

MAYDENA SANDS PTY LTD

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EXPLORATION LICENCE NO. 17/2002

MAYDENA, TASMANIA

FINAL REPORT

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ABSTRACT

During the seven year tenure of EL 17/2002 one dolomite and three silica sand/flour/rock prospects were assessed.

Only the Hedgehog Ridge Prospect showed potential, during the early stages of investigation, to host a significant deposit of better quality silica material comprising mainly silica sand/flour. Investigations culminated in a limited, shallow-penetration resistivity imaging survey over a segment of the northern part of the prospect which yielded a good data set with line to line correlation and results consistent with the lithologies expected.

Check drilling, however, failed to intersect significant depths of near surface silica sand, thereby substantially diminishing the possibilities for major quantities of easily extractable, high quality silica material at the prospect.

Any remaining resource potential at the prospect would seem to be confined mainly to narrow zones or smaller pockets of silica sand and flour located close to the Gordon River Road. Several lab-scale beneficiation tests resulted in low-iron silica flour end products, though a number of other impurities in the latter remained a matter of concern.

As extraction of these resources would most likely be technically and environmentally contentious at the present time, the tenement was relinquished.

Keywords:

EL17/2002, Dolomite,
Silica Sand, Silica flour, Silica rock,
Resistivity, Drilling.

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1. INTRODUCTION

This final report summarises activities by Maydena Sands Pty. Ltd. and its precursor, J.J. McDonald and Sons Mining Pty. Ltd., during the seven year tenure of E.L.17/2002 and subsequent reductions to 10.01.2010 (Fig. 1).

Interest in the ground covered by the original exploration licence arose as a result of J.J. McDonald & Sons Mining Pty. Ltd. activities at the Pine Hill silica sand deposit located within RL 2/2003 some 5 km to the south east.

Regional mapping by MRT geologists suggested that the geological formations potentially prospective for additional resources of silica sand and flour extend into this area in a north westerly direction from the Pine Hill deposit.

An added attraction was the availability of basic access to the main areas of interest.

In early 2005, this tenement was transferred to Maydena Sands Pty. Ltd., a new entity which continued to focus under the same management on the exploration, assessment and possible development of any silica sand, silica flour and hard rock silica resources indicated within it.

2. TENURE

On the 30th of April 2002 an application was lodged by J. J. McDonald & Sons Mining Pty Ltd for an exploration licence of 13 sq km covering ground potentially prospective for silica sand/flour and silica rock associated with lower Cambrian sequences 7-10 km WSW of Maydena (Fig. 2).

Ministerial consent to the grant of this exploration licence was obtained on 28/01/03 effective for 5 years to 10th January 2008.

An application for a reduction of the original 13 sq km tenement area by 9 sq. km to an interim size of 4 sq. km surrounding the Hedgehog Ridge silica sand and flour prospect (viz. Fig 2), submitted in November 2004, was approved by the Director of Mines on 26.05.2005. Exploration activities and outcomes during tenure of the larger area are summarized in a Partial Relinquishment Report by Krummei (2004) (a).

On the same date, title to the reduced Exploration Licence area was transferred to Maydena Sands Proprietary Limited, a Company formed to hold and operate the exploration and mining interests of the Directors and Shareholders of J.J. McDonald & Sons Mining Pty Ltd in the Maydena district.

A further reduction of the Exploration Licence area to the current size of 2sq.km was approved on 27/04/07 and tenure was extended by two, one-yearly intervals to 10.01.2010 to allow completion of work programmes at the Hedgehog Ridge Prospect.

The reduced tenement now comprised:

- State Forest – Multiple use forest land
- MDC Informal Reserve Area
- Aurora/Hydro/Transend land

3. LOCATION AND INFRASTRUCTURE

The original tenement was situated approximately 7 km west of Maydena and about 95 km by sealed road west of Hobart (Fig.2).

The sealed Gordon River Road provided excellent basic access to the area. Individual prospect areas could be reached via well-established Forestry haulage roads. However, thick vegetation, topography and drainage impeded access within the immediate area of interest north of the Gordon River Road.

Other basic facilities, including housing and a small labour pool, are available in the small township of Maydena (pop. ca. 400) and surrounding district.

A single strand power line follows the Gordon River Road through the area.

A 700 m long, east-west oriented, fair weather gravel airstrip is located about 2 km east of the Hedgehog Ridge Prospect.

A narrow gauge railway line from New Norfolk to Maydena has been progressively upgraded to passenger standard as far as the entrance to the Mt Field National Park.

However, plans to upgrade this rail line to freight standard from New Norfolk to Maydena have recently been deferred indefinitely.

