CSA Global
Resource Industry Consultants

CSA Global Pty Ltd
Unit 12, 16 Charlton Court
Woolner, NT 0820

PO Box 36559
Winnellie, NT 0821
Australia

T +61 8 8941 2097
E csant@csaglobal.com

ABN 67 077 165 532

www.csaglobal.com

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Technical Review

THESSALLY RESOURCES PTY LTD

Review of Preliminary Economic Assessment Parameters

Huandot Magnesite Deposit

Batchelor, Northern Territory

by

Murray Lines
M AusIMM, M SME

For:

Thessally Resources Pty Ltd
c/- Level 2, 3 Ord Street,
West Perth,
WA 6005

Approved:

Patrick Maher
Manager, Northern Territory

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1 Introduction

Exploration licence 27724 is a one graticular block tenement located approximately 85km south of Darwin in the Northern Territory, Australia (see Figure 1). The tenement contains the Huandot Magnesite deposit and was granted to TSL for a period of two years on the 7th May, 2010. TSL have submitted an application for renewal of the tenement to allow them to further progress work programs and studies into the development of the Huandot deposit.

The current licence covers the same area as historical tenement ERL 128 owned by several companies notably Nircon Resources Ltd. (NRL), various companies related to the Normandy Mining Group [Commercial Minerals Ltd. (CML) & Normandy Industrial Minerals Ltd. (NIML)] and Magnesium Developments Limited (MDL). During the early work on ERL128 an interested party to the ongoing developments was Norsk Hydro Canda Inc. (NHCInc), see Table 1. In 2001 MDL submitted an application for Mineral Lease 23292 over part of ERL 128 (see Figure 2) in preparation to develop the Huandot deposit. The mineral lease (ML 23292) was subsequently granted to MDL in 2006.

Initially the area was explored for base metal mineralisation of a style similar to that mined at the Woodcutters deposit located about 5km to the north. The base metal exploration was unsuccessful however, the presence of magnesite was noted and further work was aimed at evaluating the development potential of the magnesite resources.

The first few drilling programs in the Huandot area were completed using the RC and RAB drilling techniques. The initial drilling suffered sample recovery problems. This was overcome in later RC and diamond drilling programs completed in the late 1990's and reliable samples and assay results suitable for resource estimation were obtained.

The exploration work, culminated in a 30,000t bulk sample being collected which was sent to Canada for metallurgical test work (see Figure 3 and Figure 4). Detailed financial modelling and mine design work was also completed.

The metallurgical test work concluded the magnesite was of a suitable quality for magnesium metal production however, the very tight material quality specifications, more cheaply available magnesite from China and lack of infrastructure in the area combined to see the project fail to reach production stage. Based on these results MDL applied to the Department of Primary Industry, Fisheries and Mines to relinquish ML 23292 and the tenement was surrendered on 14 November 2008.

Improvements in the global market for magnesite and up-graded infrastructure in the area suggest that the Huandot magnesite deposit is worthy of re-examination. The new infrastructure includes, improved roads, completion of the Alice Springs to Darwin railway line, a high voltage power line which runs along the Batchelor Road past the deposit to the Browns Oxide mine (closed) and availability of bulk, on-shore gas supplies.

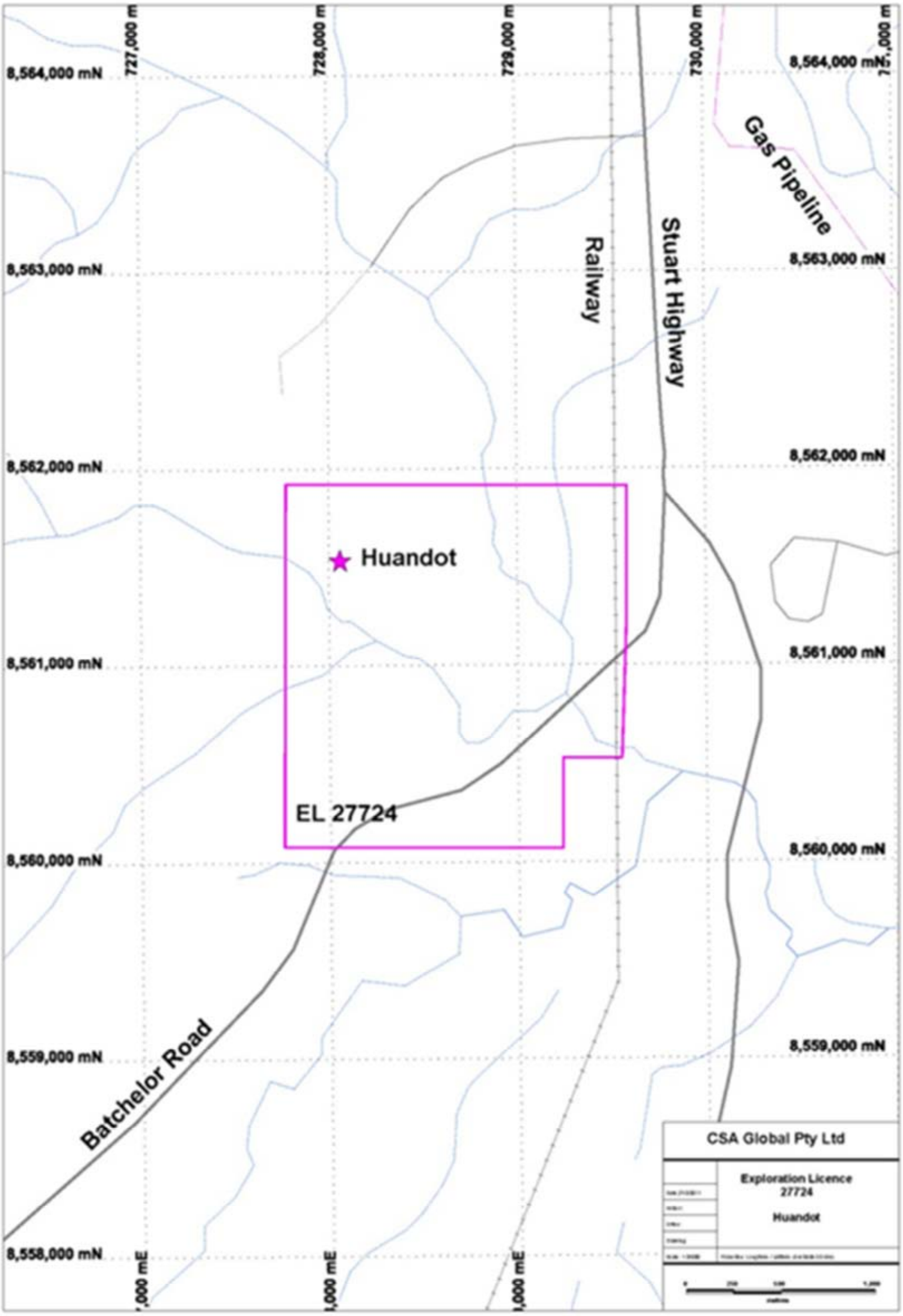

Figure 1. Location of EL 27724 – Huandot Magnesite project

Table 1. Summary of previous exploration for magnesite in the Huandot area up to 2001

Period	Company	Exploration Activity	Comments
1979-83	BHP	Geological Mapping, rock chip sampling & shallow drilling over the Celia & Coomalie Dolomite 4 kms SW of Huandot BHP testing for refractory grade magnesite	Magnesite analyses from drill holes ranged from 41.9% - 46.0% MgO 1% - 13.6% SiO_2 0.17% - 4.4% CaO 0.32% - 1.87% Fe_2O_3 Substantial quantities of high-grade magnesite suitable for production of refractory products identified
1987-93	NHCInc & NRL	Reverse circulation & RAB drilling at Huandot & Area 44 1.5 km NW of Huandot	Magnesite analyses ranged from 36.3% - 43.8% MgO 0.21% - 0.66% CaO RAB holes to max 20m depth
1995	NHCInc	RC drilling 5km SW of Huandot	Results reported by Goulevitch & Turner 1996 Basement carbonate contains impure magnesite at this locality
1995	CML & NHCInc	Trial pit excavated 25,000 ton bulk sample screened and washed magnesite dispatched to Norsk Hydro Canada Blast hole sampling of cuttings	224 samples from 750 blast holes average grade 44.4% MgO 0.29% Ca 0.41% Fe Bulk sample assay 44.8% MgO 0.35% Ca 0.37% Fe
1996	CML & NHCInc	2 RC drilling programs Stage 1 - 47 holes for 1902m Stage 2 – 40 in-fill holes for 1608m	Defined 2 main areas of magnesite and provided data for resource estimation.
1997	NIML	Estimation of mineral resource, to JORC code (Powell, 1997)	NMIL estimate 4.6 M tonnes @ + 43% MgO 0.47% Ca 0.51% Fe within 50m of the surface
2001	MDL	Liaison with landowner & Exotic Timbers of Australia (ETA) Conceptual open pit designed Drilling proposal prepared Application for Mineral Lease lodged 09/08/01	Resolved area required for future mining & timber planting Drilling program submitted to DFIME for approval ML 23292 encompassing portion of ERL 128 & adjacent MCN's granted over 125.4 Ha

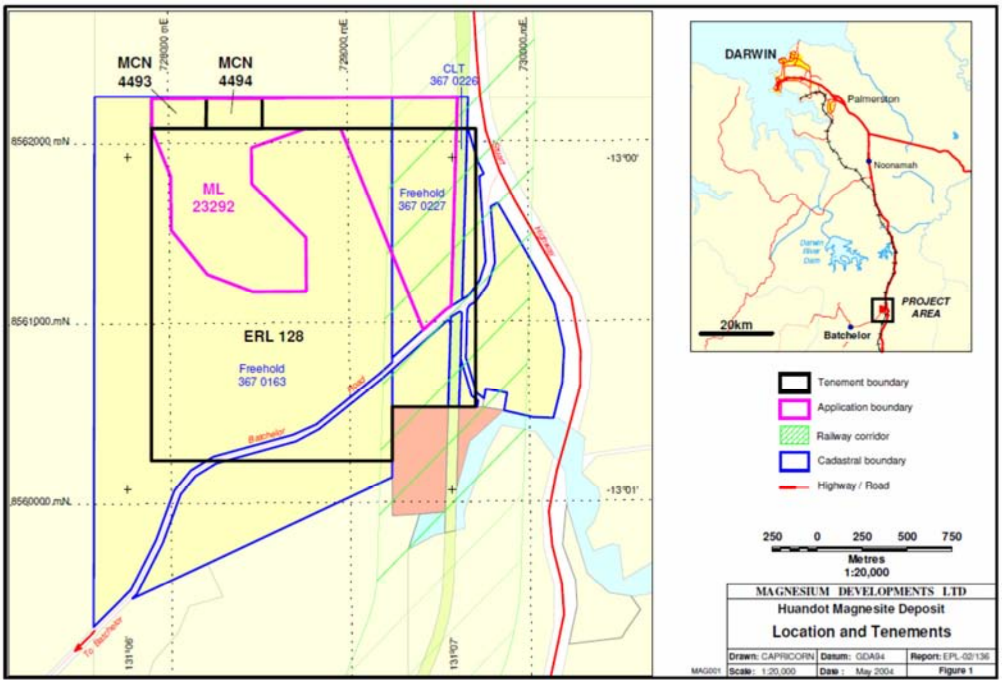

Figure 2. Map showing historic tenement boundaries circa. 2004

Figure 3. Stockpiles +200mm (top photo) + 10mm (lower photo) of crushed product ready for CML shipment to Norsk Hydro in 1995

Figure 4. Stockpile of mined magnesite prior to washing to remove clay and fines.

CSA Global Pty Ltd (CSA) was contracted by TSL as technical consultants to review the development potential of EL 27724 and manage exploration and evaluation works on the property. As part of this work CSA engaged the services of Mr Murray Lines (Managing Director of Stratum Resources). Mr Lines is a noted industrial minerals expert and geologist with a speciality in the marketing and assessment of magnesite deposits.

This report details the results of a review of TSL's exploration data, historic geological and resource models as well as preliminary mine design details for the Huandot magnesite project. The author has also reviewed potential operating parameters together with possible operating and capital cost estimates suitable for the extraction of magnesite on EL 27724.

In the course of this review a new source of mine design and economic information was obtained by the author and it forms the basis of the study and preliminary economic assessment. The review is based on all available data but has not involved a visit by the author to the Huandot project site.

