Diatreme Resources Limited
ABN: 33 061 267 061

ASX

ANNOUNCEMENT

ASX:DRX

CYCLONE STUDY REAFFIRMS PROJECT PROFITABILITY

Diatreme Resources Limited is an Australian based diversified mineral explorer with significant projects in WA and QLD.

The Board and senior personnel exhibit wide experience, ranging through the exploration, development and financing phases of resource project management.

Australian Securities Exchange
Codes: DRX, DRXO

Board of Directors Non-Executive
William Wang - Chairman
Andrew Tsang
Daniel Zhuang

Executive:
Neil McIntyre – Chief Executive
Tuan Do – CFO & Co. Secretary
Ian Reudavey – Chief Geologist

Key Projects:
• Cyclone Zircon Project
• Tick Hill Gold Project
• Cape Bedford Silica/HMS Project
• Clermont Copper Project

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15th June 2016

- **Project Enhancement and Update Study by independent consultants shows NPV of $121m, payback in under 3 yrs**
- **Potential for further cost savings from improved industry and market conditions.**

In a further boost for its flagship Cyclone Zircon Project, Diatreme Resources Limited (ASX:DRX) announced today the results of a Project Enhancement and Update Study completed by independent consultants which reaffirms the project's financial viability.

Based on the study undertaken by independent consultants Sedgman Limited and internally by DRX, the Eucla Basin's largest undeveloped zircon project now has a projected net present value of $121 million, an internal rate of return of 23% and payback in 2.8 years based on an updated estimate of processing plant capital and operating costs, shipping and diesel costs, with revenue streams adjusted for current product pricing.

Current industry and market conditions also present further opportunities for cost savings on key capital and operating expenditures, compared to the Prefeasibility Study estimates (refer ASX announcement 20 March 2012).

Commenting on the results, Diatreme's CEO Neil McIntyre said: "This latest study has confirmed the feasibility of our flagship project and its potential to deliver economic benefits for all stakeholders.

"Following the expected award of environmental approvals this month, we can now move confidently towards the completion of the Definitive Feasibility Study (DFS) and the delivery of this valuable new mine for Western Australia."

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Confidence in Cyclone's future has also been boosted by Ruidow's recent "Global Zircon Conference 2016" held in Nanjing, China, from May 24-26, which indicated that an upturn in China's residential market has lifted demand for ceramics, with leading producers anticipating higher prices for zircon from the third quarter of 2016.

Analysis by research company Beer & Co. has suggested the zircon price could reach US$1,500 a tonne by late 2018, and with forecasts of a looming supply deficit within three years, Cyclone is set to commence production amid favourable pricing conditions for its key product.

CYCLONE ZIRCON PROJECT

Project Enhancement and Update Study

DRX continues to advance its Cyclone Zircon Project with the completion of a "Project Enhancement and Update Study" by independent consultants Sedgman Limited. The study identified opportunities for cost reductions and evaluated the project economics for a possible construction schedule which would commence on completion of the DFS. Cyclone is currently the largest undeveloped zircon project in the Eucla Basin and is the flagship project for Diatreme.

DRX engaged Sedgman Limited, a leading provider of mineral processing and associated infrastructure solutions to the mineral sands industry, to undertake the study. Sedgman has reviewed work undertaken for the PFS and subsequent studies and provided an updated assessment of process plant, some infrastructure and shipping costs and assumptions at a technical and commercial level. This has provided Diatreme with a greater understanding of the project's potential commercial returns while current industry and market conditions provide an opportunity for cost savings on key capital and operating expenditures.

Using the previous PFS financial model the study outcomes demonstrated the following financial results for the project:

- NPV of $121M
- IRR of 23%
- Payback in 2.8 years

The project analysis was based on sale of heavy mineral concentrate (HMC) to processors in China and the HMC price was determined by calculating a reasonable proportion of the value of the contained final products based on the financial model previously developed by Diatreme for the PFS in 2012.