4. OBJECTIVES AND TARGETS

The overall objective of the exploration activities during tenure of this exploration licence was to add commercially viable resources of high purity silica sand and flour, preferably in the order of about a million tonnes or more, to those already outlined by J. J. McDonald & Sons Mining Pty Ltd (now vested in Maydena Sands Pty Ltd) at the Eastern Quarry, Pine Hill, in RL 2/2003. High quality silica rock was a subsidiary target.

Following general reconnaissance of the tenement, the main target area remained the western end of a 4x1 km belt of steeply dipping, ?NeoProterozoic/ lower Cambrian sediments with carbonate units and associated silica sands, the former group of rocks extending in a north westerly direction from Pine Hill.

5. PREVIOUS EXPLORATION

Although the area was part of BHP's EL 13/65 and EL 8/79 and later also fell within Amoco's EL 14/84, neither company undertook any work related to industrial minerals in this segment of their tenements (Ellis, in Jones, 1989).

Pioneer Silicon Industries Pty. Ltd. (PSI) embraced the area within its EL 14/88 but little, if any, work was carried out in this segment west of Pine Hill.

On taking over PSI's tenement in 1992, the Northwest Bay Co Pty Ltd successfully outlined a small resource of about 355,000 tonnes of good quality, open cuttable dolomite on the southern slopes of Kallista Hill situated approximately 2 km west of Pine Hill (Forster, 1993). Due to the demise of the operator, no production ensued and mineral title to the ground was ultimately relinquished.

In the early 1990s, Mineral Resources Tasmania (MRT) completed three shallow diamond drill holes as part of its reconnaissance of the Tertiary/Quaternary sequences of the surrounding area (for locations see Calver and Forsyth, 1999):

Hole Styx 2	:	0 - 31m	:	Quaternary sediments
Hole Styx 3	:	0 – 32	:	Quaternary sediments
		32 – 35	:	Cambrian sandstone
Hole Styx 6	:	0 – 21	:	Quaternary sediments
		21- 22	:	Ordovician

1:25,000 scale mapping of the Maydena Sheet was completed by MRT geologists Calver & Forsyth in 1999, providing a basic, up-to-date geological framework for this district.

6. SUMMARY OF ACTIVITIES – EL 17/2002

In 2003, during its first year of tenure, J.J. McDonald & Sons Mining Pty Ltd focused its activities on both the dolomite and silica rock/flour prospectivity of the larger tenement area. Reconnaissance identified the Loading Bay Spur silica rock/gravel prospect and the Hedgehog Ridge silica flour prospect for further follow-up. A market study and departure of a potential client did not encourage further pursuit of a viable dolomite resource at this time.

Attention during the second year of tenure was concentrated on the two silica prospects outlined the previous year. Only a low tonnage potential for silica rock/gravel was indicated at the Loading Bay Spur Prospect and deemed of no further immediate interest. In contrast, encouraging low levels of impurities, especially iron, were indicated by assays of several surface samples of silica flour and gravel at the Hedgehog Ridge Prospect.

The third year's activities, from hereon by Maydena Sands Pty. Ltd., were focused on the Hedgehog Ridge Prospect. They comprised line cutting and gridding to provide access for further assessment of the silica flour occurrences there, followed by grid mapping and limited surface sampling.

The fourth year's activities concentrated on the northern part of the Hedgehog Ridge deposit and were aimed at a preliminary, laboratory-scale assessment of the quality and yield of two samples of the silica sand exposed in the central and northern part of the prospect respectively.

During the fifth year of tenure, the main activities encompassed beneficiation test work on a small bulk sample from the southern part of the deposit. Field work was curtailed pending clarification and resolution of land access issues.

The sixth year's planned field activities were delayed due to the need to deal with regulatory matters related to the proposed drilling programme. However, air photography of the prospect area was completed. Discussions were held with geophysical contractors with a view to undertaking depth soundings of the sand and a raw material sample was submitted to TAM for preliminary testing and assessment. Marketing of the potential silica flour end product from the prospect continued.

In 2009, the final and seventh year of tenure, a small resistivity imaging survey was completed in the north western part of the prospect, followed by a limited drilling programme to test the main geophysical features outlined as well as the extent of the silica sand exposed in several road cuttings in this prospect segment. The results indicated that the expectations of a one million tonnes, near surface, silica raw material resource are unlikely to be realised here.

7. RESULTS OF ACTIVITES – EL 17/2002

7.1 Dolomite Prospect:

7.1.1 Kallista Hill Dolomite Deposit

Interest in this small dolomite deposit of at least 355,000 tonnes (Fig 2) was ignited by an enquiry about the potential availability of high quality, crushed dolomite as base feed for the production of magnesium via a “chemical” route using the Pidgeon process. A desk-top review of data, generated by the Northwest Bay Co. Pty. Ltd. (see Forster 1992 and 1993), was undertaken, followed by a field visit to the prospect.