2 Access, Tenure and Land Use

2.1 Location and Access

The Huandot magnesite deposit is located 1.5km west of the intersection of the Stuart Highway and Batchelor Road, which is approximately 90km south of Darwin. The tenement borders the Alice Springs to Darwin railroad line that terminates at the East Arm Port and ship loading facilities.

Access to the exploration licence from Darwin is via the Stuart Highway to the Batchelor turnoff and then along the Batchelor Road for approximately 3km. Both the Stuart Highway and Batchelor roads are sealed and provide all weather access. During the previous exploration campaigns access to the Huandot deposit itself was via a dirt track north from the Batchelor Road. The track is now in disrepair after several years of no use. An alternative access is via the abandoned Woodcutters mine site.

2.2 Land Use

The Huandot magnesite deposit is located on Section 163 of Howard which is freehold land owned by Savvas John Christodoulou. In 2001 a large portion of Section 163 was sub-let to Exotic Timbers of Australia Limited (ETA) for the purpose of growing exotic trees to be used for oil manufacture (see **Figure 5**).

MDL lodged a submission with the NT Department of Land Planning and Environment (NTDLPE) in July 2001 opposing the proposed planting of trees over the Huandot deposit drawing attention to the previous exploration which had defined a substantial magnesite Mineral Resource. Negotiations between MDL and ETA identified an area most likely to be involved in any future mining operations and this area was excluded from the development license issued to ETA by NTDLPE.

Tree planting was completed by ETA over the area surrounding ML 23292. At that time MDL had secured Huandot by ERL 128 and MCN 4493 and 4494 (see Figure 2).

2.3 Tenure

Exploration Licence 27724 was granted to Thessally Resources Pty Ltd for a period of two years on the 7th May, 2010. The licence, which consists of just one graticular block covers the same area as the former ERL 128 (see Figure 2).

TSL have submitted an application for renewal of the tenement to allow them to further progress work programs and studies into the development of the Huandot deposit.

2.4 Aboriginal Heritage

A sacred Sites Clearance certificate issued by the Aboriginal Areas Protection Authority (AAPA) to NIML in 1995 (Certificate 1995/136) was reissued to MDL in 2001 as Certificate 2001/067. A condition of the clearance referred to the non-disturbance of white stone outcrops within the lease area.

Discussions with AAPA established this was in reference to white quartz. No outcrops of white quartz have been located within ML 23292 although minor quartz outcrops occur outside the southern boundary of the lease. Exploration and mining operations have not in any way affected Aboriginal Heritage items or identified sacred sites.

Plate 1 Tree Planting at Huandot by Exotic Timbers of Australia Limited

Plate 2 Tree Planting and Signage by Exotic Timbers of Australia Limited

Figure 5. Photos (2009) of tree plantation on adjacent land to EL27724

3 Regional Geology

Magnesite deposits in the Batchelor area are hosted by the Celia Dolomite and Coomalie Dolomite. Both units are about 300m thick and are located near the base of the Palaeoproterozoic sedimentary sequence which onlaps the Archaean Rum Jungle and Waterhouse complexes (Goulevitch 2000).

These stromatolitic dolomite units and their contained magnesite lenses are identical in composition and separated by the arenaceous Crater Formation which is up to 600m thick. The upper unit Coomalie Dolomite is overlain by dolomitic and carbonaceous sediments of the Whites Formation (Goulevitch 2000).

Potentially economic deposits of coarsely crystalline, massive magnesite occur in the upper Coomalie Dolomite just below the Whites Formation in three areas - at Huandot and Area 44 which are both situated north of the Batchelor road 9-10 kilometres northeast of the township, and at Winchester located south of the Batchelor Road 3-4 kilometres east of the township.

3.1 Deposit Geology

Goulevitch (2000) describes the geology of the Huandot deposit as follows:

At Huandot, the magnesite occurs as a lens 80-120 metres thick and along the western and south-eastern limbs and around the hinge of a NE plunging syncline referred to locally as the Huandot Syncline (see Figure 6). The best magnesite zone (western zone) occurs over a 400 metre strike length along the western limb, which dips E at about 50-60°.

A separate magnesite concentration (eastern zone) occurs along a 300 metre strike length on the south-eastern limb which dips to the NNW at 40-50°. The intervening synclinal axis plunges to the NNE at 40-60° Deep karst weathering has created a very irregular surface on the massive magnesite which comprises the high grade material. This weathering has destroyed most of the magnesite in the keel of the syncline between the two deposits to a depth of at least 40-50 metres. Depth to massive unweathered magnesite on the limbs of the syncline can vary from nil to 20 metres over a distance of 5-10 metres.

Within the Coomalie Dolomite, the dolomitic sediments under the massive magnesite lens have also been affected by deep (? karst) weathering with the effect that along the western side of the main zone, the massive magnesite is possibly underlain by physically weak and incoherent skeletal carbonate and karst-fill deposits. Similarly, karst weathering has penetrated to a greater depth than normal along the hanging wall contact between the magnesite and overlying dolomitic sediments of the lower Whites Formation. Numerous sink-hole depressions occur along this boundary and within the sub crop limits of magnesite lens on both limbs of the Huandot Syncline. Reasonably large solution cavities were also encountered within the massive magnesite during extraction of the bulk sample and during subsequent drilling programmes.

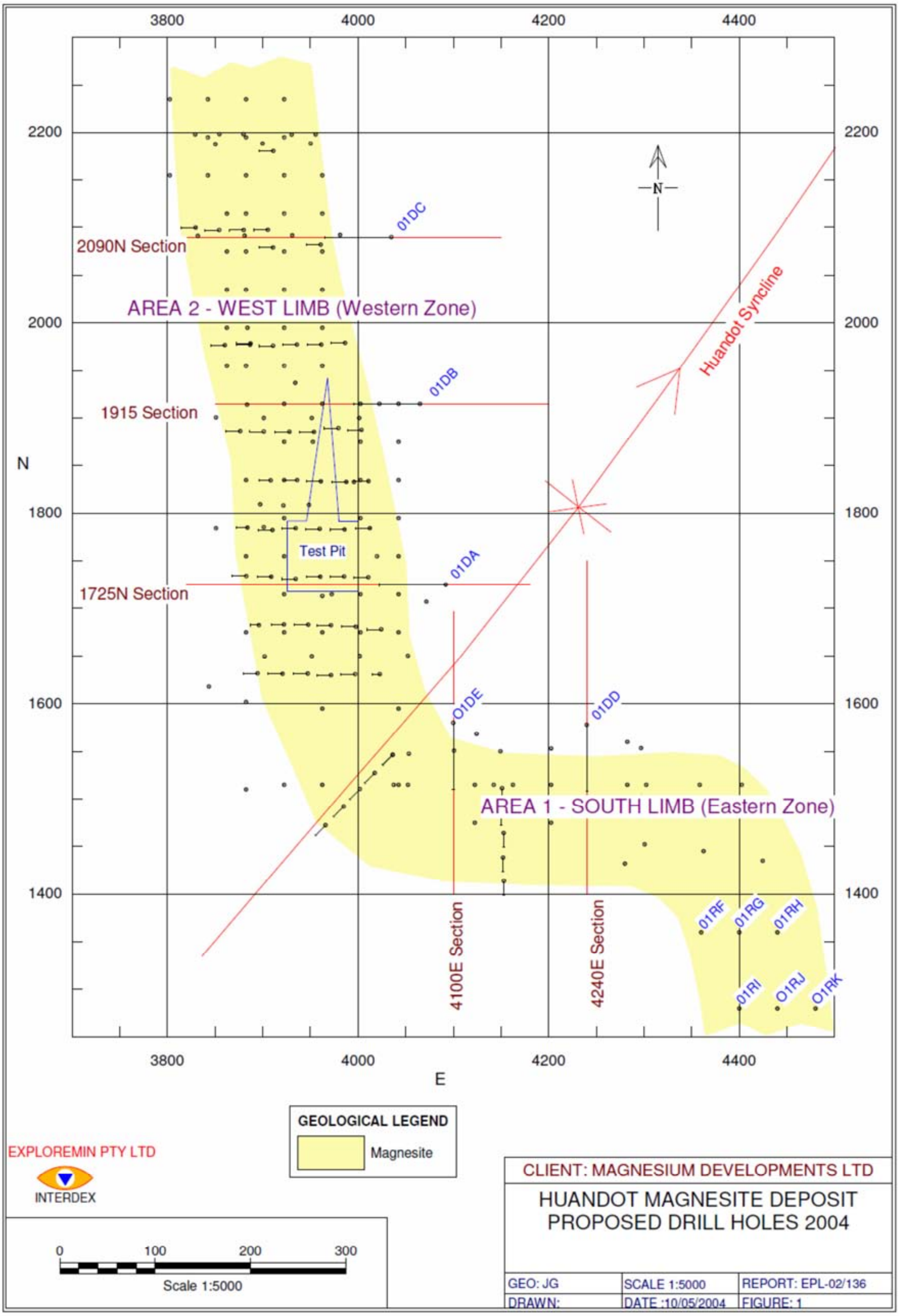

Figure 6. Drill hole plan showing main extent of known magnesite either side of the syncline

The western magnesite zone is traversed by a series of WNW striking sinistral faults and fault zones which have contributed to the irregularity of the karst weathering surface and development of sink-holes. Most of these faults are clay-filled and probably less than a metre wide though one major zone in the middle of the western zone appears to be about 50 metres wide. One of these faults was exposed in the trial pit where it dipped to the south at about 75°.

The western magnesite zone in the Huandot deposit contains the best quality magnesite identified in the region. Grade details of the bulk sample removed from a test pit (see Figure 6) in 1995 are compared to that of blast hole and diamond drill core samples in Table 2.

Table 2. Grade Comparison of bulk sample with blast hole samples and diamond drill core

SAMPLE	MgO %	Mg %	Ca %	Fe %	Al %	Si %	Insol %	RSI ml	Mass Bal %
224 Blast Hole Samples*	44.4	26.8	0.29	0.41	0.14		3.81	16	98.4
Bulk Sample 25,500T#	44.8	27.0	0.35	0.37	0.08	0.31	3.80	10	100
Pit DDHs – 1992 Assay*	45.3	27.3	0.36				3.06		

* RL 1040-1046.6 # RL1035-1046.6

Trace element levels in the bulk sample were as follows:

Ni	4 ppm	**Cu**	<1 ppm	**Zn**	5 ppm	**Pb**	<3 ppm
As	<1 ppm	**B**	4.2 ppm	**P**	115 ppm	**S**	<10-30 ppm.

Much of the deposit is better than 44% MgO (see Section 4 – Mineral Resource Estimates) and contains less than 5% insoluble minerals (mostly chlorite, talc and quartz with minor pyrite) and has a low "reactive-silica index" (RSI, 10-20). Ca, Fe and Mn contents are derived mainly from carbonate minerals, probably from within the magnesite lattice.

The eastern magnesite zone at Huandot contains 42-43% MgO (acid soluble) and a commensurately higher level of acid insoluble residue (6-8%). Ca levels and RSI are similar to the western zone but Fe is higher (0.7-0.9%).

4 Mineral Resource Estimates

Work by Goulevitch (2000) of Exploremin (EPL) is summarised below:

Mineral Resources have been estimated by NIML in the vicinity of the test pit (western zone - NIML's "Area 2") in accordance with the JORC Code (note pre-1999 revision of JORC) utilising analytical data from all diamond and RC drill holes completed by Nicron and NIML. The geological model has been further constrained with data from RAB drill holes.

The NIML method of estimation was by computerised block modelling using an SG of 2.95 g/cc. NIML's Mineral Resources are all within 50 metres of the surface and for the most part within 45 metres of the surface. The "high grade" CML resources are categorised as 67% Inferred, 24% Indicated and 9% Measured. NIML estimate that the Mineral Resources at Huandot are covered by 1.6 million cubic metres of overburden with a consequent 1:1 ratio of overburden: magnesite.

A Mineral Resource estimate was also completed using the same data by EPL for Norsk. This estimate is not as rigorous as the NIML estimate and does not comply with the JORC Code. The purpose of this work were both to provide an early estimate of the magnesite potential while the detailed NIML estimate was being prepared; and also to act as a check on the NIML estimate. The EPL check estimate was completed using the sectional / polygon method utilising Interdex software. An SG of 3.0 g/cc was used and there was no weighting for variations in sample intercept length or on-section drill hole spacing.

