MAYDENA SANDS PTY LTD

ACN 111 938 428 ABN 65 111 938 428

RETENTION LICENCE NO. 2/2003

MAYDENA, TASMANIA

ANNUAL REPORT

TO

09 January 2013

GERHARD K. KRUMMEI

DECEMBER 2012

Suite 28, 487 St.Kilda Road, Melbourne Vic 3004 Australia
Telephone and Facsimile: 61 3 9820 2595

ABSTRACT

There have been no significant improvements during the year in the battered PV Solar and polysilicon industry with polysilicon spot prices at or near rock bottom with demand for solar panels subdued.

The display glass industry fared a little better with demand and profitability largely underpinned by new glass products. Despite a fall in the number of enquiries in the second half of the year, marketing efforts will continue.

Confirmatory HIMF tests for iron removal were successful while recently initiated oxalic acid leach tests and investigations into organic particles to further improve product quality will continue.

A contaminant in the form of a silica-bearing titanium oxide, newly identified by QEMSCAN analyses, appears to place a limit on the ability of electrostatics to remove titanium contamination from the silica flour end product.

In the logistics area, encouraging progress is being made by Tasrail to improve rail freight services, but these efforts are being negated by the continuing lack of direct shipping facilities to Asia from Tasmanian ports. This issue and long term transport strategies for Tasmania are being addressed by two recently established task groups.

Keywords:

Maydena; Silica flour;
Silica sand;
QEMSCAN.

C O N T E N T S

1. INTRODUCTION

This report outlines activities by Maydena Sands Pty. Ltd. during its eighth year of tenure of Retention Licence 2/2003, granted for a four year period to 9.01.2008 and then renewed annually to 09.01.2013.

This tenement has its origins in EL 17/1998 of 7sq.km previously held and operated by J.J. McDonald &Sons Mining Pty. Ltd. The current tenement of 4sq.km is located just south of the sealed Gordon River road approximately 4 km west south west of Maydena (pop. 250 approx.) and about 90 km by road from Hobart (Fig.1). There is good access to and within the prospect area. Power, water, housing and basic facilities are readily available from within a short radius of the prospect. The last few years saw the progressive upgrade of the narrow gauge New Norfolk-Maydena rail line to passenger standard but only as far as the entrance to the Mt Field National Park from New Norfolk. As a result of a review of its assets during the year, Tasrail donated the Derwent Valley Railway line to tourist and heritage operators. In this context, mooted upgrades to freight standard of the entire stretch are now highly unlikely. An alternative rail loading facility, a major freight hub at Brighton, approx. 65km by road east of Maydena has been completed and is being progressed to operating status.

A 700m long gravel airstrip is located 3 km north west of the silica sand deposit.

The primary target for investigation, assessment and eventual exploitation remains the deposit of silica sand and its silica flour matrix located largely to the west of the Eastern Quarry, about 1 km south east of Pine Hill (Fig.2).

The overall aim of the investigations is to determine if a commercially viable operation can be established, based on products derived from the silica flour, silica sand and silica rock resource in the tenement.

In view of the growing use of solar power locally and overseas, interest was also maintained in the silica rock potential of the tenement. The latter raw material, if of sufficiently high quality is used in the production of high purity silicon metal which is an essential component of photovoltaic solar cells. Also of potential interest is the coarser, higher purity sand fraction for use in the manufacture of technical glass, optical glass and solar cell cover glass with high light transmissivity characteristics.

2. PREVIOUS WORK

Exploration by Pioneer Silicon Industries Pty. Ltd. in 1988/89 identified a lag deposit of hard silica rock at the Western Quarry containing a small resource of material deemed suitable for the manufacture of silicon. (Fig.2). From this, approximately 19,000 tonnes of crushed, screened silica rock was produced in 1991 and 1992 for shipment, of which some10,000 tonnes were consigned to Pioneer's silicon smelter at Electrona and about 9,500 tonnes went to Temco's Bell Bay ferrosilicon plant. Extraction, by Duggans Pty. Ltd. under M.L.1396 P/M, virtually ceased upon closure of the Electrona smelter south of Hobart in 1992, although a small parcel of 850 tonnes of silica rock is reported to have been mined in 1995. At the end of the earlier exploration work, a small cutting of white silica sand, first exploited in the 1970s by ANM (now Norske Skog), was located between Pine Hill and the Styx Road in an area now known as the Eastern Quarry Area. Pioneer investigated this deposit in the vicinity of the Eastern Quarry by 23 shallow RC drill holes. Preliminary estimates suggested a resource in the order of some 0.75 – 1.5 million cu. m. of mostly low iron silica sand containing about 10% of high quality lump silica. Pioneer terminated operations at Electrona before any of this latter material could be used for silicon production.

Assay results from a number of subsequent, excavator generated pit samples by the North West Bay Co. Pty. Ltd. supported the high quality of the resource and, together with sizing determinations on a bulk sample, indicated that the sand might be suitable for the manufacture of table ware glass.

During its tenure of EL 17/1998, which contained these deposits, J.J. McDonald & Sons Pty. Ltd., using the air core drill sampling method, completed 43 drill holes totalling 553 m which outlined a raw material resource of about 6 million tonnes of loose silica ranging in size from very coarse to very fine.

The drilling also demonstrated that the deposit is more variable, complex and higher in iron oxides and other impurities than previous data suggested.

Laboratory sizing determinations indicated that the deposit is a possible source of silica flour as well as glass sand, while geological mapping and interpretation pointed to a small resource potential for hard rock silica as well.

Bench scale beneficiation tests and bulk sample processing tests, including acid wash tests on samples of the glass size fraction sand, showed that the -250 micron fraction could be upgraded to a high quality product containing only about 50ppm Fe2O3 without major environmental impact, with levels of iron as low as 10ppm a possibility.

Sources of good quality limestone and dolomite were identified in relative proximity to the silica sand deposit for eventual acid neutralization uses.

The company's activities in the marketplace identified the natural silica flour as potentially the deposit's most important component economically. This material provided the major focus for ongoing geological, processing and marketing activities, though the coarser size sand fractions and the hard-rock silica potential remain of interest for future attention under the appropriate market conditions.

In early 2004, EL tenure over the area was converted to a Retention Licence

In late 2004, J.J. McDonald & Sons Mining Pty. Ltd. formed a new holding and operating company, Maydena Sands Pty. Ltd., to which the Retention Licence and all of the former company's interests in the Maydena area were transferred in April 2005.

Since then, all activities are being conducted under the new Company name.

Details of past activities and outcomes are provided in reports listed in the Sections 7 and 8 below.

3. ACTIVITIES FOR PERIOD

These included:

3.1 Work Done

- Dating, using zircon – in progress.
- Mineralogical study – focused largely on organic contaminants and to a lesser extent to assist with zircon dating.

- Beneficiation:

  Successful completion of follow up HIMF tests on a larger sample of the +40-250 micron washed, deslimed fraction at ERIEZ, Wales for the removal of iron and other magnetics.

  Completion of electrostatic tests by Robbins Metallurgical, Brisbane to remove Ti contamination in the form of rutile from the +75-250 micron fraction. – Partly successful.

  Investigations to remove organics/carbon end product contamination commenced. – In progress.

  Acid leaching – Use of oxalic acid to remove Fe stain under discussion aimed at tests. In progress.

- Market related activities:

  Ongoing market research and monitoring – silica sand, silica flour, display panels and polysilicon.

  Attendance at China Glass 2012 – Shanghai, providing contacts with:

  - Innoceram – China
  - Vesuvius – China, Europe
  - PPG – USA
  - SGGS – Germany

  Visit to Seoul, South Korea for meetings with:

  - Samsung – silica flour
  - Ssang Yong – silica flour, silica sand and silica rock
  - Chong Kuen Ahn – silica flour, silica sand

  Contacts or meetings with:

  - Shinwon Materials, S.Korea – Silica flour, silica sand.
  - Samsung – Sydney, Australia – Silica flour.
  - Sojitz, Japan (Melb.Office) – Silica powder, silica flour.

- Naturastone – Melbourne - Silica flour, silica sand.
- Stratum Resources, Australia – Silica flour, silica sand.
- MHM Metals, Australia – Silica flour, silica sand.
- Videocom, India – Silica flour, silica sand.
- Durgo Minerals, India – Silica flour, silica sand.
- Construction Materials, Greece – Silica flour, silica sand.
- King Cooper International, China – Silica flour, silica sand, silica rock.

- Project Planning:
  - Inspect Bell Bay port facilities.
  - View Port of Burnie facilities.
  - Discussions, monitoring Tasrail upgrade progress.
  - Commenced environmental base line study – In progress.
  - Meeting with EPA personnel re EPA approvals.
  - Meeting with DIER personnel re road usage, charges
  - Meeting with Forestry Tas. personnel re road usage rules, costs, charges and compensation matters.
  - Monitoring transport logistics systems in Tasmania – Ongoing.
  - Monitoring activity outcomes from Tas. Gov. established Freight Logistics Team addressing long term freight strategy for Tasmania.
  - Monitoring activity outcomes from Cross Industry Task Force addressing Tas. Freight issues.

- Community relations:

  Occasional contacts with Maydena Development Association.

- Environmental

  Checked on re-growth progress at latest rehabilitated and re-seeded drill sites.

3.2 Statistical Summary

Test Samples generated:

Eriez Magnetics Europe	:	1 X 100Kg
Robbins Metallurgical	:	1 X 16Kg
Uni.Syd. Faculty of Agric. & Environment	:	1 X 2Kg
Zircon dating	:	2 X 2Kg 1 X 3Kg
No. of Samples Analysed	:	69
No. of Analyses	:	821

3.3 Expenditure

To Dec 2011 (RL Tenure only)	:	$703,870.00
Period Jan – Sep 2012	:	$159,964.00
Estimate Oct – Dec 2012	:	$ 29,000.00 (approx.)
Estimated Cumulative Total for period of RL Tenure (to Dec 2012)	:	$892,834.00 (approx.)

4. RESULTS

4.1 Palaeodating

Attempts are in progress to use the zircon dating method as a guide to the timing of the introduction of the hydrothermal silica into the host dolomite at the Eastern Quarry silica deposit.

For this purpose, zircon grains of 50 microns or larger are required for best results using LA-ICP-MS, preceded by SEM scans of polished sections of the zircon grains.

Previous investigations (Osterloh,2002; Keays in Krummei,2011) indicated that some zircon grains of this, or greater size can occur in this material.

The following raw material samples were submitted to Monash University for zircon extraction and dating:

Sample No. 90B-2	:	1 X 2Kg Sand and lumps of Silica rock
Sample No. 101B-2	:	1 X 1.5Kg Sand and lumps of Silica rock
Random selection	:	2 X Boulders totalling 3Kg Silica rock

A 1Kg subsample of 90B-2 was crushed to pass 250 microns and put across a Wilfley table to produce a concentrate. The concentrate was examined under the microscope but no suitably large zircon grains were found.

The remainder of sample 90B-2, all of 101B-2 and the two random boulders are now being processed to see if zircons grains of suitable size can be obtained in order to advance this investigation.

4.2 Beneficiation

4.2.1 HIMF Tests – ERIEZ

Following on from last year's successful tests (Tests 1-3) to reduce Fe_2O_3 and other magnetic impurities in the silica flour using the HIMF (High Intensity Magnetic Filter) process, further confirmatory work on a larger sample, as recommended by ERIEZ, was commissioned this year. (Krummei 2011).

Towards that end, approx. 200kg of raw material silica sand from Bulk Sample 101B-2 was delivered to and washed, dried and screened by ALS Ammtec, Heybridge, to produce 100kg of silica flour in the required +40-250 micron size band. This material was airfreighted to ERIEZ Europe, Wales for two rounds of tests, again using HIMF. ERIEZ test procedures adopted are reported in Appendix 1.

Test 4 yielded pleasing end product results of 10ppm Fe_2O_3, <10ppm TiO_2, 10ppm Na_2O and K_2O each as well as around 40ppm of Al_2O_3. (Appendix 1).

Test 5 (T5) consisted of processing a further 50kg (approx.) of the remaining material in three sub-batches. The non-magnetic (NM) fraction of Batch 1 (B1)

shows slightly elevated iron values, most probably due to cross contamination from third party material. (See Appendix 1, T3210A/T5/B1NM).

Batches 2 and 3 again gave Fe_2O_3 at 10ppm, TiO_2 <10ppm, 10ppm or less of Na_2O and K_2O along with 40ppm of Al_2O_3.

These encouraging results are in line with Tests 3 and 4. However, phosphate, mainly as apatite, remains stubbornly high at up to 100ppm P_2O_5.

All the non-magnetics, middlings and magnetics of Test 5 were returned to Australia. The remaining material (20kg approx.) was retained by ERIEZ for future reference.

In summary, these tests demonstrate that a high quality end product of +40-250 micron silica flour assaying 10ppm or less of Fe_2O_3, 10ppm or less of TiO_2 from an unsorted raw material of about 40ppm Fe_2O_3 and 70ppm TiO_2 can be achieved. The amounts of Al_2O_3, CaO and MgO were also reduced.

Consequent to these positive outcomes, and facilitated by ERIEZ, the large Sklopisek silica sand operation owned by Sibelco at Mladejov, Czech Republic, was visited to view and discuss the HIMF equipment performance under operating conditions The operators report a virtually trouble free run with their HIMF equipment over the last 15 years.

Further contacts with ERIEZ re this equipment will continue.

4.2.2 Electrostatics – Robmet

Titanium is an undesirable contaminant in the silica flour applied to the production of TFT-LCD substrates and other display glass panels. Previous mineralogical investigations of the Eastern Quarry silica flour and sand indicated that titanium may be present in several forms, including ilmenite and titanomagnetite. The former two can be removed by magnetic methods. Rutile is non-magnetic but, if present as liberated grains, may be removed by electrostatic methods in order to improve end-product quality. For this purpose, discussions with Robbins Metallurgical Pty Ltd (Robmet) of Brisbane late last year, resulted in a proposal for preliminary test work to assess the applicability of this method for rutile removal from the Eastern Quarry silica sand and flour material.

Samples submitted for investigation consisted of 15kg of -75micron material, 10kg of +75-250 micron material and 16kg of +250-500 micron material. The samples provided contained too much of -45 micron material which caused the feed slots on the CoronaStat and IRMS equipment to block up. Consequently, the +75-250 and +250-500 micron fractions were combined and re-screened to yield one 16kg (approx.) sample of cleaner +75-250 micron silica flour for investigation.

One half split of the sample was processed over a bench scale CoronaStat High Tension Roll Separator Unit. The other half split was processed over a bench scale UltraStat Electrostatic Plate Separator. Each of these units was supported by an HMD Induced Roll Magnetic Separator. Process details and parameters are detailed in the Robmet report attached as Appendix 2, as are the outcomes of these investigations.