As fines generated in the process of crushing the dolomite would most likely be suitable for local agricultural and chemical applications, a brief, preliminary market survey on dolomite use and demand, particularly in southern Tasmania, was commissioned to help gauge possible off-take and price parameters (McBain, 2003).

The outcomes on both scores were disappointing.

Although the reported levels of CaO, MgO, Fe₂O₃ and TiO₂ for the Kallista Hill deposit were acceptable to the proponents of the magnesium project, SiO₂ at 1.6% was considered undesirably high. There was no further expression of interest in this resource.

Equally discouraging were the results of the market survey in that they indicated a demand for dolomite in Tasmania in the order of only 20 – 30,000 tonnes per annum, with limited growth prospects, dubious price competitiveness on a state-wide basis, as well as low total annual revenue and low margins generated from what would have amounted to a relatively small market share.

Consequently, further work on the dolomite project was deferred indefinitely.

7.2 14 Mile Creek Track

This area was of interest because of a small patch of silica sand recorded here by MRT mapping (Calver and Forsyth, 1999).

A reconnaissance traverse did not locate any significant, in situ occurrences of silica sand, except as road surfacing.

Float comprising pebbles, cobbles and boulders of chert, quartzite, silicified sandstone and rare quartz fragments in a 200m wide zone along 14 Mile Creek Track extending northwards from its junction with Maynes Road (Fig 2) gave assays high in alumina, iron, titanium and chromium in addition to elevated values for MgO, K₂O and Na₂O (Krummei, 2003).

This low purity material and its bedrock source is unsuitable for use in the production of silicon.

7.3 Loading Bay Spur

This area is located near the far west-central boundary of the original tenement (Fig.2) where clear felling of a coupe of timber provided access and some new geological information.

Of interest were three previously unrecorded occurrences of silica rock gravels comprised of heavily leached, lacy, honeycombed, chalcedonic quartz, mostly white in colour, but becoming more iron stained with depth. The largest of these accumulations extends eastwards for about 300m down a prominent, steep spur towards the fire track along which two smaller patches of similar material were also noted. The ultimate source of this material was not determined, but is possibly of glacial origin.

First pass grab samples from these three localities reported encouragingly low values for alumina, iron, titanium and chromium (Krummei, 2003).

The next round of sampling showed higher levels of impurities of the material, averaging around 780 ppm Al₂O₃, 500 ppm Fe₂O₃, 224 ppm TiO₂, 150 ppm CaO and 60 ppm MgO (Krummei, 2004). Some of these samples were contaminated by surface iron staining, suggesting that a measure of quality improvement could be achieved by aggressive washing, thus possibly making the material suitable feedstock for the production of “standard”, or metallurgical silicon.

In view of the relatively low potential estimated to amount to only a few thousand tonnes of silica gravel, further sampling and beneficiation tests on this material were not deemed justified at the time and activities at the prospect ceased.

7.4 Hedgehog Ridge Prospect

Initial limited reconnaissance channel and shallow hand auger sampling of silica sand exposures in, and around, old road cuttings adjacent to the Gordon River Road at the prospect yielded encouraging results which suggested potential for good quality silica flour product (Fig.2). Some of these samples showed less than 10 ppm Fe₂O₃ and Cr₂O₃ often at or below 1 ppm, though Al₂O₃ in the range of 0.025 - 0.100% and particularly TiO₂ up to 0.151% (range 0.010 – 0.151%) , were undesirably high. The elevated levels of Ca, Mg, K, and Na also introduced a note of caution (Krummei, 2003).

Subsequent grid mapping located several more extensive occurrences of silica flour over a distance of about 1 km, but concentrated mainly in the north western half of the prospect (Fig 3). Assay results were again encouraging and in line with those of previous scout sampling(Krummei, 2006). Fe₂O₃ averaged about 80ppm (range >10 to 230 ppm). Cr₂O₃ and Co were generally below detection levels of 1 ppm respectively, but TiO₂ levels were again in the relatively high range of 100 – 1120 ppm (average ca. 450 ppm). Al₂O₃ was skewed by several high results to an average high of 500 ppm (range 0.19 – 0.098%).

Prompted by these results, lab-scale processing of the +38-250 micron size fraction of 2 x 10kg and 1 x 5 kg raw material samples from the central, northern and southern parts of the prospect respectively yielded end products, again with generally encouraging results (Krummei, 2007 & 2008). Surprisingly, TiO₂ shows some improvement. However, levels of Al₂O₃, CaO and MgO tended to remain undesirably high (Krummei,2008).

