

MINERAL HOLDINGS AUSTRALIA PTY LTD

**RETENTION LICENCE RL1/2001
MEUNNA**

**FINAL REPORT ON EXPLORATION
MARCH 2017**

**Compiled by
T W Dickson
5 Crouch Court
Doncaster VIC 3108**

**For
Mineral Holdings Australia Pty Ltd
11 Kent Court
Toorak VIC 3142**

20 February 2017

TABLE OF CONTENTS

ABSTRACT.....	1
1.0 INTRODUCTION.....	2
2.0 PREVIOUS EXPLORATION	2
3.0 INVENTORY OF SILICA RESOURCES	4
4.0 PRESENT SITUATION	4
5.0 ENVIRONMENT	6
6.0 REFERENCES.....	7
7.0 KEYWORDS	8

LIST OF TABLES & FIGURES

Table 1: Sand Assays for Meunna vs Thomas Mt. and Specification for Glass.....	5
Table 2: Quartzite Assays from Hammer Drill Holes at Meunna RL1/2001.....	6
Plan 1: Location Diagram - RL1/2001 Meunna	9
Plan 2: Geology and Resource Plan - RL1/2001 Meunna	10
Plan 3: Location of Drill Holes and Excavator Pits – RL1/2001 Meunna.....	11

ABSTRACT

RL1/2001 was granted to Mineral Holdings Australia Pty Ltd (MHA) on 1 March 2002 for a period of three years, over an area of 2km² in north-west Tasmania. The Licence was renewed on the 1 March 2005 for a period of three years, to 1 March 2008, and subsequently for another five years to 1 March 2013, and finally to March 2017. The Licence is a flow on title from exploration licence EL11/1992 and covers exploration for Category 3 construction materials and Category 5 industrial minerals and semi-precious stones.

The Licence was applied to cover the silica resources of the 1,130m thick Proterozoic Jacob Quartzite, a quartz arenite formation within the Rocky Cape Group. The resources lie along a NE-SW trending 2km length of the Meunna Hills. The targets were high-grade quartzite and sand to supply local and overseas markets with hydraulic fracturing (frac) sand, silicon or ferrosilicon products and materials for the glass making industry.

Exploration carried out by MHA under EL11/1992, over the period 1992 to 2002, has outlined an indicated resource of 90,000m³ and an inferred resource of 270,000m³ of silica sand and gravel. In addition, there is an inferred in situ quartzite resource of 700,000m³ or 1.7 million tonnes (assuming an SG factor of 2.5).

The Meunna retention licence was considered an essential part of the Thomas Mountain quartzite and frac sand resource project that is currently being developed by MHA.

However, the sand and the quartzite are inferior to the same materials at Hogarth Creek (Thomas Mountain) RL1/2005 and generally do not meet specification. Additionally, the estimated resources of sand and quartzite are quite low and would require a very extensive drilling program to fully define those areas that might possibly meet specification. There is ample resource of better quality material at Thomas Mountain and MHA has therefore decided to relinquish title to RL1/2001.

1.0 INTRODUCTION

RL1/2001 was granted to Mineral Holdings Australia Pty Ltd (MHA) on 1 March 2002 for a period of three years over an area of 2km² in north-west Tasmania. The Licence was renewed on 1 March 2005 for a period of three years, to 1 March 2008, and subsequently for a further five years to 1 March 2013, and finally to March 2017. The Licence is a flow on title from exploration licence EL11/1992 and covers exploration for Category 3 construction materials and Category 5 industrial minerals and semi-precious stones.

The Licence was applied to cover the silica resources of the 1,130m thick Proterozoic Jacob Quartzite, a quartz arenite formation within the Rocky Cape Group. The resources lie along a NE-SW trending 2km length of the Meunna Hills. The targets were high-grade quartzite and sand to supply local and overseas markets with fracturing (frac) sand, silicon or ferrosilicon products and materials for the glass making industry.

Exploration carried out by MHA under EL11/1992 over the period 1992 to 2002 has outlined an indicated resource of 90,000m³ and an inferred resource of 270,000m³ of silica sands and gravel (Duncan 2002). In addition, there is an inferred in situ quartzite resource of 700,000m³ or 1.7 million tonnes (assuming an SG factor of 2.5).