Neither electrostatic unit was capable of reducing the TiO_2 content to the low double or single digit ppm levels required. Subsequent QEMSCAN analyses by AMDL of the final non-magnetic product revealed that the remaining titanium was in the form of rutile attached to, or enclosed within, the silica grains. This study also revealed the presence of an unidentified silica-bearing Titanium Oxide locked in with the silica. Robmet conclude that *"separating the silica bearing material away from the silica would be extremely difficult, if not impossible, using physical separation techniques".* If widespread throughout the deposit, this factor could be a major obstacle to generating a silica flour product with consistently low levels of titanium.

4.2.3 Oxalic Acid Lead Tests

Iron staining on parts of the raw silica material represents a source of contamination which precludes pockets of this material from being considered as a resource for upgrade to a high quality, low contaminant product. Earlier preliminary tests, using mainly sulphuric acid, were only partly successful. (Browne in Krummei,1999; Roche in Krummei,2005). In view of this, and environmental considerations, acid leach tests were suspended in preference to physical removal of iron. Oxalic acid has been suggested as a possible, more benign, means of removing part or most of any iron contaminant, whether stain or particulate.

Discussions are in train with a consultant to undertake some preliminary bench-top tests to test its effectiveness on a selection of feed material. The work is planned to commence early in 2013.

4.2.4 Organics

In the course of sample preparation for the recent ERIEZ magnetics tests, it was noted that some of the material contained significant amounts of dark organic material. During the washing process, some of the organic material floats off and some sinks with the silica. The organic "sinks" present both a visual and potentially chemical contaminant. (Browne in Krummei,1999.)

Dr. G. Jordan of UTAS has been approached to help identify the organic "sinks" with the ultimate aim to find a chemical free method for their removal from the end product. Preliminary inspection of some material under the microscope identified organic particles coated with carbonate and/or silica growths, probably increasing their specific gravity and causing them to sink. A more thorough investigation of the problem is scheduled for the first quarter of 2013.

4.3 Project Planning

4.3.1 Plant Site

Last year, clear felled and harvested Coupe 37G (Fig.2) located adjacent to the sealed Gordon River Road to the north and the gravel surfaced Styx Road to the east, was identified as a potentially suitable site of a processing plant. (Krummei,2011). A 2km segment of this well-maintained gravel road offers an option to transport raw material sand from the deposit site to the proposed processing site and thence the final product out to market. Forestry Tasmania, as owners and managers of the Styx Road is also responsible for its upkeep.

In this context, discussions were held with Forestry Tasmania regarding traffic issues and likely limitations, road usage costs and charges, as well as compensation for the removal of any trees in the area of operation. A response from Forestry Tasmania is awaited.

4.3.2 Environmental Base Line Study

With the emergence of a potentially suitable processing site, discussions were held with EPA staff to obtain some guidelines on issues to address in the course of an environmental base line study. The area of interest primarily is the eastern half of the Retention Licence, with particular focus on the sub-area from the Eastern Quarry silica sand deposit to and including the proposed processing site.

SEMF of Hobart was subsequently engaged to undertake this work which includes:

Water quality monitoring	On-going
Dust monitoring	On-going
Flora and Fauna studies	In Progress
Aboriginal and European Heritage studies	Pending
Geoconservation values studies	Pending

The work is also intended to highlight any “project stopper” or any other serious impediments to project development.

Water and dust sampling sites, selected and prefixed “W” and “D” respectively, are shown on the map attached to Appendix 4. Also presented in the appendix are the data sets for the dust samples collected to date. Evident is an increase in dust particles in August and September, apparently co-incidental with increased rainfall during that period.

Two rounds of water sampling were planned – one in winter and one in summer. The first round, implemented at the end of May 2012, showed no deleterious materials present. Essentially:

- Ph is neutral throughout.
- EC, Chloride and Sodium are all fairly low.
- Suspended solids are fairly low.
- Sulphite is below detection.

- Metals are mostly at concentrations below or at detection limits (10ppm) with the exception of zinc which has detectable concentrations in two samples of 180ppm and 210ppm each.
- Tannins are below laboratory detection limits.
- All SVOC, VOC and herbicides are non-detectable.

Of the two samples which showed the slightly elevated zinc levels, one is from Kallista Creek at the north west corner of the tenement and one from the Tyenna River, approximately 1km north of the northern tenement boundary and into which Kallista Creek drains. Details are in Appendix 5.

The next round of sampling is due in February, 2013.

4.3.3 Logistics

Rail:

Discussions were held with Tasrail personnel to provide an outline of Maydena Sands' freight requirements, review progress with the Brighton Transport Hub, as well as the upgrade programme for the railway system and services. A familiarisation visit to the now completed Brighton Transport Hub was undertaken in February 2012, in the company of Tasrail and DIER personnel. Another step forward is the very recent announcement that Toll Holdings has signed a 20 year lease at the site and is due to submit a Development Application to the Brighton Council. It is pleasing to note that, thanks to Federal and State funding, new engines and rolling stock are being acquired. Rail line maintenance has accelerated and there have been only two mainline derailments during 2011/2012. In the same year, the volume of freight moved amounted to 2.3 million tonnes approx., only slightly less than the preceding year. (Tasrail 2012).

These are all encouraging developments.

Less pleasing is the news that Tasrail has gifted the Derwent Valley Railway line to tourist and heritage operators. This will, most likely, place the line from Maydena to Boyer beyond the reach and to the detriment of Maydena Sands' operations.

Ports:

During the year, an inspection of the Port of Bell Bay facilities was undertaken accompanied by a representative of QUBE, the port operator. It is clear that the port facilities are severely underutilised. Both rail and road access to the wharf is excellent. There is good capacity, with ample space on the wharf to accumulate containers for shipment, with loading facilities available. This port remains the preferred option for the shipment of containerised Maydena Sands products to Asia. However, the withdrawal and current lack of direct container shipments to Asia remains an impediment to business development.

Several attempts at a guided inspection of the facilities of the Port of Burnie failed – the last one due to last minute operational demands on ground staff. Road and rail access to the port area is good, but there appear to be only very limited facilities port-side to accumulate containers for larger shipments. Thus, an off-site storage facility would most likely be required. Because of the risk of possible cross-contaminations from bulk materials already being shipped from this port, the facility would be unsuitable for any bulk shipments of high purity silica sand or flour. An added disadvantage is the extra distance for product transportation, which would significantly add to the FOB and CIF product price. Furthermore, the possibility exists that the port could become congested in the near to medium future if the proposed mining ventures on the North West Coast eventuate.

In summary, the currently available port facilities and shipping services to export Maydena Sands' products remain unsatisfactory.

A Cross Industry Task Force is addressing Tasmanian freight issues, with emphasis on revitalizing direct outward bound shipments from Bell Bay to Asia.

A separate, recently established Freight Logistics Co-ordination Team, supported with Federal funding, will be addressing a long term Tasmanian freight strategy and investigate avenues for Tasmanian business to export to interstate and international markets.

Progress and outcomes achieved by these two groups will be monitored during 2013.

4.4 Marketing

4.4.1 Overview - Polysilicon

The fortunes of the troubled global PV polysilicon industry were monitored during the year to identify any future off-take opportunities for small parcels of silica rock by-product from the Eastern Quarry silica sand deposit.

During the year, global PV solar industries and its polysilicon suppliers remained in turmoil with losses, unused capacity, production cuts, mergers, bankruptcies and production facilities for sale, all due to past overproduction, sluggish to falling demand and falling prices. PV polysilicon spot prices fell into the region of US$16-$20/kg, well below the production costs of many producers, especially those in China, which require spot prices of US$40-$45/kg to remain viable. Industry analysts predict this situation to persist for several more years.

Under these conditions, there is little encouragement to explore for high purity silica rock for PV polysilicon production, as current raw material supplies appear to be more than adequate to meet demand.

4.4.2 Overview – Display Glass

The display glass manufacturing industry offered a somewhat better scenario, especially in several of its speciality product niches, such as the tough Gorilla and Lotus glass used in applications such as iPhones, iPads and similar touchpad items. However, according to market leader Corning, overall demand for display glass substrates was subdued and likely to remain so, even in the face of slightly lower prices. But, new glass substrate materials, including flexible glass, are emerging which may invigorate the industry in the coming years.

4.4.3 Marketing Activities

The overall slow-growth situation with the display industry manifested itself in a lower number of enquiries during the year about the Maydena Sands' material.

To maintain market exposure, small test samples were supplied to some parties and marketing visits were made to:

China Glass 2012, Shanghai, China

- Contact with Innoceram, China – Silica refractories
- Contact with Vesuvius, China and Europe – Silica refractories
- Contact with PPG, USA – High purity silica for specialist glass applications
- Contact with SGGS, Germany – Producer of foam glass

Samsung, Seoul, South Korea

Presentation well received; strong interest in the high purity silica flour. Contact resulted in referral to Samsung, Sydney for follow up discussions.

Samsung, Sydney, Australia

Visit and discussion confirmed Samsung's interest in Maydena Sands' high purity silica flour, but the company is price conscious and declined to enter into a provisional off-take agreement until indicative FOB and CIF prices can be provided. Contact is being maintained.

Ssang Yong, Seoul, South Korea

Last year's contact followed up. Through subsidiaries the company operates several quarries in South Korea and expressed interest in the silica rock, sand and flour products. Indicative price for silica flour was too high.

Choeng Kuen Ahn, Seoul, South Korea

Trader: Provided further Korean contacts for follow-up

Sojitz, Japan (Melbourne Office)

This Japanese conglomerate expressed interest in fine silica flour less than 50 microns. Following a presentation and discussion, the matter was referred to HQ in Japan. A response is awaited. It is unlikely that Maydena Sands could supply the fine material of the required purity in the near-medium term.

Other contacts and enquiries dealt with:

Construction Materials, Greece

This commodity trader expressed interest to sell and distribute Maydena Sands' products in the Mediterranean region. Indicative CIF price provided appeared to dampen further interest.

Durga Minerals, India

A commodity trader interested in our high purity silica sand and flour. Requirement was immediate and could not be met. Indicative price too high.

King Cooper International, Shanghai, China

A commodity trader. Requirement immediate and could not be met.

Shinwa Materials, South Korea

Commodity trader: Awaiting reliable FOB and CIF prices for our products. Contact to be maintained.

MHM Metals, Tasmania

Expressed interest to become involved with the Pine Hill silica project. Proposal received and under consideration.

Natura Stone, Australia

The results of tests on three samples provided last year were said to be generally acceptable for the production of acrylic engineered stone. Further testing on hold, due to production faults in the factory.

Stratum Resources, Australia

Market leads discussed.

Videocon, India

This large Indian conglomerate, with a TFT-LCD TV production subsidiary, responded favourably to a small test sample of silica flour and sand provided late last year. It seems that the indicative CIF price provided was too high and interest waned.

4.5 Environmental

This year's activities had no environmental impacts.

4.6 Rehabilitation

None was required as this year's activities caused no disturbance.

5. CONCLUSIONS AND RECOMMENDATIONS

- There are no signs of an early upswing to better times for the global PV polysilicon industry, so any activity in that area will again be deferred in 2013 to a monitoring role only.
- Despite the current difficult global economic conditions, there appears to be continuing demand for various types of display glass and a range of other applications. This is encouraging news for high purity silica flour suppliers.
- Marketing and promotion efforts generated several useful contacts, although the number of enquiries received was less than last year.
- Despite an early set back, work on zircon palaeodating should continue as an aid to regional exploration for silica flour deposits similar to that at the Eastern Quarry, Pine Hill.
- The results of the electrostatic tests for the removal of rutile introduce a cautionary note to the project and point to the need to pay greater attention to the presence, distribution and deportment of titanium in the Eastern Quarry silica sand deposit.
- Results of further confirmatory laboratory scale HIMF tests to remove iron were good. Next steps to be discussed with ERIEZ.

- Continue investigations into the nature of the organic particles associated with the sand and methods of their removal.
- Undertake leaching tests using oxalic acid for the removal of iron stain.
- Complete the Environmental Base Line Study currently in progress.
- Undertake detailed review of Capex/Opex costs in the light of results of HIMF, electrostatic, oxalic acid leach tests, removal of organics and cost imposts by Forestry Tasmania.
- On the logistics side, Tasrail is showing progress towards improvements in rail freight services. Port facilities and direct shipping to Asia from Tasmania are being addressed by a couple of task groups. Progress in the integration of land freight and shipping facilities need to be monitored closely during the year.

6. PROPOSED FUTURE ACTIVITIES

- Continue with mineralogical investigations as to the nature of carbon/organic contaminants in the silica flour and silica sand.
- Investigate appropriate methods to remove the carbon and organic particles from the silica flour and silica sand product, preferably by physical means.
- Continue with the zircon dating project.
- Complete the current Environmental Base Line Study.
- Continue with product development and promotion and investigate new sales opportunities with the aim of securing off-take arrangements.
- Continue with product marketing, especially in South Korea and including attendance at China Glass 2013, as well as follow-up activities on 2012 market contacts and enquiries.
- Continue monitoring logistic support systems in Tasmania.

- Ongoing reviews of process plant and design, sand extraction concepts and capex/opex estimates.

- Maintain contact with State and local regulatory authorities, as well as local civic associations and groups, on project related matters.