Summary details of both estimates are provided below. These demonstrate excellent correlation for the "high grade" resources and acceptable correlation of the "low grade" resources and overall totals. As a consequence we consider that the CML estimate (4.5-5 MT at +43% MgO within 50 metres of the surface) is reliable. The higher overall tonnage estimated by EPL's check estimate is a result of the higher SG employed and extension of the polygons a short distance below the ends of drill holes which terminated in solid magnesite. CML's block model does not extend below the drill holes.

Table 3. Estimates of Mineral Resources, Area 2, Western Zone, Huandot Magnesite Deposit

	M TONNES	MgO %	Mg %	Ca %	Fe %	Al %	Si %	Insol %	RSI MI	S* ppm	Mn ppm
NIML - SG 2.95											
High Grade	3.5	44.1	26.62	0.39	0.53	0.12	0.05	4.47	12	17	323
Low Grade	1.1	40.8	24.63	0.74	0.44	0.21	0.05	10.8	23	8	270
Total NIML	4.6	43.4	26.17	0.47	0.51	0.14	0.05	5.90	15	15*	311
EPL - SG 3.0											
High Grade	3.4	44.4	26.75	0.36	0.53	0.12	0.05	4.34	12	15	315
Low Grade	1.8	42.3	25.75	0.49	0.47	0.19	0.05	8.63	20	14	287
Total EPL	5.2	43.7	26.32	0.41	0.51	0.14	0.05	5.80	15	15*	305

* Difficult to analyse accurately at these concentrations – possibly all less than 10 ppm

Goulevich (2000) stated; On the basis of our involvement during the bulk sampling and RC drilling programmes in 1995-1995 and our personal knowledge of the Nicron staff and contractors who conducted the 1991-1992 drilling programme, we also believe that the data used in these resource estimates can be relied upon.

Accurate surveying methods were used to locate the drill hole; acceptable sampling protocols were in place during the 1996 RC drilling campaigns to provide valid samples reasonably free of contamination; all analyses (including 1996 re-analyses of the diamond drill core) were conducted by Assaycorp Pty Ltd using the acid digest method supplied by Norsk; and Assaycorp's performance was controlled both by mass balance checks and analyses of selected duplicate samples by Norsk Hydro Canada Inc.

4.1 Planned Resource Extension Program

Further planning work was carried out in 2004 and 2005 by Goulevitch for MDL. The aim of this work was to define a resource drilling program that would attempt to increase the Inferred Mineral Resources by 8-10Mt.

A drilling program of deep holes and infill was planned. At that time the budget for the program was estimated at ~$700,000. Figure 7, Figure **8** and Figure **9** present some of the cross sections with planned drill holes as developed by EPL for MDL. A drill hole plan showing existing and planned resource infill drilling is presented as Figure 10.

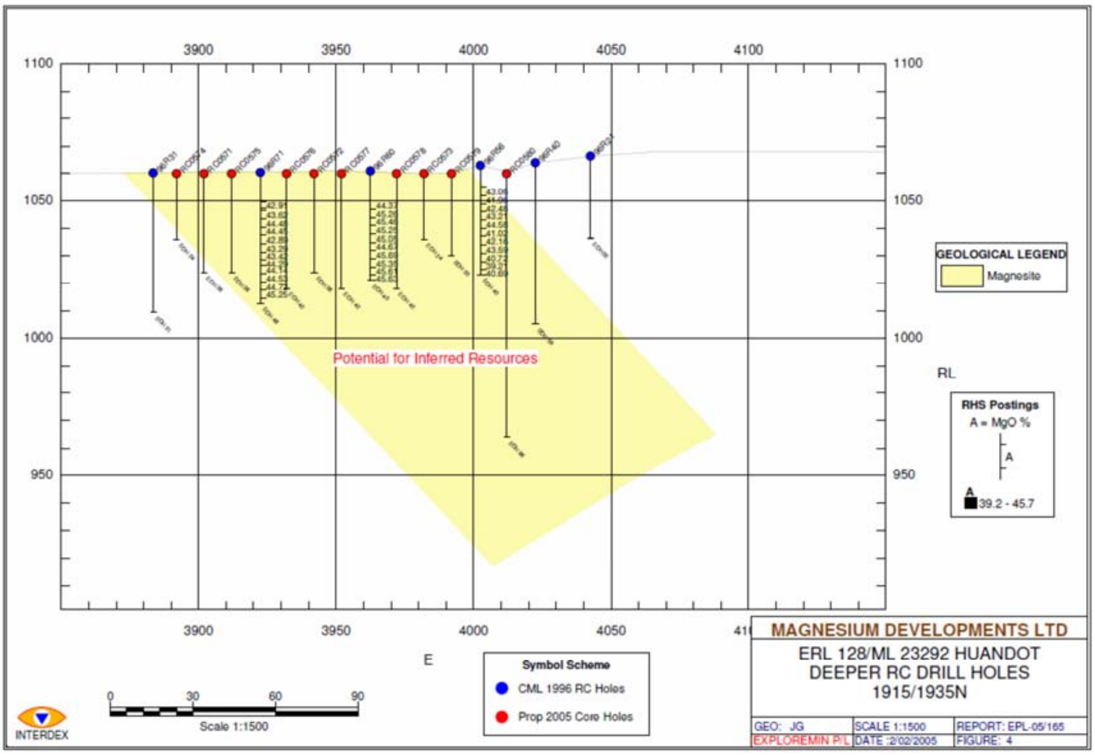

Figure 7. Planned infill RC Holes and suggested potential for additional Inferred Resources

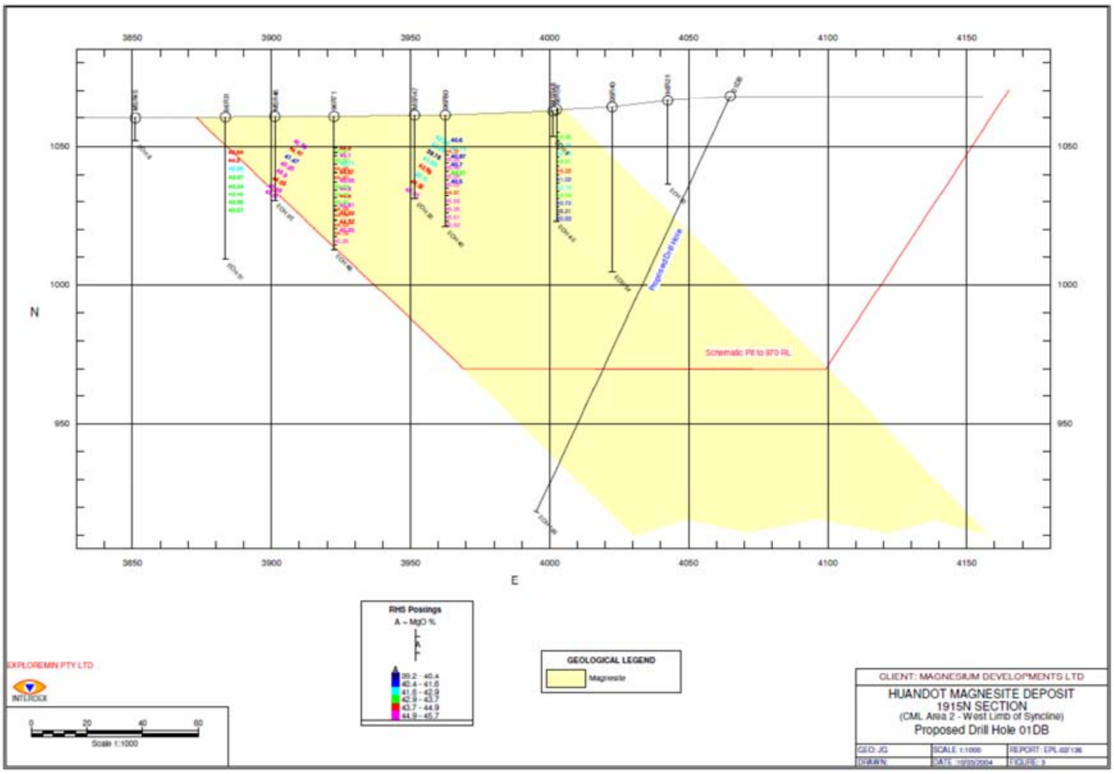

Figure 8. Cross section 1915N showing suggested deep drill hole "01DB"

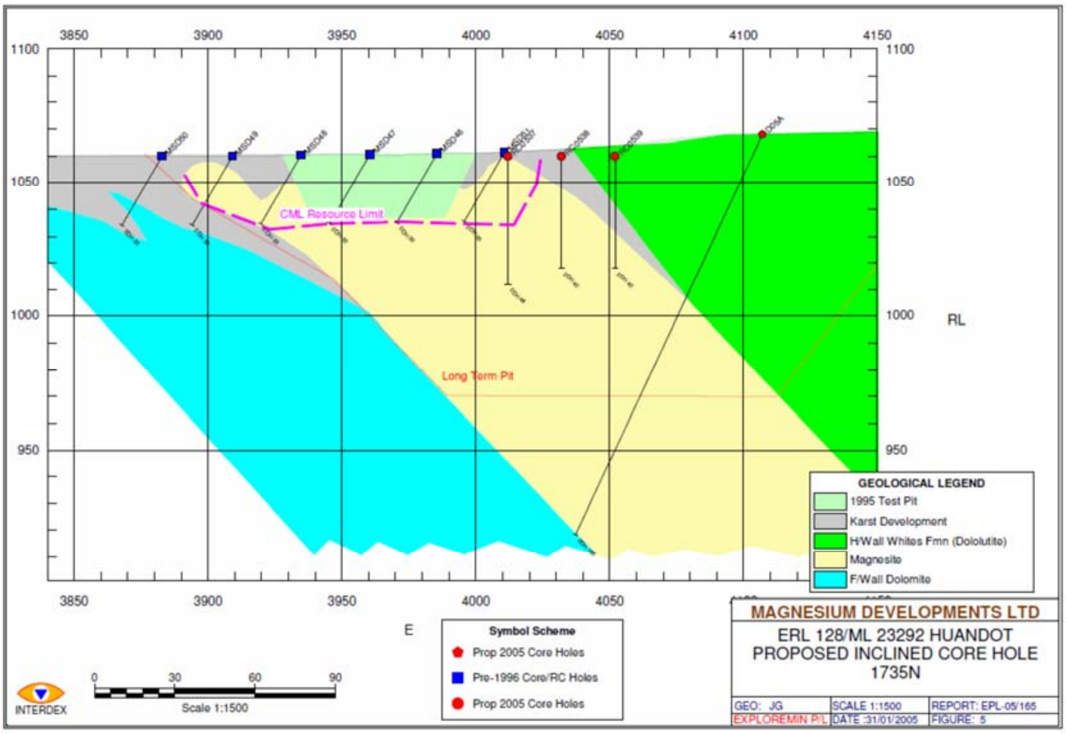

Figure 9. Cross section 1735N showing suggested infill and deep drilling, the limits of CML's resource model, location of the test pit and possible limits of "Long Term Pit"