Current industry and market conditions have presented considerable opportunities for cost savings on key capital and operating expenditures, compared to the Prefeasibility Study. Sedgman's study revealed reduced transport and operating costs resulting from the changed global economic circumstances during the four years since the Cyclone PFS was completed. A reduction in the price for diesel fuel will provide lower energy costs for diesel powered generators, earthmoving equipment and land transport systems.

Sedgman reviewed the capital cost of the WCP which was based on the PFS testwork and the WCP flowsheet completed by Mineral Technologies in 2011. The $60M estimate for the capital cost of the plant using similar technology separating equipment was verified by Sedgman as a valid current estimate. Sedgman recommended additional bulk sample testwork using reflux classifiers as a potential new technology capable of improving metallurgical performance and reducing capital and operating costs. Sedgman indicated from previous experience a potential capital cost saving of up to 20-25% if bulk sample testwork produced positive metallurgical results.

Based on this updated work, the revised cost estimates for the project are:

- $161M project capital expenditure
- $72M average annual operating cost.

As part of the overall study Diatreme reviewed the mining schedule and a revised schedule was produced to increase the average grade mined during the first three years of the operation.

The joint study has confirmed the viability of the Cyclone Project and provides DRX with an independent consultant's financial analysis which shows improvements to the project economics.

Environmental Approval

The Western Australian EPA has provided Diatreme's subsidiary Lost Sands Pty Ltd ("Lost Sands") with draft conditions relating to environmental approvals for the Cyclone Zircon Project. Lost Sands has reviewed the draft conditions and submitted comments to the EPA on 30 May 2016 for its consideration when finalising the conditions for the EPA's recommendation to the WA Environment Minister. The Minister is expected to review the EPA's recommendation for a period of two weeks and then grant the licence. This process is expected be finalised by the end of June 2016.

Grant of the environmental licence will provide Lost Sands with environmental conditions for developing and operating the Cyclone Mineral Sands Mine, including open cut pits, mining and processing infrastructure, airstrip, accommodation camp, bore fields and the haul road from the mine site to the Forrest rail siding.

Mineral Resource and Ore Reserve

DRX has successfully expanded the life of the Cyclone Zircon Project to 14 years with the acquisition of the Cyclone Extended resource (tenement R69/1) from Image Resources Ltd. The addition of Cyclone Extended increased the size of Diatreme's mineral sands project in Western Australia's Eucla Basin to a mineral resource of 211 Mt with an average grade of 2.3% HM (ASX announcement 9 April 2015). This is an effective 60% increase in contained heavy minerals over the original DRX Cyclone resource. A summary of the current mineral resource is provided in Table 1.

A Probable Ore Reserve (ASX announcement 14 December 2015) of 140 Mt at an average grade of 2.5% HM was announced in December 2015, representing a 75% conversion rate from the HM tonnes contained in the mineral resource. The mine design includes 84 Mbcm of overburden with an average strip ratio of 1:1. The strip ratio is considerably lower in the early years of the mine operation where mining is scheduled to commence in a higher grade area of the ore reserve.

The integration of Cyclone Extended into the Cyclone Project allows for a wider range of options in mine planning and design including targeting higher grade ore at the commencement of mining and could also include higher production levels while maintaining a long life operation.

An update to the Probable Ore Reserve was completed as part of the Project Enhancement and Update Study, with a Probable Ore Reserve estimate for the Cyclone Project now reported as 138 Mt at 2.6% HM, including 0.72% Zircon, containing 3.5 Mt of HM, including 1 Mt of Zircon. The revised estimate primarily relates to the adoption of a revised mining schedule which reduces the amount of lower grade "Nearshore" mineralisation (and associated interburden) mined from the deeper parts of the mine path and omits some lower grade "Beach" mineralisation on the western batter of the mine path in the first three years of operation.

The Ore Reserve is based upon mine planning parameters developed for the Cyclone Prefeasibility Study (ASX announcement 20 Mar 2012), with appropriate recognition of subsequent metallurgical testwork and process flowsheet development undertaken by Mineral Technologies.