However, the sand and the quartzite are inferior to the same materials at Hogarth Creek (Thomas Mountain) RL1/2005 and generally do not meet specification. Additionally, the estimated resources of sand and quartzite are quite low and would require a very extensive drilling program to fully define those areas that might possibly meet specification. There is ample resource of better quality material at Thomas Mountain and MHA has therefore decided to relinquish title to RL1/2001.

2.0 PREVIOUS EXPLORATION

Over the past 20 years, MHA has carried out an extensive program of exploration for silica resources in north-west Tasmania. It has identified quartzite and sand at Thomas Mountain/Dip Range (Hogarth Creek) RL1/2005, silica flour at Champion Road RL2/1996 and quartzite and sand at Meunna, originally EL11/1992, now RL1/2001. The exploration effort on EL11/1992 has been described in the series of annual reports by V. M. Threader (listed in the references) and was summarised by David Duncan (2002) as follows:

“In the year to 1993, exploration consisted of preliminary traverses along existing tracks and three surface samples were taken from an area just west of the Newhaven Track/Myalla Road junction. The samples were found to be of high purity sand derived from quartz arenite with SiO₂ greater than 99.6%. The conclusion was that the area was prospective for quartz arenite and derived sand as local accumulations in depressions and hill cap remnants.”

In the following year, some 26 samples of rock chips and sand derived from the Jacob Quartzite were taken along roads and logging tracks. Most of these were discounted due to high levels of the natural contaminants Al_2O_3 , Fe_2O_3 and TiO_2 . Three samples of sand from the Meunna Hills, NE of Myalla road showed high chemical purity, with average contaminant level of about 0.07%. The area of the Licence was reduced to 30 square kilometres.

The year to 1995 saw eleven excavator pits completed along disused logging tracks in the Meunna Hills following up on the surface sampling. An in situ resource of $90,000m^3$ of sand and gravel was identified over an area of $25,000m^2$ to an average depth of 3.6m above a hard sandstone bedrock. Sizing studies showed that 50% of this was sand at minus 425 microns grain size. Chemical analyses revealed that the iron content was variable with the average content being 113 ppm. However, three of the samples indicated that they could meet the highest purity classification (less than 20 ppm Fe_2O_3) for the silica sand market.

In 1996, thirteen percussion holes were drilled along the crest of the ridge on the Meunna Hills. Because of drilling difficulties and problems with sample return, only one hole reached its target depth (18m). Geochemistry carried out on the successful hole indicated a general increase in the level of the contaminants TiO_2 , Al_2O_3 and Fe_2O_3 at about 10-12m depth, above that the SiO_2 content being 99.4% or better. This is the pattern repeated throughout the NW and suggests enrichment by silica by either leaching of impurities or by silicification.

Five airtrack holes were drilled successfully in 1997 with downhole hammer in the area of the high quality silica sand defined during the excavator program with all holes reaching target depth. Preliminary iron contents carried, out by Index Minerals, range from 217 to 1040 ppm Fe_2O_3 with the lower values being found in the top 10m. This is probably too high for premium quality silica which should be less than 200 ppm Fe_2O_3 but is considered to be acceptable for secondary metallurgical grade silicon or ferrosilicon production."

In December 2004, five pits were dug by excavator for an aggregate depth of 11.9m, in the area previously reported as less than 20ppm Fe_2O_3 . The pits all terminated in hard sandstone basically when the hole refused to advance with ripping in any reasonable time. When dug out and brought to the surface, the material presented as up to 30% blocks of sandstone/quartzite in a matrix of mainly fine grained, light brown sand.

Channel samples of the sand profile were washed to remove organic material, dried and passed over a magnet to remove any magnetic material and then assayed. The Fe_2O_3 content of these test pit samples at 187 to 455 ppm does not repeat the minus 20ppm values of the first excavator program. In general, although the silica content is in the range of 99.5 to 99.8%, the contaminants are at least an order of magnitude too high for most silica flour specifications particularly in Fe_2O_3 , TiO_2 , K_2O and the metals Mn, Cu, Cr and Ni.