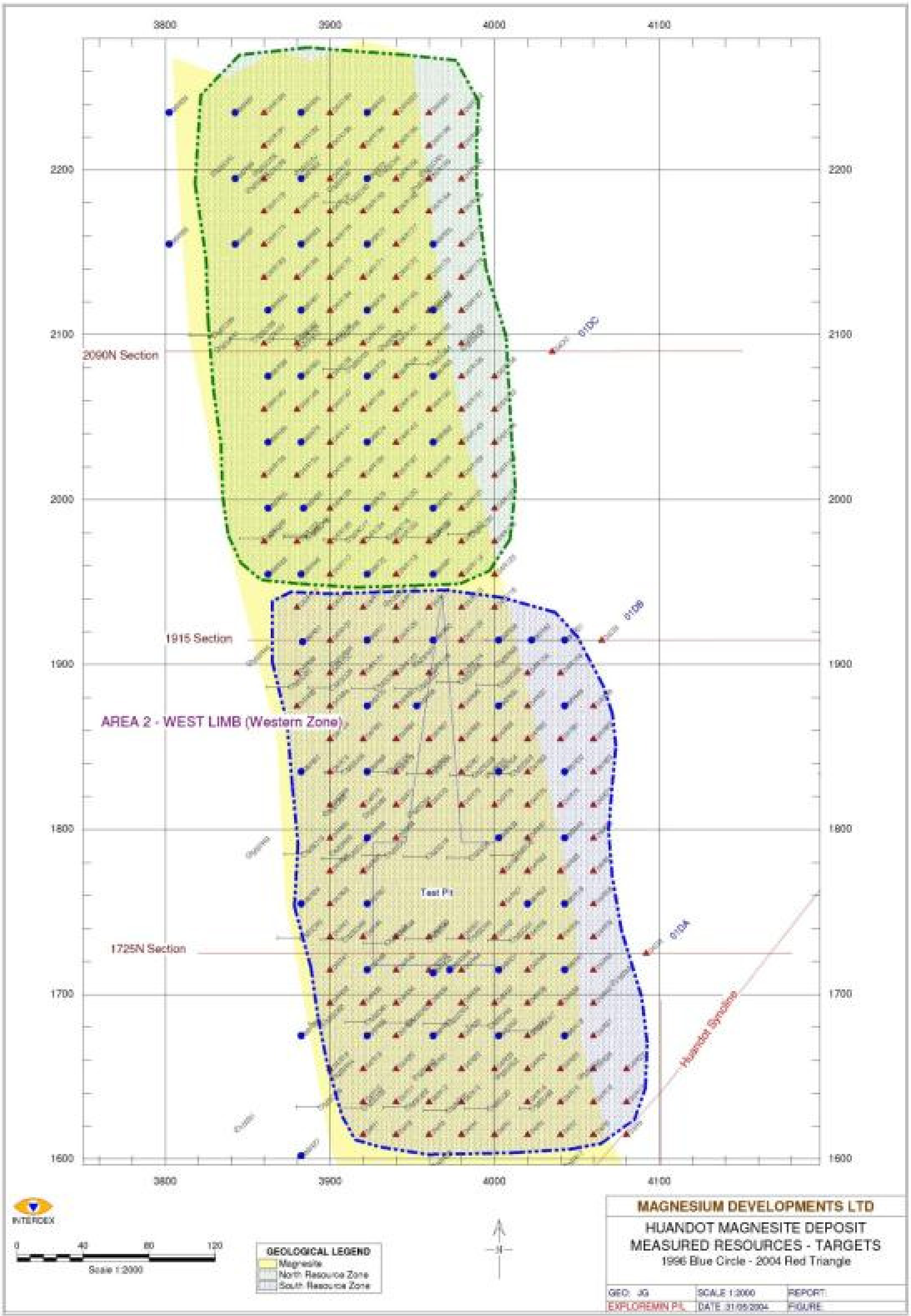

Figure 10. Drill hole plan showing existing drilling (blue) and planned drilling (red) for resource infill and expansion

5 Mine Planning

A mining lease (ML 23292) over the Huandot deposit was granted to MDL on the 2nd June, 2006. Prior to this application MDL had commissioned extensive mine plans from a company called Eventech based in Darwin in the Northern Territory.

5.1 Overview of Eventech Mining Concept

Mine development plans produced by Evantech suggested a relatively simple mining operation. The top 15m of the deposit was initially considered waste due to the highly weathered karstified nature of the near surface zone. As the underlying magnesite ore was generally massive in nature, all material from the magnesite zone was considered ore, averaging 90% magnesite, and of suitable quality for processing.

The following production schedule was proposed:

Table 4. Evantech's proposed production schedule for the development of the Huandot deposit

	Tonnage
Preproduction	60,000t
Year 1	140,000t
Year 2	190,000t
Year 3	330,000t
Year 4	380,000t
Year 5 and thereafter	380,000t

The planned open cut mine would deliver ore to a stockpile and crusher. The mine was expected to operate on a campaign basis to avoid water in the pit and was not expected to operate during the wet season. Ore would be crushed to minus 75mm and stockpiled ready for transporting to Darwin for shipment.

Whilst rail transport was suggested as a future possibility, Evantech's plans said that ore would be hauled to Darwin by road train (~80t lots) to an East Arm Port stockpile area. Shipments would likely be up to 60,000t of material and require the Port to truck the ore from the stockpile to the wharf and load the ship using 30t grabs utilising the existing wharf cranes.

Wharf infrastructure has improved during the past decade and authorities appear keen to encourage new opportunities such as this would involve. With gas available, the possibility of upgrading magnesite to caustic calcined or even dead-burned would become an option for the future. Darwin Port offers excellent logistics to Asia, the growth region for magnesite consumption in foreseeable years.

5.2 Mine Planning Model

Evantech generated a new block model for purposes of preliminary mine planning. The drill hole data used was the same as that used by NIML (Goulevich, 2000) as was the SG (2.95 g/cc) however new wireframes were created with different geometries to that used in by NIML. The block model had a block size of 5m x 5m x 5m with a search distance of 30m and grade interpolation by IDW^2.

The grade-tonnage estimates generated by Evantech were comparable in grade to the estimates completed by NIML and EPL in 2000 however the tonnage was more than double the previous estimates (see Table 5). The reason for the significant increase in tonnage was not stated but must be due to a considerably different geometry of the interpreted mineralisation (deeper, greater strike and across strike extents).

Table 5. Comparison of NIML Mineral Resource with other grade-tonnage estimates

ESTIMATE	M TONNES	%Mg	%MgO	%Ca	%Fe	%INSOL
TOTAL NIML	4.6	26.17	43.4	0.47	0.51	5.90
TOTAL EPL	5.2	26.32	43.7	0.41	0.51	5.80
TOTAL EVANTECH	10.5	26.18	43.4	0.47	0.50	6.18

Evantech stated that whilst the estimates were not in accordance with JORC principles, the model was considered adequate for the initial phase of mine planning.

5.3 Mine Planning Parameters

The Eventech mine plan parameters were detailed in a briefing from Magnesium International and revised through subsequent phone conversations. The production requirements were as listed in Table 4.

A simple pit geometry was adopted with pit wall slopes of approximately 30° from the horizontal. This was to allow for the development of safety benches every 10 or 20m vertical. Since the pit was to be allowed to flood every year after the mining campaign during the dry season and then rapidly dewatered the following year, steeper pit wall slopes were not considered appropriate. Ramp grade was set at a ratio of 1:10 with a 15m width which would allow for the use of 50t to 85t haulage trucks.

As mentioned earlier the top 15m of the karst magnesite zone was to have been considered as waste. Whilst this would have made for a simpler plan to schedule out mine development, it would likely lead to greater ore losses to waste than may be necessary. Evidence for this is provided from observations made when in 2003, the Woodcutters Mine dry screened the magnesite stockpiled at Huandot (obtained from the test pit mined in 1995) for rip rap construction materials to rehabilitate their waste rock dump. The operators recovered almost as much magnesite from this screening operation as was obtained from the 25,500t bulk sample taken below 1045m RL. Payment for the screening operation was based on surveyed quantities and the table below details these volumes and tonnages.

Table 6. Results of 2003 Woodcutters screening operation

SIZE FRACTION	% of FRACTION	S/P LCM	BULKING FACTOR	TONNES MgCO3
Fines <10mm	34%	5440		
+10 to 200mm	30%	4880	2.0T/LCM	9,760
+200mm to ~ minus 600mm	36%	5740	2.0T/LCM	11,480
Total	100%			21,240
Note: Boulders not considered				

The fines consisted of a sandy-clay material (see photograph of stockpile: Figure 4) with small chips of magnesite containing the vast majority of impurities that likely would be considered unsuitable for the mill treatment process. Both of the stockpiles, +10mm and +200mm, contained bright white, heavy hard magnesite. The numerous large magnesite boulders were just cast aside and discarded. If the boulders had been broken and recovered, the tonnage of magnesite would have easily exceeded the bulk sample.

Using MineMap software, points were created from the drill holes for the top of the solid magnesite unit. This was triangulated and a surface created. When viewed in cross section throughout the ore body, it appears that the karst zone of the magnesite is a highly irregular series of peaks and valleys ranging from 1062m RL to 1016m RL elevation. As mining occurs within maintained bench levels, it was believed that peaks of solid magnesite and valleys of sandy clay with boulders will be encountered. Based on the above-mentioned assumptions, the following mining/screening recovery factors were developed and applied to the mining schedule and cost estimate:

Table 7. Mining / screening recovery factors

BENCH	MINING & RECOVERY FACTORS
1060m RL & above	All wasted, including modelled ore. 0% recovery.
1055m RL	Selectively mined in pit for ore & waste, with only ~20% of the modelled insitu resources recovered. All material from this bench to be screened.
1050m RL	Selectively mined in pit for ore & waste, with only ~40% of the modelled insitu resources recovered. All material from this bench to be screened.
1045m RL	85% of modelled ore to be recovered. No screening, only crushing.
1040m RL & below	90% and above of modelled ore to be recovered. No screening, only crushing.

5.4 Mine Schedule

Based on the desired production requirements and the parameters mentioned above, the mine was scheduled out over a 10 year period (see Table 8).

A preliminary site layout for this mine plan is shown in Figure 11. The location of the pre-production pit is highlighted in Figure 12 and stacked cross sections through the block model (from 1640mN to 2190mN) are provided in Figure 13 and Figure 14. A summary of the proposed mine development on a year-by-year basis follows:

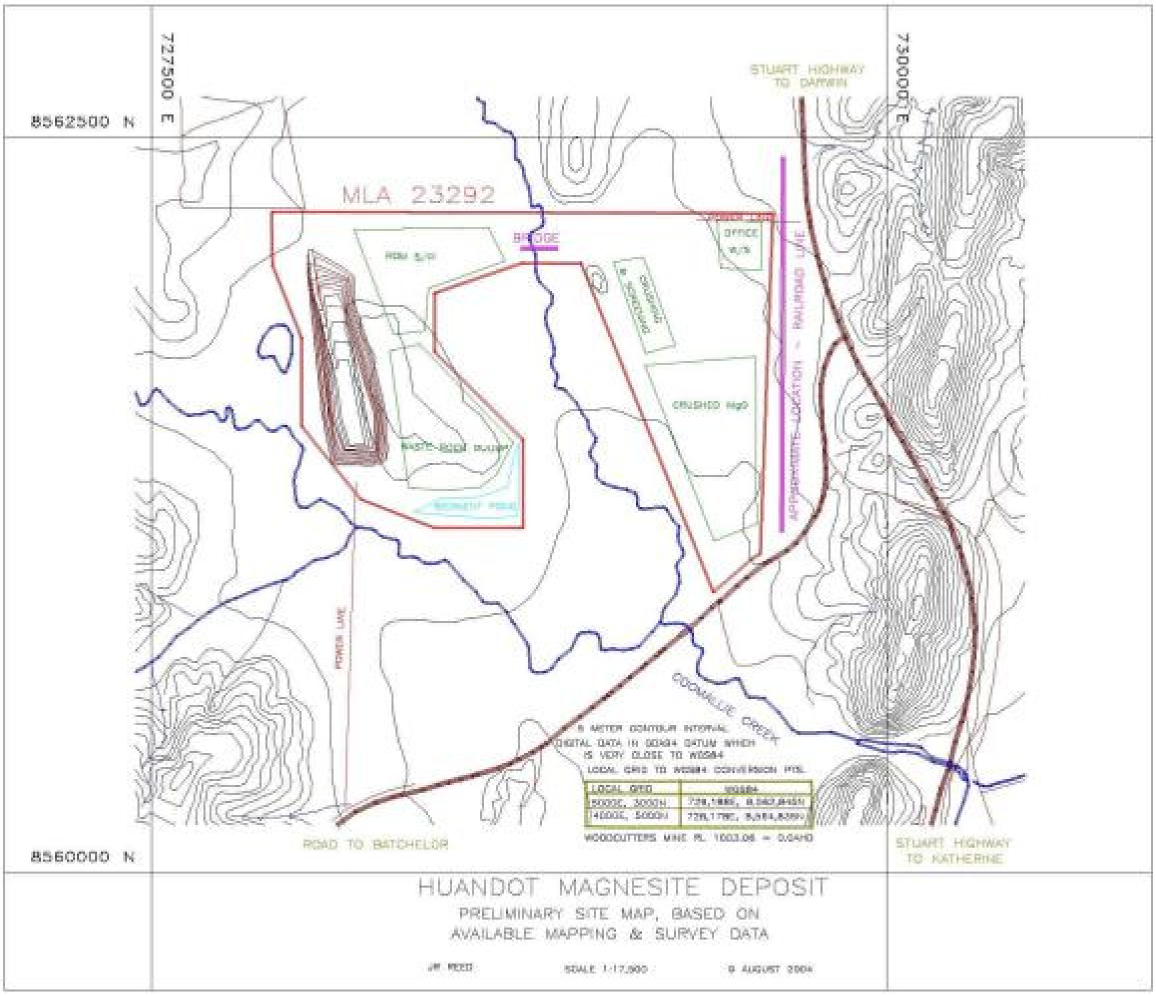

Figure 11. Preliminary site layout showing relation to roads and rivers.