The design parameters for the open pit were developed based on simultaneous assessment of a number of economic and mining factors:

- A nominal 0.4% Zircon cut-off grade was applied. Lower grade material was included in areas with less overburden and where required to create a practical pit geometry for dozer trap mining.
- Areas with higher stripping ratios required a higher grade ore to be economic.
- The base of induration (within the Quaternary weathering profile) was used as the top of the ore zone to exclude indurated material (with poor quality HM) from mining.
- Low grade interburden material, which was not part of the Mineral Resource, was included in the pit design to allow mining of the Beach and Nearshore mineralisation in a single pass.
- Pit wall design used batter angles of 35° for ore and interburden (both unconsolidated sand) and 45° for overburden (variably indurated sandy loam).

The Ore Reserve has been classified as Probable based on the accuracy of the cost estimate (PFS quality) and additional work required for the marketing of Cyclone HMC in China. However, 90% of the Ore Reserve is derived from Measured Resource, and there is a high level of confidence in the other modifying factors applied.

The mining factors are based on preliminary designs by personnel with extensive experience in mineral sands. Proven techniques with low technical risk have been selected. The mining method comprises overburden removal by truck and shovel, and ore mining by dozer push to in-pit traps and slurry pumping. Infrastructure requirements are minimal and will consist of a network of temporary haul roads, electricity and water reticulation to the mining unit and a mobile slurry pipeline.

Mining dilution was built in to the Ore Reserve by the inclusion of ‘waste’ material in the mine design, both as roof and floor dilution and internal waste (interburden) which occurs between the beach and nearshore mineralisation. No mining recovery factor has been used as ore loss is negligible when using dozer push methods.

Metallurgical testwork and process flowsheet design has been carried out by Mineral Technologies (MT) in Carrara on representative bulk ore samples (one from the life of mine, the other from the initial 2-year path). MT have proposed the use of conventional wet concentrator plant (WCP) for mineral sands, primarily utilising spiral separation with secondary screening and classification to achieve high HMC quality. A recovery factor to HMC of 68% for HM and 95% for Zircon has been utilised. MT has proposed the use of a conventional mineral separation plant (MSP), primarily utilizing magnetic and electrostatic separation with secondary screening and gravity separation to generate mineral products. Hot acid leach of the HM is required to achieve optimal recovery and product quality, due to the presence of coated grains.

The Ore Reserve estimate is based on the Cyclone Mineral Resource estimate, released to ASX on 9 April 2015 and described in the attached JORC 2012 – Table1. The modelling techniques used for the Cyclone Mineral Resource Estimate are considered to align with industry best practice.

The Cyclone Mineral Resource (ASX announcement 9 April 2015) comprises 211 Mt at an average grade of 2.3% HM. The Probable Ore Reserve has been estimated at 140 Mt at an average grade of 2.5% HM, representing a 75% conversion rate for contained HM tonnes. The pit design includes 83 Mbcm of overburden with a strip ratio of 1:1. The strip ratio is considerably lower in the early years of the mine operation.

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Supporting Information for the Cyclone Ore Reserve includes:

Table 1: Cyclone Project Resource & Reserve Estimate

Appendix 1: Cyclone Project, Annualised Ore Reserve

Attachment: JORC Code, 2012 Edition - Table 1

TABLE 1: CYLONE PROJECT RESOURCE & RESERVE ESTIMATE

MINERAL RESOURCE

Resource Category	HM cut-off %	Material Mt	HM %	HM Mt	Slime %	OS %	Head Grade						Zircon Kt
							Zircon %	Rutile %	Leuc %	HiTi %	Alt Ilm %	Si TiOx %	
MEASURED	1.0	156	2.4	3.79	4.2	5.1	0.69	0.08	0.17	0.52	0.26	0.55	1,070
INDICATED	1.0	55	1.8	0.99	4.1	4.5	0.36	0.06	0.06	0.50	0.11	0.31	200
TOTAL	**1.0**	**211**	**2.3**	**4.78**	**4.2**	**4.9**	**0.60**	**0.08**	**0.14**	**0.51**	**0.23**	**0.50**	**1,270**
						Mineral Assemblage	**27%**	**3%**	**6%**	**23%**	**10%**	**22%**	

