ON TITLE
FROM EL 38/2002, PREVIOUSLY EL 43/1970, AND
MLS 8M/1989 AND IW.1988 – DIP RANGE N.W. TASMANIA**

MINERAL HOLDINGS AUSTRALIA PTY LTD

CONTENTS	Page No.
1.0 INTRODUCTION	2
2.0 EXPLORATION OF SILICA RESOURCES ...	2
3.0 RESOURCES ESTIMATE	5
4.0 INDUSTRIAL TESTING	6
5.0 MARKET OUTLOOK	8
6.0 CONCLUSIONS	9
7.0 REFERENCES	9

PLANS 1	Location of Tenements
2	Area of RL Application
3A	Exploration Summary, Thomas Mountain
3B	Drilling Plan, Thomas Mountain
3C	Drilling Sections, Thomas Mountain

Compiled by

**D. McP Duncan
McPherson Duncan & Associates
18, Old Summerleas Rd
Kingston Tas 7050**

For

**Mineral Holdings Australia Pty Ltd
11, Kent Court,
Toorak Vic 3124
21st February 2005**

APPLICATION FOR A RETENTION LICENCE AS A FLOW ON TITLE FROM EL 38/2002 AND MLS 8M/1989 AND 1W/1988- DIP RANGE NW TASMANIA

1.0 INTRODUCTION

Mineral Holdings Australia Pty Ltd (MHA) is applying for a Retention Licence to cover the silica resources identified by the company in the Thomas Mountain area of the Dip Ranges, some 20km due west of Wynyard, NW Tasmania. These resources have been explored and evaluated over a period in excess of 30 years by the company itself or by other companies in joint venture.

The core of the resources is currently held by MHA under two mining leases at Thomas Mountain, 8M/1989 of 161ha and 1W/1988 the latter being a storage area for stockpiles and treatment. Adjacent areas, currently held by the company under EL 38/2002, contain extensions of the silica resources known in the leases (Plan 1).

In recent years, MHA has had discussions with a number of industrial companies, within Australia and overseas, as potential customers or developers of the deposits, some with the intention of building a silicon factory within the State. Although there have been some site visits by potential JV partners, none have gone further. MHA is still convinced of the potential for success in promotion of industrial minerals in the longer term.

Under its recent policy of revoking non performing mining leases, Mineral Resources Tasmania has suggested that a retention licence is a more appropriate title for the marketing and industrial testing activities currently being pursued by MHA in promoting these industrial minerals.

Over the last two years, MHA has evaluated the regional area for additional resources under EL 38/2002 and has recognised the area around Thomas Mountain as having the best potential for more silica. Accordingly, MHA has decided to surrender EL 38/2002 with the proviso that the RL application at Thomas Mountain (Plan 2) cover the silica resources identified as being present within both the EL and the MLs.

2.0 EXPLORATION OF SILICA RESOURCES

Since 1970, it has been recognised by both Government surveys and company exploration that the Proterozoic rocks of northern Tasmania contain resources of high-grade quartzite.

Mineral Holdings Australia Pty Ltd and its Joint venture partners have pursued the Detention Sub Group Quartzite in the Dip Ranges through a series of mineral tenements including ELs 32/2002, 25/1988 and 43/1970 and MLs 8M/1989 and 1W/1988. Full details of the exploration history have been given in a series of annual reports listed in the references at the end of this report.

Most recently, under EL 38/2002, MHA has re-evaluated the Dip Ranges in the Thomas Mountain area (Plan 2A) in the light of modern specifications for silica

products and with the incentive provided by the new energy resources – natural gas and increased electricity output- potentially available at the Port Latta Industrial Site. The exploration licence and the enclosed ML 8M/1989 contain fine grained orthoquartzites with 99% quartz grains which have a granular to glassy texture depending on variable silicification and occasional metamorphism. Much of the terrain consists of rounded, steep-sided hills and valleys with gullies and gorges showing quartzite cliffs.

The structural setting has the Detention Quartzite in a series of tight anticlines and synclines with NE trending and gently plunging axes with the folds becoming overturned in the east giving mostly NW-dipping beds at moderate dips of 45 degrees or above (Plan 2A).

The silica resources currently outlined in the lease and the licence are 0.35Mt of very hard, silicified, sandstone or quartzite, 1.55Mt of hard sandstone, 0.65Mt of poorly consolidated or weathered soft sandstone and 2.45Mt of unconsolidated sand.

The potential uses of these resources include silicon metal, silica sand and quartzite for the chemical, metallurgical, glass and petroleum industries.

A brief account of the main exploration techniques leading to the establishment of the resource base follows below and the locations are plotted on the summary Plan 3A.

- Longworth & McKenzie Pty Ltd, 1981 (for Kaiser Aluminium)
Area NE of Hogarths Creek

5 costeans and 27 air track holes across 6 sites; aggregate of 345m in holes, none deeper than 15m because of lack of rods;

4 diamond drill holes with a total of 126m;

chemical analyses on surface, costeans and two diamond holes;
percussion holes mostly contaminated and not analysed;
five samples subjected to abrasion and decrepitation testing

Results: quartzite in the Detention Formation is more limited than first thought and much of the units are poorly cemented sandstones with irregular silicification. Physical and chemical testing of the sediments indicate a weathering profile up to 15m thick derived from deeper quartzite units. While the quality of silica in the upper zone is good, at least 50% would be physically unsuitable for ferrosilicon production based on Temco standards. While no resource figures were given, it was concluded that the units did not contain the 2Mt target of quartzite of the required chemical purity and physical properties.

- Monier Ltd, 1987
Just north of Hogarths Creek

3 percussion holes along Site No 2 traverse; up to 12m depth of silica sand; tested by Monier and found suitable as an export quality glass sand.

- Mineral Holdings, 1987-1991
Hogarths gully

An access road was built into the cliffs considered to contain 0.5Mt of quartzite and a bulk sample of 4033 tonnes of quartzite extracted and eventually tested in two furnace trials by Temco, Bell Bay.

The results proved that the Dip Range quartzite had an average grade of 98.7% SiO₂ and 0.2% Al₂O₃ and was a competent, non-decrepitating, raw material suitable for ferrosilicon production and superior to their own feedstock from Whyalla quartz.

Pioneer Silicon did a furnace trial at Electrona in 1988 on a 209 tonnes bulk sample of crushed and sized quartzite of 99.7% SiO₂ from the Hogarths quarry and reported a satisfactory performance although the Al₂O₃ levels were considered to be too high due to the mining of some of the ore from below the water table where the levels were higher. A second parcel of 204 tonnes was mined above the water table and ran satisfactorily with very low Al₂O₃ with no technical problems being reported. The smelter closed in 1991 and Temco moved from ferrosilicon into silicon-manganese production needing only 97% SiO₂ from a local source.

Excavator pitting for silica sand along a traverse to the NE of Hogarths Creek near the ridges of the lease bottomed on bedrock at 1-2m with negative results.

The program continued in 1990 with 16 pits dug along a traverse on the ridge slopes south of Hogarths Creek. Up to 1.45m of sand was discovered in seven of the holes on the SE side of the quartzite ridges, of high purity with SiO₂ over 99.10% and both Al₂O₃ and Fe₂O₃ less than 0.05%.

Fifty hand auger holes were developed along the ridge crests and slopes SW of the un-named tributary of Hogarths Creek. Most holes contained only shallow sand up to 2.4m and bottomed on high-grade quartzite/sandstone.

In 1991, MHA completed 27 auger holes and a screening program on sand just NE of the sand pit on Section 2. Mean depth of the holes were 0.9m and 2/3 of the 3,000 sq m area contained >40% of the significant 20/45 US mesh size category for proppant sand.

- Temco, 1990
Hogarths gully, south side

Temco drilled a diamond core hole to 102m depth and inclined to the east from the quartzite cliffs in the south side of Hogarths gully, on the future site of the bulk sample quarry. The sediments varied from hard quartzite to soft sandstone with uncemented sand in short intervals throughout the hole. Best grades were from 0 to 10m and from 52 to 69m with an average grade of

98.9% SiO₂, 0.37% Al₂O₃, 0.23% Fe₂O₃ and 0.05% TiO₂. The clay jointings in the drill core in the tests were not washed and a higher-grade result with less impurities would be easily achieved by simple washing.

- Mineral Holdings, 1993-94
Area SW of Hogarths Creek

The company developed 42 hammer drill holes along 8 sections with 362m on the licence and 304m on the lease. 22 surface samples were also taken (Threader, 1994).

3.0 RESOURCES ESTIMATE

The above percussion drilling along with the Temco diamond hole forms the basis of the resource estimate (Threader, 1994). The drill locations are shown on Plan 3B and the sections in Plan 3C.

The drill holes are arranged as fences along 8 mostly NW-SE sections and dip east at 45 degrees. The holes are about 20m deep and range from 15m to 70m apart.

The drill samples have been described according to colour and hardness based on drill penetration rate. On this basis, the area south of the quarry, encompassed by sections 3-5, covers 25ha and has been tested to 10m vertical depth and with a density factor of say 2 as an average of quartzite and silica sand.

Only about 60% of the holes have been subject to chemical analysis.

This gives 5 Mt of siliceous material which can be subdivided based on the percentages in the drilling as –

0.35 Mt of silicified sandstone/quartzite (VH, very hard)

1.55 Mt of sandstone (H, hard)

0.65 Mt of poorly consolidated sand (S, soft)

2.45 Mt of sand (VS, very soft)

Sixteen of the 42 holes have been excluded from this estimate due to poor colour or high alumina content (> 1.0% Al₂O₃). These are mainly on sections 6-8 which are in the SW corner of the area and are most incompletely drilled of all the sections.

Some infill drilling and additional analyses would be required to raise this estimate to Indicated Resource status (JORC).

There are indications that the sand units are 60m thick and could extend to a vertical depth of 50m or more. Section 3 is best defined in hard sandstone of some purity with Al₂O₃ still less than 1% reaching about 80m vertical depth in the Temco diamond hole in the Hogarths Creek area. Surprisingly, the last 15m of the hole are in soft sand even at this depth.

This indicates that a significant increase in resources is likely in depth and, considering the other exploration data, along strike to the NE or SW with a possible 20M tonnes of sand and sandstone available as a conservative figure in the area of the Retention Licence.

4.0 INDUSTRIAL TESTING

The potential silica products including drill and bulk samples from this area have been extensively tested over the years of exploration and evaluation for industrial uses.

The Australian Glass Manufacturers Company (AGC) in Hobart reportedly furnace-tested 4,000 tonnes of Thomas Mountain sand which, when washed only with no other beneficiation, analysed on average at 99.92% SiO₂. No technical results are available, but the test showed "excellent low-cost furnacing".

In early 1991, Temco ran some furnace trials on a 4032.84 tonnes bulk sample of Dip Range quartzite from a quarry developed on the southern side of Hogarths Creek. The average grade unwashed was 98.7% SiO₂ and 0.2% Al₂O₃. The sample was tested in two furnace trials neither, as it happened, under optimum conditions.

However, the results indicated that the Dip Range material was a competent, non-decrepitating, raw material for ferrosilicon production and superior to other silica ores tested including their own feedstock derived from Whyalla quartz. In terms of the power efficiency of production, the Dip Range quartzite consumed 5-10 % less energy than the other silicas tested.

In 1991, despite the fact that quartzite from the Dip Range lease had been successful in 210 tonne trial runs at the Pioneer Silicon Plant at Electrona and the Temco Ferrosilicon Plant trial of 4,000 tonnes at Bell Bay, the closure of the silicon plant at Snug and the failure to secure sales by Temco they then moved from ferrosilicon to silicon-manganese production needing only 97% SiO₂. This had a discouraging effect on exploration in the area as the higher grades of 99.5% SiO₂ at Thomas Mountain were not needed.

Arrangements were made to test the Thomas Mountain silica products for the production of silicon carbide by Norton Abrasives, Lillesand, Norway. Two 150 tonnes bulk samples, one of quartzite from the quarry and one of sand from the top pit, were extracted by Boral Ltd and prepared by the Index Minerals Resources plant at Burnie.

By the end of March 1998, the bulk furnace trial at Lillesand produced excellent green silicon carbide from the unwashed silica sand 150 tonne bulk sample. No technical details of the tests were conveyed to MHA but the production trials at Lillesand were held to be very successful with a very high percentage yield of green silicon carbide and the sand was said to have a high yield with "excellent furnace-ability". The furnace tests including the supply of silica were estimated to cost more than \$300,000 or nearly A\$500,000 in today's dollar terms. Technical details of the test remain commercially sensitive.

As a result of these tests, Norton was encouraged to press ahead with the project to produce 100,000 tonnes per annum of silica sand and quartzite initially for export to Norway for Lillesand production as it was deemed better than Belgium sand and then with plans to mount a feasibility study to produce green silicon carbide and other abrasive products in Tasmania. This promising project failed to eventuate reportedly over the inability of the State Government to provide a competitive power price and a smelter was built in (Venezuela) South America.

Dow Corning (USA) also carried out a field geological and marketing study some years ago and tested small samples of quartzite and grab samples of sand (5 kg each) with a view to producing chemical grade silicon metal. They were offering a 10 year 50,000 tpa contract for the silicon, had the technical expertise to produce the silicon metal and MHA held the exclusive rights to a number of their patents in Australia. By 2000, Dow Corning had purchased a 50,000 tpa silicon metal plant in Brazil and then deferred the setting up of a similar plant in Tasmania for the Pacific Rim.

Much effort was put into testing the sand as a propping agent in oil drilling. Dip Range sand was tested by Stim Laboratories, Halliburton Services and Dowell Schlumberger all of the USA and Santos and Amdel in Australia. Tests were carried out on the 20/40 size range (US screen classification) which is the -850 to +420 μ m fraction. Dip Range sand is a fine/medium grained sand with a median value of about 250 μ m with about 50% is in the 20/45 size fraction. However, as a frac sand fraction it has a high unit value of some US\$ 225-270/short ton and so it will be economic to pursue this usage.

As summarized by Stim, the Dip Range sample passed the sieve analysis, the acid solubility test, and the turbidity test but slightly failed the shape factor, sand grain clusters and crush resistance tests for deep wells. From the Amdel tests, it is found that the sand grains have a dramatic decrease in crush resistance at about 4000psi which would, according to Halliburton, restrict the use of this sand but be excellent for shallow wells less than 1200 psi needed for the recovery of methane gas.

In the following year, MHA carried out an auger drilling and field screening program of sand just north of the sand mine on Site No 2 near Hogarths Creek in the CML (Threader, 1992). The program covered about 3,000 sq metres and the mean depth of holes was 900mm. The results from holes 10-27 showed that about 2/3 of the area contained > 50% of the significant 20/45 size category compared with the mean result (45%) from previous laboratory-based, sizing analyses.

In June 1987, three percussion holes were drilled along No 2 traverse just north of Hogarth Creek by Monier Ltd with depths recorded in silica sand of up to 12m. Samples were tested by that company and stated to be suitable as an export quality glass sand. An access road was constructed by MHA into the cliffs in Hogarths Gully under CML 33M/86 which were thought to contain 0.5Mt of quartzite and a bulk sample was extracted for testing by Temco and Pioneer as described earlier in this report. Some testing of sand resources by excavator pitting in the NE portion of the licence and along the ridges of the lease bottomed on bedrock at 1-2m with negative results.