7. REFERENCES

Hansard. 08.12.11	House of Assembly – Government Business Scrutiny Committee - TasRail
Hofmann, T. 2009	Applications, Requirements and Trends in the Solar Glass Market. In “Glass Worldwide”, November 2009, p.74.
Krummei, G.K. 2004	Retention Licence No. 2/2003, Maydena, Tasmania. Annual Report to 09.01.2005
Krummei, G.K. 2005	Retention Licence No. 2/2003, Maydena, Tasmania. Annual Report to 09.01.2006
Krummei, G.K. 2006	Retention Licence No. 2/2003, Maydena, Tasmania. Annual Report to 09.01.2007
Krummei, G.K. 2007	Retention Licence No. 2/2003, Maydena, Tasmania. Annual Report to 09.01.2008
Krummei, G.K. 2008	Retention Licence No. 2/2003, Maydena, Tasmania. Annual Report to 09.01.2009
Krummei, G.K. 2009	Retention Licence No. 2/2003, Maydena, Tasmania. Annual Report to 09.01.2010
Krummei, G.K. 2010	Retention Licence No. 2/2003, Maydena, Tasmania. Annual Report to 09.01.2011
Krummei, G.K. 2011	Retention Licence No. 2/2003, Maydena, Tasmania. Annual Report to 09.01.2012
Nieminen, R. 2009	Glass Processing Opportunities for the Solar Industry. In “Glass Worldwide”, November 2009, p.80 et seq
Tasrail	Annual Report 2010/2011
Tasrail	Annual Report 2011/2012

8. BIBLIOGRAPHY

Bear, I.J.	1975	Technical Note on the identification and Removal of Stain from Zircon Concentrates: AusIMM Proc.No.256 pp 29-31
Calver, C.R.	1990	Limestone Resources of the Maydena-Florentine Valley Area: Tas. Dept. of Mines Report 1990/06
Calver, C.R.	1992	Maydena DDH 1 – Appraisal of the Limestone Resource at Risbys Basin: Tas. Dept. of Mines Report 1992/03
Calver, C.R. & Forsyth, S.M.	1999	Maydena, Tasmania; Digital Geological Atlas, 1:25,000 Series: Tasmanian Geological Survey
Eberhard, R	1994	Inventory and Management of the Junee River Karst System, Tasmania; Forestry Tasmania Report
Forster, M.C.	1992	E.L. 14/88 Maydena, Annual Report – Year 4
Forster, M.C.	1993	E.L. 14/88 Maydena, Annual Report – Year 5
Forster, M.C.	1994	Maydena – Tasmania, Pine Hill High Grade Silica, June 1994
Houshold, L	1992	Risbys Basin Karst Area – Preliminary Investigation of Geomorphic Features and Cave Fauna. Dept. of Parks, Wildlife & Heritage Report.
Hughes, T.D.	1957	Limestones in Tasmania; Geol. Surv. Tas. Bull. 10
Hughes, T.D. & Everard, G.B.	1953	Limestone Deposits of the Maydena Area; Geol. Surv. Tas. Unpubl. Rept.
Jones, P.A.	1989	Exploration Licence No. 14/88, Maydena, Tasmania. Progress Report on Exploration Activity. 5th August 1988 to 5th July 1989.
Krummei, G.K.	1999	Exploration Licence No. 17/98, Maydena, Tasmania. Annual Report to End September 1999.
Krummei, G.K.	2000	Exploration Licence No. 17/98, Maydena, Tasmania. Annual Report to 04.09.2000.
Krummei, G.K.	2001	Exploration Licence No. 17/98, Maydena, Tasmania. Annual Report to 04.09.2001.
Krummei, G.K.	2002	Exploration Licence No. 17/98, Maydena, Tasmania. Annual Report to 04.09.2002.

Krummei, G.K. 2003 (a) Exploration Licence No. 17/98, Maydena, Tasmania. Relinquishment Report

Krummei, G.K. 2003 (b) Exploration Licence No. 17/98, Maydena, Tasmania. Annual Report to 04.09.2003.

McGowan, A 1992 Risbys Basin Karst Area – Survey of Cultural Values and Impact of Proposed Access Tracks and Drill Sites. Tas. Dept. Parks, Wildlife and Environment Report.

Osterloh, S 2002 Origin of the Maydena Silica Flour and Bedrock Silicification, Tasmania. B.Sc (Hons.) Thesis; CODES; School of Earth Sciences, University of Tasmania

Patterson, W 1990 Exploration Licence 14/88 – Maydena. Annual Report on Exploration Activity. 6th July 1989 to 4th August 1990.

Wrigley, P.K. 1992 Surface Exploration of the Limestone Resource at Roberts Hill, Maydena. Tas. Dept. of Mines Report 1992/32.

Wrigley, P.K. 1993 Evaluation of the Limestone Resource at Roberts Hill, Maydena. Tas. Dept. of Mines Report 1993/03.

APPENDIX 1

HIMF TEST REPORTS

ERIEZ

CONFIDENTIAL INFORMATION
A: Maydena Sands Pty Ltd
B: Eriez Magnetics Europe Ltd

LABORATORY TEST REPORT

Eriez Magnetics Europe Limited
Manufacturing, Design and Laboratory Facility.

Greenway,
Bedwas House Industrial Estate,
Bedwas,
Caerphilly CF83 8YG
United Kingdom

tel 029 2086 8501
International
+44 029 20868501

fax 029 2085 1314
International
+44 029 20851314

e-mail
eriez@eriezeurope.co.uk

www.eriez.com

Report for:	**Maydena Sands Pty Ltd** **Suite 28, 487 St Kilda Road** **Melbourne Vic 3004** **AUSTRALIA**
Contact Name:	**Gerhard Krummei**
Test Number:	**T3210A**
Eriez Reference:	**AU1900**
Date:	**01 JUNE 2012**
Page:	**1 of 5**

Laboratory Test Report Contents

1. INTRODUCTION

Eriez Magnetics Europe Ltd has been asked to undertake a laboratory test programme to investigate methods of additional wet magnetic separation on Fine Silica sand/Silica Flour.

2. SAMPLES RECEIVED

Identical samples as T3210 in six bags as follows:

MATERIAL COMPOSITION

SiO2	99.5%
Fe3O4	40ppm

PARTICLE SIZE

+40 - -250microns

OBJECT

Remove Fe bearing minerals including any illmenite and garnets.
Fe2O3 - <10ppm

CAPACITY

10t/h output

3. EQUIPMENT

- Eriez® Model HI-Filter wet Magnetic Separator.

4. PROCEDURE

HI-Filter:

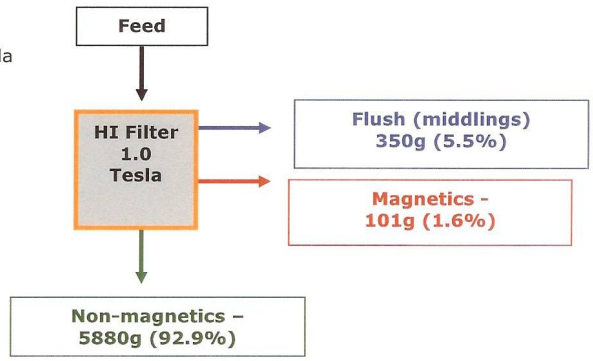
For the HI Filter test a pre-determined weight of sand was extracted and added to a pre-determined volume of water in a feed preparation vessel. The resulting slurry was then agitated by means of a mechanical stirrer until dispersed and homogeneous. The dispersed slurry was then pumped by means of a pneumatically operated reciprocating diaphragm pump at an even flowrate through the energised Laboratory HI Filter and the resulting non-magnetic product collected. The HI Filter was then flushed with the magnet still energised and the flushing's (labelled "middlings") collected separately.

The HI Filter was then de-energised and a combination of water and compressed air used to discharge the magnetic particles collected in the matrix and this also collected separately (labelled "magnetics").
The background magnetic intensity for the tests was 1.0 Tesla.
A matrix composed of 3:1 FEX/MEX expanded metal mesh was tested. The middlings, magnetics and non-magnetics fractions were filtered and then dried in an oven at 105°C.

5. RESULTS

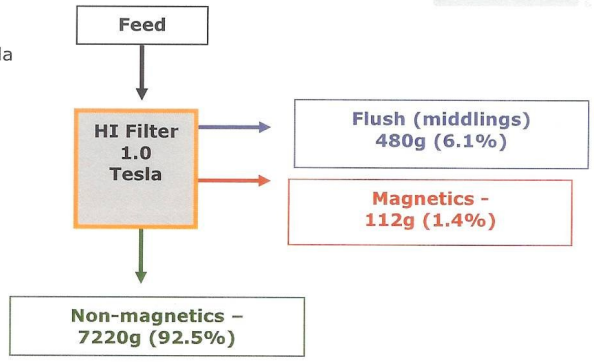
Test 1

Magnetic field: 1.0 Tesla
Flow rate: 5.0cm/s
Matrix load: 28.3g/cm2



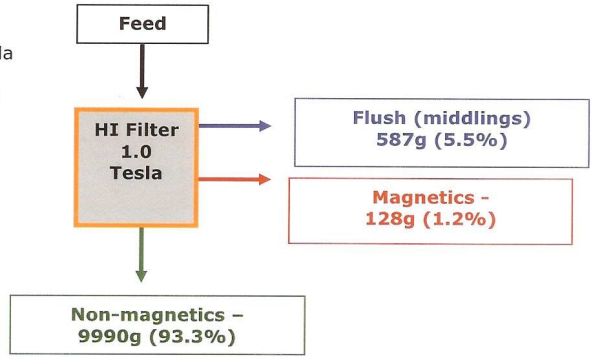
CONFIDENTIAL INFORMATION
DATE: 01 JUNE 2012
TEST NUMBER: T3210A
Test 2

Magnetic field: 1.0 Tesla
Flow rate: 5.0cm/s
Matrix load: 34.9g/cm2



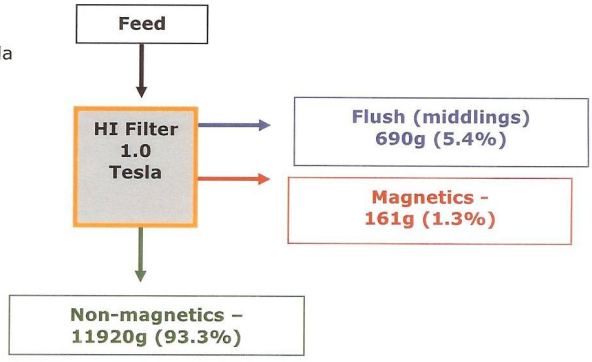
Test 3

Magnetic field: 1.0 Tesla
Flow rate: 4.7cm/s
Matrix load: 47.8g/cm2



Test 4

Magnetic field: 1.0 Tesla
Flow rate: 4.7cm/s
Matrix load: 57.0g/cm2



6. CONCLUSIONS

Please note the middlings percentage will differ from the production units.

The samples from the testwork should be analysed by Maydena and results reported to Eriez for evaluation and comment.

For Eriez Magnetics Europe Ltd

R. Greenway

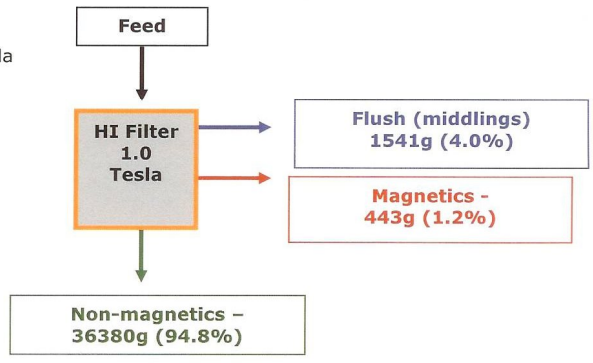
Name: Raith Greenway
Position: Laboratory Engineer

Additional test on 4/9/2012

Eriez Europe had a welcomed visit from Gerhard Krummei regarding previous testwork stated above. He advised he would like the remainder of the Feed, which is stored at Eriez, to be processed and be used as samples for his prospective clients.
No specific parameters were given by Gerhard, however, similar percentage solids (~25%) as previous tests; test 3 in particular, was carried out.
The test was run in 3 batches to produce a more substantial amount of non-magnetics.
All separated fractioned weights from each batch were combined i.e. 3 lots of middlings, magnetics and non-magnetics

Test 5

Magnetic field: 1.0 Tesla
Flow rate: 4.7cm/s
Matrix load: g/cm2
Matrix: Fex/Mex 3:1



CONFIDENTIAL INFORMATION
DATE: 01 JUNE 2012
TEST NUMBER: T3210A

Roughly ~20Kg of Feed will be kept at Eriez Europe for reference also a small sample of non-magnetics from each batch 1-3 will be stored here.

The Test 5 non-magnetics, middlings and magnetics will be returned separately for single and joint analysis.

For Eriez Magnetics Europe Ltd

R. Greenway

Name: Raith Greenway
Position: Laboratory Engineer

Australian Laboratory Services Pty. Ltd.
32 Shand Street
Stafford
Brisbane QLD 4053
Phone: +61 (7) 3243 7222 Fax: +61 (7) 3243 7218
www.alsglobal.com

Finalized Date: 13- JUL- 2012
Account: MCDSON

CERTIFICATE BR12143410

Project: URGENT
P.O. No.: ex BR12134946
This report is for 16 Sand samples submitted to our lab in Brisbane, QLD, Australia on 6- JUL- 2012.
The following have access to data associated with this certificate:
GERHARD KRUMMEI

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
SPL- 21	Split sample - riffle splitter
PUL- 42	Pulverize Agate Mill

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
ME- ICP64	Method for Silica Sample Sand	ICP- AES

To: MAYDENA SANDS PTY LTD
ATTN: GERHARD KRUMMEI
SUITE 28/487 ST KILDA ROAD
MELBOURNE VIC 3004

This is the Final Report and supersedes any preliminary report with this certificate number. Results apply to samples as submitted. All pages of this report have been checked and approved for release.

Comments: Analysis done on new splits subsequently milled.

Signature:

Shaun Kenny, Brisbane Laboratory Manager

Australian Laboratory Services Pty. Ltd.
32 Shand Street
Stafford
Brisbane QLD 4053
Phone: +61 (7) 3243 7222 Fax: +61 (7) 3243 7218
www.alsglobal.com

Project: URGENT

CERTIFICATE OF ANALYSIS BR12143410

Sample Description	Method Analyte Units LOR	ME- ICP64 Al2O3 % 0.001	ME- ICP64 CaO % 0.001	ME- ICP64 Cr2O3 ppm 1	ME- ICP64 Fe2O3 % 0.001	ME- ICP64 MgO % 0.001	ME- ICP64 MnO % 0.001	ME- ICP64 TiO2 % 0.001	ME- ICP64 V2O5 % 0.001	ME- ICP64 Na2O % 0.001	ME- ICP64 K2O % 0.001	ME- ICP64 P2O5 % 0.001
Test 1 Non- Mag A		0.004	0.038	1	0.003	0.005	<0.001	<0.001	<0.001	0.001	0.002	0.009
Test 1 Non- Mag B		0.005	0.040	1	0.003	0.005	<0.001	<0.001	<0.001	0.001	0.001	0.010
Test 1 Non- Mag C		0.003	0.040	1	0.004	0.005	<0.001	<0.001	<0.001	0.001	0.001	0.010
Test 1 Non- Mag D		0.004	0.040	1	0.003	0.005	<0.001	<0.001	<0.001	0.001	0.001	0.010
Test 2 Non- Mag A		0.003	0.039	1	0.003	0.005	<0.001	<0.001	<0.001	0.001	0.002	0.010
Test 2 Non- Mag B		0.004	0.040	1	0.003	0.005	<0.001	<0.001	<0.001	0.001	<0.001	0.011
Test 2 Non- Mag C		0.004	0.039	1	0.001	0.005	<0.001	<0.001	<0.001	0.001	<0.001	0.010
Test 2 Non- Mag D		0.004	0.040	<1	0.001	0.005	<0.001	0.002	<0.001	0.001	<0.001	0.010
Test 3 Non- Mag A		0.004	0.030	<1	0.001	0.005	<0.001	<0.001	<0.001	0.001	0.002	0.007
Test 3 Non- Mag B		0.003	0.030	<1	0.001	0.005	<0.001	<0.001	<0.001	0.001	<0.001	0.007
Test 3 Non- Mag C		0.004	0.031	<1	0.001	0.005	<0.001	<0.001	<0.001	0.001	0.002	0.007
Test 3 Non- Mag D		0.005	0.030	<1	0.001	0.005	<0.001	<0.001	<0.001	0.001	0.001	0.006
Test 4 Non- Mag A		0.005	0.028	1	0.001	0.005	<0.001	<0.001	<0.001	0.001	<0.001	0.006
Test 4 Non- Mag B		0.004	0.025	<1	0.001	0.004	<0.001	<0.001	<0.001	0.001	0.001	0.006
Test 4 Non- Mag C		0.004	0.028	<1	0.001	0.005	<0.001	<0.001	<0.001	0.001	0.002	0.006
Test 4 Non- Mag D		0.004	0.028	<1	0.001	0.005	<0.001	<0.001	<0.001	0.001	0.001	0.006

Comments: Analysis done on new splits subsequently milled.