ORE RESERVE

Reserve Category	Zircon cut-off %	Material Mt	HM %	HM Mt	Slime %	OS %	Head Grade						Zircon Kt
							Zircon %	Rutile %	Leuc %	HiTi %	Alt Ilm %	Si TiOx %	
PROBABLE	0.4	138	2.6	3.52	4.6	5.3	0.72	0.07	0.17	0.59	0.32	0.57	990
TOTAL	**0.4**	**138**	**2.6**	**3.52**	**4.6**	**5.3**	**0.72**	**0.07**	**0.17**	**0.59**	**0.32**	**0.57**	**990**
						Mineral Assemblage	**28%**	**3%**	**7%**	**23%**	**13%**	**22%**	

Table Notes

- Rounding may generate differences in last decimal place
- A constant SG of 1.7 has been used to derive material tonnes
- Slime refers to material typically <53um
- OS refers to oversize material typically >2mm
- Mineral Assemblage derived from QEMSCAN® analysis
- Leucoxene (Leuc) – Ti-oxides containing 85 – 95% TiO2, HiTi - Ti-oxides containing 70 - 85% TiO2, Altered Ilmenite (Alt Ilm) - Ti-oxides containing <70% TiO2, Si-bearing Ti-Oxide (Si TiOx) – Ti-oxides containing >10% silica rich Ti minerals.
- Resources are inclusive of Reserves

Mining Lease

On 24 November 2014 DRX announced that the WA Department of Mines and Petroleum had granted a Mining Lease (ML69/141) for the Cyclone Zircon Project on 18 November 2014. The mining lease covers the original Cyclone resource area including sufficient additional area around the resource for operational activities including tailings, infrastructure and services. The mining lease covers sufficient resources for the first 10 years of mining and an additional lease will be obtained to cover the Cyclone Extended area as part of the DFS. The Cyclone Extended resource is currently held under a Retention Licence (R69/1).

Areas for other infrastructure and services more distant from the mine including the airstrip, accommodation camp and road will be secured under two Miscellaneous Licences. An application for the first Miscellaneous Licence for the airstrip, accommodation camp, and a section of the haul road has been submitted to the DMP and is expected to be granted by 30 June 2016. An application for the second Miscellaneous licence for the remainder of the haul road including the section through the nature reserve will be submitted following grant of the environmental licence.

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Water Supply

The availability of a suitable water supply for the Cyclone project was confirmed in late 2013 with the discovery of a massive high yielding groundwater aquifer in the Officer Basin sediments beneath the planned mine area. A bore was constructed to a depth of 812 metres to test the sediments and discovered high yielding sandstone formations which commenced at a depth of 530 metres and continued for the full depth of the bore.

An estimated flow rate up to 40 litres per second was obtained from the bore using the drill rig to air lift the water. The water quality at 25,000 ppm total dissolved solids is better than expected and is a good quality supply for the mine and processing plant. The potable water supply for the accommodation camp will require a desalination plant which will use the bore water.

The test bore is planned to be used as a production bore to form part of the Cyclone project borefield. The current estimate is for a network of at least ten bores to a depth of approximately 650 metres to supply the 7.8 gigalitres of water required for the mine, wet concentrator plant, and all other site uses each year. The test bore results confirmed that the capital cost estimate for water supply used in the financial evaluation of the project was appropriate. A pump test will be completed as part of the DFS to confirm the borefield design and obtain information to confirm the operating costs for the water supply system.

Native Title and Mining Agreement

A Native Title and Mining Agreement between Lost Sands and the Pila Nguru (Aboriginal Corporation) (RNTBC) representing the Spinifex People was signed at a ceremony held at Tjuntjuntjarra WA on 15 November 2014. The Spinifex People are the traditional owners of the Cyclone Project area,

The agreement provides enormous opportunities for the Spinifex People. Diatreme expects the mine will create around 100 jobs in both the construction and operational stages and the company has committed to a medium term target of recruiting 20% of the operational workforce from the local Indigenous community.