The excavator program of 16 pits dug on the ridge slopes south of Hogarths Creek provided samples for a sizing analysis which determined that compared with a fine sand specification provided by Monier, the Dip Range sand is slightly deficient in the medium to fine sand range (425-212um) and slightly excessive in the very fine sand range (-150um). The chemistry of the sand was of high purity giving SiO₂ over 99.10% and both Al₂O₃ and Fe₂O₃ less than 0.05%. Testing by the Department of Mines laboratory determined that there was negligible -10um fraction of silica sand present at Dip Range.

Screen tests show that, in commercial operation, the run of mine material from Thomas Mountain area could be screened to produce a + 30mm fraction of metallurgical silica, a -850 +420um fraction of frac sand and a -420um fraction for glass sand. The deposit is too coarse for silica flour.

5.0 MARKET OUTLOOK

In 1994, a review report was commissioned by MHA of their silica tenements in NW Tasmania (Shepherd, 1994). The report concluded that there was potential for deposits of at least several hundred thousand tonnes of quartzite at Hebe River and Thomas Mountain with the former having the highest purity silica. Diamond drilling was recommended at both of the above prospect areas to prove up additional quartzite resources to at least 2 M tonnes or preferably 3-5 M tonnes considered necessary to satisfy a greenfields silicon smelter with certain assumptions including a 20 years operational life and a capacity of 30,000 tonnes per annum. The targets of further exploration were given as ridge tops or cross-cutting faults where silicification has formed hard quartzite of higher purity. Chemical specifications of quartzite for premium quality silicon were given for several companies and are contained in the above report.

More recently, MHA engaged BHP Engineering (BHPE) to survey the world market outlook for silicon carbide and to amend an earlier plant feasibility study for an SiC factory of 15,000 tonnes per annum capacity situated at Bell Bay, Tasmania or in the Latrobe Valley, Victoria. The report concluded that the capital cost of the plant would be between A\$140 M and A\$155 M and estimated the likely raw material requirements (BHPE, 1999).

Marketing letters have been sent out to a number of companies over the past two years inviting them to inspect, or declare expressions of interest in, the various silica properties in the MHA ground-holding with a view to developing extractive and processing industries in NW Tasmania now that natural gas is available on site at Port Latta. These companies are Cookson Plibrico Pty Ltd, Brussels (who have a 40,000 tpa requirement for green silicon carbide); Sydney Gas Company, Sydney; Index Minerals, Burnie; Degussa Australia Ltd, Dandenong; and Terrane Minerals Ltd, New Zealand.

Following examination of silica sand and dolomite samples, Pilkington Australia/UK plan to carry out a field visit to evaluate resources with a view to the establishment of a new Tasmanian glass industry for high grade products like television screens, automobile windscreens and solar panels.

Fusing tests of silicas, including Thomas Mountain sand, and magnesites from Cann Creek with around 0.04% Fe₂O₃ is ideal for electrical-grade, fused magnesia as advised by Degussa, Germany and by other companies and may lead to a field visit in the future for this project.

On the basis that lump quartzite will sell in the range A\$40-\$60 /t, frac sand will fetch A\$350/t and glass sand will realize A\$36/t, the in situ deposits are valued conservatively at \$396M.

6.0 CONCLUSIONS

The evaluation of the resources revealed by the previous exploration suggests that there is an inventory of various silica resources in the Thomas Mountain area of the Dip Ranges included in this RL application. Temco stated that this resource of quartzite would be their preferred resource for future ferro-silicon production in Tasmania after very extensive trials.

There is an estimated inferred resource of 5M tonnes of silica in the area just south of Hogarths Creek quarry, based on the percussion holes along 3 sections, which breaks down to-

0.35 Mt of very hard, silicified sandstone,

1.55 Mt of hard sandstone,

0.65 Mt of poorly consolidated, soft sandstone and

2.45 Mt of very soft sand.

Some infill drilling would be required to raise this resource estimate to the Indicated Level (JORC Code).

A significant increase in resources is likely in depth and, considering the other exploration data, along strike to the NE or SW with an inferred 20M tonnes of high grade sand and sandstone available as a conservative figure in the area of the Retention Licence.

Future exploration will be directed at drilling and bulk testing any areas deemed prospective for silica resources as continued marketing reveals new opportunities. The challenge is to match the known silica resources with new specifications as they become available from industry.

No ground disturbance was necessary in the past two years of the exploration licence and consequently there is no need for rehabilitation.

7.0 REFERENCES

Anon, April 1981. Report on Stage 2- Geological Investigation of EL 43/1970 for Kaiser Aluminium. Longworth and McKenzie Pty Ltd. TCR 81_1553.

Anon, June 1981. Report on Stage 3- Preliminary Drilling of EL 43/1970 for Kaiser Aluminium. Longworth and McKenzie Pty Ltd. TCR 81_1573.

Anon, Aug, 1994. Treatment of A High Grade Silica Sand for Gwalia Consolidated Ltd, Dip Range. Ammtec Ltd. TCR 94_3652.

BHPE, 1999. Silicon Carbide Plant Study- 8M/1989; EL 11/1992. BHP Engineering for Mineral Holdings Australia Pty Ltd. TCR 99_4355.

Bacon, C.A. 1989. Silica. Miner. Resour. Tasm. 12.

Duncan, D. McP. 2004. Exploration Licence 38/2002 Dip Range. Annual Report on Exploration to March 2004.

Duncan, D. McP. 2005. Exploration Licence 38/2002 Dip Range. Annual Report on Exploration to March 2005.

Gee, R.D, 1971. Table Cape, Tasmania. Tasm. Geol. Atlas 1 Mile Series Expl. Rep., Sheet 22 (8016S).

Shepherd, N.1994. Summary Report, Quartzite Prospects in Northwest Tasmania held by Mineral Holdings Australia Pty Ltd. 8M/1989, EL 11/1992, EL 20/1993, EL 25/1988. TCR 94_3538.

Threader, V.M. Nov, 1989. Annual Report, EL 25/1988 (Dip Range). Mineral Holdings Australia Pty Ltd. TCR 89_3047.

Threader, V.M. Oct, 1990. Annual Report EL 25/1988- Dip Range. Mineral Holdings Australia Pty Ltd. TCR 90_3193.

Threader, V. M. Oct, 1991. Annual Report EL 25/1988- Dip Range. Mineral Holdings Australia Pty Ltd. TCR 91_3307.

Threader. V. M. Oct, 1992. Annual Report for 1991-2. EL 24/1988 (Champion Road) and EL 25/1988 (Dip Range). Mineral Holdings Australia Pty Ltd. TCR 92_3395.

Threader. V.M. Oct, 1994. Annual Report for 1993-1994. EL 25/1988 (Dip Range). Mineral Holdings Australia Pty Ltd.

Threader. V. M. Aug, 1995. Annual Report for 1994-1995. EL 11/1992 (Meunna) and EL 20/1993 (Hebe River). Mineral Holdings Australia Pty Ltd. TCR 95_3765.

Threader. V. M. June, 1996. Relinquishment Report. EL 25/1988 Dip Range (Part). Mineral Holdings Australia Pty Ltd. TCR 96_3879.

Turner, N.J., 1989. in Geology and Mineral Resources of Tasmania. Special Publication Geological Society of Australia 15. Eds. Burrett, C.F., Martin, E.L.

KEYWORDS

Dip Range, Thomas Mountain, Detention Subgroup, Rocky Cape Group, Sand, Quartzite, Silica Resources, Bulk Testing.

PLANS 1, 2, 2A, 3A, 3B & 3C

MINERAL HOLDINGS SILICA TENEMENTS NW TASMANIA

Scale 1:100,000

PLAN 1

Thomas Mt ML 8M/89

EL 38/2002 Dip Range

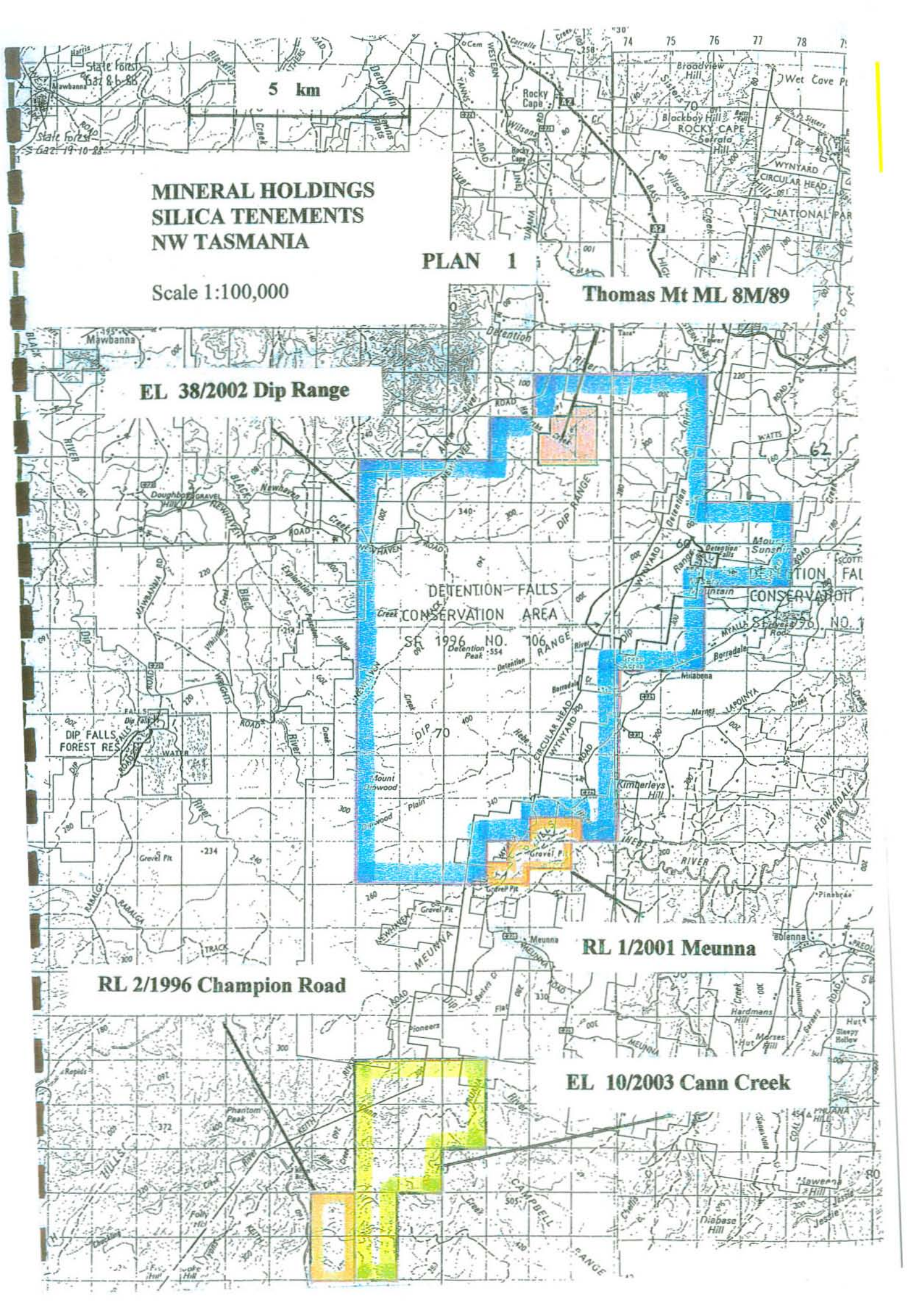
DETENTION FALLS
CONSERVATION AREA

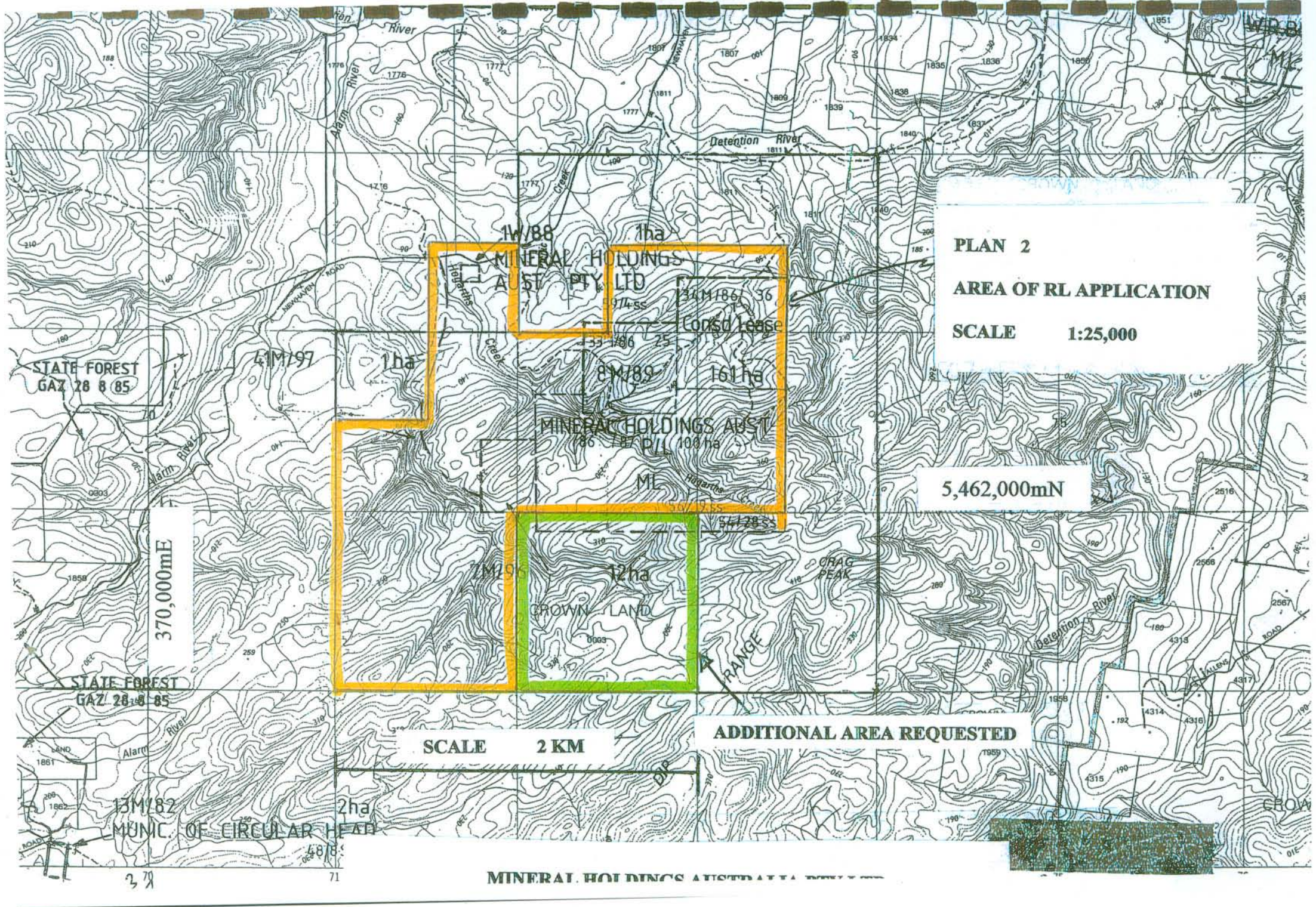
SF 1996 NO. 106 RANGE

RL 1/2001 Meunna

RL 2/1996 Champion Road

EL 10/2003 Cann Creek





PLAN 2

AREA OF RL APPLICATION

SCALE 1:25,000

5,462,000mN

SCALE 2 KM

ADDITIONAL AREA REQUESTED

PLAN 2A – REGIONAL GEOLOGY & SILICA PROSPECTS, MHA

MRT Geology from Smithton and Trowutta 1:50,000 Sheets

5,462,000mN

THOMAS MOUNTAIN PROSPECT

EL 38/2002 DIP RANGE

368,000mE

HEBE RIVER PROSPECT

5,452,000mN

SCALE 3 KM

PLAN 3A - EXPLORATION SUMMARY, THOMAS MT

Scale 1:10,000

LEGEND

- DDH No 1-4 Diamond Drilling, L&M, 1981
- Site 1-6 Costeans, L&M, 1981
- Section 1-8 Percussion Drilling, MHA, 1994
- Auger Traverse, MHA, 1991
- Excavator Traverses, MHA, 1987, 1990
- Sand
- Quartzite Crests
- Quartzite Cliffs, Quarry