The 60,000t pre-production was obtained west and south of the existing test pit mined in 1995. Ramp width was doubled with the sump depth increased from ~ 1041m to 1040mRL. This area had the highest magnesite quality and lowest impurities, but resulted in the highest strip ratio (8.8) of the 10 year plan. The rational was that the additional waste would be used for construction purposes on the property. Figure 12 details a proposed preproduction pit development between the modelled footwall & hanging wall of the magnesite mineralisation.

In Year 1 the 140,000t was scheduled by simply expanding the test pit to the east, west and south, out towards the footwall and hanging wall contacts. A new dewatering sump is planned to be established at 1035mRL.

In Year 2 the planned 190,000t of ore was mined by expanding the test pit further out to the east, west, and south, still within the footwall and hanging wall contacts. A new dewatering sump is planned to be established at 1030mRL.

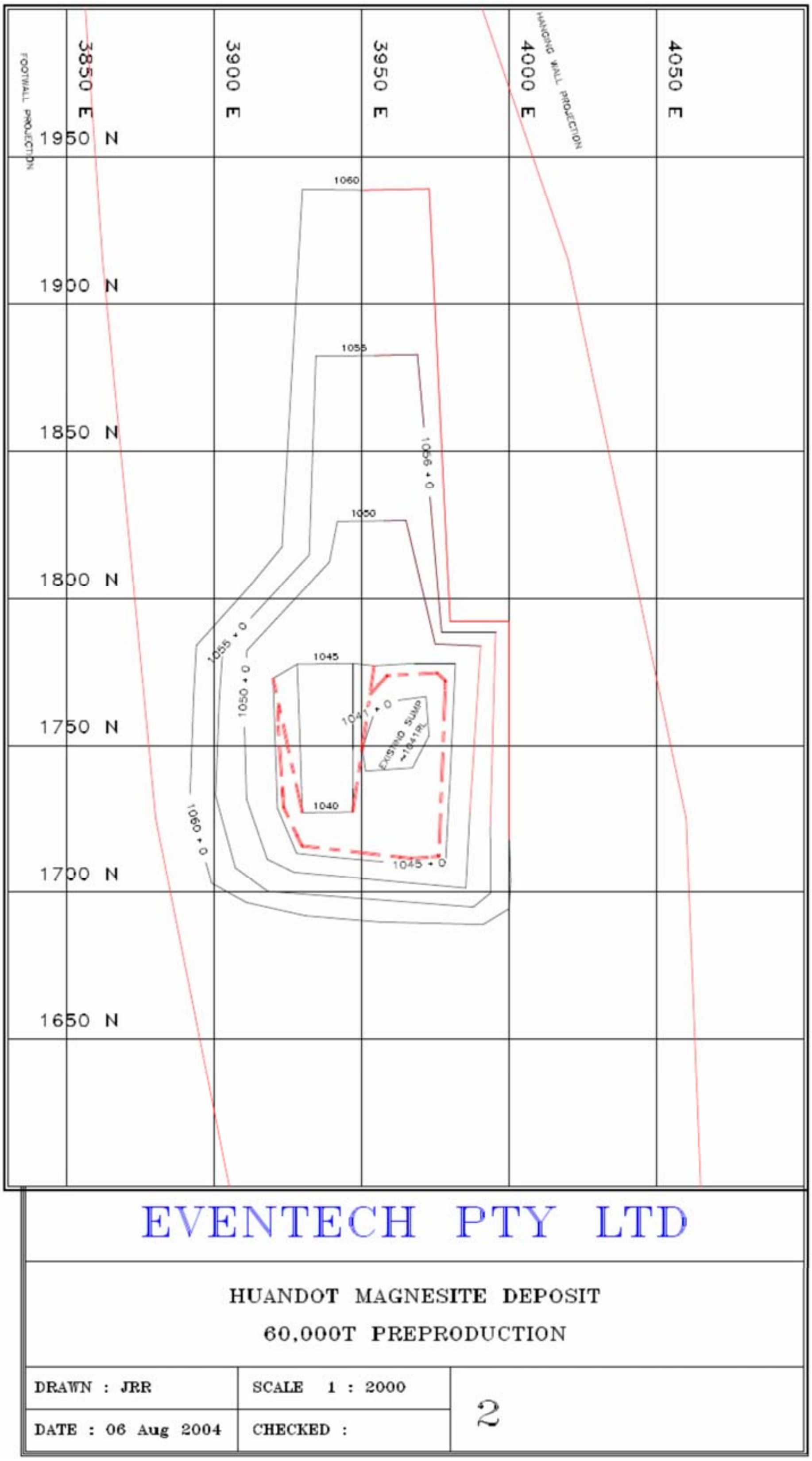

Figure 12. Proposed preproduction pit development between footwall & hanging wall

In Year 3 the scheduled 330,000t of magnesite was sourced by opening up a northern pit to 1040mRL and by mining of all of southern pit benches to 1045mRL and part of 1040mRL bench designed as designed to the maximum extent south and depth. A sump was is planned to be established at 1025mRL in southern pit. The northern pit entrance could be relocated approximately 100m north and remain in ore, but at the time of scheduling the northern boundary of MLA 23292 had not been confirmed. The strip ratio was 5.3, the second highest in the mine plan. The two unconnected pits will result in higher pit dewatering costs.

In Year 4 the 380,000t of ore was planned to be won by connecting both pits at 1045mRL. Since the northern pit was short of ore, the remaining part of southern pit 1040mRL bench and part of 1035mRL bench were planned for development. The dewatering sump remained at 1025mRL.

In Year 5 both pits are planned to be connected at 1030mRL to enable the extraction of 380,000t of ore. The plan resulted in excess ore from the northern pit and this was carried forward to the following year. No ore was taken from the southern pit in Year 5 and the sump remains at 1025mRL.

In Year 6 the design was short of the scheduled 380,000t of ore and the eastern cutback into the hanging wall would need to be started earlier. All remaining ore was taken from the southern pit. The cutback on the eastern side of pit in the hanging wall would mine ore and waste from 1065m, 1060m and 1055mRL benches. The sump remained at 1025mRL.

At this point in time the pit geometry was constrained and not able to produce sufficient ore within the footwall and hanging wall contact and the pit needed to be expanded. An easterly direction was selected since it appeared to have the lower strip ratio.

In Year 7 the plan produced too much ore and resulted in ore and waste mining from cutback benches at 1050m, 1045m and part of 1040mRL. Extra ore was carried forward to the following year. The sump remained at 1025mRL.

In Years 8, 9 & 10 ore production was maintained at 380,000tpa without problems.

Based on this schedule the total ore production over the 10 year mine life was estimated to be 3.4Mt at 43.9% MgO at an average stripping ratio of 1.7 as is detailed in Table 8.

5.5 Mining Cost Estimate

Mining cost estimates are summarized Table 9. The raw data utilized to obtain these figures has been taken directly for the author's review of the Eventech data.

The following sections discuss the basis for the direct and indirect cost estimates relied upon in Evantech's mine planning study. The author has commented on the appropriateness of these figures to ascertain the development potential of the Huandot magnesite deposit based on present day considerations.

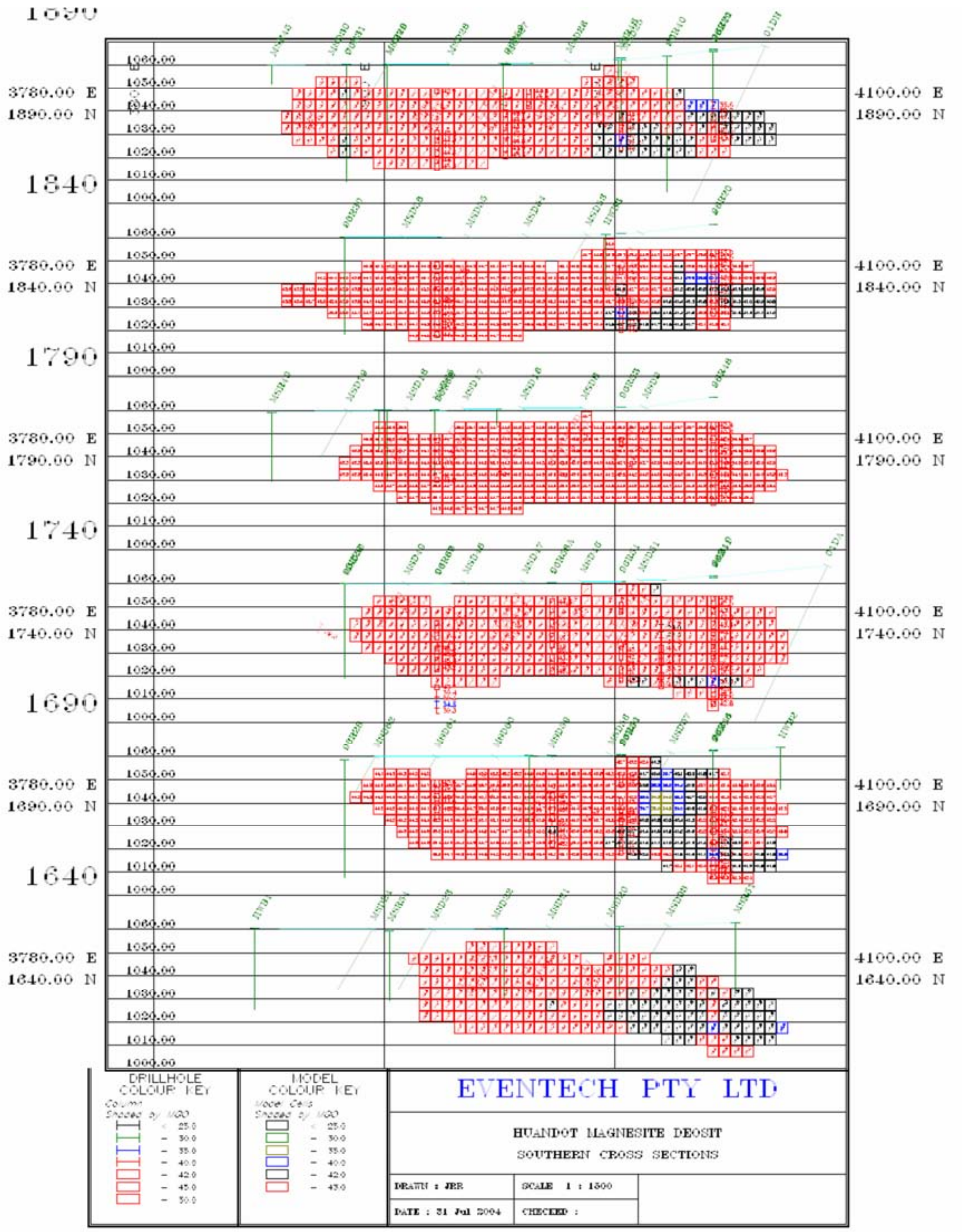

Figure 13. Stacked (block model) sections through the planned pit area. 1640mN to 1890mN