The agreement also provides for direct cash compensation payments, contracting opportunities to tender on various mine contracts and vocational benefits through direct employment on the project and traineeships. In addition, an educational trust fund will support the Spinifex People's education and training activities and a number of cultural initiatives are also planned. Payments associated with the agreement have been included in the Cyclone project financial model since execution and were also included in the recent financial evaluation by Sedgman.

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Definitive Feasibility Study

The Cyclone Project has now been effectively de-risked subject to the WA Environment Minister's grant of the environmental licence. The de-risking process has mitigated key project risks identified in the PFS and during the early stage of the DFS. DRX can now move confidently towards completing the DFS with the knowledge and comfort provided by the de-risking process.

In summary the key risks that have been mitigated and related management measures are listed below:

- **Native Title and Mining Agreement** - Agreement executed with the Native Title holders on 15 November 2014.
- **Mining Lease** - Granted by the WA Department of Mines and Petroleum on 18 November 2014.
- **Environmental Approval** - Draft environmental conditions received, EPA finalising these for a recommendation to the WA Environment Minister, licence expected by 30 June 2016.
- **Water Supply** - A massive water supply discovered and test bore completed at the Cyclone mine site, detailed water supply design to be completed in the DFS.
- **Mine Life** - Acquisition of Cyclone Extended has increased the mine life to 14 years at a mining rate of 10 million tonnes per year.
- **Independent Update and Assessment** - The Project Enhancement and Update Study by Sedgman Limited has revealed cost reductions and demonstrated robust financial results. Sedgman has highlighted other opportunities for improving the Cyclone Project economics.

For further information, please contact:

Neil McIntyre, CEO

About the Cyclone Zircon Project

Discovered in 2007, the Cyclone Zircon deposit is located along the Barton shoreline within the Wanna Lakes area of the northern Eucla Basin, 25 kilometres from Western Australia's state border with South Australia and 220 kilometres north of the transcontinental railway.

Following the acquisition of the Cyclone Extended Heavy Mineral Resource, the Cyclone Project's JORC Mineral Resource (Measured and Indicated) has been estimated at comprising 211 million tonnes at 2.3% heavy minerals (1% cut-off grade) containing 4.8 million tonnes HM (refer ASX announcement 9 April 2015). This includes a Measured Resource of 156Mt at 2.4% HM and an Indicated Resource of 55Mt at 1.8% HM (both at 1% HM cut-off grade).

In November 2014, Western Australia's Department of Mines and Petroleum granted a Mining Lease (ML69/141) for the project, which followed the signing of a Project Agreement with the traditional owners, the Spinifex People.

A Definitive Feasibility Study is underway along with further project specific commercial and operational enhancement studies, with Cyclone representing potentially the largest undeveloped zircon project in the Eucla Basin.

Cautionary Statement

This announcement has been prepared in accordance with the JORC Code (2012) and the ASX Listing Rules. Whilst Diatreme Resources has concluded that it has a reasonable basis for providing the forward looking statements included in this announcement, Diatreme Resources advises that given the current price of zircon and the company's current market capitalisation (compared to the capital expenditure required in connection with the Cyclone Zircon Project), the production targets and forecast financial information contained in this announcement do not provide an assurance of economic development at this stage. The stated production target and forecast financial information contained in this announcement is based on Diatreme Resources' current expectations of future results or events and should not be relied upon by investors when making investment decisions.

Competent Person Statement

The information in this report, insofar as it relates to Mineral Resources is based on information compiled by Mr Ian Reudavey, who is a full time employee of Diatreme Resources Limited and a Member of the Australian Institute of Geoscientists. Mr Reudavey has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he has undertaken to qualify as a Competent Person as defined in the 2012 Edition of 'The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Reudavey consents to the inclusion in the report of the matters based on the information in the form and context in which it appears.