Geology by MRT- 1:25,000 Sheet Mawbanna

EL 38/2002 Dip Range

Pri - Irby Siltstone

Prd - Detention Quartzite

CROWN LAND

Pre - Cowrie Siltstone

RANGE

Scale 1km

373,000mE

5,463,000mN

Excavator Traverse

Quarry & DDH

Auger Traverse

Quartzite Crest

A 2.4m
B 1.2m
C 1.2m

Section 8

Section 7

Section 6

Section 5

Section 4

Section 3

Section 2

Section 1

Augered

Site 1

Site 2

Site 6

Thomas Mt

DDH No 4

DDH No 3

DDH No 2

Quartzite Peak

Hogarth's Creek

Creek

DDH No 1

Site 4

Site 5

Site 3

1777

1811

1807

1809

1811

Detention River

NEW HAVEN

River

Alarm River

1776

1776

1777

1807

1807

001

100

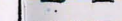
1777

Scale 1:10,000

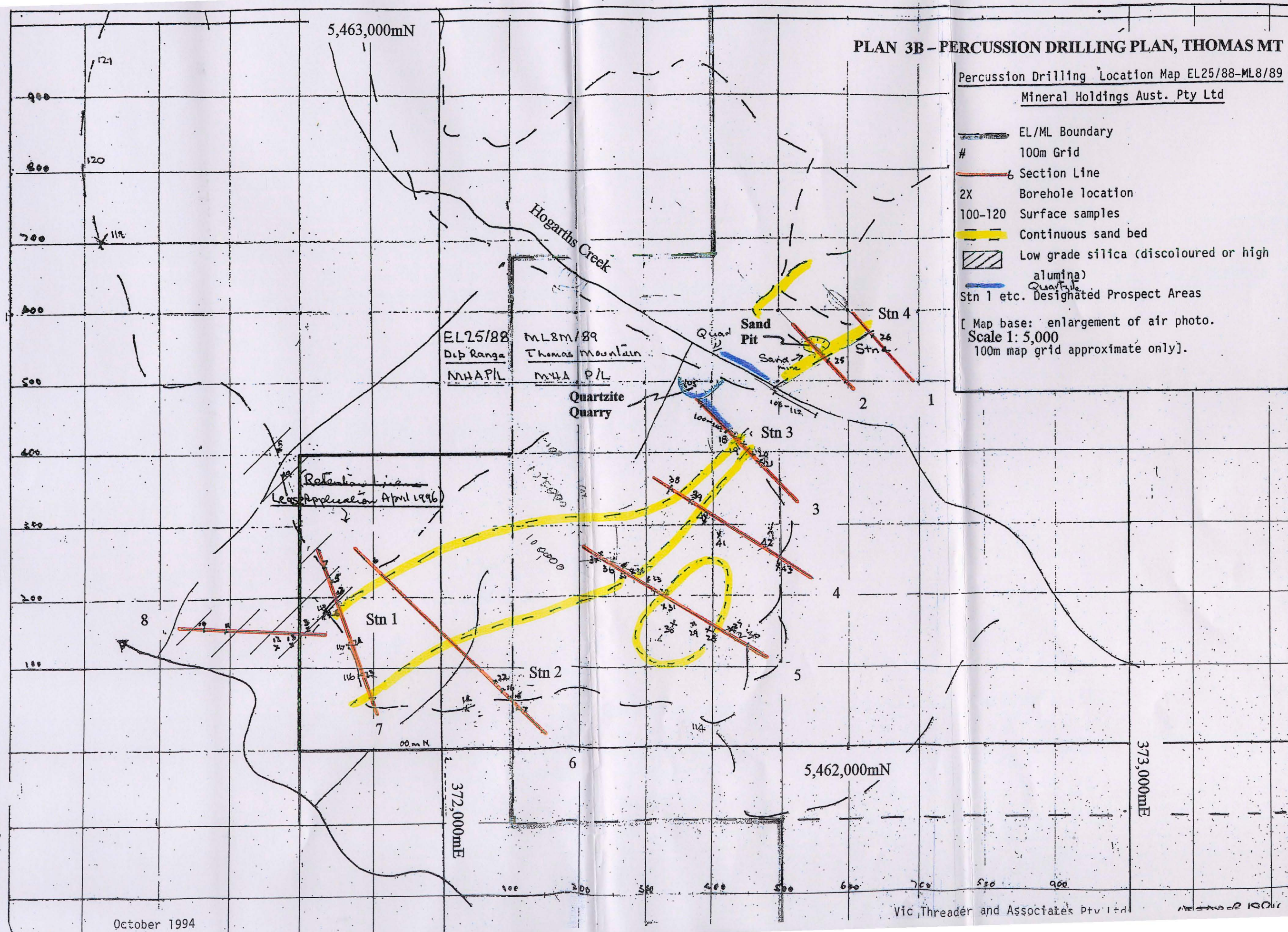
PLAN 3B - PERCUSSION DRILLING PLAN, THOMAS MT

Percussion Drilling Location Map EL25/88-ML8/89

Mineral Holdings Aust. Pty Ltd

-  EL/ML Boundary
-  # 100m Grid
-  Section Line
-  2X Borehole location
-  100-120 Surface samples
-  Continuous sand bed
-  Low grade silica (discoloured or high alumina)
-  Stn 1 etc. Designated Prospect Areas

[Map base: enlargement of air photo.
Scale 1:5,000
100m map grid approximate only].





BIND

AMNTEC

**TREATMENT
OF
A HIGH GRADE SILICA SAND
FOR
GWALIA CONSOLIDATED LTD .**

REPORT NO. A4281

AMMTEC LTD

**TREATMENT
OF
A HIGH GRADE SILICA SAND
FOR
GWALIA CONSOLIDATED LTD**

REPORT NO. A4281

AUGUST 1994

TABLE OF CONTENTS

PAGE NO.

SUMMARY	(i)
1. INTRODUCTION	1
2. SAMPLE	1
3. ANALYTICAL	1
4. SAMPLE PREPARATION	2
5. ATTRITIONING	2
5.1 Test Procedure	2
5.2 Test Results	3
6. TBE SEPARATION	3
6.1 Test Procedure	3
6.2 Test Results	4
7. SIZE ANALYSIS - TBE FLOATS	4
7.1 Test Procedure	4
7.2 Test Results	5

FIGURES

Figure 1	Flowsheet - High Grade Silica Sands	7
Figure 2	Grade of Fe_2O_3 , Al_2O_3 , TiO_2	8
Figure 3	Distribution of Fe_2O_3 , Al_2O_3 , TiO_2	8

TABLES

Table 1	Head Assay	10
Table 2	Attritioned Test Results	11
Table 3	Sink Assay Results	12
Table 4	Float Sizing Results	12

APPENDIX

Appendix I	Analabs Results
------------	-----------------

SUMMARY

1. A single sample of high grade silica sand was supplied to AMMTEC for upgrading and analysis.

Head Fe_2O_3	:	113 ppm
Head Al_2O_3	:	287 ppm
Head TiO_2	:	570 ppm

2. The sample was attritioned and deslimed.

Deslimed sand	:	97.9% by weight
Slime sand	:	2.1% by weight

3. The deslimed sand was TBE separated to remove any heavy mineral particles.

TBE Float	:	99.97% by weight
TBE Sink	:	0.03% by weight

4. Full details of the test results are found in the report.

N.B. This 5KG representative sample was taken by Mr. T. Monks in the No. 2 Pit about 10 metres below the surface.

1. INTRODUCTION

Mr David Bale, of Gwalia Consolidated Ltd, requested AMMTEC to carry out a treatment program on a sample of high grade silica.

The test program included the following :

1. Dry and weigh the received sand.
2. Assay a split of the sand.
3. Attrition and deslime the sand, deslime the product at $53\mu\text{m}$ and assay the products.
4. TBE separate a split of the deslimed sand.
5. Size and assay (in detail) the screen fractions.

Full details of the test program are found in the flowsheet of Figure 1.

2. SAMPLE

A single sample of damp, high grade silica was supplied to AMMTEC in a plastic bag.

MHA 1 : 8307 grams (damp)

3. ANALYTICAL

Most of the test products were sent to Analabs, Welshpool, for detailed analysis. Analabs used specific preparation methods, i.e. Zirconia bowls.

The following elements (oxides) were assayed :

Fe_2O_3	Al_2O_3	TiO_2	CaO	MgO
Na_2O	K_2O	WO_3	ZrO_2	Cr_2O_3
NiO	CoO	Cl	V_2O_5	

Gwalia specified the analytical detection limit for each analyte. In some cases (e.g. Cr_2O_3) the analysis was at a higher detection limit (i.e. 10 vs 1).

A single sample was sent to SGS, Queens Park, to assay for Fe_2O_3 , Al_2O_3 , TiO_2 and Cr_2O_3 as a check and to determine if Cr_2O_3 in the product (float tail) was within specification. The method D3-AAS was used.

4. SAMPLE PREPARATION

The received sample was oven dried at 105°C overnight. The oven and all sample trays were washed and scrubbed clean to remove any source of cross contamination.

The sample (and intermediate products) were mixed and split using a clean stainless steel riffle.

Damp Head Weight	=	8307.5 grams
Dry Head Weight	=	7906.9 grams
Sample Moisture	=	4.82%

A split of the head was taken for detailed assay with the results presented in Table 1.

5. ATTRITIONING

The sample was lightly attritioned to remove any residual or surface contaminants. Following attritioning the sand was deslimed by screening at $53\mu\text{m}$.

5.1 Test Procedure

The test procedure was as follows :

- (1) Split out 2 x 1100 grams of dry head sample.
- (2) Transfer 1100 grams of sample to a 1 litre *WEMCO* attritioning cell and add water to achieve 76% solids.
- (3) Attrition for 5.0 minutes.
- (4) Recover the attritioned sand and wet screen at $53\mu\text{m}$ using 10 litres of wash water.
- (5) Repeat for the second charge.
- (6) Recover, dry and weigh the $+53\mu\text{m}$ and $-53\mu\text{m}$ fractions.
- (7) Assay splits of the $+53\mu\text{m}$ and $-53\mu\text{m}$ fractions in detail.

5.2 Test Results

The -53 μ m fraction after attritioning was only a small fraction (2.1%). The deslime fraction was high in contaminate grades.

The attrition weight results are shown below :

Attrition Test Results	
Feed Weight	2 x 1100 grams
Solids Density	76 %
Attrition Time	5 minutes
+53 μ m Weight	2150.2 grams
-53 μ m Weight	47.0 grams
Total Weight	2197.2 grams

Details of the product assays are presented in Table 2.

6. TBE SEPARATION

A split of the deslimed (attritioned) sands was treated by TBE in an attempt to remove any heavy mineral particles, i.e. high in Fe and Ti.

6.1 Test Procedure

The test procedure was as follows :

- (1) Split out 500 grams of +53 μ m attritioned sand.
- (2) Transfer to a 2000 ml beaker and fill with new, clean TBE.
- (3) Mix the sample and allow to separate.
- (4) Recover the floats and sinks and wash thoroughly with acetone. Oven dry overnight.

- (5) Weigh the sinks and floats. Send the sinks for detailed assay at Analabs and send a split of the TBE float (50 grams) to SGS for Fe_2O_3 , Al_2O_3 , TiO_2 and Cr_2O_3 analysis.

6.2 Test Results

The results showed that only 0.03% of the sample sank in the TBE. The sinks assay indicated high assays of all elements, particularly Fe_2O_3 , Al_2O_3 , MgO , TiO_2 , ZrO_2 and Cr_2O_3 .

TBE Separation		
Product	Weight (g)	Weight (%)
TBE Float	499.80	99.97
TBE Sink	0.17	0.03
Total	499.97	100.00

Details of the assay results for the sinks and floats are found in Tables 3 and 4.

7. SIZE ANALYSIS - TBE FLOATS

A split of the TBE floats was screen sized and the screen products assayed in detail.

7.1 Test Procedure

- (1) Split out about 450 grams of TBE floats.
- (2) Wet screen at $53\mu\text{m}$ and dry the oversize and undersize.
- (3) Dry screen the dry oversize at 1180, 850, 600, 425, 300, 212, 150, 106, 75 and $53\mu\text{m}$.
- (4) Recover and weigh each screen fraction. Send each fraction to Analabs for detailed analysis.
- (5) Calculate the distribution (by size) of each analyte.

7.2 Test Results

The sizing results indicated that most of the weight of material fell in the size range 150 to $600\mu\text{m}$ (i.e. 81.8% of the weight). There was a small quantity of $-53\mu\text{m}$ material (0.7%) remaining in the sample even after desliming.

The results indicate a bias in most elements towards the fine and coarse fractions. Details of the results are found in Table 4. Note the head assay results for Fe_2O_3 , Al_2O_3 , TiO_2 and Cr_2O_3 .

The Fe_2O_3 , Al_2O_3 and TiO_2 grades and distribution over the size fractions were plotted and the results are presented in Figures 2 and 3.