Australian Laboratory Services Pty. Ltd.
32 Shand Street
Stafford
Brisbane QLD 4053
Phone: +61 (7) 3243 7222 Fax: +61 (7) 3243 7218
www.alsglobal.com

Project: URGENT

QC CERTIFICATE OF ANALYSIS BR12143410

Sample Description	Method Analyte Units LOR	ME- ICP64 Al2O3 % 0.001	ME- ICP64 CaO % 0.001	ME- ICP64 Cr2O3 ppm 1	ME- ICP64 Fe2O3 % 0.001	ME- ICP64 MgO % 0.001	ME- ICP64 MnO % 0.001	ME- ICP64 TiO2 % 0.001	ME- ICP64 V2O5 % 0.001	ME- ICP64 Na2O % 0.001	ME- ICP64 K2O % 0.001	ME- ICP64 P2O5 % 0.001
STANDARDS												
BCS313- 1		0.038	0.009	2	0.013	0.001	<0.001	0.017	<0.001	0.004	0.005	0.001
Target Range - Lower Bound		0.033	0.004	<1	0.010	<0.001	<0.001	0.015		<0.001	0.003	
Upper Bound		0.040	0.008	3	0.014	0.003	0.002	0.019		0.005	0.007	
BCS516		0.482	0.025	17	0.064	0.028	0.001	0.145	0.001	0.019	0.122	0.014
Target Range - Lower Bound		0.477	0.022	<1	0.054	0.035	<0.001	0.159	<0.001	0.017	0.117	<0.001
Upper Bound		0.551	0.027	2	0.065	0.042	0.003	0.185	0.002	0.022	0.136	0.002
BLANKS												
BLANK		0.001	0.001	11	0.004	<0.001	<0.001	<0.002	<0.001	<0.001	0.002	<0.001
BLANK		<0.001	<0.001	1	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001
BLANK		<0.001	<0.001	3	0.001	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001
BLANK		<0.001	<0.001	<1	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001	0.001	<0.001
Target Range - Lower Bound		<0.001	<0.001	<1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Upper Bound		0.002	0.002	2	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
DUPLICATES												
Test 3 Non- Mag B		0.003	0.030	<1	0.001	0.005	<0.001	<0.001	<0.001	0.001	<0.001	0.007
DUP		0.002	0.032	1	0.001	0.005	<0.001	0.002	<0.001	0.001	0.002	0.007
Target Range - Lower Bound		<0.001	0.029	<1	<0.001	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	0.006
Upper Bound		0.004	0.033	2	0.002	0.006	0.002	0.002	0.002	0.002	0.002	0.008

Comments: Analysis done on new splits subsequently milled.

Australian Laboratory Services Pty. Ltd.
32 Shand Street
Stafford
Brisbane QLD 4053
Phone: +61 (7) 3243 7222 Fax: +61 (7) 3243 7218
www.alsglobal.com

Project: Silica Sand

CERTIFICATE OF ANALYSIS BR12264343

Sample Description	Method / Analyte / Units / LOR	ME-ICP64 Al2O3 % 0.001	ME-ICP64 CaO % 0.001	ME-ICP64 Cr2O3 ppm 1	ME-ICP64 Fe2O3 % 0.001	ME-ICP64 MgO % 0.001	ME-ICP64 MnO % 0.001	ME-ICP64 TiO2 % 0.001	ME-ICP64 V2O5 % 0.001	ME-ICP64 Na2O % 0.001	ME-ICP64 K2O % 0.001	ME-ICP64 P2O5 % 0.001	ME-CON02 Li ppm 1	ME-ICP64 ZrO2 % 0.001	
T3210A/T5/B1NM		0.006	0.039	1	0.003	0.005	<0.001	<0.001	<0.001	0.001	0.001	0.010	<1	<0.001	non-magnetics
T3210A/T5/B2NM		0.004	0.032	<1	0.001	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.008	<1	<0.001	" "
T3210A/T5/B3NM		0.004	0.038	<1	0.001	0.005	<0.001	<0.001	<0.001	<0.001	0.001	0.010	<1	<0.001	" "
T3210A/T5/B1MID		0.009	0.040	<1	0.020	0.005	<0.001	0.002	<0.001	0.003	0.001	0.010	<1	<0.001	middlings
T3210A/T5/B2MID		0.004	0.034	<1	0.006	0.005	<0.001	<0.001	<0.001	0.001	0.001	0.009	<1	<0.001	"
T3210A/T5/B3MID		0.004	0.039	<1	0.003	0.005	<0.001	<0.001	<0.001	0.001	0.002	0.010	<1	<0.001	"
T3210A/T5/B1MAG		0.081	0.080	3	0.157	0.036	0.001	0.015	<0.001	0.015	0.012	0.012	<1	0.001	magnetics
T3210A/T5/B2MAG		0.064	0.095	1	0.069	0.025	0.001	0.010	<0.001	0.011	0.007	0.010	<1	<0.001	"
T3210A/T5/B3MAG		0.062	0.113	3	0.087	0.030	0.001	0.010	<0.001	0.008	0.010	0.011	<1	0.001	"

Comments: This is an amended report. Note addition of ZrO2 as subsequently requested. ZrO2 may not be completely dissolved in acid digestion so results may bias low.

Australian Laboratory Services Pty. Ltd.
32 Shand Street
Stafford
Brisbane QLD 4053
Phone: +61 (7) 3243 7222 Fax: +61 (7) 3243 7218
www.alsglobal.com

Project: Silica Sand

QC CERTIFICATE OF ANALYSIS BR12264343

Sample Description	Method Analyte Units LOR	ME-ICP64 Al2O3 % 0.001	ME-ICP64 CaO % 0.001	ME-ICP64 Cr2O3 ppm 1	ME-ICP64 Fe2O3 % 0.001	ME-ICP64 MgO % 0.001	ME-ICP64 MnO % 0.001	ME-ICP64 TiO2 % 0.001	ME-ICP64 V2O5 % 0.001	ME-ICP64 Na2O % 0.001	ME-ICP64 K2O % 0.001	ME-ICP64 P2O5 % 0.001
STANDARDS												
BCS313-1		0.036	0.007	1	0.013	0.001	<0.001	0.015	<0.001	0.003	0.007	0.001
Target Range - Lower Bound		0.033	0.004	<1	0.010	<0.001	<0.001	0.015		<0.001	0.003	
Upper Bound		0.040	0.008	3	0.014	0.003	0.002	0.019		0.005	0.007	
BCS516		0.506	0.025	12	0.057	0.032	0.001	0.135	0.001	0.018	0.129	0.015
Target Range - Lower Bound		0.477	0.022	74	0.054	0.035	<0.001	0.159	<0.001	0.017	0.117	<0.001
Upper Bound		0.551	0.027	87	0.065	0.042	0.003	0.185	0.002	0.022	0.136	0.002
BLANKS												
BLANK		<0.002	<0.001	<1	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001
Target Range - Lower Bound		<0.001	<0.001	<1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Upper Bound		0.002	0.002	2	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
DUPLICATES												
T3210A/T5/B3MAG		0.062	0.113	3	0.087	0.030	0.001	0.010	<0.001	0.008	0.010	0.011
DUP		0.060	0.112	3	0.083	0.030	0.001	0.010	<0.001	0.008	0.010	0.011
Target Range - Lower Bound		0.058	0.108	2	0.081	0.028	<0.001	0.009	<0.001	0.007	0.009	0.010
Upper Bound		0.064	0.117	4	0.089	0.032	0.002	0.011	0.002	0.009	0.011	0.012

APPENDIX 2

ELECTROSTATIC TEST REPORT

ROBMET

Memorandum

Reference: 555-PM-MEM-0000-8001 Rev A

TO:	Gehard Krummei
COMPANY:	Maydena Sands Pty Ltd
FROM:	Arno Kruger
DATE:	22 May 2012
RE:	Electrostatic and Magnetic Separation of Silica Sand to Remove Titanium Minerals

1.0 Introduction

Robbins Metallurgical Pty Ltd "Robmet" was requested by Mr Gerhard Krummei of Maydena Sands Pty Ltd "Maydena" to evaluate the effectiveness of electrostatic and magnetic separation techniques for the removal of titanium minerals from a silica sand concentrate, which was prepared by screening provided feed material into a +75µm -250µm fraction.

Results from the evaluation test work on the +75µm -250µm material is discussed herein.

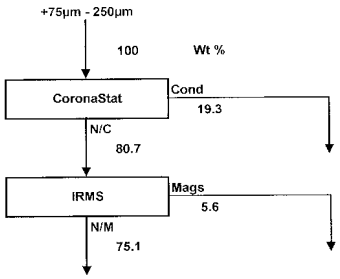
2.0 Results

2.1.1 CoronaStat High Tension Roll Separator, HMD Induced Roll Magnetic Separator Evaluation

A half split from the +75µm -250µm material was processed over a bench scale CoronaStat High Tension Roll Separator operating at 100°C, 220rpm roll speed, 26 kilovolts and configured as a three stage non-conductor retreat unit, producing a conductor and non-conductor fraction. Non-conductor fraction was processed over a bench scale HMD Induced Roll Magnetic Separator operating at 15,000Gauss, 150rpm roll speed and configured as a non-magnetic retreat unit, producing a magnetic and non-magnetic concentrate. All samples from the above test work were submitted for chemical analyses and a metallurgical balance completed. A metallurgical block diagram and balance is attached below.

Memorandum

Reference: 555-PM-MEM-0000-8001 Rev A



		Assay											
		Al2O3	CaO	Cr2O3	Fe2O3	MgO	MnO	TiO2	V2O5	Na2O	K2O	P2O5	Li
	Wt %	%	%	ppm	%	%	%	%	%	%	%	%	ppm
Cond	19.3	0.017	0.013	9.0	0.020	0.005	-	0.035	-	0.003	-	0.002	2.0
Mags	5.6	0.032	0.038	25.0	0.036	0.018	-	0.052	-	0.004	-	0.005	2.0
N/M	75.1	0.018	0.025	13.0	0.006	0.007	-	0.018	-	0.003	-	0.003	2.0
Feed (Calculated)	100.0	0.019	0.023	12.9	0.010	0.007	-	0.023	-	0.003	-	0.003	2.0
Feed (Actual)		0.019	0.024	3.0	0.01	0.007	-	0.026	-	0.003	-	0.003	2.0

		Distribution											
		Al2O3	CaO	Cr2O3	Fe2O3	MgO	MnO	TiO2	V2O5	Na2O	K2O	P2O5	Li
	Wt %	%	%	%	%	%	%	%	%	%	%	%	%
Cond	19.3	18	11	13	37	13	-	29	-	19	-	13	19
Mags	5.6	10	9	11	19	14	-	12	-	7	-	10	6
N/M	75.1	73	80	76	43	73	-	58	-	74	-	77	75
Feed (Calculated)	100.0	100	100	100	100	100	-	100	-	100	-	100	100
Feed (Actual)		-	-	-	-	-	-	-	-	-	-	-	-

Data depicted above indicated that processing of the +75µm -250µm material as per block diagram and at the specified settings, reduced the TiO_2 from 0.023% to 0.018%, with a combined rejection of 42% to conductor and magnetic rejects, whilst the Fe_2O_3 levels have been reduced from 0.01% to 0.006%. Mass yield to potential product is calculated at 75.1%.

Metallurgical calculations indicate that electrostatic separation without further magnetic separation could produce a product containing 0.02% TiO_2 and 0.008% Fe_2O_3.

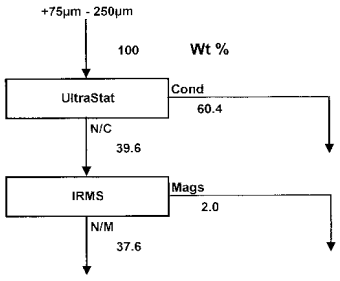
Of note is the discrepancy with respect Cr_2O_3 levels with back calculated head feed data indicating 12.9ppm vs 3.0ppm actual. This discrepancy could be associated with contamination from several sources with the most likely being from a chromite sample treated prior to the testing of the silica sand sample. Robbins Metallurgical has taken due care to prevent contamination but without having dedicated Silica Sand machines and given the extremely low levels of contaminants contamination at this level is difficult to prevent.

Memorandum

Reference: 555-PM-MEM-0000-8001 Rev A

2.1.2 UltraStat Electrostatic Plate Separator, HMD Induced Roll Magnetic Separator Evaluation

Remaining half split from the +75µm -250µm material was processed over a bench scale UltraStat Electrostatic Plate Separator operating at ambient, 22 kilovolts and configured as a two stage non-conductor retreat unit, producing a conductor and non-conductor fraction. Non-conductor fraction was processed over a bench scale HMD Induced Roll Magnetic Separator operating at 15,000Gauss, 150rpm roll speed and configured as a non-magnetic retreat unit, producing a magnetic and non-magnetic concentrate. All samples from the above test work were submitted for chemical analyses and a metallurgical balance completed. A metallurgical block diagram and balance is attached below.