The information in this report, insofar as it relates to Ore Reserves is based on information compiled by Mr Phil McMurtrie, who is a director of Tisana Pty Ltd (a consultant to Diatreme Resources Limited), and a Member of the Australasian Institute of Mining and Metallurgy. Mr McMurtrie has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he has undertaken to qualify as a Competent Person as defined in the 2012 Edition of 'The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr McMurtrie consents to the inclusion in the report of the matters based on the information in the form and context in which it appears.

APPENDIX 1

Cyclone Project - Annualised Ore Reserve

Year	Overburden Mm^3	Strip Ratio	Ore Mt	HM %	HM kt	Zircon kt	Rutile kt	Leucox kt	HiTi kt	Alt Ilm kt	Si TiOx kt
1	3.3	0.6	10.0	2.7	275	95	10	20	50	25	60
2	4.5	0.8	10.0	3.1	305	105	10	25	55	30	60
3	5.0	0.8	10.0	2.7	265	90	10	20	45	25	60
4	7.0	1.2	10.0	1.9	195	70	10	15	25	15	45
5	7.7	1.3	10.0	2.3	230	80	10	20	35	20	55
6	6.7	1.1	10.0	3.1	305	85	5	15	80	30	80
7	6.8	1.2	10.0	2.8	280	75	5	15	80	35	60
8	7.0	1.2	10.0	2.7	275	75	5	20	70	30	65
9	4.5	0.8	10.0	1.8	180	50	5	10	40	35	35
10	3.6	0.6	10.0	2.2	220	60	10	15	45	30	45
11	4.6	0.8	10.0	2.3	230	50	10	20	55	35	50
12	7.1	1.2	10.0	3.0	300	70	5	20	70	40	80
13	7.7	1.3	10.0	2.5	255	50	5	15	65	55	50
14	7.5	1.6	7.8	2.5	200	25	0	5	90	45	30
TOTAL	**82.8**	**1.0**	**137.8**	**2.5**	**3520**	**990**	**105**	**235**	**810**	**445**	**780**

Rounding may generate differences in totals
Mineral tonnages reflect contained mineral within mined ore, not product tonnes

Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	• Sampling techniques are considered to be mineral sands "industry standard' for dry beach sands with low levels of induration and slime. • Samples are down hole intervals of air-core drill cuttings collected from cyclone mounted rotary splitter, approximately 2-3kg (representing ~20%) of drill material is sampled. • Diatreme samples are 1.5m intervals, Image samples are either 2m or 1m intervals, with visibly mineralised zones typically sampled at 1m intervals. • Sample representivity validated by twin drill holes, sample duplicate analysis and bulk sample testwork. • For Diatreme samples Heavy Mineral (HM) is defined as mineral grains within 53 to 710 µm size range with an SG greater than 2.9 • For Image samples Heavy Mineral (HM) is defined as mineral grains within 63 to 1,000 µm size range with an SG greater than 2.9.
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• Vertical NQ air-core drilling utilizing blade bit, 3m drill runs.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• Visual assessment and logging of sample recovery and sample quality. • Reaming of hole and clearance of drill string after every 3m drill rod. • Sample chute cleaned between samples and regular cleaning of cyclone to prevent sample contamination. • No relationship is evident between sample recovery and grade.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• Geological logging of the total hole by field geologist, with retention of sample in chip trays to allow subsequent re-interpretation of data. • The total hole is logged; logging includes colour, grain size, sorting, induration and estimates of HM, slimes and oversize utilizing panning. • Logging is captured in Micromine data tables, with daily update of field database and regular update of master database.
Sub-sampling techniques	• *If core, whether cut or sawn and whether quarter, half or all core taken.*	• Rotary split on site (approx. 80:20), resulting in approximately 1.5 – 2.0kg of dry sample (as mineralization occurs above the water table).