FIGURES

FIGURE 1

FLWSHEET - HIGH GRADE SILICA SANDS

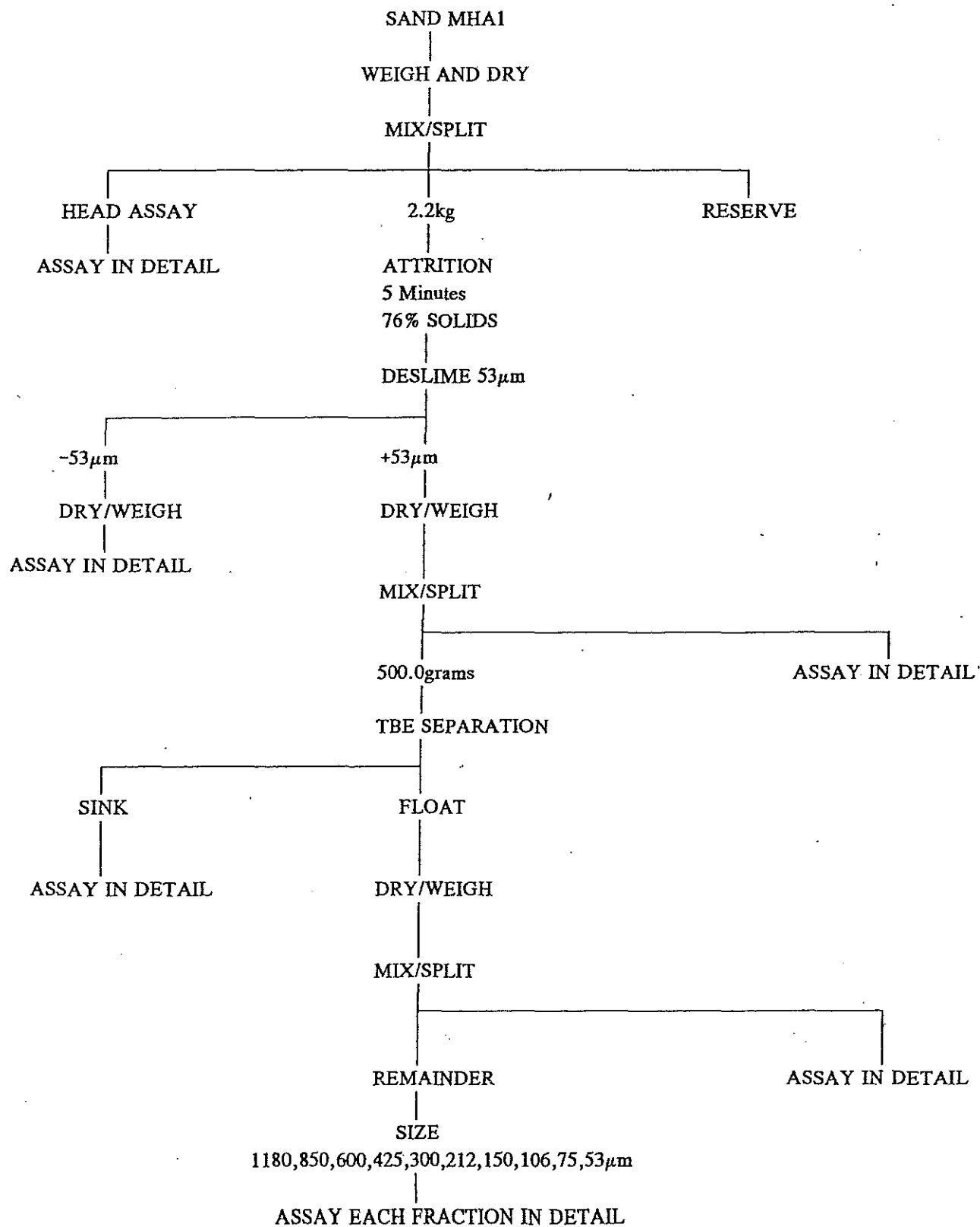


FIGURE 2

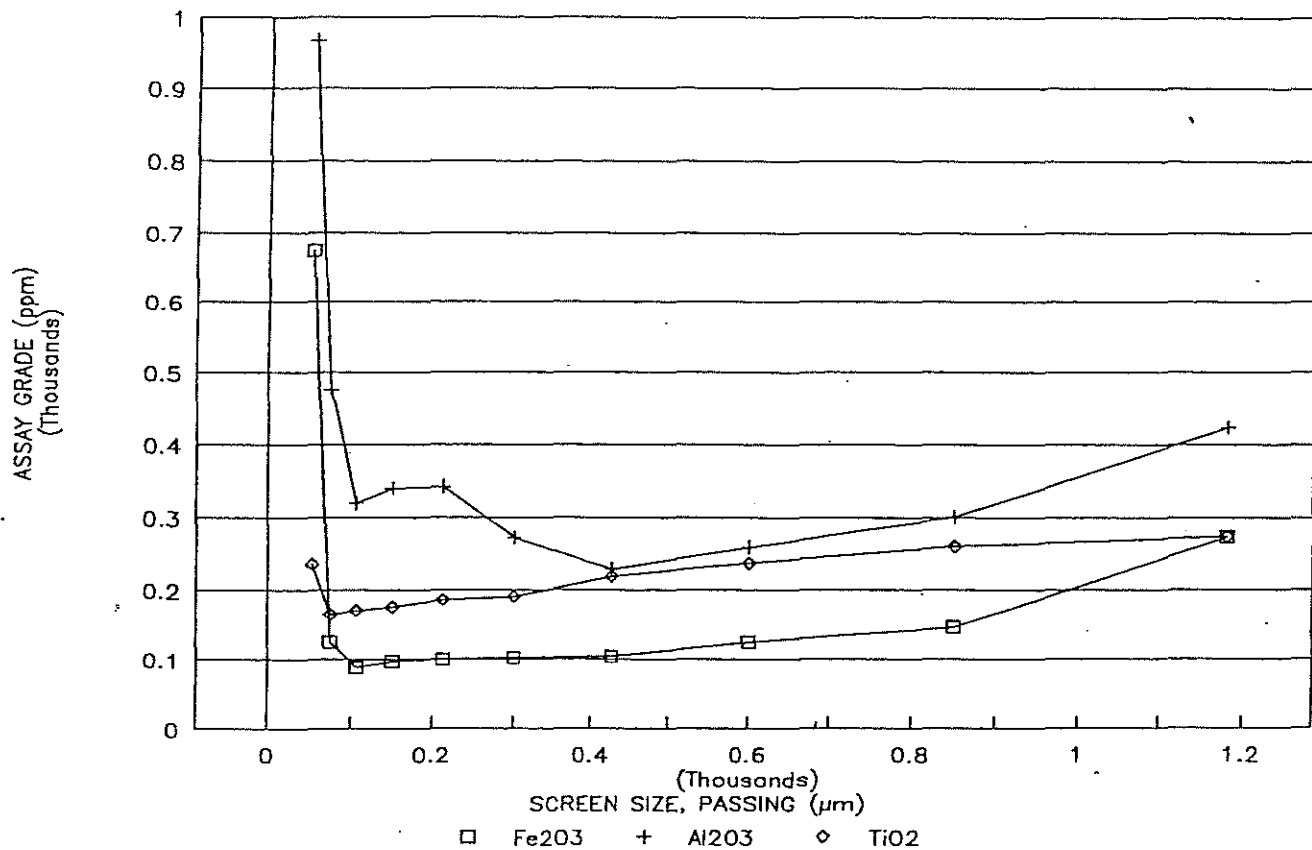
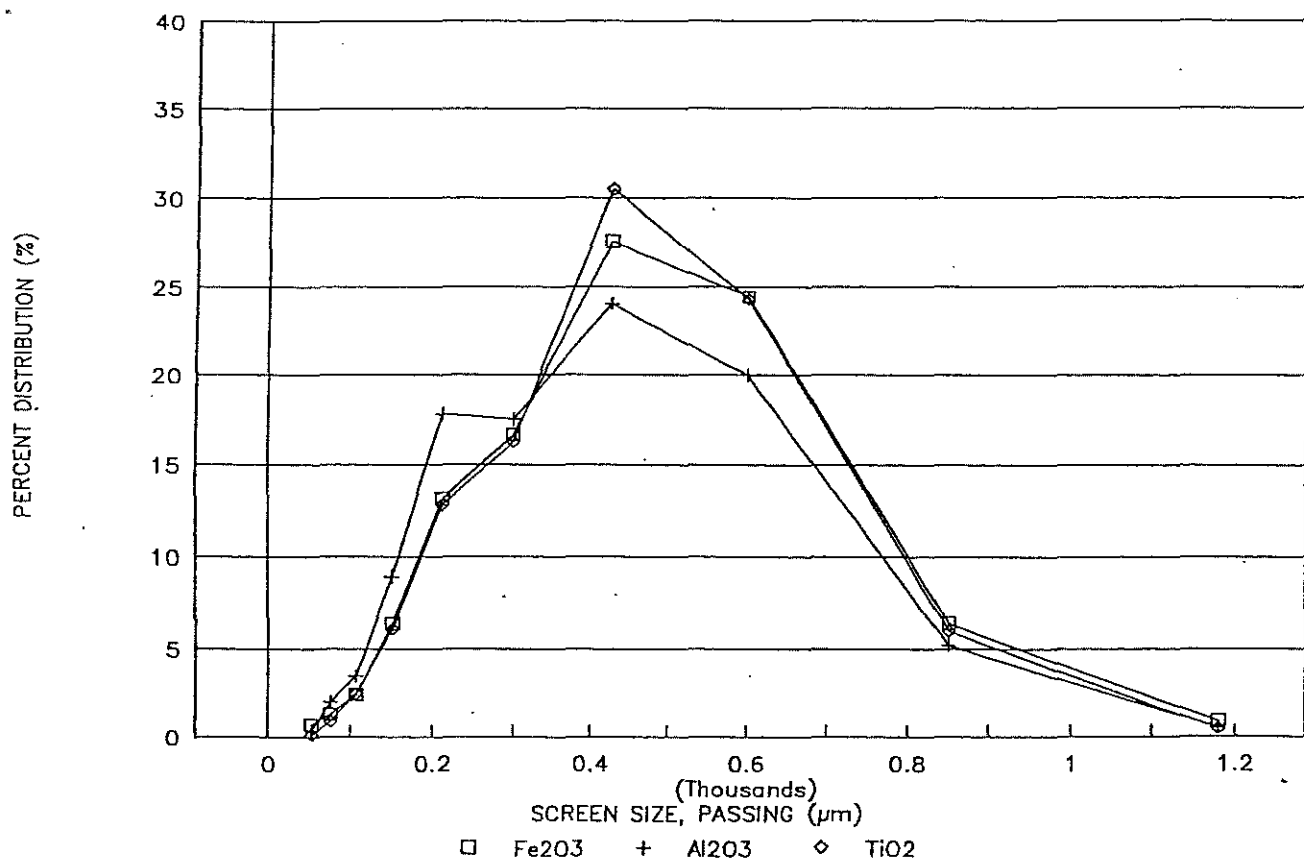
GRADE OF Fe_2O_3 , Al_2O_3 , TiO_2 

FIGURE 3

DISTRIBUTION OF Fe_2O_3 , Al_2O_3 , TiO_2 

TABLES

TABLE 1

HEAD ASSAY														
SAMPLE	Fe2O3 (ppm)	Al2O3 (ppm)	Na2O (ppm)	MgO (ppm)	Cl (ppm)	K2O (ppm)	CaO (ppm)	TiO2 (ppm)	V2O5 (ppm)	Cr2O3 (ppm)	CoO (ppm)	NiO (ppm)	ZrO2 (ppm)	WO3 (ppm)
MHA1	113	287	19	23	120	59	31	570	<2	<10	<0.2	<2	52	0.1

TABLE 2

ATTRITIONED TEST RESULTS

SAMPLE	Product	Weight	Fe2O3		Al2O3		Na2O		MgO		Cl		K2O		CaO		TiO2		V2O5		Cr2O3		CoO		NiO		ZrO2		WO3	
	Weight (g)	Percent (%)		Distn		Distn		Distn		Distn		Distn		Distn		Distn		Distn		Distn		Distn		Distn		Distn		Distn		Distn
			(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)
ATTRITED +53μm	2150.20	97.86	114	59.1	264	86.0	39	49.0	38	85.9	75		58	91.7	52	55.5	237	46.5	<2		<10		<0.2		<2		23	47.9	0.1	59.6
ATTRITED -53μm	47.00	2.14	3625	40.9	1965	14.0	1859	51.0	287	14.1			240	8.3	1896	44.5	12460	53.5	20		355		11		414		1128	52.1	3.9	40.4
TOTAL	2197.20	100.00	189	100.0	301	100.0	78	100.0	43	100.0			62	100.0	91	100.0	498	100.0			10		0		0		46	100.0	0.2	100.0
ASSAY HEAD			113		287		19		23		120		59		31		570		<2		<10		<0.2		<2		52		0.1	

TABLE 3

SINK ASSAY RESULTS

SAMPLE	Fe2O3 (ppm)	Al2O3 (ppm)	Na2O (ppm)	MgO (ppm)	Cl (ppm)	K2O (ppm)	CaO (ppm)	TiO2 (ppm)	V2O5 (ppm)	Cr2O3 (ppm)	CoO (ppm)	NiO (ppm)	ZrO2 (ppm)	WO3 (ppm)
SINKS	14443	38913	2130	6367		<600	631	48038	184	167	7	188	35531	6.1

TABLE 4

FLOAT SIZING RESULTS

Screen Fraction (μm)	Screen Weight (g)	Weight Percent (%)	Fe ₂ O ₃		Al ₂ O ₃		Na ₂ O		MgO		Ca		K ₂ O		CaO		TiO ₂		V ₂ O ₅		Cr ₂ O ₃		CuO		NiO		ZrO ₂		WO ₃					
			(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)	(ppm)	(%)				
+1180	0.12	0.03			(Combined with +850 μm fraction for analysis)																													
-1180+850	1.58	0.35	273	0.9	423	0.6	65	0.6	36	0.3			96	0.6	52	0.4	274	0.5	<2		<10		0		4		23	0.6	0.3					
-850+600	21.95	4.85	147	6.4	300	5.2	50	5.9	81	7.3	50		65	5.6	60	5.3	260	6.0	<2		<10		<0.2		4		12	4.1	<0.1					
-600+425	97.26	21.48	126	24.4	259	20.0	46	24.2	55	21.7	50		57	21.6	63	24.8	237	24.3	<2		<10		<0.2		<2		14	21.1	<0.1					
-425+300	132.41	29.25	104	27.6	229	24.0	39	28.1	51	27.7	50		48	25.0	56	30.0	219	30.5	<2		<10		<0.2		4		16	34.7	<0.1					
-300+212	81.1	17.91	103	16.7	272	17.5	36	16.0	55	18.1	50		54	17.2	57	18.8	190	16.3	<2		<10		<0.2		<2		12	15.3	<0.1					
-212+150	65.61	14.49	100	13.1	342	17.8	32	11.5	55	14.6	50		59	15.2	45	11.9	185	12.8	<2		<10		<0.2		<2		12	12.5	<0.1					
-150+106	33.08	7.31	97	6.4	340	8.9	28	5.1	61	8.3	50		66	8.6	42	5.6	175	6.1	<2		<10		<0.2		<2		9	5.0	<0.1					
-106+75	13.78	3.04	89	2.4	319	3.5	28	2.1	17	0.9			71	3.8	36	2.0	170	2.5	<2		<10		<0.2		<2		22	4.9	0.1					
-75+53	5.33	1.18	126	1.3	476	2.0	40	1.2	25	0.5			96	2.0	43	0.9	165	0.9	<2		<10		<0.2		4		16	1.4	0.3					
-53	0.53	0.12	675	0.7	967	0.4	1859	5.3	287	0.6			200	0.4	90	0.2	235	0.1	<2		<10		<0.2		4		50	0.4	0.3					
TOTAL	452.75	100.00	111	100.0	278	100.0	41	100.0	54	100.0			56	100.0	55	100.00	210	100.0									14	100.0						
ASSAY			110		310												190				1													

6..