		Assay											
		Al2O3	CaO	Cr2O3	Fe2O3	MgO	MnO	TiO2	V2O5	Na2O	K2O	P2O5	Li
	Wt %	%	%	ppm	%	%	%	%	%	%	%	%	ppm
Cond	60.4	0.020	0.026	1.0	0.014	0.008	0.000	0.027	0.000	0.003	0.004	0.003	2.0
Mags	2.0	0.031	0.040	10.0	0.071	0.022	0.001	0.061	0.000	0.004	0.002	0.005	2.0
N/M	37.6	0.015	0.017	1.0	0.006	0.005	0.000	0.016	0.000	0.003	0.001	0.002	2.0
Feed (Calculated)	100.0	0.018	0.023	1.2	0.012	0.007	0.000	0.024	0.000	0.003	0.003	0.003	2.0
Feed (Actual)		0.019	0.023	1.0	0.016	0.007	<0.001	0.026	<0.001	0.003	0.002	0.003	2.0

		Distribution											
		Al2O3	CaO	Cr2O3	Fe2O3	MgO	MnO	TiO2	V2O5	Na2O	K2O	P2O5	Li
	Wt %	%	%	%	%	%	%	%	%	%	%	%	%
Cond	60.4	66	69	51	70	68	0	68	-	60	85	68	60
Mags	2.0	3	3	17	12	6	100	7	-	3	1	4	2
N/M	37.6	31	28	32	19	26	0	25	-	37	13	28	38
Feed (Calculated)	100.0	100	100	100	100	100	100	100	-	100	100	100	100
Feed (Actual)													

Data depicted above indicated that processing of the +75µm -250µm material as per block diagram and at the specified settings, reduced the TiO_2 from 0.024% to 0.016%, with a combined rejection of 75% to conductor and magnetic rejects, whilst the Fe_2O_3 levels have been reduced from 0.01% to 0.006%. Mass yield to potential product is calculated at 37.6%.

Memorandum

Reference: 555-PM-MEM-0000-8001 Rev A

Metallurgical calculations indicate that electrostatic separation without further magnetic separation could produce a product containing 0.02% TiO_2 and 0.009% Fe_2O_3.

3.0 Conclusion and Recommendation

Utilizing a combination of electrostatic and magnetic separation equipment could potentially reduce TiO_2 levels by 30% and Fe_2O_3 levels by 50%, with the CoronaStat/IRMS option giving a higher yield to potential product as compared to the UltraStat/IRMS option.

Robbins Metallurgical recommends that Maydena gives consideration to the following additional work:

- Full QEMSCAN analyses to evaluate the deportment of TiO_2 and better understand options to remove further if required.
- Metallurgical comparison of CoronaStat vs IRMS as potential exists to use magnetic separation instead of electrostatic separation

Memorandum

Reference: 555-PM-MEM-0000-8001 Rev A

4.0 Disclaimer

CONFIDENTIALITY AND DISCLAIMER

This report has been prepared by Robbins Metallurgical Pty Ltd for the sole, confidential use of Maydena Sands Pty Ltd and is not intended for distribution to other persons or organisations. Robbins Metallurgical Pty Ltd accepts no liability in connection with Maydena Sands Pty Ltd providing the report to a third party.

The information contained in this report has been compiled from Robbins Metallurgical's test work results obtained from samples as provided by Maydena Sands Pty Ltd.

Robbins Metallurgical Pty Ltd has made every effort to ensure that the information presented and conclusions reached are realistic and not misleading. Robbins Metallurgical Pty Ltd makes no warranty as to the accuracy of the information contained in this report and will not accept responsibility or liability for any loss incurred by any person or organization relying on the information in this report.

Australian Laboratory Services Pty Ltd.
32 Shand Street
Stafford
Brisbane QLD 4053
Phone +61 (7) 3243 7222 Fax +61 (7) 3243 7218
www.alsglobal.com

CERTIFICATE BR12091123

Project: URGENT

P.O. No.:

This report is for 8 Silica Sand samples submitted to our lab in Brisbane, QLD, Australia on 27-APR-2012.

The following have access to data associated with this certificate:

ARNO KRUGER	GERHARD KRUMMEI	

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
WEI 21	Received Sample Weight
LEV 01	Waste Disposal Levy
SPL 21	Split sample - riffle splitter
PUL 42	Pulverize Agate Mill
DRY 21	High Temperature Drying

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
ME ICP64	Method for Silica Sample Sand	ICP AES
ME CON02	Various Elements in Concs.	

To: MAYDENA SANDS PTY LTD
ATTN: GERHARD KRUMMEI
SUITE 28/487 ST KILDA ROAD
MELBOURNE VIC 3004

This is the Final Report and supersedes any preliminary report with this certificate number. Results apply to samples as submitted. All pages of this report have been checked and approved for release.

Signature:

Shaun Kenny, Brisbane Laboratory Manager

ALS Minerals
Australian Laboratory Services Pty. Ltd.
32 Shand Street
Stafford
Brisbane QLD 4053
Phone: +61 (7) 3243 7222 Fax: +61 (7) 3243 7218
www.alsglobal.com

Finalized Date: 4- MAY- 2012
Account: MCDSON

Project: URGENT

CERTIFICATE OF ANALYSIS BR12091123

Sample Description	Method	ME-ICP64	ME-ICP64	ME-ICP64	ME-ICP64	ME-ICP64	ME-ICP64	ME-ICP64	ME-ICP64	ME-ICP64	ME-ICP64	ME-ICP64	ME-CON02
	Analyte	Al2O3	CaO	Cr2O3	Fe2O3	MgO	MnO	TiO2	V2O5	Na2O	K2O	P2O5	Li
	Units	%	%	ppm	%	%	%	%	%	%	%	%	ppm
	LOR	0.001	0.001	1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	1
Sample A - 250um		0.019	0.023	1	0.016	0.007	<0.001	0.026	<0.001	0.003	0.002	0.003	2
Sample B - 250um		0.019	0.024	3	0.010	0.007	<0.001	0.026	<0.001	0.003	0.004	0.003	2
Sample AT1 COND		0.020	0.026	1	0.014	0.008	<0.001	0.027	<0.001	0.003	0.004	0.003	2
Sample AT2 MAGS		0.031	0.040	10	0.071	0.022	0.001	0.081	<0.001	0.004	0.002	0.005	2
Sample AT2 Non Mags		0.015	0.017	1	0.006	0.005	<0.001	0.016	<0.001	0.003	0.001	0.002	2
Sample BT1 COND		0.017	0.013	9	0.020	0.005	<0.001	0.035	<0.001	0.003	<0.001	0.002	2
Sample BT2 MAGS		0.032	0.038	25	0.036	0.018	0.001	0.052	<0.001	0.004	0.002	0.005	2
Sample BT2 Non Mags		0.018	0.025	13	0.006	0.007	<0.001	0.018	<0.001	0.003	0.002	0.003	2

Australian Laboratory Services Pty. Ltd.
32 Shand Street
Stafford
Brisbane QLD 4053
Phone: +61 (7) 3243 7222 Fax: +61 (7) 3243 7218
www.alsglobal.com

Project: URGENT

QC CERTIFICATE OF ANALYSIS BR12091123

Sample Description	Method	ME- ICP64	ME- ICP64	ME- ICP64	ME- ICP64	ME- ICP64	ME- ICP64	ME- ICP64	ME- ICP64	ME- ICP64	ME- ICP64	ME- ICP64
	Analyte	Al2O3	CaO	Cr2O3	Fe2O3	MgO	MnO	TiO2	V2O5	Na2O	K2O	P2O5
	Units	%	%	ppm	%	%	%	%	%	%	%	%
	LOR	0.001	0.001	1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
STANDARDS												
BCS313-1		0.037	0.007	1	0.013	0.002	<0.001	0.014	<0.001	0.004	0.006	<0.001
Target Range - Lower Bound		0.033	0.004	<1	0.010	<0.001	<0.001	0.015		<0.001	0.003	
Upper Bound		0.040	0.008	3	0.014	0.003	0.002	0.019		0.005	0.007	
BCS516		0.512	0.026	13	0.063	0.035	0.001	0.127	0.001	0.019	0.130	0.014
Target Range - Lower Bound		0.477	0.022	<1	0.054	0.035	<0.001	0.159	<0.001	0.017	0.117	<0.001
Upper Bound		0.551	0.027	2	0.065	0.042	0.003	0.185	0.002	0.022	0.136	0.002
BLANKS												
BLANK		<0.001	<0.001	1	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BLANK		<0.001	<0.001	<1	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Target Range - Lower Bound		<0.001	<0.001	<1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Upper Bound		0.002	0.002	2	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
DUPLICATES												
Sample BT2 Non Mags		0.018	0.025	13	0.006	0.007	<0.001	0.018	<0.001	0.003	0.002	0.003
DUP		0.017	0.024	13	0.006	0.007	<0.001	0.018	<0.001	0.003	0.002	0.003
Target Range - Lower Bound		0.016	0.023	12	0.005	0.006	<0.001	0.016	<0.001	0.002	<0.001	0.002
Upper Bound		0.019	0.026	14	0.007	0.008	0.002	0.020	0.002	0.004	0.003	0.004

APPENDIX 3

QEMSCAN ANALYSES

ROBMET/AMDL

Gerhard Krummei

From: "Arno Kruger" <ArnoK@rjrobbins.com.au>
To: "Gerhard Krummei" <gkrummei@ozemail.com.au>
Sent: Thursday, 19 July 2012 12:57 PM
Attach: N5284QS12 - Robins Metallurgical Mineralogy Report.xls
Subject: QEMSCAN Data

Dear Gerhard,

Sorry I missed your call earlier. I have received the QEMSCAN data and have attached a copy of the report for your perusal and offer the following comments:

* Mineral abundance data indicate the Ti minerals associated with the the conductors and magnetic material to be predominantly rutile, altered ilmenite, leucoxene and Silica bearing titanium oxides
* Mineral abundance data indicate the Ti minerals in the non-magnetic material (potential product) to be Silica Bearing Titanium Oxide material and that the N/M material contain no free rutile, ilmenite, altered ilmenite or leucoxene
* Elemental deportment data indicate Titanium to be 100% associated with Silica Bearing Titanium Oxides for the non-magnetic material (potential product)
* TiO2 mineral locking data indicate the Ti to be locked with the Silica

My interpretation of the above is that the electrostatic and magnetic separation stages have removed all off the free liberated titanium minerals and some of the easily separated Silica bearing Ti minerals. What is left in the product is Titanium associated with silica and is locked in as part of the mineral as shown by the locking analyses. Separating the Silica bearing material away from the silica would be extremely difficult if not impossible using physical separation techniques.

Please review and if you have any questions please feel free to contact me. E-mail is possibly best as I am in and out of the office for the next few days.

Regards

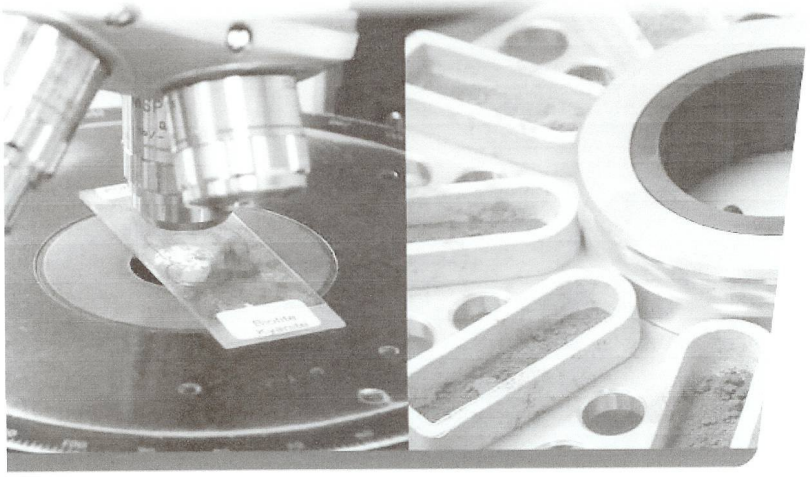
Arno Kruger
Principal Metallurgist

ROBBINS

28 Staple Street
Seventeen Mile Rocks, Qld 4073
Ph: (617) 3376 9777
Fx: (617) 3376 9699
Web: www.rjrobbins.com.au

Amdel

MINERAL LABORATORIES



REPORT N5284QS12

QEMSCAN ANALYSIS OF 3 SILICA SAND SAMPLES

CLIENT: ROBBINS METALLURGICAL

CLIENT DETAILS

Company	Robbins Metallurgical
Address	28 Staple Street, Seventeen Mile Rocks, Qld 4073
Contact	Arno Kruger
Email	ArnoK@rjrobbins.com.au
Telephone	Tel: +61 (7) 3376 9777 Fax: +61 (7) 3376 9699

Robbins Metallurgical submitted 3 Silica sand samples for analysis by QEMSCAN PMA method, using one block per sample. The samples are listed below. Note that the low 'Ti-grade' of these samples (≤ 520 ppm TiO2) would usually require analysis of multiple blocks, to obtain good particle statistics. At the clients request, this report presents the data obtained using one block per sample.

Sample Name	No. Blocks prepared	Analysis Mode
555 SBT1 Cond	1	PMA
555 SBT2 Mag	1	PMA
555 SBT2 N/M	1	PMA
	3	

Each sample was mounted in an epoxy resin for analysis by QEMSCAN. Graphite was added to the sample to aid in seperation of the individual particles. Each block was coated with carbon prior to QEMSCAN analysis. The Particle Mineralogical Analysis (PMA) method was used on all sample blocks. The data was processed using iDiscover v.5.2

Reported by:

Barry Whittington
Senior Mineralogist - Pacific Zone
Bureau Veritas Australia Pty Ltd

Report: N5284QS12
Client Robbins Metallurgical
Report Date: 11/07/2012
Tab 3 of 11

Mineral lists are designed to display the results in the most appropriate format. The following mineral lists have been used to report the data for this project. A description of each mineral grouping is included below.