3.0 INVENTORY OF SILICA RESOURCES

The resources identified in RL1/2001 by MHA (Duncan 2002) are based on the 1,130m thick Jacob Quartzite, a quartz arenite formation within the Rocky Cape Group. They lie along a NE-SW trending 2km length of the Meunna Hills (Plan 2).

The resources reported by Duncan (2002) are:

Sand and gravel	90,000m ³	Indicated
	270,000m ³	Inferred
Quartzite/sandstone	700,000m ³	Inferred

The in situ resource of 90,000m³ of sand and gravel has been identified in the NE of the area, based on 11 excavator pits, over an area of 25,000m², with an average depth to hard sandstone bedrock of 3.6m. Sizing and purity studies are given in the annual exploration accounts. Duncan (2002) judged that this deposit meets the criteria for the Indicated Resource Category (JORC 1999).

This sand and gravel resource occurs on the SE flank of the northern part of the NE-SW trending ridge. There is a distinct possibility that, following the pattern elsewhere in Tasmania, the deposit extends along the entire SE flank of the ridge to correlate with the sand and gravel resources of the Pokes Road Quarry located at the SW end. The ridge topography may have protected the resource on the sheltered SE flank from the eroding effects of the wind and sun prevailing from the north and west. If this is the case, an additional Inferred resource of 270,000m³ of sand and gravel could lie along the SE flank of the ridge.

Also, eighteen percussion drill holes have quantified the bedrock quartzite/sandstone resource on the crest of the ridge (11 holes) and also under the sand resource already defined (5 holes). In the program, three holes encountered schist interbeds.

Based on the drilling, the in situ hardrock quartzite resource along the ridge is conservatively inferred to be 700,000m³ (2,000m x 50m x 7m) or 1.7 million tonnes assuming an SG of 2.5. The limited analyses available may rule out this material for best quality silicon but it is expected to be acceptable for secondary metallurgical grade silicon or ferrosilicon. On extraction, some of the deposit may be waste either as schist interbeds or substandard quartzite/sandstone.

4.0 PRESENT SITUATION

Only limited work has been carried out at Meunna while effort has been concentrated on developing the Thomas Mountain area for initial production.

However, MHA has been very active in trying to interest companies and groups in the development of a quartzite and frac sand mining operation at Meunna and also in trying to interest potential customers in the products. Interest in the area has however been minimal.

The main problem is that most of the quartzite and the sand is below specification as silica for metallurgical grade silicon metal production, ferrosilicon production or glass production, and is inferior to that at Thomas Mountain in RL1/2005.

	GLASS SAND SPEC.	SAMPLE				
		Meunna Myalla Rd	Meunna Newhaven Track	Thomas Mountain Bottom Pit LHS	Thomas Mountain Bottom Pit RHS	Thomas Mountain Top Pit
SiO ₂	99.0 min	99.45	99.62	99.79	99.80	99.77
Na ₂ O		0.03	0.02	0.01	0.01	0.02
K ₂ O		0.02	0.02	0.01	0.01	0.01
CaO		<0.01	<0.01	<0.01	<0.01	<0.01
MgO		0.01	0.01	0.01	<0.01	0.01
CaO+MgO						
SrO		ND	ND	ND	ND	ND
Al ₂ O ₃	± 0.05	0.05	0.02	0.02	0.02	0.02
TiO ₂	0.10 max	0.25	0.14	0.07	0.07	0.09
Fe ₂ O ₃	0.030 max	0.031	0.035	0.012	0.010	0.013
Cr ₂ O ₃	0.0006 max	0.0003	0.0005	0.0001	0.0002	0.0001
MnO		ND	ND	ND	ND	ND
SO ₃		ND	ND	ND	ND	ND
LOI		0.16	0.13	0.08	0.08	0.07
COD		381	334	115	125	122
+1000µm	NIL	2.2	1.1	<0.1	<0.1	<0.1
+600µm	2.0 max	8.6	6.1	7.1	5.4	9.6
+425µm	10.0 max	21.2	18.4	32.6	32.7	41.1
+250µm		57.3	57.9	66.5	69.4	70.2
+150µm		87.6	85.2	91.1	92.7	88.8
+106µm		92.8	92.5	96.3	97.6	94.7
+75µm		94.9	96.5	97.9	98.7	98.0
-75µm	1.0 max	5.1	3.5	2.1	1.3	2.0