APPENDIX I

ANALABS RESULTS

Phone (09) 4587999

52 Murray Road, Welshpool, W.A. 6106

Fax (09) 4582922

ANALYTICAL REPORT No. 101160.10.13262

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

INVOICE TO:

I Smith
Ammtec Pty Ltd
6 MacAdam Place
Balcatta WA 6021

ORDER No.

PROJECT

DATE RECEIVED

RESULTS REQUIRED

04/08/94

ASAP

No. OF PAGES
OF RESULTS

DATE
REPORTED

No.
OF COPIES

TOTAL No.
OF SAMPLES

4

16/08/94

1

22

SAMPLE NUMBERS

SAMPLE DESCRIPTION

ELEMENT/METHOD

A A4281 & others

Prep : GP013GP016 ZIRCONIA ROWL

Fe,Al,Ca,Mg,Na,K/GA144
Scan/GA201

A A4281 & others

Prep :

W,Ni,Co/GS201

A A4281 & others

Prep :

V,Ti,Cr/GI201

A A4281 & others

Prep : GP013,GP016

Zr/GS201

A A4281 & others

Prep :

Cl/CA25

RESULTS
TO

I Smith
Ammtec Pty Ltd
6 MacAdam Place
Balcatta WA 6021

REMARKS

Note: Zr,Ti data >1% may bias low due to solubility problems.

RESULTS
TO

RESULTS
TO


AUTHORISED OFFICER

ANALYTICAL DATA

SAMPLE PREFIX				REPORT No.		REPORT DATE		CLIENT ORDER No.			PAGE
				101160.10.13262		16/08/94					1 OF 4
	SAMPLE No.			Na	Na	Na	Mg	Mg	Mg	Al	
METHOD				DA144	GI201	GA201	DA144	GI201	GA201	DA144	
1	A A4281 Head Assay			14	-	-	21	-	-	15	
2	A A4281 Deslim +53um			29	-	-	23	-	-	14	
3	A A4281 Float +600um			37	-	-	49	-	-	15	
4	A A4281 Float +425um			34	-	-	33	-	-	13	
5	A A4281 Float +300um			29	-	-	31	-	-	12	
6	A A4281 Float +212um			27	-	-	33	-	-	14	
7	A A4281 Float +150um			24	-	-	33	-	-	18	
8	A A4281 Float +106um			21	-	-	37	-	-	18	
9	A4281 TBE Sinks			-	1580	-	-	3840	-	-	
10	A4281 Float -53um			-	-	68	-	-	55	-	
11	A4281 Float +850um			-	-	48	-	-	22	-	
12	A4281 Slime -53um			1379	-	-	173	-	-	1040	
13	A4281 Float +75um			21	-	-	10	-	-	16	
14	A4281 Float +53um			30	-	-	15	-	-	25	
15											
16											
17											
18											
19											
20											
21											
22											
23											
24	DETECTION			2	50	5	2	20	5	10	
25	UNITS			ppm	ppm	ppm	ppm	ppm	ppm	ppm	

results in ppm unless otherwise specified
= element not determined

IS = Insufficient sample
SNR = sample not received

AUTHORISED
OFFICER

ANALYTICAL DATA

SAMPLE PREFIX

REPORT No.

REPORT DATE

CLIENT ORDER No.

PAGE

				101160.10.13262		16/08/94				2 OF 4	
	SAMPLE No.			A1	A1	D1	K	K	K	Ca	
METHOD				GI201	GA201	CA25	DA144	GI201	GA201	DA144	
1	A A4281 Head Assay			-	-	-	49	-	-	27	
2	A A4281 Deslim +53um			-	-	-	48	-	-	31	
3	A A4281 Float +600um			-	-	-	54	-	-	43	
4	A A4281 Float +425um			-	-	-	47	-	-	45	
5	A A4281 Float +300um			-	-	-	40	-	-	40	
6	A A4281 Float +212um			-	-	-	45	-	-	41	
7	A A4281 Float +150um			-	-	-	49	-	-	32	
8	A A4281 Float +106um			-	-	-	55	-	-	30	
9	B A4281 Head Assay			-	-	120	-	-	-	-	
10	B A4281 Deslim +53um			-	-	75	-	-	-	-	
11	B A4281 Float +600um			-	-	50	-	-	-	-	
12	B A4281 Float +425um			-	-	50	-	-	-	-	
13	B A4281 Float +300um			-	-	50	-	-	-	-	
14	B A4281 Float +212um			-	-	50	-	-	-	-	
15	B A4281 Float +150um			-	-	50	-	-	-	-	
16	B A4281 Float +106um			-	-	50	-	-	-	-	
17	A4281 TBE Sinks			2.06	-	-	-	<500	-	-	
18	A4281 Float -53um			-	512	-	-	-	166	-	
19	A4281 Float +850um			-	224	-	-	-	80	-	
20	A4281 Slime -53um			-	-	-	199	-	-	1355	
21	A4281 Float +75um			-	-	-	59	-	-	26	
22	A4281 Float +53um			-	-	-	80	-	-	31	
23											
24	DETECTION			0.01	50	50	0	500	5	2	
25	UNITS			%	ppm	ppm	ppm	ppm	ppm	ppm	

Results in ppm unless otherwise specified
= element not determined

IS = Insufficient sample
SNR = sample not received

AUTHORISED

ANALYTICAL DATA

SAMPLE PREFIX

REPORT No.

REPORT DATE

CLIENT ORDER No.

PAGE

101160.10.13262

16/08/94

3 OF 4

	SAMPLE No.			Ca	Ca	Li	V	Cr	Fe	Fe
METHOD				GI201	GA201	GI201	GI201	GI201	DA144	GI201
1	A A4281 Head Assay			-	-	342	<2	<10	79	-
2	A A4281 Deslim +53um			-	-	142	<2	<10	80	-
3	A A4281 Float +600um			-	-	156	<2	<10	103	-
4	A A4281 Float +425um			-	-	142	<2	<10	88	-
5	A A4281 Float +300um			-	-	131	<2	<10	73	-
6	A A4281 Float +212um			-	-	114	<2	<10	72	-
7	A A4281 Float +150um			-	-	111	<2	<10	70	-
8	A A4281 Float +106um			-	-	105	<2	<10	68	-
9	A4281 TBE Sinks			465	-	28800	103	114	-	1.01
10	A4281 Float -53um			-	64	141	<2	<10	-	-
11	A4281 Float +850um			-	37	164	<2	<10	-	-
12	A4281 Slime -53um			-	-	7470	11	243	2535	-
13	A4281 Float +75um			-	-	102	<2	<10	62	-
14	A4281 Float +53um			-	-	99	<2	<10	88	-
15										
16										
17										
18										
19										
20										
21										
22										
23										
24	DETECTION			50	5	10	2	10	0	0.01
25	UNITS			ppm	ppm	ppm	ppm	ppm	ppm	%

results in ppm unless otherwise specified
= element not determined

IS = Insufficient sample
SNR = sample not received

AUTHORISED
OFFICER

ANALYTICAL DATA

SAMPLE PREFIX

REPORT No.

REPORT DATE

CLIENT ORDER No.

PAGE

101160.10.13262

16/08/94

4 OF 4

	SAMPLE No.			Fe	ES	Ni	Zr	Zr	W	
METHOD				GA201	ES201	GS201	GS201	ES201	GS201	
1	A A4281	Head Assay		-	<0.2	<2	-	-	0.1	
2	A A4281	Deslim +53um		-	<0.2	<2	-	-	0.1	
3	A A4281	Float +600um		-	<0.2	3	-	-	<0.1	
4	A A4281	Float +425um		-	<0.2	<2	-	-	<0.1	
5	A A4281	Float +300um		-	<0.2	3	-	-	<0.1	
6	A A4281	Float +212um		-	<0.2	<2	-	-	<0.1	
7	A A4281	Float +150um		-	<0.2	<2	-	-	<0.1	
8	A A4281	Float +106um		-	<0.2	<2	-	-	<0.1	
9	B A4281	Head Assay		-	-	-	38.4	-	-	
10	B A4281	Deslim +53um		-	-	-	16.8	-	-	
11	B A4281	Float +600um		-	-	-	8.7	-	-	
12	B A4281	Float +425um		-	-	-	10.1	-	-	
13	B A4281	Float +300um		-	-	-	12.2	-	-	
14	B A4281	Float +212um		-	-	-	8.8	-	-	
15	B A4281	Float +150um		-	-	-	8.9	-	-	
16	B A4281	Float +106um		-	-	-	7.0	-	-	
17	A4281 TBE	Sinks		-	5.2	148	1000.0	26300	4.8	
18	A4281	Float -53um		472	<0.2	3	36.8	-	0.2	
19	A4281	Float +850um		191	0.2	3	16.7	-	0.2	
20	A4281	Slime -53um		-	8.4	325	835.0	-	3.1	
21	A4281	Float +75um		-	<0.2	<2	16.5	-	0.1	
22	A4281	Float +53um		-	<0.2	3	12.2	-	0.2	
23										
24	DETECTION			10	0.2	2	0.5	5	0.1	
25	UNITS			ppm	ppm	ppm	ppm	ppm	ppm	

sults in ppm unless otherwise specified
element not determined

IS = Insufficient sample
SNR = sample not received

AUTHORISED
OFFICER

AMMTEC LIMITED

A.C.N. 063 332 516



6 MacAdam Place, Balcatta,
Western Australia 6021
Telephone: (09) 344 2416, (09) 344 2418
Telex: AA96177. Fax: (09) 345 4688

IAN G SMITH
SENIOR METALLURGIST

GRAHAM W LLOYD
MANAGING DIRECTOR

MINERAL HOLDINGS AUSTRALIA PTY. LIMITED

A.C.N. 004 759 853

CERTIFICATE OF ANALYSIS

PRODUCT: THOMAS MOUNTAIN SILICA SAND
(Raw Material Unprocessed Pit 2)

PARTICLE SIZE:

+1180 μm	0.03%
-1180 +850 μm	0.35%
-850 +600 μm	4.85%
-600 +425 μm	21.48%
-425 +300 μm	29.25%
-300+212 μm	17.91%
-212+150 μm	14.49%
-150 +106 μm	7.31%
-106 +75 μm	3.04%
-75 +53 μm	1.18%
-53 μm	0.12%
TOTAL	100.00%

CHEMICAL ANALYSIS: SiO_2 greater than 99.8%

Fe_2O_3	113 ppm	0.0113%
TiO_2	570 ppm	0.0570%
Al_2O_3	287 ppm	0.0287%
CaO	31 ppm	0.0031%
MgO	23 ppm	0.0023%
Na_2O	19 ppm	0.0019%
Cl	120 ppm	0.0120%
CoO	<0.2 ppm	0.0002%
Cr_2O_3	<10 ppm	0.0010%
K_2O	59 ppm	0.0059%
V_2O_5	<2 ppm	0.0002%
ZrO_2	52 ppm	0.0052%
NiO	<2 ppm	0.0002%
WO_3	0.1 ppm	0.00001%

MINERAL HOLDINGS AUSTRALIA PTY LTD
THOMAS MOUNTAIN SAND
CHEMICAL COMPOSITION

10.5.1991.

(Unbeneficiated Samples)

Elements/Oxide	Average	No. of Analyses
SiO ₂	99.53%	6
Al ₂ O ₃	293 ppm	7
Fe ₂ O ₃	222 ppm	17
TiO ₂	300 ppm	6
MgO	<186 ppm	5
CaO	<79 ppm	6
MnO	125 ppm	4
Li ₂ O	2 ppm	1
Na ₂ O	< 213 ppm	6
K ₂ O	< 96 ppm	6
P ₂ O ₅	< 100 ppm	3
So ₃	767 ppm	3
ZrO ₂	36 ppm	1
Cr ₂ O ₃	1.5 ppm	1
Cu	1 ppm	1
U	0.5 ppm	1
Y	1 ppm	1

Source of data

A.C.I. (Australian Glass Manufacturers Co.)
Hepworth Minerals & Chemicals Ltd
Monier Ltd.
Tasmanian Dept. of Mines
TSI Group PLC
Unimin Corporation

Mar., 1991
July, 1990
June, 1987
June & October, 1990
Oct., 1989
July, 1989

THE SHORT TERM API TYPE CONDUCTIVITY
AND PERMEABILITY OF A SUBMITTED SAMPLE
OF SAND FROM MINERAL HOLDINGS OF AUSTRALIA
2.0 LB/SQ FT 20/40 SAND AT 500, 1,000, 1500,
2000, 2,500 AND 3,000 PSI 75°F

Tested June, 1994

FOR
Mineral Holdings of Australia P/L
2nd Floor, 135 Collins Street
Melbourne, Victoria 3000
Australia

BY
STIM-LAB
P.O. Box 1644
Duncan OK 73534

P. O. Number: Fax of 27th May, 1994
per Mr. Neil M. Thomas

File Number: SL 3643
June 1994

STIM-LAB
Inc.



7406 N. 81 HIGHWAY • P. O. BOX 1644 • DUNCAN, OKLAHOMA 73534
TELEPHONE 405/252-4309 • FAX NUMBER 405/252-6979

LENN PENNY
resident

June 30, 1994

Mr. Neil M. Thomas
Mineral Holdings Australia PTY. Limited
135 Collins Street
Melbourne, Victoria
Australia, 3000

Dear Mr. Thomas,

STIM-LAB has completed the requested Short Term API conductivity and permeability type evaluation with closures targeting the near surface coal deposit closure pressures. (5 closures = normal API test - 1 extra free of charge) The sample was sieved to the enclosed sieve distribution to remove the above and below 20/40 cut of sand. The sample was then washed by hand and dried prior to testing the sieve and conductivity at 2.0 lb/sq ft @ 500, 1000, 1500, 2000, 2500, and 3000 psi.

The procedures are outlined in the following section of this report. The data is presented in Tables 1. The sieve analysis of the sample is provided in Table 2.

Thank you for having STIM-LAB perform this test. If you should have any questions, please do not hesitate to call.

Sincerely,

Kathy Abney,
Conductivity Supervisor

KA/cdb
Enclosures

PROCEDURE FOR CONDUCTIVITY AND LIQUID PERMEABILITY MEASUREMENTS

1. The equipment used for the measurement of conductivity and liquid permeability included:

75 ton Dake Press with air oil intensifier. API Monel K-500 flow cells with 10 sq in flow paths.

Rosemont (smart family) 30:1 pressure transducers for measuring pressure drop and rate, plumbed with ¼ in. lines and calibrated with the smart system computer and checked to 1 in. of water.

One gallon nitrogen driven fluid reservoirs filled with 2% KCl and deoxygenated with nitrogen.

Internal gauges and calipers for measuring widths.

IBM PC to process data and calculate conductivity and permeability.

Two 10 sq in. Ohio Sandstone.