Criteria	JORC Code explanation	Commentary
and sample preparation	• *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• Diatreme sample is then dried, screened and washed to determine oversize and slimes content in company sample preparation facility. 100g sample for HLS (HM assay) is riffle split from homogenized screened and de-slimed sample. • Diatreme duplicate HLS splits submitted at 1 in 40, results support sample representivity. • Image sample is dried and a 100g split screened and washed to determine oversize and slimes content in contractor sample preparation facility. The remaining sand fraction is then submitted for HLS (HM assay). • Sample size is considered appropriate for the material sampled. • Mineralogy samples are typically down hole composites of HM from the mineralized zone(s) with multiple hole composites across section for some of the thinner mineralized zones.
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	• Diatreme sample preparation laboratory operated by subsidiary company with methods and procedures adopted from industry standards. • Diatreme HM analysis undertaken by recognised independent HM laboratory (Diamantina Labs) utilizing TBE. • Image sample preparation and analysis undertaken by recognised independent HM laboratory (Western Geolabs). • Duplicates and external laboratory checks regularly undertaken for HM analysis, acceptable levels of accuracy and precision have been established. • Mineralogy of the HM fraction determined by QEMScan analysis. • Valuable heavy minerals reported are Zircon, Rutile (Ti-oxides >95% TiO_2), Leucoxene (Ti-oxides 85 – 95% TiO_2, HiTi (Ti-oxides 70 – 85% TiO_2), Altered Ilmenite (Ti-oxides <70% TiO_2) and Si TiOx (siliceous Ti-oxides containing >10% silica rich Ti minerals). • Potentially deleterious minerals are also assayed (e.g. andalusite) as well as proportions of clean, coated and composite grains.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• Significant intersections validated against geological logging and local geology / geological model. • Significant intersections verified by company personnel. • Selected significant intersections independently validated as part of due diligence exercise by BaoTi in 2011. • A number of twinned holes occur across the deposit and these have verified the sampling and assaying results. • All data captured and stored in electronic format, with compilation and

Criteria	JORC Code explanation	Commentary
		storage completed by external contractors.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• All holes initially located using handheld GPS with an accuracy of 5m. • Subsequent DGPS survey of drill hole collars, accurate to within 1m in X and Y as survey was often taken of rehabilitated drill site (i.e. estimated collar location). • UTM coordinates, Zone 52, GDA94 datum. • Topographic surface generated from processing Ikonos satellite imagery and DGPS control points, collar RL's levelled against this surface to ensure consistency in the database and with the block model.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• Diatreme drill lines established at 150m to 300m spacing in interdunal swales with holes 50m apart in the beach mineralisation, 50-100m apart in the areas of nearshore only mineralisation and 25-50m apart in the narrower higher grade strand mineralisation. • Image drill lines established at 250m to 500m spacing in interdunal swales with holes 50m apart in the main body of mineralisation and 50-100m apart on the marginal areas of mineralisation. • Drill spacing and distribution is sufficient to allow valid interpretation of geological and grade continuity appropriate to the estimation procedure and classification applied. • Sample compositing (down hole and occasionally across / along section) has been undertaken for determination of mineralogy.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• The mineralisation displays an average strike around 340°, whereas the overlying Quaternary dune field has dune ridges dominantly trending 80° – 260°. Exploration data is therefore well orientated to sample the mineralised feature without bias.
Sample security	• *The measures taken to ensure sample security.*	• Sample collection and transport from the field undertaken by company personnel following company procedures. • Diatreme HLS samples dispatched to laboratory in secure packaging via Australia Post.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• A prospective JV partner (BaoTi) undertook a geological due diligence exercise in 2011 with positive results. • A number of experienced mineral sands geologists have been involved in generation of the exploration methods, procedures and geological database.