Table 1: Sand Assays for Meunna vs Thomas Mountain and Specification for Glass Manufacture

HAMMER DRILL LOGS IN JACOB QUARTZITE-EL 11/92 (MEUNNA)

BH No.	Depth (m)	Thick ness (m)	Hard ness#	Colour*	Analysis				Depth (m)
					SiO ₂ %	TiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	
1	0-3	3	S	W					
	3-5	2	H	W	99.2	0.24	0.13	<0.1	(3-5
	5-6	1	S	W	99.4	0.18	0.12	<0.1	(
	6-7	2	H	W	(Rods jammed)				
2	0-12	12	H	W	99.6	0.09	0.11	<0.1	(0-6
					99.6	0.07	0.12	<0.1	(
					99.4	0.07	0.28	<0.1	(6-12
					99.5	0.07	0.28	<0.1	(
	12-15	3	H	OW	98.8	0.09	0.66	0.1	(12-14
					98.9	0.07	0.52	0.1	(
3	0-4	4	H	W	98.30	0.12	0.97	0.1	(14-18
					97.8	0.15	1.19	0.2	(
	4-5	1	S	W	(Lost air)				

Table 2: Quartzite Assays from the Three Best Hammer Drill Holes at Meunna RL1/2001

A typical specification for quartzite for metallurgical-grade silicon is:

- SiO₂ 99% min,
- Fe₂O₃ 0.07% max,
- Al₂O₃ 0.40% max,
- TiO₂ 0.050% max, and
- P₂O₅ 0.002% max.

When this specification is compared with Table 2, it is evident that most of the resource at Meunna contains too much TiO₂ to meet the specification and as a consequence it has been decided to not apply for an extension of term of the Meunna retention licence RL1/2001.

5.0 ENVIRONMENT

All pits and drill sites have been backfilled immediately following logging and sampling many years ago. The surface was recontoured at that time and slash and litter distributed around as appropriate. There has been no recent environmental impact.

6.0 REFERENCES

Dickson, T.W. 2009, RL1/2001 Meunna Report on Exploration March 2008 to March 2009, Mineral Holdings Australia Pty Ltd.

Dickson, T.W. 2010, RL1/2001 Meunna Report on Exploration March 2009 to March 2010, Mineral Holdings Australia Pty Ltd.

Dickson, T.W. 2011, RL1/2001 Meunna Report on Exploration March 2010 to March 2011, Mineral Holdings Australia Pty Ltd.

Dickson, T.W. 2013, RL1/2001 Meunna Report on Exploration March 2012 to March 2013, Mineral Holdings Australia Pty Ltd.

Dickson, T.W. 2014, RL1/2001 Meunna Report on Exploration March 2013 to March 2014, Mineral Holdings Australia Pty Ltd.

Dickson, T.W. 2015, RL1/2001 Meunna Report on Exploration March 2014 to March 2015, Mineral Holdings Australia Pty Ltd.

Dickson, T.W. 2016, RL1/2001 Meunna Report on Exploration March 2015 to March 2016, Mineral Holdings Australia Pty Ltd.

Duncan, D. McP. 2002. Final Report on Exploration. 1992-2002 EL11/1992, Meunna. Mineral Holdings Australia Pty. Ltd.

Duncan, D. McP. 2004. Annual Report to March 2004 Retention Licence 1/2001 Meunna. Mineral Holdings Australia Pty. Ltd.

Duncan, D. McP. 2005. Annual Report to March 2005 Retention Licence 1/2001 Meunna. Mineral Holdings Australia Pty. Ltd.

Threader, V.M. 1992. Annual Report for 1991-1992 EL24/1988 Champion Road and EL 25/1988 Dip Range. Mineral Holdings Australia Pty Ltd.

Threader, V.M. 1993. Annual Report for EL11/1992 Meunna. Nargun Pty. Ltd.

Threader, V.M. 1994. Annual Report, 1993-1994 for EL11/1992 Meunna. Mineral Holdings Australia Pty Ltd.