Standard Mineral List

Rutile	includes rutile / anatase (>95% TiO2)
Leucoxene	includes Ti Oxide phases with 65 % to 95% TiO2
Altered Ilmenite	includes Ti Oxide phases with 55 % to 65 % TiO2
Ilmenite	includes Ti Oxide phases with 40 % to 55 % TiO2
Titanomagnetite	includes Ti Oxide phases with <40 % TiO2
Si bearing Ti Oxide	includes Ti Oxide phases containing Si
Quartz	includes quartz
Zircon	includes zircon
Fe Ox/OH	includes Fe-oxides/hydroxides
Others	includes all phases not listed above and occuring in trace form

Expanded TiO2 Mineral List

Rutile	includes rutile / anatase (>98% TiO2)
TiO2 95%	includes Ti Oxide phases with 95-98% TiO2
TiO2 90%	includes Ti Oxide phases with 90-95% TiO2
TiO2 85%	includes Ti Oxide phases with 85-90% TiO2
TiO2 80%	includes Ti Oxide phases with 80-85% TiO2
TiO2 75%	includes Ti Oxide phases with 75-80% TiO2
TiO2 70%	includes Ti Oxide phases with 70-75% TiO2
TiO2 65%	includes Ti Oxide phases with 65-70% TiO2
TiO2 60%	includes Ti Oxide phases with 60-65% TiO2
TiO2 55%	includes Ti Oxide phases with 55-60% TiO2
TiO2 50%	includes Ti Oxide phases with 50-55% TiO2
TiO2 40%	includes Ti Oxide phases with 40-50% TiO2
TiO2 30%	includes Ti Oxide phases with 30-40% TiO2
TiO2 20%	includes Ti Oxide phases with 20-30% TiO2
TiO2 10%	includes Ti Oxide phases with 10-20% TiO2
TiO2 5%	includes Ti Oxide phases with 0-10% TiO2
Si bearing Ti Oxide	includes Si bearing Ti Oxide phases
Quartz	includes quartz
Zircon	includes zircon
Fe Ox/OH	includes Fe-oxides/hydroxides
Others	includes all phases not listed above and occuring in trace form

Simple TiO2 Mineral List

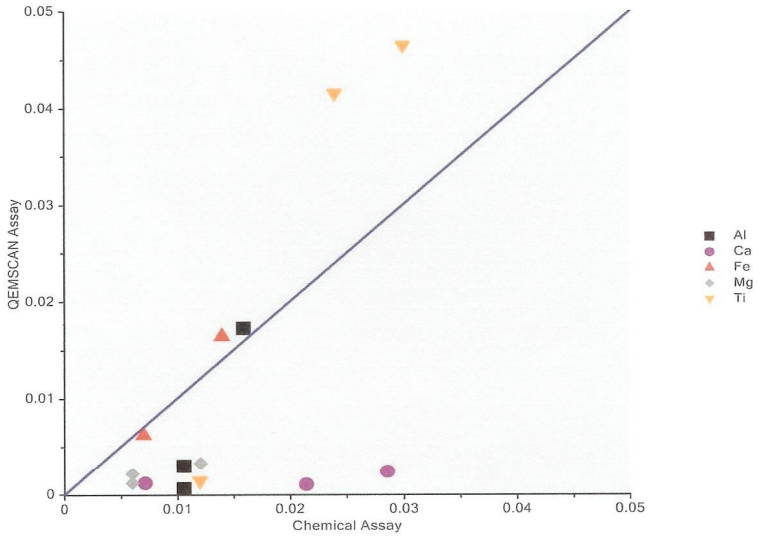
TiO2 Minerals	includes all Ti Oxide phases
Si bearing Ti Oxide	includes Si bearing Ti Oxide phases
Quartz	includes quartz
Zircon	includes zircon
Fe Ox/OH	includes Fe-oxides/hydroxides
Others	includes all other minerals not listed above and occuring in trace form

QEMSCAN generates assays for each sample by using assigning each pixel analysed chemical values and S.G. Chemical assays are compared to the QEMSCAN generated assays to determine if the analysis is valid. The line in the below graph is the 1:1 line.

	Samples	SBT1 Cond	SBT2 Mag	SBT2 N/M
Elemental Mass (%)	Al (QEMSCAN)	0.00	0.02	0.00
	Al (Chemical)	0.01	0.02	0.01
	Ca (QEMSCAN)	0.00	0.00	0.00
	Ca (Chemical)	0.01	0.03	0.02
	Fe (QEMSCAN)	0.02	0.08	0.01
	Fe (Chemical)	0.01	0.03	0.01
	Mg (QEMSCAN)	0.00	0.00	0.00
	Mg (Chemical)	0.01	0.01	0.01
	Ti (QEMSCAN)	0.04	0.05	0.00
	Ti (Chemical)	0.02	0.03	0.01

Note: these QEMSCAN data were obtained by analysing one block per sample. Analysing replicate blocks would provide statistically more reliable QEMSCAN elemental assays for minerals and elements present at low concentrations.

Assay Reconciliation



The mineral abundance data for each sample is displayed below. The breakdown of the TiO2 categories is also displayed below.
PLEASE NOTE: This information is based on the mass and chemistry assigned to each measured pixel and is different from particle classification data, which is calculated by using an average particle chemistry.

Standard Mineral List

Mass (%)		SBT1 Cond	SBT2 Mag	SBT2 N/M
Minerals	Rutile	0.04	0.03	0.00
	Leucoxene	0.01	0.01	0.00
	Altered Ilmenite	0.01	0.03	0.00
	Ilmenite	0.00	0.00	0.00
	Titanomagnetite	0.00	0.00	0.00
	Si bearing Ti Oxide	0.08	0.10	0.06
	Quartz	99.75	99.54	99.88
	Zircon	0.02	0.04	0.01
	Fe Ox/OH	0.00	0.06	0.00
	Others	0.09	0.19	0.05
	TOTAL	100.00	100.00	100.00

Note: these QEMSCAN data were obtained by analysing one block per sample.
Analysing replicate blocks would provide statistically more reliable QEMSCAN mineralogical data.

Expanded TiO2 Mineral List

Mass (%)		SBT1 Cond	SBT2 Mag	SBT2 N/M
Minerals	Rutile	0.04	0.03	0.00
	TiO2 95%	0.00	0.00	0.00
	TiO2 90%	0.00	0.00	0.00
	TiO2 85%	0.00	0.00	0.00
	TiO2 80%	0.00	0.00	0.00
	TiO2 75%	0.00	0.00	0.00
	TiO2 70%	0.00	0.00	0.00
	TiO2 65%	0.01	0.01	0.00
	TiO2 60%	0.01	0.02	0.00
	TiO2 55%	0.00	0.01	0.00
	TiO2 50%	0.00	0.00	0.00
	TiO2 40%	0.00	0.00	0.00
	TiO2 30%	0.00	0.00	0.00
	TiO2 20%	0.00	0.00	0.00
	TiO2 10%	0.00	0.00	0.00
	TiO2 5%	0.00	0.00	0.00
	Si bearing Ti Oxide	0.08	0.10	0.06
	Quartz	99.75	99.54	99.88
	Zircon	0.02	0.04	0.01
	Fe Ox/OH	0.00	0.06	0.00
	Others	0.09	0.19	0.05
	TOTAL	100.00	100.00	100.00

Simple TiO2 Mineral List

Mass (%)		SBT1 Cond	SBT2 Mag	SBT2 N/M
Minerals	TiO2 Minerals	0.06	0.07	0.00
	Si bearing Ti Oxide	0.08	0.10	0.06
	Quartz	99.75	99.54	99.88
	Zircon	0.02	0.04	0.01
	Fe Ox/OH	0.00	0.06	0.00
	Others	0.09	0.19	0.05
	TOTAL	100.00	100.00	100.00

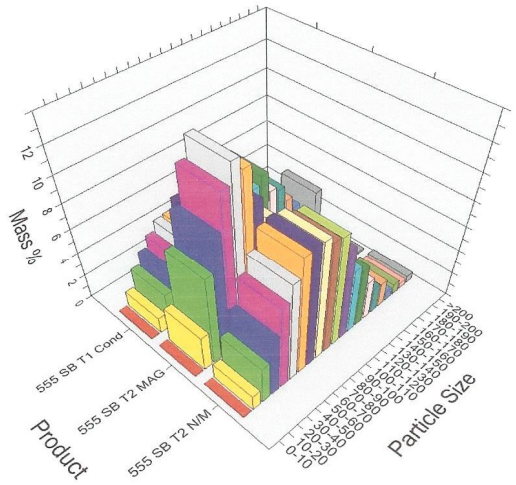
The average particle size data is displayed below, in microns, for the three samples. Grain size data is also presented for the TiO2 minerals and the Si-bearing Ti Oxides, but analysing one block per sample means the results for these 'phases' are indicative only. These results were all obtained from the QEMSCAN data.

Main Mineral List

Particle size distribution

Mass Percent		SBT1 Cond	SBT2 Mag	SBT2 N/M
Particle Size Distribution (µm)	0-10	0.1	0.1	0.1
	10-20	1.3	2.9	1.3
	20-30	2.9	7.3	3.2
	30-40	3.9	9.8	4.9
	40-50	4.8	12.4	7.0
	50-60	5.6	13.7	8.2
	60-70	5.7	12.9	9.7
	70-80	6.6	10.4	9.8
	80-90	7.1	8.9	9.7
	90-100	7.2	6.8	9.2
	100-110	8.0	4.9	9.0
	110-120	7.6	3.3	7.5
	120-130	6.8	2.4	5.4
	130-140	7.5	1.3	4.9
	140-150	5.9	1.3	3.3
	150-160	5.5	0.6	2.2
	160-170	4.2	0.3	2.0
	170-180	3.2	0.3	0.7
	180-190	1.9	0.2	0.9
	190-200	1.0	0.1	0.5
	>200	3.2	0.2	0.6
Est P80 (µm)		149	92	121
TOTAL		100.00	100.00	100.00

Particle Size Distribution



Main Mineral List

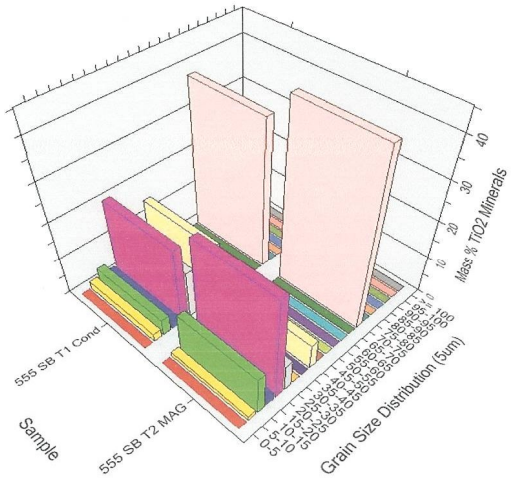
TiO2 minerals grain size distribution

Due to the low number of these Ti-containing grains analysed, these numbers are indicative o

Mass Percent		SBT1 Cond	SBT2 Mag	SBT2 N/M[1]
Grain Size Distribution (µm)	0-5	0	0	
	5-10	2	1	
	10-15	4	10	
	15-20	2	2	
	20-25	21	28	
	25-30	13	7	
	30-35	5	0	
	35-40	0	0	
	40-45	15	7	
	45-50	0	0	
	50-55	0	0	
	55-60	0	0	
	60-65	0	0	
	65-70	0	0	
	70-75	38	45	
	75-80	0	0	
	80-85	0	0	
	85-90	0	0	
	90-95	0	0	
	95-100	0	0	
	>= 100	0	0	
Est P80 (µm)[2]				
TOTAL		75.00	100.00	0.00

1 No 'TiO2 minerals' detected for QEMSCAN analysis of the one block.
2 Statistically, not enough Ti-containing mineral grains detected to warrant estimation of the P80 size.

Grain Size Distribution



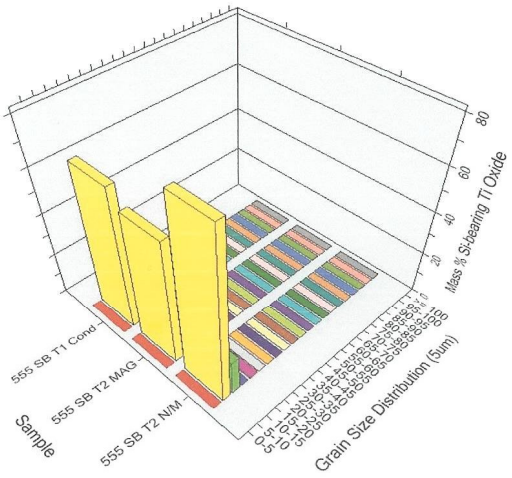
Main Mineral List

Si-bearing Ti-oxide grain size distribution
Due to the low number of these Ti-containing grains analysed, these numbers are indicative only.

Mass Percent		SBT1 Cond	SBT2 Mag	SBT2 N/M
Grain Size Distribution (µm)	0-5	0	0	0
	5-10	66	60	82
	10-15	14	16	17
	15-20	13	6	0
	20-25	0	18	1
	25-30	0	0	0
	30-35	6	0	0
	35-40	0	0	0
	40-45	0	0	0
	45-50	0	0	0
	50-55	0	0	0
	55-60	0	0	0
	60-65	0	0	0
	65-70	0	0	0
	70-75	0	0	0
	75-80	0	0	0
	80-85	0	0	0
	85-90	0	0	0
	90-95	0	0	0
	95-100	0	0	0
	>= 100	0	0	0
Est P80 (µm)[1]				
TOTAL		100.00	100.00	100.00

1 Statistically, not enough Ti-containing mineral grains detected to warrant estimation of the P80 size.

Grain Size Distribution

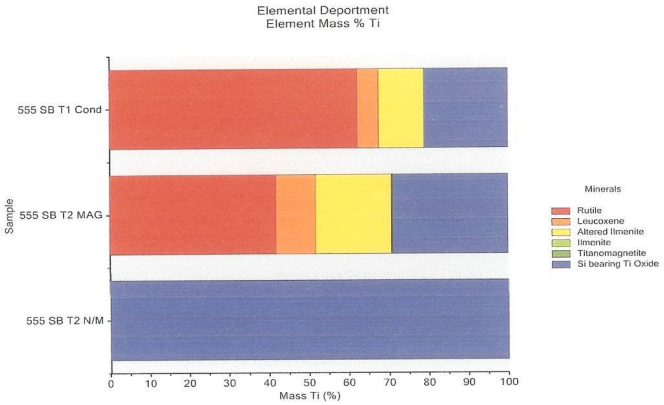


The elemental deportment of Ti is displayed below using the Main Mineral List and the Expanded TiO2 Mineral List

Standard Mineral List

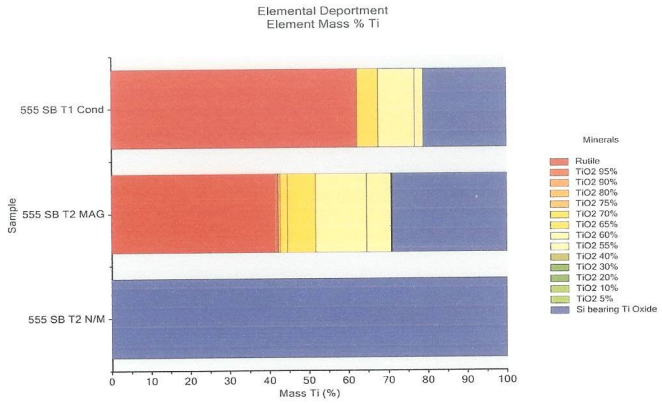
	Mass Ti (%)	SBT1 Cond	SBT2 Mag	SBT2 N/M
Minerals	Rutile	62	42	0
	Leucoxene	5	10	0
	Altered Ilmenite	11	19	0
	Ilmenite	0	0	0
	Titanomagnetite	0	0	0
	Si bearing Ti Oxide	21	29	100
	TOTAL	100	100	100

Note: these QEMSCAN data were obtained by analysing one block per sample. Analysing replicate blocks would provide statistically more reliable QEMSCAN deportment data. This is especially so for the SBT2 N/M sample, where QEMSCAN analysis identified only a small number of Ti-containing particles.