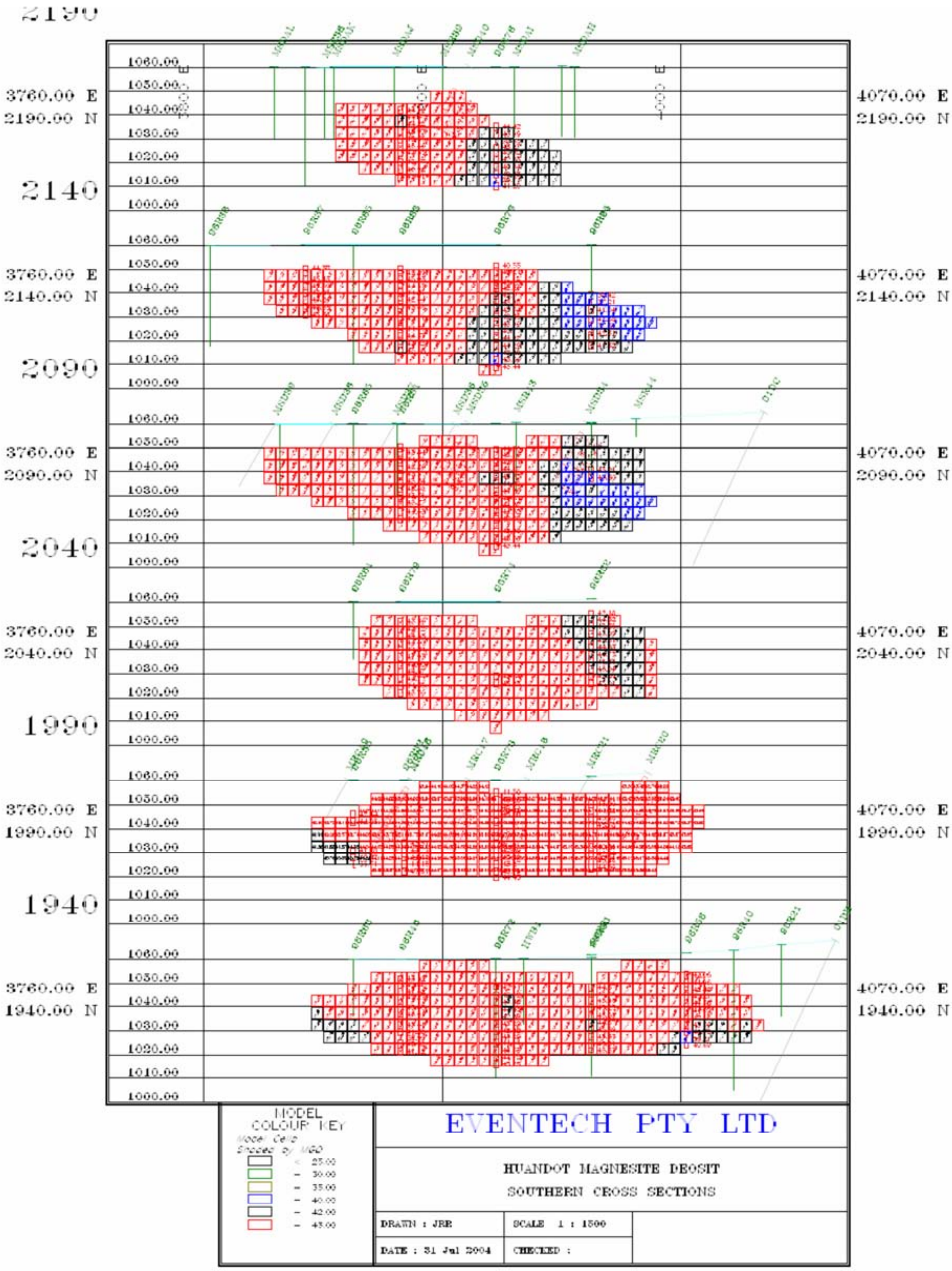

Figure 14. Stacked (block model) sections through the planned pit area. 1940mN to 2190mN

Table 8. Huandot Magnesite deposit mining schedule

Huandot Magnesite Deposit Mining Schedule

PERIOD	BENCHES WORKED	INSITU ORE BCM'S	INSITU WASTE BCM'S	MODELLED ORE TO BE SELECTIVELY MINED IN PIT & SENT TO WRD. BCM'S	MODELLED ORE TO BE HAULED FROM PIT TO DRY SCREENING OPERATION, BCM'S	RECOVERED ORE BCM'S	RECOVERED ORE TONNES	% MG	%MGO	%CA	%FE	%INSOL	STRIP RATIO
PRE PROD	1070-45	46,053	160,943	19,151	17,490	20,456	60,344	27.1	44.93	0.34	0.47	3.51	8.8
YEAR 1	1065-35	121,109	157,508	56,099	39,840	47,734	140,816	26.48	43.91	0.59	0.44	4.79	4.5
YEAR 2	1065-35	107,485	117,094	34,916	28,000	64,446	190,117	26.35	43.69	0.68	0.48	5.41	2.4
YEAR 3	1065-40	220,627	511,765	86,361	60,657	111,865	330,002	26.59	44.08	0.39	0.54	4.98	5.3
YEAR 4	1065-35	240,551	183,358	89,815	68,278	128,817	380,000	26.65	44.17	0.36	0.54	4.7	2.1
YEAR 5	1045-30	144,551	0	15,737		128,814	380,000	26.65	44.19	0.31	0.53	4.78	0.1
YEAR 6	1060-25	186,846	220,908	40,950	25,394	128,855	380,123	26.51	43.95	0.35	0.51	5.28	2
YEAR 7	1050-40	202,941	55,992	64,371	48,782	128,813	380,000	26.04	43.15	0.51	0.46	6.49	0.9
YEAR 8	1040-35	138,583	44,995	9,740		128,843	380,087	26.04	43.25	0.61	0.47	6.1	0.4
YEARS 9 & 10	1035-25	272,552	20,646	13,628		258,923	763,824	26.5	44	0.39	0.5	5.07	0.1
TOTAL/AVE		1,681,298	1,473,209	430,768	288,441	1,147,567	3,385,313	26.44	43.86	0.44	0.5	5.27	1.7

STRIP RATIO DEFINED AS INSITU WASTE BCM + MODELLED ORE SENT TO WRD BCM / RECOVERED ORE BCM

Table 9. Mining cost summary based on 2004/05 prices

MINING COST SUMMARY													
		DIRECT COST									INDIRECT COSTS		
PERIOD	RECOVERED ORE TONNES	DRILL & BLAST ORE & WASTE, TOTAL COSTS	LOAD & HAUL WST, TOTAL COST	LOAD & HAUL ORE, TOTAL COST	SCREEN	CRUSH	LOAD & HAUL CRUSHED ORE TO RAIL,TOTAL COST	LOAD & HAUL FINES FROM SCREEN TO WRD, TOTAL COST	DUMP MAINT, ROCK BREAKING & SERVICE TRK, TOTAL COST	PIT DEWATER, TOTAL COST	MIL SUPERVISION	FINAL REHABILITATION ACCRUE $0.50/T OF ORE SHIPPED	TOTAL COST, $/T
PRE PROD	60,344	724,486	500,837	87,701	262,350	86,937	26,592	8,380	111,186	13,112	304,650	30,172	35.74
YEAR 1	140,816	975,160	587,427	216,482	597,593	202,870	62,054	22,458	149,657	28,146	304,650	70,408	22.84
YEAR 2	190,117	786,027	440,705	249,638	419,993	273,897	83,780	10,560	120,631	28,102	304,650	95,059	14.80
YEAR 3	330,002	2,563,371	1,584,240	451,132	909,855	475,426	145,425	29,121	393,399	39,813	304,650	165,001	21.40
YEAR 4	380,000	1,483,698	818,954	514,030	1,024,163	547,458	167,458	28,507	227,702	66,448	304,650	190,000	14.14
YEAR 5	380,000	505,928	98,303	484,339	-	547,458	167,458	-	77,644	97,315	304,650	190,000	6.51
YEAR 6	380,123	1,427,143	712,119	552,951	380,903	547,648	167,516	22,151	219,023	86,366	304,650	190,062	12.13
YEAR 7	380,000	906,019	406,675	471,137	731,730	547,457	167,457	12,683	139,046	94,941	304,650	190,000	10.45
YEAR 8	380,087	642,525	230,363	493,469	-	547,583	167,496	-	98,608	97,240	304,650	190,044	7.29
YEARS 9	381,912	513,095	106,293	547,623	-	550,212	168,300	-	78,744	102,452	304,650	190,956	6.71
YEARS 10	381,912	513,095	106,465	548,918	-	550,212	168,300	-	78,744	112,455	304,650	190,956	6.74
TOTAL	3,385,313												

5.5.1 Direct Costs – Review of 2004/05 data

Drill and Blast

Ray Stevenson, owner of Fantome Pty Ltd, a local drill and blast contractor, who was involved with the test pit mining with Henry Walker in 1995 provided EPL a flat rate of $3.50/BCM for all drilling & blasting. All ore and waste was to be drilled and blasted to arrive at this estimate.

In 2012, this cost has been estimated at having risen to $4.50/BCM (based on author's experience).

Pit Dewatering

Terry Pike, Owner of Mine Maintenance & Construction Pty Ltd, provided the cost estimates for pit dewatering. His company specialises in pit dewatering and hire of contract trades personnel and was also involved with the test pit dewater in 1995.

The worksheet "Water_Pit_Vol_Est" contains John Goulevitch's initial estimates for the annual costs associated with pit dewatering and needs to be revised. The largest unknowns with dewatering are the amount of recharge groundwater flows into the pit and when the dewatering bore ring will be installed. In 2004/05. Eventech considered the costs associated with pit dewatering as a rough estimate. Later in the mine life they suggested the option of dewatering in-pit with a pontoon-mounted electrical pump which would lower fuel and manpower costs.

Load and Haul – Ore and Waste

Geoff Akers, owner of G & K Akers Contracting, who specializes in large excavators and haulage provided EPL with base rates of $3.26/BCM and $2.52/BCM for load and hauling ore and waste respectively. Eventech extended these rates throughout the 10 year plan considering overhaul distances and pit depth.

G & K Akers costs are based on the use of a 100t excavator and 3 x 85t haulage trucks, which Eventech considers appropriate for the material being mined. These costs include operator, fuel and maintenance repair. Mobilisation and demobilisation fees are in addition to the BCM rates.

Crushing and Screening

Crushing and screening costs were provided to EPL by Ken Martin who screened the magnesite stockpile for Woodcutter previously. The suggested rates for crushing and screening of $15/BCM and $5/BCM was considered high even for the time so an alternative contractor such as CGC Group out of Perth or another local group if available could be considered.

An early estimate for work in 2012-13 is around $18/BCM and $7/BCM for crushing and screening respectively but this will need firming up with local service contractor. These prices fluctuate with the amount of work on at any particular time.

Load and Haul – Fines and Crushed Ore

Eventech listed a rate of $1.30/BCM for the costs to load and haul of fines from the screen to the waste rock dump and carting crushed ore to the rail head. This was based on the use of highway type truck and a small front end loader.

A recommended figure for current times is a rate of $2.00/BCM.

Additional Costs

Haul road and dump maintenance, rock breaking of boulders at the ROM stockpile and the provision of a service truck to fuel and service other mobile plant had been allocated for in the Evantech estimates (excluding rock breaking which is allowed for in the Ken Martin screening estimate, these items are not included in the above direct cost items). The costs assume on the hire of a water cart, grader, dozer, excavator with rock breaker and service truck where two personnel operate these five items of plant a total of 21 hours per shift, when the mine is operating. The total estimated cost for this item was $2,820/shift. The hourly hire rates are from the Woodcutters 2003 rehabilitation project and include operator, fuel, all maintenance repairs (rental was only paid for the hours worked).

The estimated rate for 2012-13 is $3,250/shift.

5.5.2 Indirect costs

In 2004/05 EPL made an estimate for supervision costs. The procedure used was to make allowances for the mine supervisor, off-sider, bookkeeper, mining engineering, survey crew, environmental personnel and safety consultant plus contract tradesmen and crane to work on the site on an annual basis. This was to allow for the establishment of hired site offices, environmental monitoring, survey of pit before and after mining, and the preparation of Mining and Environmental Management Plans to the Regulatory Authorities. This was considered as a fixed cost of $259,650/year.

The author's estimate for this in 2012-13 could be around $360,000/year.

Added to this was the rental of a site office and generator, two chemical toilets, industrial rubbish bins, and allowance for furnishings. It was assumed this gear would be rented for six months every year to cover the average time required for dewatering, mining and crushing (and then removed from site). The estimated cost for this was $45,000, bringing the total site supervision costs to $304,650/year.

The author's estimate for this in 2012-13 would be $60,000 and $425,000/year respectively.

To cover the costs associated with the final rehabilitation of the mine the author suggest that any future operator accrue approximately $0.50/tonne of ore shipped off the site. On the basis of the Evantech mine plan this would amount to ~$1.7m through Year 10.

5.5.3 Capital Costs

Table 10 below summarizes the suggested list of capital items required to start the mine and is based on 2004/05 prices. The author has made an estimate of likely costs for the same items at current times.