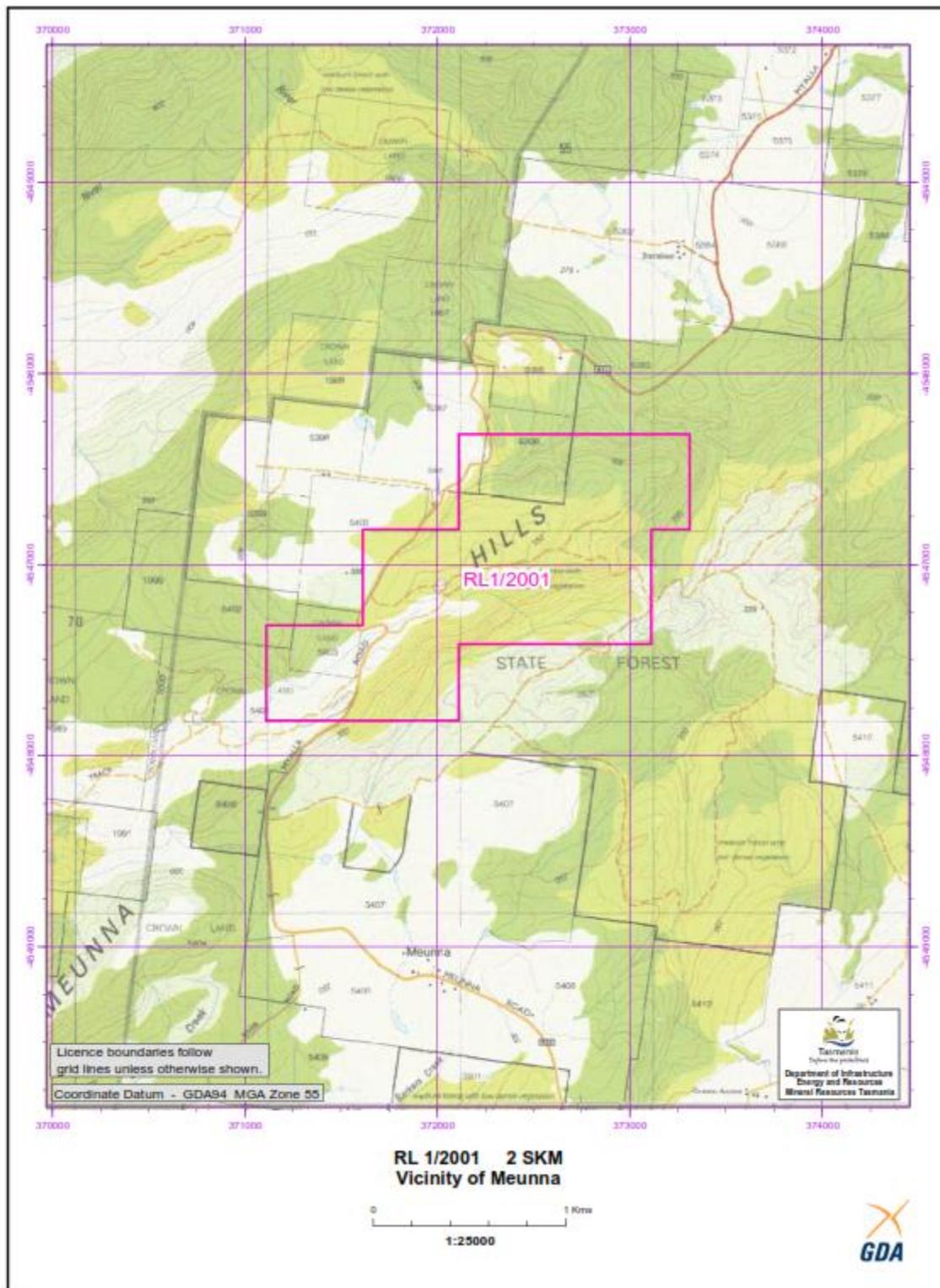
Threader, V.M. 1995. Annual Report, EL's 11/1992 and 20/1993, Meunna and Hebe River. Mineral Holdings Australia Pty Ltd.

Threader, V.M. 1996. Annual Report, EL11/1992 Meunna.1996. Mineral Holdings Australia Pty Ltd.