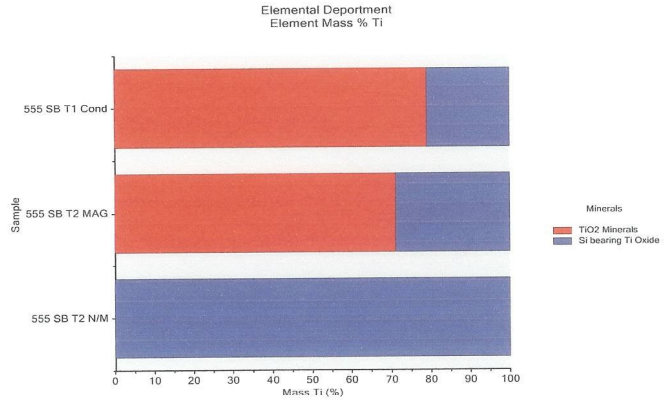
Expanded TiO2 Mineral List

	Mass (%)	SBT1 Cond	SBT2 Mag	SBT2 N/M
Minerals	Rutile	62	41	0
	TiO2 95%	0	0	0
	TiO2 90%	0	0	0
	TiO2 85%	0	0	0
	TiO2 80%	0	0	0
	TiO2 75%	0	0	0
	TiO2 70%	0	2	0
	TiO2 65%	5	7	0
	TiO2 60%	9	13	0
	TiO2 55%	2	6	0
	TiO2 50%	0	0	0
	TiO2 40%	0	0	0
	TiO2 30%	0	0	0
	TiO2 20%	0	0	0
	TiO2 10%	0	0	0
	TiO2 5%	0	0	0
	Si bearing Ti Oxide	21	29	100
	TOTAL	100	100	100



Simple TiO2 Mineral List

	Mass Ti (%)	SBT1 Cond	SBT2 Mag	SBT2 N/M
Minera	TiO2 Minerals	79	71	0
	Si bearing Ti Oxide	21	29	100
	TOTAL	100	100	100

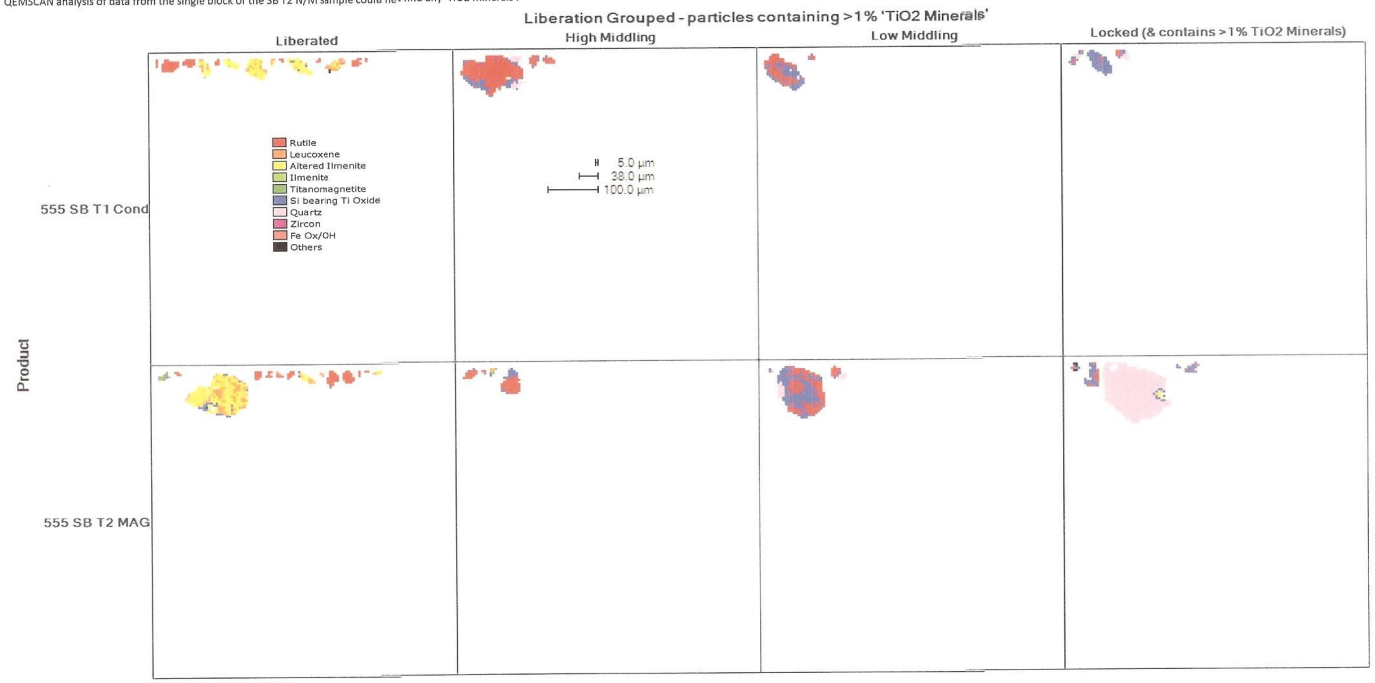


[redacted]

Report: N5284QS12
Client Robbins Metallurgical
Report Date: 11/07/2012
Tab 8 of 11

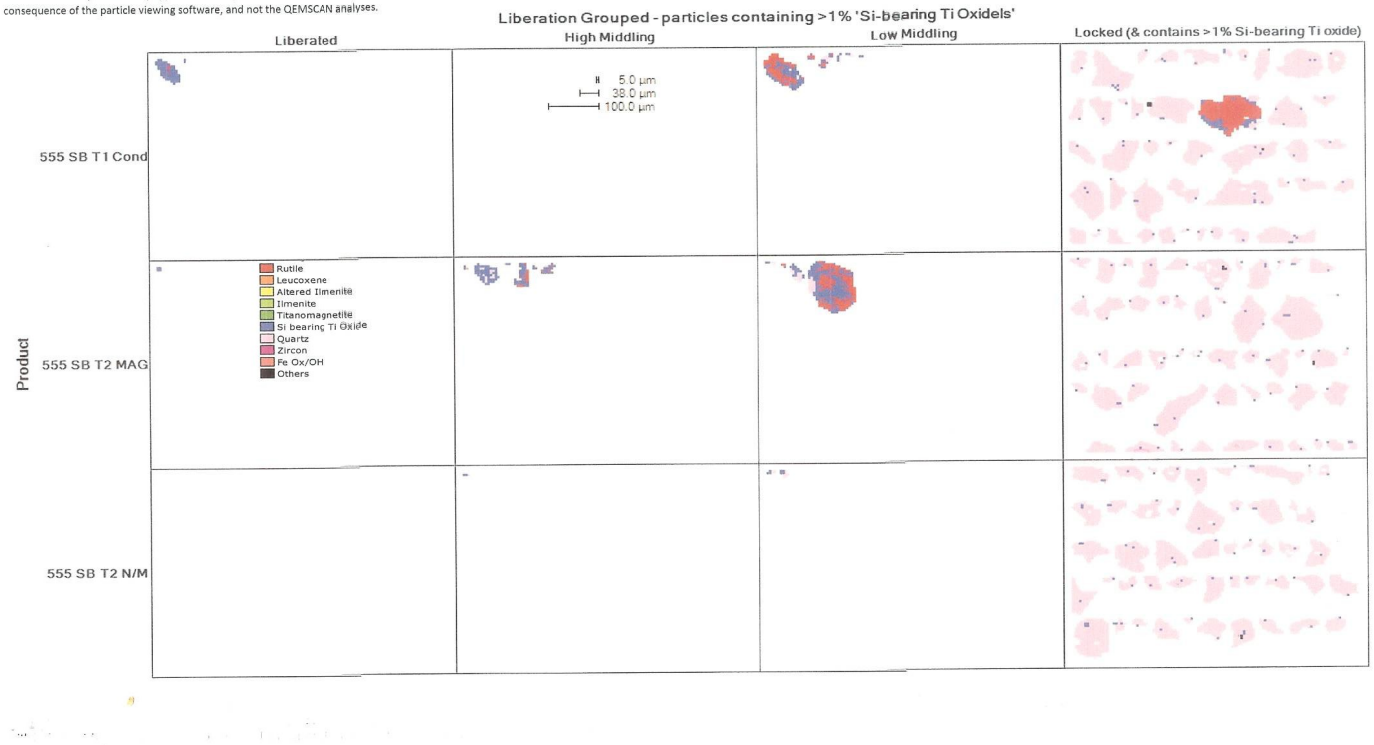
QEMSCAN example images are shown below, along with SEM images of 'typical' Si-bearing Ti-oxides.

Particles from the 'TiO2 Minerals' group (Simple TiO2 Mineral List).
Note that in this instance, the 'Locked' image grid displays only those particles with >1 % (by area) of the 'TiO2 minerals'.
QEMSCAN analysis of data from the single block of the SB T2 N/M sample could not find any 'TiO2 minerals'.



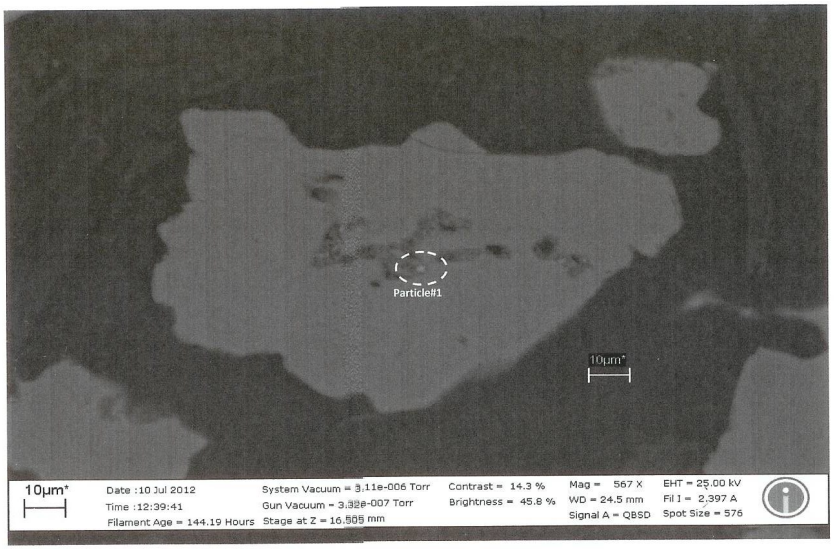
Particles from the 'Si-bearing Ti Oxides' group (Simple TiO2 Mineral List).
Note that in this instance, the 'Locked' image grid displays only those particles with >1 % (by area) of the Si-bearing Ti Oxide phases.

Note: 'truncated' particles may appear at the edges of the grids in the pictures below. This is a consequence of the particle viewing software, and not the QEMSCAN analyses.



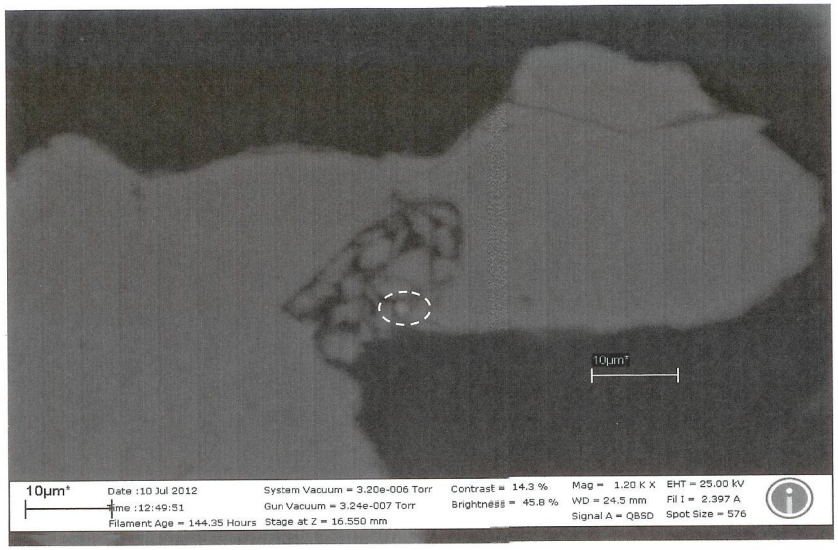
SEM images of locked Si-bearing Ti-oxides

The Ti-containing particles are the lighter areas in the centre of the circled region. Spot analysis indicates these particles are associated with Si and Fe, although it is unclear if these elements are present within the Ti-rich grains or associated with regions outside of the grain, but within the 'analysis region'. EDS analysis results are presented below these two images.



Normalised wt% data from EDS analysis of the particles above.

	O	Na	Al	Si	Ti	Fe	Total
TiO2 particle#1	53.4			34.2	8.7	3.7	100.0
Quartz surrounding particle #1	58.9			41.1			100.0
TiO2 particle #2	36.6	4.2	1.7	27.6	22.9	6.9	100.0



The liberation of TiO2 Mineral data is displayed below. This is calculated using the area percent of TiO2 Minerals in each TiO2 Mineral bearing particle. Example images of each liberation category are also displayed.

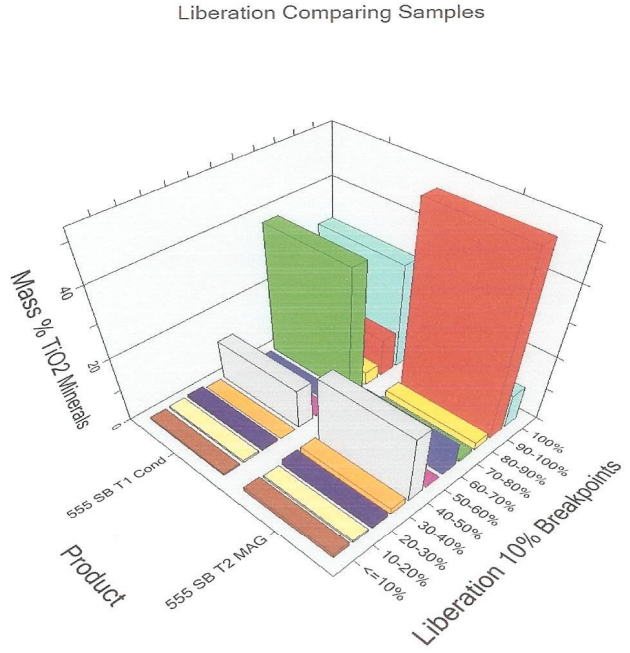
100%	Area Percent TiO2 Minerals is 100%
90-100%	Area Percent TiO2 Minerals is between 90% and 100%
80-90%	Area Percent TiO2 Minerals is between 80% and 90%
70-80%	Area Percent TiO2 Minerals is between 70% and 80%
60-70%	Area Percent TiO2 Minerals is between 60% and 70%
50-60%	Area Percent TiO2 Minerals is between 50% and 60%
40-50%	Area Percent TiO2 Minerals is between 40% and 50%
30-40%	Area Percent TiO2 Minerals is between 30% and 40%
20-30%	Area Percent TiO2 Minerals is between 20% and 30%
10-20%	Area Percent TiO2 Minerals is between 10% and 20%
<10%	Area Percent TiO2 Minerals is less than 10%

TiO2 liberation (using the 'TiO2 Minerals' in the Simple Mineral List)

Mass % TiO2 Minerals		SBT1 Cond	SBT2 Mag	SBT2 N/M	
Liberation TiO2 Minerals	100%	31	10		Liberated
	90-100%	12	53		
	80-90%	4	2		High Middling
	70-80%	38	1		
	60-70%	0	7		
	50-60%	1	0		Low Middling
	40-50%	12	21		
	30-40%	0	2		
	20-30%	1	2		Locked
	10-20%	1	1		
	<=10%	0	1		
	TOTAL	100	100	No 'TiO2 minerals' measured	

Note: these QEMSCAN data were obtained by analysing one block per sample. Analysing replicate blocks would provide statistically more reliable QEMSCAN liberation data. This is especially so for the SBT2 N/M sample, where QEMSCAN analysis identified only a small number of Ti-containing particles.