2. An API cell was loaded with proppant sample to be tested. The proppant was leveled with a blade device.
3. The proppant sample was placed between the core slabs and were made a part of a one cell stack.
4. The cell was stacked to within 0.002 in. from top to bottom and positioned between the platens of the Dake Press. Pressure was increased to 500 psi and the system was evacuated and saturated with water at 75°F.
5. The proppant was allowed to equilibrate as outlined in the data tables.
6. The flow rate, pressure differential, and average width were measured at each pressure in order to calculate conductivity and permeability. Five measurements were taken and averaged to arrive at each conductivity. Flow rate was measured with a Mettler balance to 0.01 ml/mn. Darcy's Law was used for the calculations to determine the conductivity and permeability.
8. The pressure was increased at 100 psi per minute, at 500 or 10000 psi increments and the above measuring technique repeated.
9. The conductivity and permeability of the proppant were collected at 500, 1,000, 1,500, 2,000, 2,500 and 3,000 psi at room temperature.

SL-3643

Table 1

Conductivity and Permeability of

2 lb/sq ft of 20/40 (Sieved and Washed) Mineral Holdings of Aust.

Between Ohio Sandstone with 2% KCl
Temperature as indicated

Closure (psi)	Temp. Deg F	Conductivity (md-ft)	Width (in)	Permeability (Darcies)
500	75	6361	0.248	308
1000	75	5252	0.242	260
1500	75	4905	0.237	248
2000	75	4159	0.232	215
2500	75	3502	0.227	185
3000	75	3197	0.222	173

June 1994

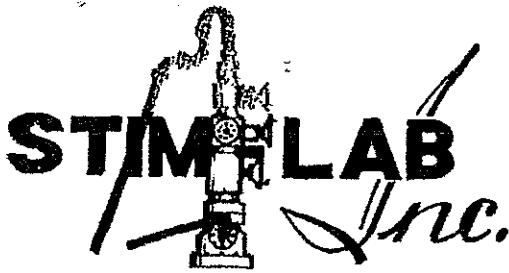
Sieve Analysis of Submitted Sample
From Mineral Holdings of Australia P/L

Sample I.D.

Sand
20/40

	Percent Retained	Percent Cumulative
Sieve		
16	0.0	0.0
18	0.0	0.0
20	2.2	2.2
25	13.5	15.7
30	28.9	44.6
35	22.5	67.1
40	23.1	90.2
45	9.8	100.0
50	0.0	100.0
pan	0.0	100.0

June 1994



7406 N. 81 HIGHWAY • P. O. BOX 1644 • DUNCAN, OKLAHOMA 73534
TELEPHONE 405/252-4309 • FAX NUMBER 405/252-6979

GLENN PENNY
President

Mr. Neil Thomas

Mineral Holdings Australia
Fax: 011 61 3 650 3855

Typically there is not a pass/fail conductivity measurement, rather there is a target conductivity. Sieve distribution, grain strength, and angularity dictates conductivity. Enclosed are some typical sieve distributions of the sands listed on the graph. As you notice, the shape of the Mineral Holdings Sand decline curve resembles that of the Arizona sand. The main difference between the two sands in conductivity is the sieve distribution. A larger average size sand distribution should yield more conductivity.

If increased conductivity is needed, sieve the sand more to the 25-35 distribution and get rid of all the small end. The angularity of the Mineral Holdings Sand may have caused the initial sharp stress decline between 500 and 1000 psi closure as is also exhibited by the Arizona sand. (The angles were broken off the sand with increased closure and the pore spaces get smaller) However, based on this limited testing the Mineral Holdings Sand looks like it will hold up vs stress. However, longterm conductivity will be more representative of the product.

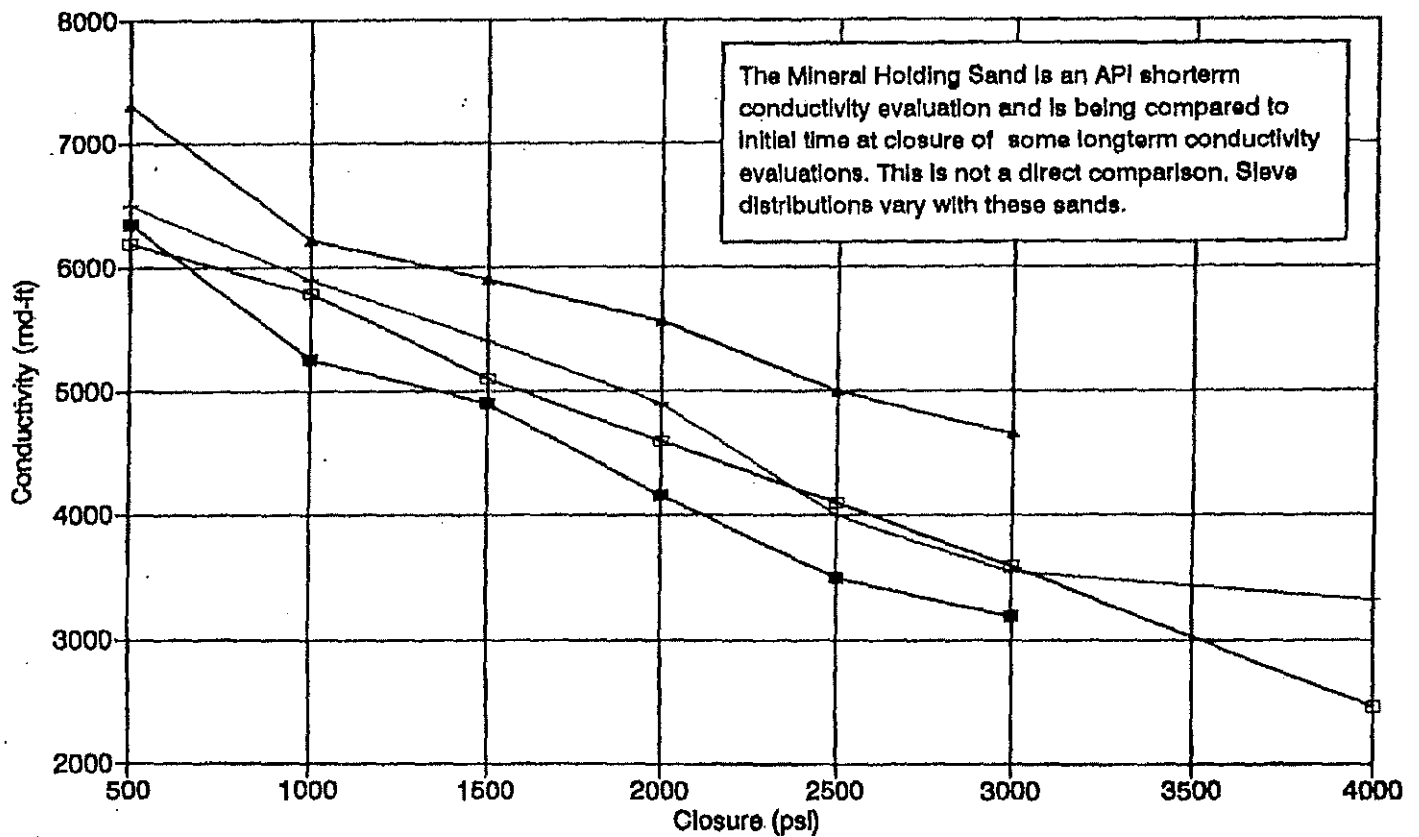
If your deposit will yield a larger distribution at a profitable price then offer a 16/30 distribution to the coal fields as well as a higher cut 20/40 sand. At the cost of the imported US sand vs that of an Australian deposit there is no question in choice of which sand will be more attractive to the producer if the conductivity is similar.

	20/40 Northern White	20/40 Hickory	20/40 Arizona
Sieve	% Retained	% Retained	% Retained
16	0.0	0.0	0.0
20	2.8	1.8	6.0
25	17.4	16.2	41.4
30	28.2	32.4	36.4
35	28.6	33.4	12.8
40	19.6	14.6	3.0
50	3.2	1.8	0.4
pan	0.2	0.0	0.0

Refer to report for your distribution. Clusters also may be present in your sand and if so, will disaggregate with closure resulting in a lower conductivity. Mechanical processing should help this problem.

Kathy Abney, Conductivity Supervisor

Comparisons-Initial Time @ Closure Data of Longterm Tests @150F vs API Shorterm



■ 20/40 Min.Hold.Sand + 20/40 North. White □ 20/40 Hickory ▲ 20/40 Arizona

(X)



3445 N. 81 HIGHWAY, BUILDING B • P. O. BOX 1644 • DURICAH, OK 73534
TELEPHONE 405/252 4309 • FAX NUMBER 405/252-6979

GLENN PERRY
President

January 24, 1992 *9. 3/2*

Mr. H. M. Thomas
Mineral Holdings Australia Pty. Limited
Second Floor
100 Collins Street
Melbourne, Australia 3000

Dear Mr. Thomas:

STIM-LAB has completed the series of tests requested by your firm on the submitted sample of sand from the Thomas Mountain Deposit, Tasmania. This sample was tested as outlined in API RP 56, Recommended Practices for Testing Sand Used in Hydraulic Fracturing Operations. It passed the sieve analysis, shape factor, acid solubility, and turbidity tests; the cluster content and the crush percentage exceeded the test standards. The sand has a high quartz content, with very few contaminants.

In any case, this sand may very well be serviceable for use in low-closure reservoirs, particularly coalbed methane.

Thank you for having STIM-LAB perform these tests. If we may be of service in any other way, please let me know.

Sincerely,

Ron Brurter, Group Leader
Conductivity and Analysis

RB/ab



DOCUMENTATION OF RESULTS

Date:	12/10/2005	Document created:	4/8/03
Job no:	Mountain Thomas		
Purpose of test:	Silica Flour		
Purpose of test:	Geology		
Date of testing:	12-10-2005 & 20/10/2005		
Equipment used:	ICP -Perkin Elmer OES	Analyst	E.H. Gutsa

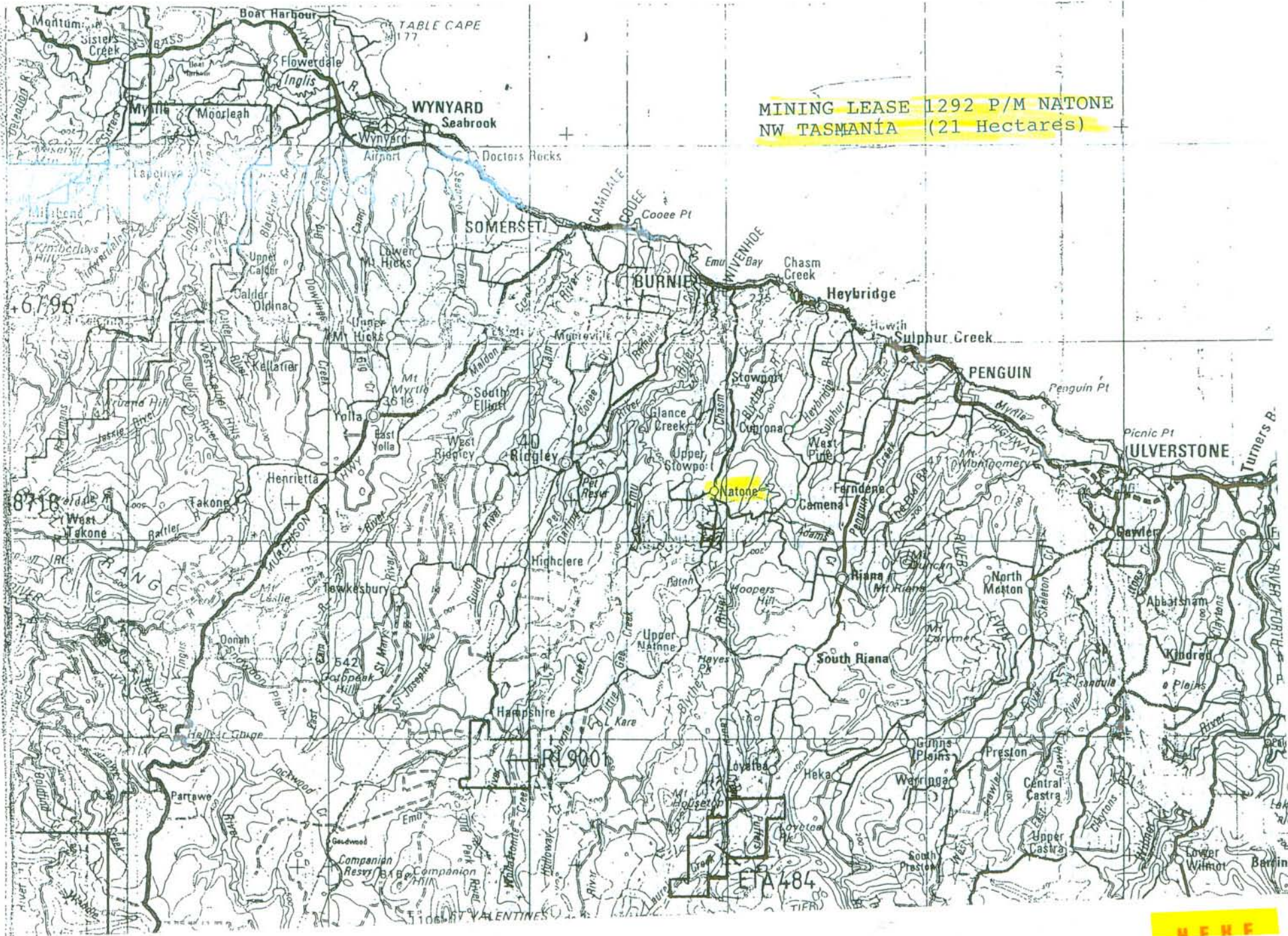
Mountain Thomas Top Pit mesh fraction analysis

	Top Pit Composite	>18US	Top (18-20) US	Top (20-45) US	Top (45-120)	Top <120 US
Element/Compound	ppm	ppm	ppm	ppm	ppm	ppm
Fe	93	101	117	94	86	198
Fe ₂ O ₃	133	144	167	134	123	283
Ti	404	206	199	212	357	1635
TiO ₂	674	344	332	354	595	2727
Al	203	159	174	168	228	548
Al ₂ O ₃	383	300	329	317	430	1035
Ca	26.0	35.4	85.4	25.0	25.6	37.5
CaO	36.4	49.5	119.5	34.9	35.7	52.4
Mg	20.0	13.2	13.4	13.1	21.4	73.9
MgO	33.1	21.9	22.1	21.6	35.4	122.5
K	63.1	54.9	59.4	54.5	65.4	106.5
K ₂ O	76.0	66.1	71.5	65.7	78.8	128.3
Mn	1.19	1.39	1.48	1.32	1.15	2.40
Cu	1.06	3.74	3.72	2.20	2.43	6.39
Cr	2.08	1.93	1.56	1.27	1.83	6.98
Ni	0.15	0.41	0.40	0.21	0.09	0.45

Mountain Thomas Sieve Analysis

Mesh size (US)	TOP PIT		Bottom PIT	
	Weight (g)	% fraction	Weight (g)	% fraction
Greater than 18 US	5.16	0.77	0	0
18 - 20 US	11.76	1.75	0.54	0.08
20 -45 US	426.18	63.25	269.61	37.59
45-120 US	193.19	28.67	412.74	57.54
Finer than 120 US	37.47	5.56	34.44	4.80
Total	673.76	100.00	717.33	100.00