Table 10. Capital item cost estimates

ITEM	EPL Est. Cost	Est. Cost 2012
Purchase of freehold land from current owner	?	?
EIS on project to obtain ML23292	250,000	250,000
Survey of mineral lease boundaries to obtain ML	15,000	18,000
Purchase of phone/fax/copier	3,000	3,000
Purchase of used 5000l diesel fuel tank for site offices	4,000	5,000
Bridge over Coomalie Creek	53,000	70,000
Purchase of a water tank & pressure pump for site offices	3,000	3,500
Septic tank suitable for staff & contractors	5,000	6,000
One dewater bore: drilling, casing, screen & development	12,800	15,000
Equip one bore with pump, head works, electrical cable & pipeline	6,465	9,000
Landcruiser ute for supervisor	55,000	55,000
Telstra, establishment of 6 phone lines to site offices	11,500	12,000
Stabilized concrete pad for crushed ore pad near rail line ?	?	?
Power line from Batchelor Road to dewater bore field	70,000	90,000
Powerline from Stuart Highway to site office	44,750	60,000
TOTAL	**533,515**	**700,000**

Pit Dewater Bores

In 2004/05 Chris Nicholson of Delta Electrics put EPL in touch with Vick Carusi who constructs high voltage power lines. His preliminary estimate ($70,000) to construct the power line from the south for the pit bore dewatering ring and possibly the floating pontoon electric pump to dewater the pit are in the file notes for cost estimates. The cost for the eastern power line to the site offices area was estimated at $45,000.

The cost to drill, case and screen a single 150mm diameter dewater bore was estimated at $12,800. Delta Electrics and Grundfos have estimated that it would cost $5,465 to equip and start a single dewater bore, with a total of 10 required. To this would need to be added the costs (say $1,000/bore) for head-works and buried power cables to the bores and a pipe line to carry water to the channel discharge point flowing into the West Branch of Coomallie Creek.

For any new scoping or preliminary feasibility study the author would recommend the addition of 2 dewater bores per year starting in Year 1, with the 10 bores being fully installed and operational by the start of Year 6. It is likely more suppliers exist around the district now.

The information used to size the pit dewater bores was based on the Batchelor Magnesium Project EIS, prepared by URS. This document was surprisingly silent on technical data and only contained the following five points of interest:

- “Based on data collected by Uren & Golder, a pit dewater rate of ~ 5,300m^3/day has been calculated. This will be achieved by the installation of 10 dewatering bores placed around the margins of the pit with pumps as required in sumps in the pit floor."
- "The water table within the vicinity of the pit is within 2m of the surface throughout the year. It has been established that the overburden is quite permeable and porous and it is expected that pumping can reduce water levels."
- "The ground water quality is considered acceptable for direct release to local water courses. However, some suspended solids will be present from the pit floor sumps and therefore all water collected from the sumps will be directed to settling ponds for removal of sediments and water quality testing prior to release to local surface water courses."
- "Aquifer parameters have been calculated from monitoring bore data collected during and after the excavation and dewatering of the trial pit. The hydraulic conductivity of the alluvial aquifer system has been established by applying the Thiem equation for steady state radial flow. A dewatering rate of 1,380m^3/day (16l/s) was used. This was the rate observed after 6 weeks of trial mining. The estimated hydraulic conductivity was calculated to be 14m/day. Analysis of monitoring bore data using the Jacob straight-line method yielded values of hydraulic conductivity within the range of 21 to 29 m/day."
- "Based on historical data, the water in Coomalie Creek is of approximately neutral pH, with levels of calcium, magnesium, nitrate & bi-carbonate that are comparable with similar waterways in the Top End."

5.6 Future Mine Site Development Considerations

In 2004, a site visit was conducted by John Goulevitch of EPL after obtaining permission from property owner (Savvas Christdoulou). One thing which was a surprise to John Goulevitch was the difference between the sizes and widths of the North and West Branches of Coomallie Creek. Woodcutters discharged mine water into the Northern Branch of the creek for several years. It is quite wide, shallow and contains heavy grasses and trees. Whereas the West Branch of Commallie Creek is about 4m wide and around 1.5m deep. John Goulevitch’s estimate has assumed that water from the pit and dewatering bores would be disposed of in an open channel flowing into the West Branch of the creek across Savvas’s freehold land. Reed, 2004 commented that he believed that any future operator will need to purchase an area of property sufficient to allow uninterrupted mining at Huandot.

Figure 11 illustrates the then existing site access roads, test pit and other existing and proposed features relating to the Huandot project. Whilst this schematic suggests the screening and crushing occurring are located near the office, it is believed that these activities should be done adjacent to the ROM stockpile, to reduce costs.

When Evantech was obtaining mining cost estimates, two of the larger mining contractors in the region (Howard Springs Mining and Henry Walker Elton) were not interested in providing budget prices for mining due to the small size of the contract. Year 3 required the largest material movement of 733,000 BCM of in-situ material and was completed with a 100t excavator in 140 shifts. The next largest material movement was in Year 6 with 408,000 BCM with the remainder generally under 300,000 BCM and can be mined out in around 40 shifts. This may be indicative of what any operator will experience during operations at Huandot and Evantech believed that the mining work would be more suited to the local smaller operator who provided costs for this estimate.

If this is the case any new operator will not be dealing with a single contractor who will be providing supervision, site offices/facilities, safety policies & procedures, etc. What John Goulevitch did to compensate for this was to beef up the supervision costs on the belief that any new operator should establish a furnished site office, basic workshop, washrooms, sewage, water tank, telephone, fax, office generator, first aid room, etc.

All direct cost items include diesel fuel in the rates, excluding pit dewatering, which has an estimate for its fuel usage. Any new operator would need to pay for this as well as the generator fuel to power the site office.

The stockpile areas have just been allocated and not accurately sized. The location and geometry of the waste rock dump will probably be the most critical item to plan from a permitting and cost point of view. It is possible that some of the waste material could be sold to waste the Darwin aggregate market or be used for remediation purposes e.g. Rum Jungle mining areas.

Deep karst weathering has created a very irregular surface to the massive magnesite. Sinkholes are common at the surface. Caves could be an issue when mining, particularly near the contact zones. One drilling rig dropped into sinkhole during previous drilling activity.

6 Product and Market

6.1 Magnesite Overview

Magnesium is the eighth most abundant element and constitutes about 2% of the earth's crust. It is the third most plentiful element dissolved in seawater, with a concentration averaging 0.13%. Although magnesium is found in more than 60 minerals, only a few are of commercial importance. A list of magnesium-bearing minerals is presented in Table 11.

Table 11. Chemical compositions of selected magnesium containing minerals

Common Name	Chemical Composition
Brucite	$Mg(OH)_2$
Carnallite	$KMgCl_3{\bullet}6H_2O$
Dolomite	$CaMg(CO_3)_2$
Epsomite	$MgSO_4{\bullet}7H_2O$
Kainite	$MgSO_4{\bullet}KCl{\bullet}3H_2O$
Kieserite	$MgSO_4{\bullet}H_2O$
Magnesite	$MgCO_3$
Olivine	$(MgFe)_2SiO_2$
Schoenite	$MgSO_4{\bullet}K_2SO_4{\bullet}6H_2O$
Serpentine	$Mg_3(OH)_4Si_2O_5$

In addition to minerals, seawater and well and lake brines are also important sources of magnesium. One of the more important magnesium minerals is magnesite ($MgCO_3$), with a theoretical maximum magnesia (MgO) content of 47.6%; this carbonate form represents the world's largest source of magnesia. Other commercially important magnesium-bearing minerals are dolomite, which serves the aggregate industry as well as the chemical industry.

These minerals are the starting raw materials for a wide range of products. These include magnesium metal and several grades of magnesia used for the production of both dead-burned magnesia for refractory manufacture and lighter fired caustic-calcined magnesia. The latter is used in a variety of agricultural, construction, environmental, and industrial applications.

The word magnesite literally refers only to the natural mineral, but common usage applies this name to two other types of materials, dead-burned magnesite and caustic-calcined magnesite. For the most part, these are commercial products of magnesia, differing mainly in density and crystal development that results from different levels of heat application. When magnesia produced from seawater or brines first made its appearance on the world market, the products also were called dead-burned or caustic-calcined magnesite, but more recently the technical literature has increasingly referred to the materials as refractory magnesia or refractory-grade magnesia and caustic-calcined magnesia, respectively. These terms are now also increasingly being applied to magnesia products derived from the natural mineral magnesite, especially for those materials with high MgO content.

The terms dead-burned magnesite or refractory magnesia refer to the granular product produced by firing magnesite, magnesium hydroxide, or another material reducible to magnesia at temperatures exceeding 1,450°C. The heat treatment must be of sufficient duration to produce a dense, reasonably weather-stable granule for use in manufacturing refractory materials. It is most important to establish that the magnesite does not decrepitate (fall into dust) during firing process (especially in dead-burning) as this would block the egress of gas and deem the material unsuitable. Microcrystalline magnesite tends to be better for refractories rather than coarse-grained magnesite. Laboratory tests for this important physical property are relatively simple.

The use of the terms describing magnesia products is somewhat confusing to those not closely connected with the industry. The vagueness of the terminology can lead to misreading of statistics to such a degree that simultaneous shortage and surplus of certain magnesia products is indicated. Confusion has been further amplified by use of such terms as high-purity or super high-purity magnesia; in most cases these terms have been used for magnesia supplied to the refractory industry. They usually refer to the content and relationship of the accessory oxides and density of the material as they affect the refractoriness of the final product rather than any specific MgO content.

The terms high grade and high purity generally refer to a refractory magnesia containing more than 96% MgO, a density greater than 3.30 g/cm^3, preferably 3.40 g/cm^3, and a proper relationship of auxiliary oxides.

Caustic-calcined magnesia results from 800°C to 1,000°C heat being applied, frequently in a rotary kiln, to magnesite or other material reducible by heat to magnesia. It is heated until less than 10% ignition loss remains and the product displays absorptive capacity or activity. Caustic-calcined magnesia readily absorbs water vapour or carbon dioxide (CO_2), an action that is referred to as activity. This activity feature then facilitates the production of high-density periclase. This is generally done through briquetting and the application of additional high-temperature heat. The production of caustic magnesia involves less energy than is required to produce dead-burned magnesite.

Fused magnesia is produced by heating high-grade magnesite to a molten state for up to 6 hours in electric arc furnaces to approximately 3,000°C. The resulting product, at 96% to 98% MgO, has a high density of 3.50 g/cm^3 and relatively high chemical stability, strength, and resistance to abrasion. World production is approximately 160kt per year, which is used in refractories and in electrical products.

Deadburned (DBM) and electrofused magnesia (EFM) are used predominantly in the refractory industry where they are mainly used to make shaped and unshaped products to line high temperature vessels such as furnaces and kilns in the steel, cement, non-ferrous, glass and chemical industries.

The main application is in steel refractories with more than 70% of all refractories used in steel production. High grade DBM and EFM are used mainly in bricks/shapes:

- Magnesia carbon bricks
- Magnesia bricks

- Magnesia chrome bricks
- Magnesia spinel bricks
- Magnesia dolomite bricks
- Magnesia carbon alumina bricks

High grade magnesia for refractory applications is classified according to purity (MgO content), bulk specific gravity (BSG), periclase crystal size (PCS) and CaO/SiO_2 ratio.

Typically, high grade DBM for the steel industry requires MgO 97% minimum, BSG 3.40 minimum, PCS 100µ minimum and CaO/SiO_2 2.0 minimum.

High grade EFM requires MgO 97% minimum (usually 97.5-98.0% with SiO2 0.5% maximum), BSG 3.50 minimum, PCS 500µ minimum and CaO/SiO_2 4.0 minimum. Lower grade EFM is also used in refractory bricks and shapes.

Historically the main global producers of high grade DBM have been based on synthetic technology converting magnesium rich seawater or brine into magnesia. The only natural high grade DBM producers are Turkey and Australia (QMAG) which have operations based on cryptocrystalline magnesite deposits.

Note that the location of Huandot is good as it is at a gateway to the fast growing Asian region including India, Indonesia, Thailand, Taiwan, Korea etc. Export quality magnesite freighted from other sources would typically incur a larger freight cost e.g. Turkey, Greece, etc.

The main refractory EFM producers are based on natural magnesia in China and Australia (QMAG). There are also a number of producers in USA, Europe and China producing fused magnesia for the smaller volume electrical insulation market and with different specifications and technical characteristics.

The majority of QMAG's sales of DBM and EFM are made into the world refractory market. QMAG's products are ideally suited for steel refractories and are mostly used in these applications. The steel refractory industry is located in the major steel producing centres of the world. Consequently, a large portion of QMAG's DBM and EFM is exported to Europe and USA, with additional sales in to Asian markets.