Images showing the liberated and locked 'TiO2' grains are presented in the 'Particle Images' tab (tab#8)



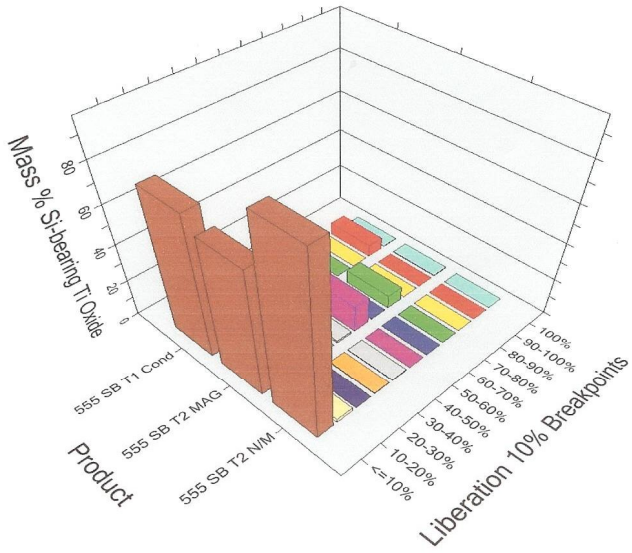
Si-bearing Ti Oxide liberation (using the Simple Mineral List)

Mass % TiO2 Minerals		SBT1 Cond	SBT2 Mag	SBT2 N/M	
Liberation TiO2 Minerals	100%	0	0	0	Liberated
	90-100%	6	0	0	
	80-90%	0	0	0	High Middling
	70-80%	0	7	0	
	60-70%	0	0	0	
	50-60%	0	15	0	Low Middling
	40-50%	9	1	0	
	30-40%	0	0	0	
	20-30%	1	3	0	Locked
	10-20%	8	5	2	
	<=10%	75	69	97	
	TOTAL	100	100	100	

Note: these QEMSCAN data were obtained by analysing one block per sample. Analysing replicate blocks would provide statistically more reliable QEMSCAN liberation data. This is especially so for the SBT2 N/M sample, where QEMSCAN analysis identified only a small number of Ti-containing particles.

Images showing the liberated and locked Si-bearing Ti Oxide grains are presented in the 'Particle Images' tab (tab#8)

Liberation Comparing Samples



APPENDIX 4

BASELINE DUST MONITORING REPORTS

EXTRACT – SEMF REPORT

Figure 1: Calculated Total Dust (Last 12 Months)

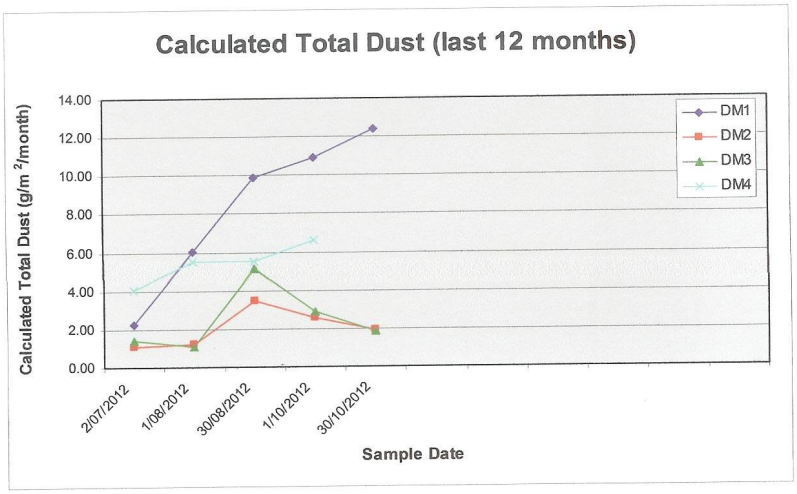


Figure 2: Average Height of Rainwater in Bottle (Since Monitoring Commenced)

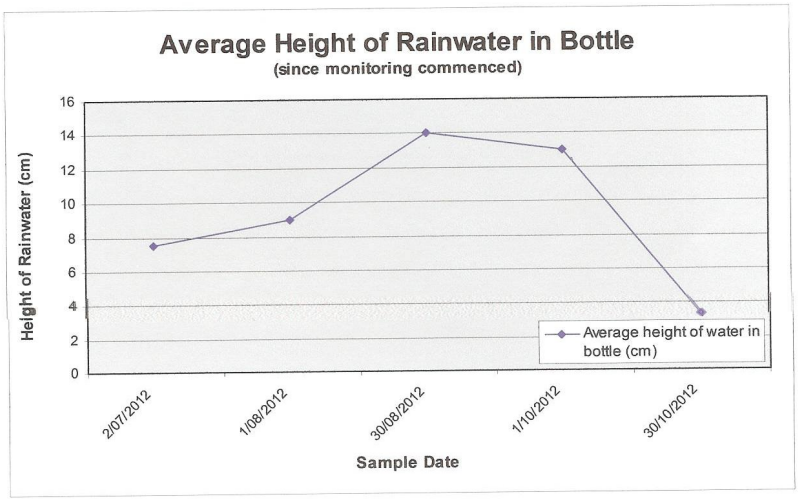
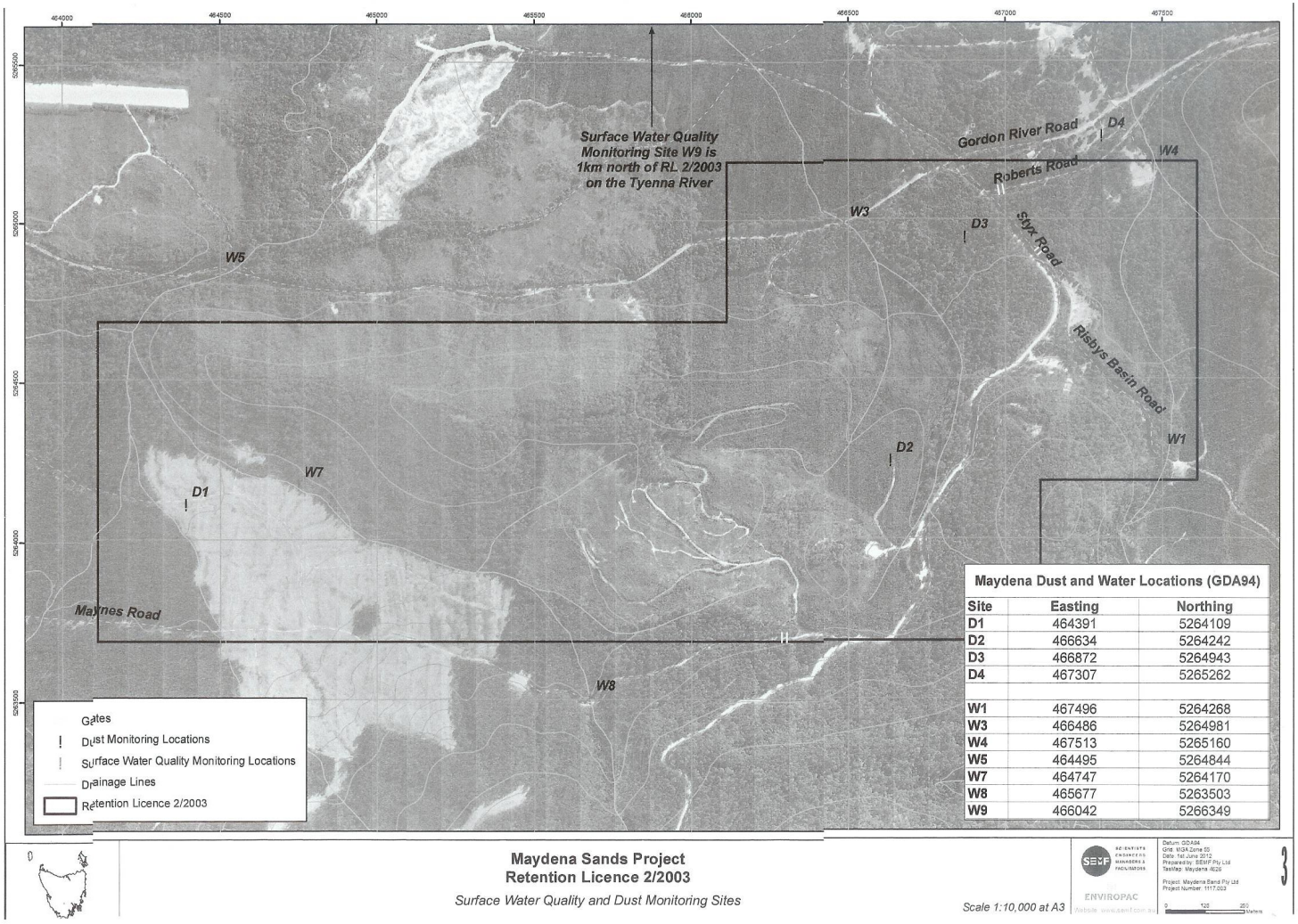


Table 1: Maydena Sand Mine – Baseline Dust Monitoring Results

	Total Dust[1] (mg)	Calculated Total Dust[2] (g/m^2/month)	Calculated Total Dust[2] (mg/m^2/day)
Date Samples Collected – 2 July 2012			
DM1	94	2.27	0.07
DM2	70.8	1.08	0.03
DM3	77.5	1.42	0.04
DM4	129	4.07	0.12
Date Samples Collected – 1 August 2012			
DM1	157.0	6.06	0.18
DM2	71.8	1.24	0.04
DM3	69.6	1.12	0.03
DM4	148.0	5.55	0.17
Date Samples Collected – 30 August 2012			
DM1	219.0	9.90	0.30
DM2	109.0	3.46	0.10
DM3	138.0	5.16	0.15
DM4	144.0	5.51	0.17
Date Samples Collected – 1 October 2012			
DM1	256.0	10.94	0.33
DM2	98.6	2.58	0.08
DM3	104.0	2.87	0.09
DM4	174.0	6.59	0.20
Date Samples Collected – 30 October 2012			
DM1	261	12.36	0.37
DM2	83	1.92	0.06
DM3	82	1.85	0.06
DM4	-	-	-

Notes:
(1) Total Dust (mg) values from AST Analysis.
(2) Calculated Total Dust values based on Equation 9(1) of AS 3580.10.1-2003.
(3) Denotes below detection limits.



Maydena Dust and Water Locations (GDA94)

Site	Easting	Northing
D1	464391	5264109
D2	466634	5264242
D3	466872	5264943
D4	467307	5265262
W1	467496	5264268
W3	466486	5264981
W4	467513	5265160
W5	464495	5264844
W7	464747	5264170
W8	465677	5263503
W9	466042	5266349

Maydena Sands Project
Retention Licence 2/2003

Surface Water Quality and Dust Monitoring Sites

Scale 1:10,000 at A3

SEMF ENVIROPAC

Datum: GDA94
Grid: MGA Zone 55
Date: 1st June 2012
Prepared by: SEMF Pty Ltd
TasMap: Maydena 8626

Project: Maydena Bend Pty Ltd
Project Number: 1117.003

0 125 250 Metres

3

APPENDIX 5

BASELINE WATER SAMPLING RESULTS – METALS

EXTRACT – SEMF REPORT

ALS Group

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EB1214605	Page	: 1 of 4
Client	: SEMF PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MS FIONA KESEF	Contact	: Customer Services
Address	: 101 GEORGE STREET LAUNCESTON TASMANIA, AUSTRALIA 7250	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: kesef@semf.com.au	E-mail	: Brisbane.Enviro.Services@alsglobal.com
Telephone	: +61 03 6333 7900	Telephone	: +61 7 3243 7222
Facsimile	: +61 03 6333 7950	Facsimile	: +61 7 3243 7218
Project	: Maydena Sands 1117 003	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 01-JUN-2012
Sampler	: Fiona	Issue Date	: 13-JUN-2012
Site	: ----		
		No. of samples received	: 8
Quote number	: EN/040/10	No. of samples analysed	: 8

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA

WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Jonathon Angell	Inorganic Coordinator	Brisbane Inorganics
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

Analytical Results

Sub-Matrix: WATER				Client sample ID	W1	W3	W4	W5	W7
				Client sampling date / time	30-MAY-2012 13:30	30-MAY-2012 15:30	30-MAY-2012 15:00	30-MAY-2012 11:00	30-MAY-2012 11:30
Compound	CAS Number	LOR	Unit		EB1214605-001	EB1214605-002	EB1214605-003	EB1214605-004	EB1214605-005
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		7.09	7.18	7.37	7.31	7.41
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		105	93	95	96	170
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L		8	6	11	<5	14
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<1	<1	<1	<1	<1
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		15	13	11	9	19
ED093F: Dissolved Major Cations									
Sodium	7440-23-5	1	mg/L		10	8	8	6	13
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	<0.005	0.018	<0.005
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Analytical Results

Sub-Matrix: WATER				Client sample ID	W8	W9	Dup2	-----	-----
				Client sampling date / time	30-MAY-2012 12:00	30-MAY-2012 16:30	30-MAY-2012 15:00	----	----
Compound	CAS Number	LOR	Unit		EB1214605-006	EB1214605-007	EB1214605-008	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		7.15	7.48	7.51	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		144	112	116	----	----
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L		7	5	<5	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<1	<1	<1	----	----
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		22	9	9	----	----
ED093F: Dissolved Major Cations									
Sodium	7440-23-5	1	mg/L		15	6	6	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	0.001	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L		0.001	0.001	0.001	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	0.021	0.016	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----

ILLUSTRATIONS