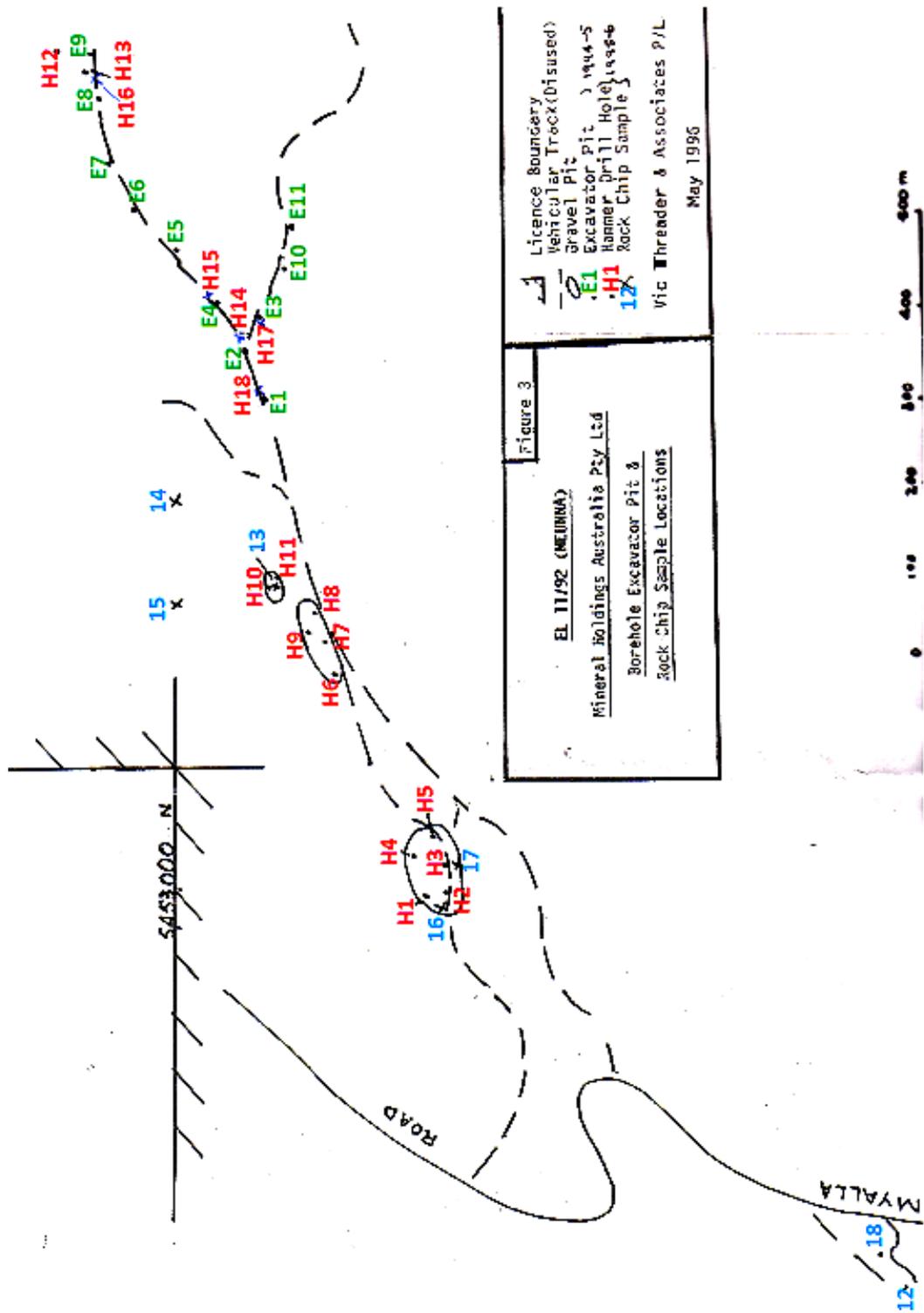
Threader, V.M. 1997. Annual Report, EL11/1992 Meunna. Mineral Holdings Australia Pty Ltd.

7.0 KEYWORDS

Meunna Hills, Jacob Quartzite, Rocky Cape Group, Sand, Sandstone, Quartzite, Silica resources.



Plan 1: Location Diagram - RL1/2001 Meunna



Plan 3: Location of Drill Holes and Excavator Pits – RL1/2001 Meunna