QMAG is well established in the refractory market, and has a dominant supplier position at most of its DBM and EFM accounts. QMAG is viewed as a strategic supply source for most refractory customers and supports its sales with a high level of service. It is possible QMAG could become interested in Huandot as a partner if the material is found to have some unique properties which could conceivably enhance their range of products.

Calcined magnesia (CCM) is used mostly in chemical-based applications e.g.:

- Agriculture (fertiliser and stockfeed);
- Pulp and paper;
- Iron and steelmaking;

- Hydrometallurgy; and
- General chemical, waste and water treatment.

CCM is normally graded according to purity, sizing and reactivity. Most of the CCM that is traded throughout the world ranges from 85-95% MgO.

Calcination

To produce the required magnesia products, it is necessary to convert the magnesium carbonate (magnesite) feedstock to magnesium oxide (MgO) or magnesia.

Calcining operations are conducted in Multiple Hearth furnaces (MHF's).The raw magnesite is fed into the furnaces, where it is heated by natural gas to 1,000°C to produce caustic calcined magnesium oxide or magnesia (MgO).

While a considerable amount of upgrading has been achieved with the raw magnesite at producers such as QMAG (recently acquired by Sibelco of Belgium) further upgrading of the calcined magnesia is completed prior to the production of high-grade deadburned (DBM), electrofused (EFM) and calcined (CCM) products.

The objective of the upgrading process is to separate the calcined magnesite by crushing and screening into discrete streams based on chemistry and size. The sorted calcined magnesia is stored in bins with the contents of each bin separately analysed to allow blending to form a homogenous material of known composition suitable for the product specification in DBM, EFM and CCM products. The various product grades are stored for blending prior to transfer to DBM or EFM plants. This allows very precise quality parameters to be set and pricing for products vary according to grade (see Table 12).

Table 12. QMAG Price list 2010

PRODUCT CATEGORY	PRODUCT DESCRIPTION	PACKAGING	EX WORKS PRICE ($A/MT)
EFM	QMAG EFH 1 0-45mm	Bulk loose in containers	1250
	QMAG EFH 2 0-45mm		950
DBM	QMAG EXTRA		750
CCM	EMAG 45	1MT bulk bags	630
	EMAG 500		620
	EMAG 523		615
	EMAG 3220	Bulk loose in containers	POA

6.2 Magnesite Marketing Comments

Magnesite can be sold "as mined" as feedstock for several industrial sectors, but by calcining at specific temperatures highly value-added products are able to be produced. As much of the dead-burned magnesia has been sourced from China during the past 15 years, the new export tariffs and allocations has meant that non-Chinese sources are now in demand worldwide. Countries including Thailand and Singapore have been seeking new supplies through Stratum Resources.

During the past 15 years the price of magnesite and magnesium products has been kept artificially low due to Chinese policy of exporting virtually profit-free magnesium products. This situation has turned around 180 degrees in the past 18 months. Now the Chinese is more concerned to produce only high value refractory products for internal use to benefit Chinese steel production.

Many mines in the Liaoning area of NE China which represents around 25% of the world's supply magnesite ore for refractory products. Many mines have wasted material through "high-grading" and this has led to much wastage of second grade material. Also the older types of kilns used have been highly polluting and most have now been closed or modernised.

This change in fundamental approach by the Chinese government has opened new opportunities for non-Chinese sources. Companies such as RHI (www.rhi.at/internet_en) and Magnesita (www.magnesita.com.br/en/) have formed policy of owning resources after previously being buyers of Chinese magnesite exports. These companies are actively seeking long term resources and should be approached with the Huandot material on the chance they find it suited to some special market niche. As companies such as this consume large quantities, they need to keep seeking new resources/deposits.

6.3 Pricing

QMAG, recently acquired by Sibelco was looking to increase refractory magnesite output including dead-burned and fused magnesia products, but are now supposedly concentrating on increasing the easier to produce caustic magnesia side of the business. This is primarily aimed at hydrometallurgical markets such as nickel processing. They are also exporting significant quantities now to the Congo and other African nations for hydrometallurgical use, but also for water treatment throughout the region.

Based on the data from previous explorers of the Huandot magnesite deposit, it can be extrapolated that the average cost of magnesite ore to be mined, crushed, screened and washed for the stockpile on site is likely to be close to $38 per tonne (based on the expected average cost per tonne to extract between $35-40).

If we use a figure of $18 per tonne as delivery to Darwin Port stockpile and an anticipated loading cost of $9 per tonne, we can estimate a cost in bulk FOB (Freight on Board) onto a ship of say $65 per tonne. As a comparison a quality Greek Magnesite is priced at approximately $85 ($79-$92) FOB (based on present figures released by the Industrial Minerals Magazine, May 2012), see Figure 15.

A projected cost of $65 per tonne (FOB) for Huandot magnesite should be a very attractive figure which could allow an operating profit of ~$40 to be added, realising a price of around $100-$110 from potential buyers.

Magnesia

Calcined, 90-92% MgO, lump,
FOB China $320-360
European calcined, agricultural grade,
CIF Europe €240-350

Dead-burned,
Lump, FOB China
90% MgO $350-400
92% MgO $430-470
94-95% MgO $410-480
97.5% MgO $560-600

Fused,
Lump, FOB China
96% MgO $790-860
97% MgO $930-1050
98% MgO $1080-1210

Magnesite

Greek, raw, max 3.5% SiO_2,
FOB East Mediterranean €65-75

Figure 15. Extract from Industrial Minerals Pricing Guide May 2012

*Note: The €65 ex price Greece = $80 AUD

Euro		AUD
65.00 EUR	=	79.852 AUD
1 EUR		1.2285 AUD

Present price per tonne of various QMAG magnesite products to various markets is provided in Table 12. This is a good guide for Australian sourced caustic-calcined and dead-burned magnesia products. These products are proving to be a successful export around the world, being exported as far as Europe and USA to fill the gap left by falling tonnages from China (driven by Government policies of export tariffs). These products are also experiencing increased prices due to lower supply and steadily increasing demand for non-Chinese materials.

In the author's opinion the Huandot resource could well be worthy of development in the near term and the next step could be approaching selected users of magnesite in the region e.g. NSL Refractories in Singapore and Golden Lime in Thailand, along with other interested parties.

7 Environmental and Heritage Considerations

During the author's research of historic documents the following was noted with respect to Environmental and Aboriginal considerations.

7.1 Environment and Land Use

Vegetation cover of the deposit and the areas required for stockpiles and processing is typical of the region. There should be no major issues associated with clearing for mine development.

Coomalie Creek is a permanent stream running northwest to southeast, south of the deposit (see Figure 16). Woodcutters Creek (ephemeral) runs north to south, east of the deposit. This creek flows through a paperbark swamp, which will need to be protected.

Ground water will be a considerable issue to deal with from a mining and environmental perspective. The water table only drops to about 2-3m below surface during the dry season. Ground water inflow to the pit will be clean and will have to be discharged to Coomalie Creek. Woodcutters have set a precedent in this regard without obvious detriment to the environment. The leaseholder will have to demonstrate that the operation does not impact negatively on the regional ground water system or the surface water system (see comments in Section 5.7).

Figure 16. Comalie Creek (flows through the property)

Exotic timber planting has been carried out by ETA on the area adjoining the eastern and southern boundaries of the Huandot licence as far south as the Batchelor Road. An irrigation system, sourcing water from the old test pit, has been installed to water the plantation. However, at the time of the site visit the northern Exotic Timber area was completely burned out, including irrigation hoses for the trees. Unless the affected land is purchased by the operator a compensation agreement will have to be entered into with the landholder prior to approval for mine.

7.2 Rehabilitation Status

The trial pit excavated by NIML has filled with water and is now used by the landowner as a stock water supply. Overburden from the pit was placed on the Woodcutters overburden dumps and has been subsequently contoured and allowed to re-vegetate naturally.

It was noted that all drill sites have regenerated to natural vegetation cover and are no longer visible. The perimeter of the pit is protected by a bund wall and large magnesite rock fragments for safety. The pit wall is battered to ensure no collapse can occur.

7.3 Native Title and Heritage

The Huandot tenement is on freehold land and it is therefore assumed that native title has been extinguished. The surrounding area outside of the freehold land is within the area managed by the Finniss River Land Trust on behalf of the Warrai and Kungarakan people.

Clearance to work the property is required from the Aboriginal Protection Authority. The Aboriginal Protection Authority issued an Authority Certificate to the leaseholder to carry out "drilling, quarrying, surveying, access improvement, surface sampling and geological mapping". Two of the conditions attached to the authorisation are of note:

- “A new Certificate will be required for future works”.
- "No damage shall occur to the white stone outcrops within the lease area."
    - There are some white quartzite rocks on the western side of the lease and apparently outside the proposed pit boundary. It is believed that these are the rocks referred to and that there is no problem in meeting this condition. This needs to be verified as the rocks are currently hidden by grass. However, there is also a magnesite outcrop in the centre of the pit. These rocks are dark in colour due to weathering of the rock. Nevertheless there is some concern that the Condition may also refer to this outcrop.

8 Conclusions

All geological mapping, rock chip sampling, drilling activities and trial mining was undertaken on ERL 128 previously held by NIML (formerly Commercial Minerals Limited). During the tenure of Mineral Lease 23292 MDL did not undertake any field exploration or mining activities and the ML was surrendered on 14 November 2008.

The reported Mineral Resource estimate for the Huandot magnesite deposit is 4.6 M tonnes @ 43.4% MgO, 26.17% Mg, 0.47% Ca, 0.51% Fe, 0.14% Al, 0.05% Si and 5.9% insolubles. The

Mineral Resources are within 50m of the surface and is categorised as 67% Inferred, 24% Indicated and 9% Measured.

A check estimate was completed and available data demonstrate excellent correlation for the "high grade" resources and acceptable correlation of the "low grade" resources and overall totals between the two estimates. As a consequence the NIML estimate (mentioned above) is considered by us to be reliable.

To upgrade Mineral Resources to dominantly Measured and Indicated status, NIML stated that drilling on 40m centres would be required, with closer-spaced drilling in some areas to test short spaced variability. Significant potential for resource expansion exists given that the Mineral Resource in this are remains open down dip, below and to the east of the earlier drilling. Estimates of Exploration Target potential are in the range of 15Mt to 18Mt at 40% to 45% MgO (to a depth of ~80m, includes existing resources). The need for infill drilling for resource definition and expansions should be assessed during future engineering studies and will be dependent on the Independent Engineers assessment. There is a reasonable argument that further drilling will not be required until mine development commences.

The preliminary mining study demonstrates that the suggested "required" production of 3 MT of ore can certainly be established via development of "Area 2" along the west limb of the Huandot Syncline. The production schedule could easily be increased if warranted. Input parameters, particularly costs will need to checked and updated, and the mining study should be modernised to optimise project cashflows and development options.

Bench scale leach/purification test work will be required during the next capital cost estimate phase. Samples could be available from previous developers such as Magnesium International. Stratum Resources knows this company personnel and can arrange contact if needed.

The deposit is well serviced with major infrastructure including roads, rail, power and water. The deposit is easily accessed from the Stuart Highway and is within one hour drive of Darwin and a 15 minute drive to the town of Batchelor. Darwin and Batchelor both provide reliable source of trades people and contractors should mining be contemplated in the future.

The Huandot deposit is close by to the Alice-Darwin railway to the east and the Batchelor Road to the south. It fronts onto all-weather roads, 66km from the Port of Darwin. A rail spur could easily be constructed on the lease area.

The trial pit is not visible from road or rail and has not caused any contamination of the ground water or affected in any way the water table. Exploration activities have not caused any vegetation disturbance and all drill sites have revegetated naturally.

Possible Aboriginal Heritage sites comprising white quartz outcrops within the lease area were identified by the Aboriginal Areas Protection Authority. Field investigations failed to locate such material inside the ML boundary although some minor quartz outcrops are present south of the Mineral Lease. Exploration activities have not disturbed or damaged any known sacred sites.

The author considers that the Huandot deposit (EL 27724) is a suitable source of magnesite for an offshore magnesite smelter. However development studies should also review the potential for value added products and a smelter scoping study should be investigated.

The author suggests that a site visit will be required and recommends the availability of Dr Ian Wilson, an associate of Stratum Resources. Dr Wilson has visited most of the world's magnesite deposits during the past 35 years and he collaborates with Stratum Resources in the region.

9 References

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