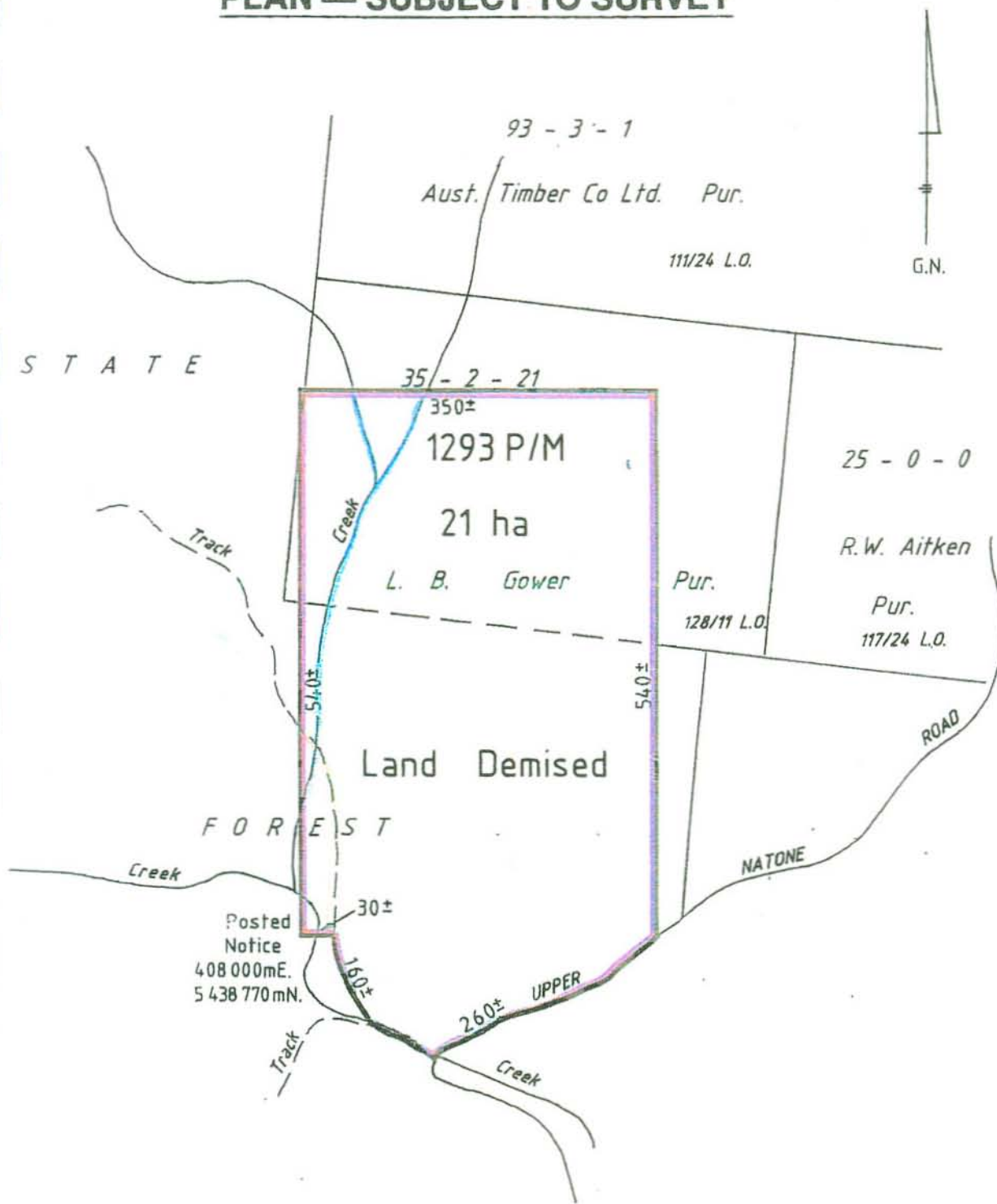
ATTACHMENT 5



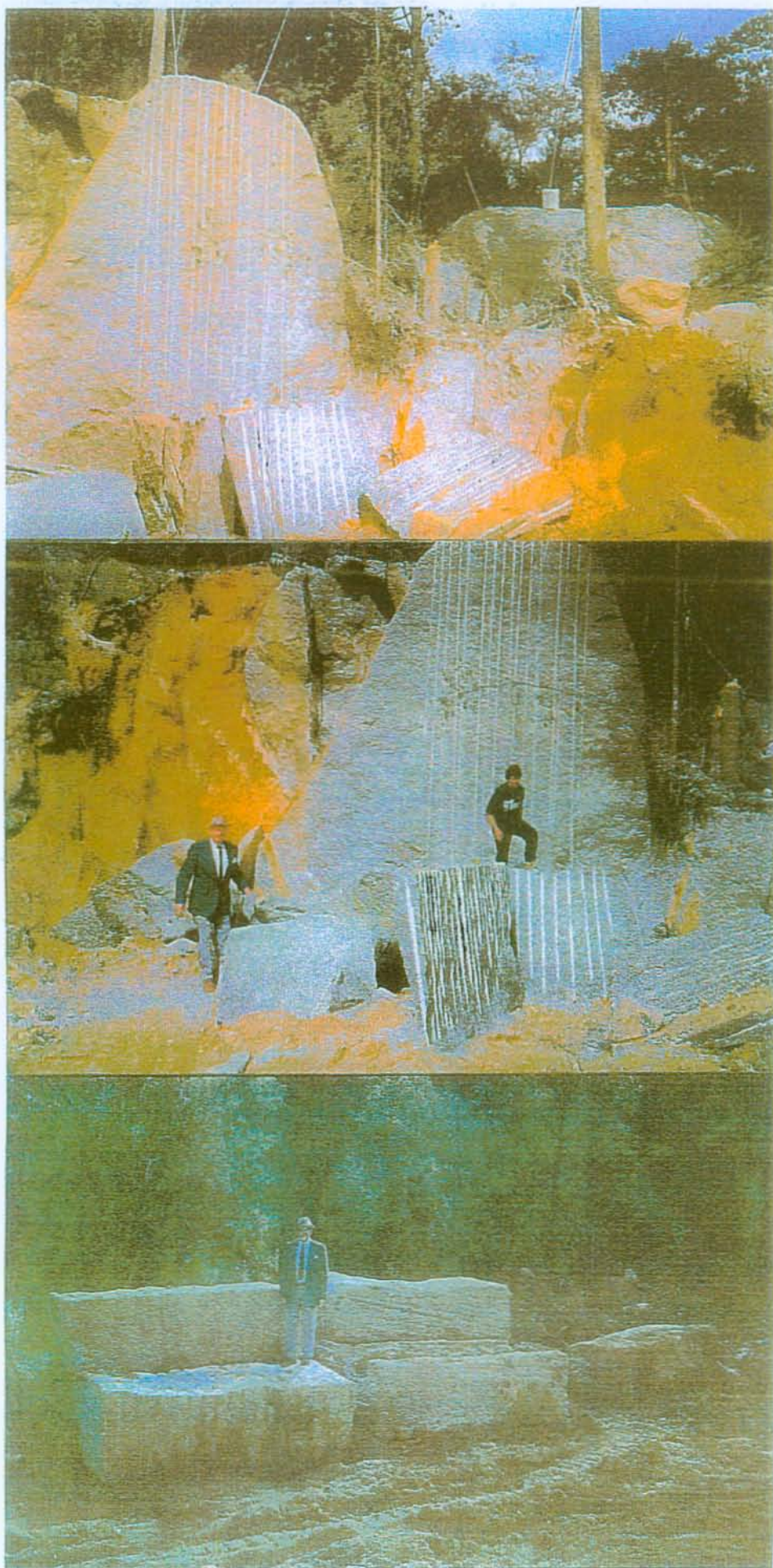
MINING LEASE 1292 P/M NATONE
NW TASMANIA (21 Hectares)

NENE

PLAN — SUBJECT TO SURVEY



DISTRICT DEVON		VICINITY NATONE	
PALITY BURNIE	MAP RIANA	SCALE 1 : 6 000	
ATION NO. 1293 P/M	AREA 21 ha	 DIVISION OF MINES & MINERAL	
ANT	NARGUN PTY LTD.		
AM AMENDED 6 / 11 / 06	EXAMINED <i>WZ</i>	DATE	



NATONE TASMANIA (21 Hectares) ML 1293 P/M

NARGUN PTY. LTD.

A.C.N. 005 703 202

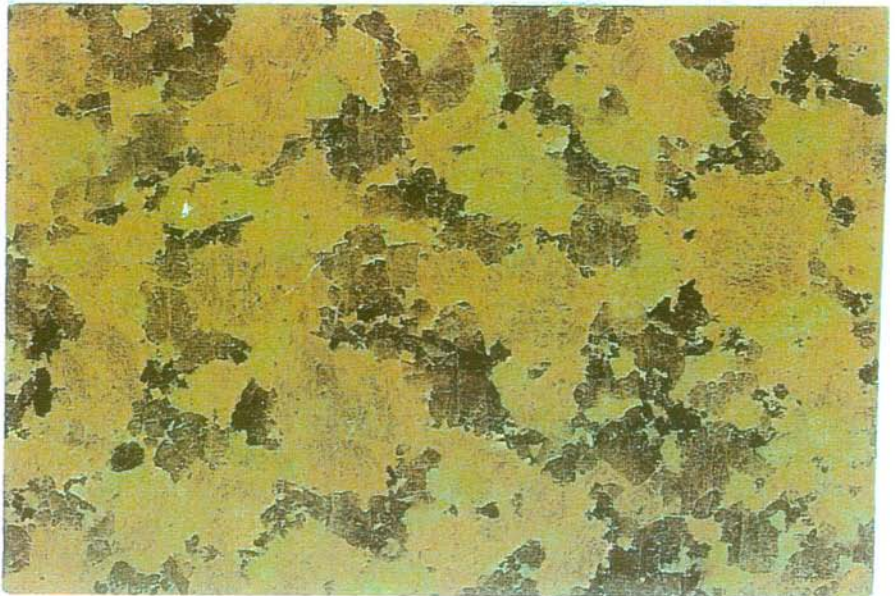
A.B.N. 72 005 703 202

Correspondence to:

11 KENT COURT,
TOORAK , AUSTRALIA 3142
TELEPHONE(61 3) 9822 0077
FAX: (61 3) 9824 7617
Email: tominex@iprimus.com.au

**MINING LEASE No. 1293 P/M
(21 HECTARES)**

“NATONE” PINK/GREEN/BROWN GRANITE



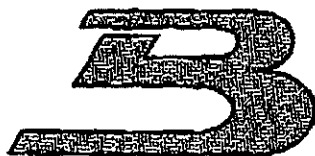
DIMENSIONAL STONE USAGE

LOCATION: TAKONE, NEAR BURNIE, TASMANIA.

ILLUSTRATION OF SUCCESSFUL DIMENSIONAL STONE (GRANITE) production
by Boral and laid on the floor of
THE N.S.W. TAXATION BUILDING
FOYER AT 12-22 ONIORA ROAD;
HURSTVILLE. NSW 1493.



ML.12/93 21 HECTARES
NATONE PINK/GREEN/BROWN
GRANITE.



RECEIVED - 4 JUL 2005

Burnie Port Corporation

FACSIMILE TRANSMISSION

To:	Nell Thomas	Fax No.:	03 9824 7617
Attention:			
From:			
Date:	4 th July 2005	No. of pages:	1
Name:	Ivan Hurkett		
Subject:	Port Reclamation - Rock		

The information contained in this facsimile message, and any attached pages, is confidential to the intended recipient. If the reader of this message is not the intended recipient, you are hereby notified that any use, dissemination, distribution or reproduction of the information is prohibited. If you have received this facsimile in error, please notify the sender immediately by return facsimile or telephone so that arrangements can be made for the retrieval of the original documents at no cost to you.

Dear Mr Thomas,

Further to our telecom please find below very basic information regarding potential reclamation projects at the port of Burnie that might require the supply of various types of rock.

	<u>Armour Rock</u>	<u>Bund Rock</u>	<u>General Fill</u>
Sand Trap Reclamation:	7,000 tonne	40,000 m3	220,000 m3
Western Reclamation	10,000 tonne	40,000 m3	66,000 m3

For information:

Armour Rock: Clean sound basalt rock generally in the range 0.75 tonne to 1.5 tonne dependant upon location.

Bund Rock: Clean sound rock, grading approx 80% in the 200mm to 500mm range. No more than 10% over 500mm and minimum fines specification.

General Fill: Selected rock fill (or sand) generally as dug, 80% in the 50mm to 300mm range with sufficient fines to ensure good compaction.

If the above is of interest then I would welcome your estimates of costs for the various rock supplied to the port to place alongside the other suppliers tenders that we already have.

Regards,

Ivan Hurkett
MANAGER ENGINEERING SERVICES

Burnie Port Corporation Pty Ltd - ACN 078 720 279
19-20 Marine Terrace PO Box 216 Burnie Tasmania 7320
Telephone (03) 6434 7300 - Fax (03) 6434 7373

SUMMARY OF ENQUIRIES

**SUMMARY OF ENQUIRIES OVER THE YEARS
THAT WE HAVE FOR OUR CARBONATES (MAGNESITE,
DOLOMITE, DOLOMITIC LIMESTONE AND LIMESTONE,
SILICAS AND GRANITES**

1. Cookson and Plibrico (Vesuvius)

Letter of 7th June 2001, for 300,000 tpa of Lyons magnesite (10 year contract).

2. Minemakers Australia NL

Verbal enquiry for 300,000 tpa of Lyons magnesite (5 year contract).

3. Nabalco **

Enquiry for 100,000 tpa of limestone of 30th July 1999.

4. Worsley Alumina Pty Ltd. **

Fax of 6th September 1994, for 100,000 tpa of limestone.

5. Hellyer Metals Pty Ltd

Email of 24th May 2005, 100,000 tpa of limestone for a 10 year contract.

6. Pilkington

Letter of 10th August 2004, enquiry for 50,000 tpa of dolomite and 50,000 tpa of silica sand.

7. Hismelt **

Enquiry for 100,000 of dolomite, when available.

8. Blue Scope Steel **

9 One Steel **

* These contracts are under review to be replaced (mid-term) by higher grades of our dolomite, dolomitic limestone and lime-sand.

NB: Note BHP shipments of carbonates quotation November.2001 of US\$11.00 per tonne, FIS and trimmed, Port Latta to Port Hedland. W.A.



FROM VESUVIUS GROUP S.A./N.V.
Mechelsesteenweg, 455 B 1
B - 1950 KRAAINEM (Brussels)
Fax : 32/2/767.13.51

Date : June 7, 2001

To — : MINERAL HOLDINGS AUSTRALIA PTY.LIMITED
Fax n° — : 00 61 3 9650 3855 —
Attn — : Mr. Neil M. Thomas —

From — : Charles Turner —
Pages
incl. cover: 1

Dear Mr. Thomas,

Thank you for the meeting last week in Brussels and for the follow-up notes.