The table below gives an indication of the end product achievable in the +38-250 micron size range and also provides a comparison of the assay results of the processed, final product from the central, northern and southern parts of the prospect (Fig.3)

Sample	Al ₂ O ₂ %	CaO %	Cr ₂ O ₃ ppm	Fe ₂ O ₃ %	K ₂ O %	MgO %	MnO %	Na ₂ O %	P ₂ O ₅ %	TiO ₂ %	V ₂ O ₅ %	LOI% %	Comment
HR001B-NM	0.076	0.049	<1	0.003	0.002	0.020	<0.001	0.004	<0.001	0.002	<0.001	0.26	Middle
HR002B-NM	0.025	0.064	<1	0.003	0.001	0.034	<0.001	0.003	<0.002	0.002	<0.001	0.20	North End
HR003B-NM	0.028	0.063	<1	<0.001	0.001	0.028	<0.001	0.003	<0.001	0.010	<0.001	N/A	South End

*Note: NM – Non-magnetic fraction

Sizing data for the attrition washed samples using a MALVERN Mastersizer 2000 unit indicate that a relatively fine-grained end product can result from the silica raw material at the prospect:

Sample No.	d(0.1) micron	d (0.5) micron	d (0.9) micron
HR001B-BM*	37	85	205
HR002B-BM	49	102	224
HR003B-BM	30	70	170

*Note: BM – Before magnetic treatment

Screen sizing of the three raw material samples prior to processing indicated an approximate yield of the desired size band in the range of 39 -57% as follows:

Sample No.	Oversize %	+38-250u Fraction %	Undersize %	Total %
HR001B	31.00	38.9	30.00	99.9
HR002B	28.30	53.40	18.30	100.0
HR003B	19.20	56.70	24.10	100.0

After attention to several regulatory and technical issues, a small resistivity imaging survey, followed by programme of four shallow drill holes was completed.

The primary target area identified showed significant exposure of poorly sorted silica sand material in several road cuttings in an area measuring some 500m x 200m extending from just north of grid line 4500E to 5000E and situated to the north east of the Gordon River Road. (Fig.3). The southward continuation of this zone to just beyond grid line 5500E was assigned a lower priority.

The results of the resistivity soundings suggested that the lateral extent and depth of the sand under investigation could well be less than envisaged from extrapolation of available geological data and thus, in effect, signalling a significant reduction of the potential for the target volume of high quality silica sand at the prospect.

Details of the resistivity survey (Papp) and drilling results are provided in the report by Krummei (2009).

The most disappointing outcome of the drilling programme was the absence of any significant intersections of silica sand in holes HRD 001, HRD 001/A and HRD 002 drilled along geophysical Line 2, despite a 3-4m exposure of silica sand in an old road

cutting near-by. The best intercept achieved was 1.8m of silica sand in hole HRD 002 (Krummei, 2009). This pointed to a lack of continuity of any major near-surface sand occurrences between Lines 1 and 3 based on the geophysical responses noted and downgrades the potential of the target area to host the quantity of raw material sand aimed for and anticipated from earlier geological extrapolations.

The high levels of alumina, titanium, alkali metals and to some extent iron further downgraded this segment of the prospect as a major source of silica flour supply for the electronics display industry.

Hole HRD003 confirmed the existence of a small patch of silica sand at the southern end of the prospect. But the location of this resource close to the Gordon River Road could preclude its extraction and the high levels of alumina, titanium and iron, and possibly its fineness would make it unattractive for use in the electronics display panel industry.

8. ENVIRONMENTAL & REHABILITATION ACTIVITIES

The environmental impact of the initial reconnaissance work, surface sampling, grid line cutting, grid line mapping and the geophysical survey was minimal to nil. There was only negligible environmental impact as a result of the drilling activities at Hedgehog Ridge as there was no need for access or drill pad construction due to the specially designed and constructed equipment used. Drill sites were cleaned up, rehabilitated where necessary, holes capped and all waste cleared.

All grid pegs and marker tape have been removed.

9. CONCLUSIONS

9.1 Of the prospects examined, only Hedgehog Ridge gave indications of possible, commercially exploitable, near-surface, raw material silica sand/flour. However, limited drilling diminished its stature to host significant quantities of viable material and suggests that any remaining resource potential at the prospect would seem to be confined mainly to narrow zones or smaller pockets of silica sand and flour located close to the Gordon River Road. Extraction of these resources would most likely be technically and environmentally contentious by virtue of their location.

9.2 Under these circumstances, further expenditure at the prospect is deemed not to be warranted at the present time.

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ILLUSTRATIONS