Ultimately, I would be interested to know the estimated cost for supplying up to 200,000 tpy fob tasmanian port. The material should be dead-burned and contain 90-91 % MgO..

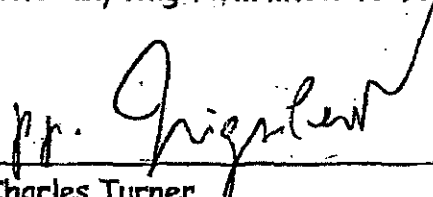
The various steps of the process would be :

1. Mining of the raw ore. Assume we would need to mine 300,000 tpy or ore to get 200,000 tpy finished product for shipping.
2. Crushing and screening of the ore to a size of 15-25 mm.
3. Dead-burning of the sized ore to obtain finished product.
4. Loading on to ship.

Are you able to estimate the cost of these steps ? It would be very helpful if you could give me a rough approximation, including all fees, royalties, etc.

As I mentioned to you at our meeting, I am only doing some superficial thinking at this time in order to see if this idea has any long term merit to Vesuvius.

Best regards,


Charles Turner

Senior Vice President Corporate Development

AC.N. 000 453 663
MANAGER, Gove Joint Venture

P.O. Box 21 Nhulunbuy
N.T. 0881 Australia
Telephone (08) 89875211



Supply: Fax No. (08) 89875305

Shipping: Fax No. (08) 89875410

Telex AA85045

— PLEASE RESPOND DIRECTLY TO FAX NO.: (08) 89875305 —

— PLEASE PASS TO THE CORRECT PERSON IMMEDIATELY —

NUMBER OF PAGES INCLUDING THIS PAGE: 1

Fax To:	Neil Thomas	Fax No.:	08 9 550 3855
Company:	Mineral Holdings Aust	Ref:	lime info
Sent by:	Ian Whish-Wilson	Authoriser:	
Date Sent:	30 July 1999	Copies To:	
Subject:	Supply of Limestone		

A. 17/6/99

As we discussed today, Nabalco is an Alumina Refinery that has a requirement for about 80,000 - 100,000 tonnes of limestone annually. You mentioned the advantages of using dolomitic limestone in regards to reduced limestone organic compounds, reduced scaling and wear and tear of kiln bricks in the calcination process, and increased alumina production. I would be very interested in receiving technical data and supporting information on this.

You also mentioned possible developments at Port Latta that will reduce shipping costs. In the past, shipping costs have not been competitive and this has been a major factor in determining our source of limestone. Gove can only accept ships carrying about 20,000 tonnes of limestone due to wharf limitations. Therefore, I am interested in any possibilities that may reduce the shipping costs.

My phone number is (08) 89875323.

Regards

Ian Whish-Wilson
Logistics Superintendent

Worsley Alumina Pty Ltd



A.C.N. 008 905 155

Worsley Alumina Pty Limited is the agent and manager of the Worsley Soda Joint Venture and the Boddington Gold Mine Joint Venture. In each case liability and responsibility of the Joint Ventures is shared in accordance with the following schedule of participating interests:
Bauxite/Alumina Operations: Reynolds Australia Ltd 50% The Shell Company of Australia Ltd 37.5% Kobe Alumina Associates (Australia) Pty Ltd 10% Nippon Kasei Alumina Ltd 2.5%
Boddington Gold Mine: Reynolds Australia Ltd 40% B2B2m Australia Gold Ltd 30% Newmont Mining (WA) Ltd 20% Kobe Alumina Associates (Australia) Pty Ltd 10%

CONFIDENTIAL COMMUNICATION

If you have received this confidential communication by mistake please telephone 097 348461 immediately

URGENT? ☐

FACSIMILE: 097 34 8413

TELEPHONE: 097 34 8311

ATTENTION MR N THOMAS

DATE: 5 September 1994

COMPANY: MINERAL HOLDINGS AUST PTY LTD

NO OF PAGES: 2
(including cover page)

CC: R FROST (WAPL)

FAX NUMBER: (03) 650 3855

A. 7/9/94

FROM: PAUL POTTER

PHONE: (097) 34 8355

Dear Mr Thomas

re: Supply of Limestone to Worsley Alumina Pty Ltd

Following your fax and telecon I wish to confirm that WAPL requires 100,00 tonnes of burnt lime annually. We have no port facility to handle such material as it is railed directly from our current supplier. WAPL has no lime calcining facility so the supply of carbonate would require significant capital investment.

As discussed on numerous occasions in the past, WAPL does not have the mandate nor the desire to invest in an offsite capacity to produce limestone or burnt lime. We would only be interested from a customer perspective in the long term.

Yours faithfully

PAUL POTTER

Worsley Alumina Pty Ltd



A.C.N. 008 905 155

Worsley Alumina Pty Limited is the agent and manager of the Worsley Sandstone Joint Venture and the Boddington Gold Mine Joint Venture. In each case liability and responsibility of the Joint Ventures is several in accordance with the following schedule of participating interests:

Bauxite/Alumina Operations: Reynolds Australia Ltd 50% The Shell Company of Australia Ltd 37.5% Kobe Alumina Association (Australia) Pty Ltd 10% Nippon Aichi Alumina Ltd 2.5%
Boddington Gold Mine: Reynolds Australia Ltd 40% Barrick Australia Gold Ltd 30% Newmont Mining (WA) Ltd 20% Kobe Alumina Association (Australia) Pty Ltd 10%

CONFIDENTIAL COMMUNICATION

If you have received this confidential communication by mistake please telephone 097 348461 immediately

URGENT? ☐

FACSIMILE: 097 34 8413

TELEPHONE: 097 34 8311

ATTENTION MR N THOMAS

DATE: 5 September 1994

COMPANY: MINERAL HOLDINGS AUST PTY LTD

NO OF PAGES: 2
(including cover page)

CC: R FROST (WAPL)

FAX NUMBER: (03) 650 3855

A. 7/9/94

FROM: PAUL POTTER

PHONE: (097) 34 8355

Dear Mr Thomas

re: Supply of Limestone to Worsley Alumina Pty Ltd

Following your fax and telecon I wish to confirm that WAPL requires 100,00 tonnes of burnt lime annually. We have no port facility to handle such material as it is railed directly from our current supplier. WAPL has no lime calcining facility so the supply of carbonate would require significant capital investment.

As discussed on numerous occasions in the past, WAPL does not have the mandate nor the desire to invest in an offsite capacity to produce limestone or burnt lime. We would only be interested from a customer perspective in the long term.

Yours faithfully

PAUL POTTER

From: Andrew Platts [andrew.platts@intec.com.au]
Sent: Tuesday, 24 May 2005 12:14 PM
To: 'Neil Thomas (E-mail)'
Cc: 'Hellyer_Gp (E-mail)'
Subject: Limestone Supply - Intec Hellyer Metals Project

Mr Neil Thomas,
Chairman,
Mineral Holdings Australia Pty Ltd,
11 Kent Court,
Toorak, Victoria 3142

Dear Neil,

Thankyou for your product specification for limestone from Redpa, North West Tasmania. The quality of the sample taken is good (attached). A Bankable Feasibility Study for the construction of a major hydrometallurgical facility for treatment and recovery of zinc, lead, silver and gold from the tailings dam at the Hellyer Minesite (The Hellyer Metals Project) will be undertaken in the second half of this calendar year 2005.

Could you please provide a budget quotation for the mining, crushing and transportation of 100,000 tonnes per annum of limestone for supply to the Hellyer minesite, Cradle Mountain Link Road. Limestone should be crushed to all less than 10mm. Supply start 2007 for a 10 year project life.

With regards possible supply of a sample for testing through the Burnie Demonstration plant, I will get back to you on timing, quantity and the question of how we crush and grind it to <100 microns.

Regards
Andrew

Andrew Platts
General Manager
Hellyer Metals Project
Intec Hellyer Metals Pty Ltd
Ph (03) 64316156
Mobile 0419 889640



Redpa
Limestone.pdf



PILKINGTON

April 2005

Mr N Thomas
Mineral Holdings Australia Pty Ltd
11 Kent Court
Toorak
Melbourne
3142

CONFIDENTIAL

Dear Neil,

RE: Tasmania – Carbonate Resources

- Pilkington Australia is very impressed by the quality of product and size of reserves that you have available in Tasmania.

Pilkington globally are glass manufacturers and not a mining company, so whilst we may not want to purchase the licences we would be extremely interested in working with other interested parties with a view to purchasing finished product for our Australian business. Of particular interest is the apparent low levels of Iron and other contaminants that are usually present and which are detrimental to glass manufacture.

In Australia we use around 140,000 tonnes of Sand, 42,000 tonnes of Dolomite and 9,000 tonnes of Limestone per annum and subject to satisfactory price negotiations and quality testing we could set up contracts with a potential supplier for any one or all of these products.

It is encouraging that the infrastructure of road, rail & port are readily. The support offered from the Tasmanian Government with regard to exports may also assist in moving projects forward. Pilkington can review receiving product in Bulk or Container, whichever option worked out to be the most economic.

I look forward to dealing with you or your contacts in the future.

Yours sincerely,

Andrew Simpson
Contracts Manager – Raw Materials

Pilkington Australia Limited

95 Greens Road Dandenong South Victoria 3175 Australia
Locked Bag 1350 Dandenong South Victoria 3164 Australia
Tel: (03) 9212 2222 Fax: (03) 9212 2111
ABN 68 006 904 052

PRODUCTIVITY COMMISSION TO REVIEW CONTAINERISED AND BULK SHIPPING BETWEEN THE AUSTRALIAN MAINLAND AND TASMANIA

The Treasurer today announced that the Productivity Commission will undertake a public inquiry of the current arrangements for containerised and bulk shipping for Tasmania.

The Tasmanian Freight Equalisation Scheme, introduced in 1976, and the Tasmanian Wheat Freight scheme, introduced in 2004 to replace the previous scheme, aim to assist in alleviating the freight cost disadvantage incurred by shippers of eligible goods moved between the Australian mainland and Tasmania by sea.

The schemes have been subject to regular review and a number of changes over time, however it is timely for a major inquiry with the aim of developing more efficient long term solutions.

The inquiry will examine the effectiveness of the subsidy scheme arrangements as a mechanism for addressing freight cost disadvantage to Tasmania, taking into account the costs and benefits of the arrangements.

The Australian Government has consulted with the Tasmanian Government in formulating the Terms of Reference for the review, given the significance of the schemes to the Tasmanian economy.

The Productivity Commission will shortly release an issues paper and invite expressions of interest from anyone wanting to participate in the review. Anyone with interest in the inquiry is encouraged to make a submission to the Commission.

The Terms of Reference for the inquiry are attached. Further information about the inquiry is available from the Productivity Commission at www.pc.gov.au or by phone 02 6240 3239.

MELBOURNE
1 March 2006

Contact: David Alexander
03 9650 0244

Terms of Reference

INQUIRY INTO THE SUBSIDISATION OF CONTAINERISED AND BULK SHIPPING BETWEEN THE MAINLAND AND TASMANIA

Productivity Commission Act 1998

CHRIS PEARCE, Parliamentary Secretary to the Treasurer, pursuant to Parts 2 and 3 of the *Productivity Commission Act 1998*, hereby refer the current arrangements for subsidising containerised

tominex iinet

From: "Handy Pacific Chartering" <hpc@bhpbilliton.com>
To: <tominex@iinet.net.au>
Sent: Friday, 26 May 2006 4:37 PM
Subject: Shipping Carbonates to Pt Kembla

RECEIVED 29 MAY 2006

Neil

Basis the very limited information you have provided I would estimate.

Part Cargo of

8000 - 10,000 mts of Carbonates per shipment in owners option - Stowage factor not exceeding 42 cuft
- Carbonates being classified as harmless cargo
non dangerous etc etc, what is the UN classification number please

Loading Pt Latta
Discharge Pt Kembla

1 day shinc load
1 day shinc disch

Freight would be region Usd 7 - 8pmt provided we can part cargo this on a Pellet vessel already heading to Pt Kembla.

++

Please treat above as a very rough guide and if you require more information for the project or are looking to Ship carbonates to other destinations we would be happy to assist

You with your shipping needs.

Brgds
William

This message and any attached files may contain information that is confidential and/or subject of legal privilege intended only for use by the intended recipient. If you are not the intended recipient or the person responsible for delivering the message to the intended recipient, be advised that you have received this message in error and that any dissemination, copying or use of this message or attachment is strictly forbidden, as is the disclosure of the information therein. If you have received this message in error please notify the sender immediately and delete the message.

**BHP TRANSPORT & LOGISTICS, MELBOURNE
QUOTE FOR SHIPMENT OF DOLOMITE ORE
FROM PORT LATTA TO PORT HEDLAND, W.A.
NOVEMBER 2001.**

As previously noted with you BHP Transport & Logistics is interested in the shipment of 1.2m tonnes of dolomite from Port Latta to WA, and as requested I have completed a freight indication as follows:

Vessel Type: Bulker with cranes and grabs, 5 holds/5 hatches

Cargo size: 43,500 mt dolomite

Load: 1 safe berth Port Latta

Discharge: 1 safe berth Port Hedland - assumed WA port

Load Rate: 24,000 tonnes per day SHINC

Dis Rate: 8,400 tonnes per day SHINC - assume into hopper

Freight Rate: USD11.00 per tonne, free in stowed and trimmed

+++++

I have used Handymax size ship for costing purposes and it should be noted that this is suitable size for the assumed discharge berth of Hedland as the cargo would be discharged at Common User Wharfs.

We are also interested in other dry bulk shipments around the Australian coast and to Japan/Korea area.

Best regards

Wendy Rademacher

Snr Chartering Officer

BHP T&L Melbourne

EOM

NOTICE - This message and any attached files may contain information that is confidential and/or subject of legal privilege intended only for use by the intended recipient. If you are not the intended recipient or the person responsible for delivering the message to the intended recipient, be advised that you have received this message in error and that any dissemination, copying or use of this message or attachment is strictly forbidden, as is the disclosure of the information therein. If you have received this message in error please notify the sender immediately and delete the message.

Iominex Iinet

From: <sgcarra@jebsons.com.au>
To: <tominex@iinet.net.au>
Sent: Monday, 22 May 2006 8:30 PM
Subject: Bulk Vessels Traversing Bass Strait to Australian Ports

RECEIVED 23 MAY 2006

Dear Neil:

For your budgeting purposes, based on the current market levels please find below indicative Freight rates for loading 30,000mt of Tasmanian Crushed Carbonates:

Vessel To Be Nominated

Burnie / Port Kembla	US\$14.25 p/mt
Burnie / Adelaide	US\$14.75 p/mt
Burnie / Kwinana	US\$24.30 p/mt .

Based on the following assumptions:

Load Rate ex-Burnie of 500mt p/hr
Discharge Rate of a Geared Vessel of 300mt p/hr
Bunkers: IFO-180 US\$407 p/mt and MDO US\$700 p/mt
Loading and Discharging costs are to the Charterer's account.

If you have any further queries, please don't hesitate to call.

Regards

Steven Carra
Coastal Manager
Email: sgcarra@jebsons.com.au
Ph. 9600 0966
Fax. 9602 2660
Mobile. 0402 001515