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• The Cyclone deposit occurs within adjoining tenements M69/141, R69/1 and E 69/2425 in Western Australia. M69/141 and E69/2425 are held by Lost Sands Pty Ltd, a wholly owned subsidiary of Diatreme Resources, and R69/1 is held by Diatreme Resources. • The tenements are in good standing. • A Project Agreement is in place with the native title party (Pila Ngaru).
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Exploration within R69/1 has been undertaken by Image Resources, although exchange of data was first initiated under a MoU in September 2010. • The general drilling, sampling and assaying techniques utilised by Image are consistent with those utilised by Diatreme, and as such the data is considered to be of similar quality to that generated by Diatreme. • Diatreme acquired all data for R69/1 with the tenement purchase in March 2015.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The Cyclone mineral resource comprises a number of stacked and re-worked beach strandline mineral sand deposits associated with a Tertiary age coastal shoreline feature. • Mineralisation occurs within bimodal near-shore sands, beach / surf zone strandlines, homogenous beach sands, and overlying aeolian dune sands. • Quaternary cover overlies the deposit, and a shallow weathering profile with calcrete and ferruginous induration has developed.
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* o *easting and northing of the drill hole collar* o *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* o *dip and azimuth of the hole* o *down hole length and interception depth* o *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	• The Cyclone mineral resource has been estimated using data from 1,384 drill holes and it is not considered appropriate to tabulate each drill hole. • Representative cross sections along the strike of the mineralization to illustrate some of the drill data and the nature of the mineralisation were attached to previous announcements (23 Jan 2012, 9 Jan 2014, 9 Apr 2015).

Criteria	JORC Code explanation	Commentary
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• Image drill data was composited to 1.5m intervals within corresponding geological domains for the purpose of resource estimation.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	• As the mineralization is associated with marine sands it is essentially horizontal, with a maximum slope of 1°. • All drilling is vertical, hence the drill intersection is essentially equivalent to the true width of mineralization.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• A map of the drill collar locations and the outline of the Mineral Resource and Ore Reserve was attached to previous announcements (9 April 2015 and 14 Dec 2015).
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• Not applicable, resource estimate considers all material within the mineralisation domains. • Resource estimate is presented using variable cut-off grade and by geological domain to allow an understanding of grade distribution.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• Geological observations are consistent with beach placer / strandline mineralisation. • Several bulk samples (up to 12t) and subsequent metallurgical tests have characterized the nature of the mineralisation and confirmed that conventional processing techniques can be applied to produce marketable products. Some HM is coated and acid leaching +/- attritioning may be required for efficient separation / processing. • No bulk density measurements have been undertaken. • No groundwater was intersected in the course of drilling. • A Quaternary weathering profile including calcrete and rubbly laterite has developed above and within the upper part of the mineralisation. Minor cementing and silicification of the mineralised sand can occur, but the mineralisation is dominantly (>95%) unconsolidated sand. • Siliceous coatings and intergrowths on some HM grains are the only known deleterious substances. U+Th levels are <500pm for zircon

Criteria	JORC Code explanation	Commentary
		product.
Further work	• *The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• Not applicable, project is proceeding to feasibility study based on comprehensive exploration program completed to date. • The limits of mineralisation have been established by the comprehensive exploration program completed to date.

Section 3 Estimation and Reporting of Mineral Resources

(Criteria listed in section 1, and where relevant in section 2, also apply to this section.)

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• Drill data logged electronically in the field, manual and automatic validation undertaken prior to loading in to master database. • The master database is managed by external consultants. • General database validation using Micromine prior to resource estimation. • Detailed database validation by manual/visual checking using Micromine.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• Competent Person has undertaken several site visits and supervised numerous exploration drilling campaigns and is familiar with the terrain, mineralization and geological characteristics of the deposit.
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• A general geological model for mineralisation has been developed based on exploration data and published models for beach placer development, with minor modification to accommodate locally observed features. This allows high confidence in the geological interpretation of the Cyclone deposit. • The data is of sufficient density that alternative interpretations will not materially affect the Mineral Resource estimate. • The deposit has been split in to three domains, based upon geology and HM grade, for the purposes of resource estimation. • The 'Beach' domain comprises beach sands and minor dune and reworked beach sands, and typically displays transitional upper and lateral boundaries, with a distinct basal contact associated with surf zone grit and gravel. • The 'Strand' domain comprises beach strandline mineralization and typically displays transitional upper and seaward lateral boundaries with

Criteria	JORC Code explanation	Commentary
		a sharp basal contact associated with surf zone grit and gravel, it occurs wholly within the Beach domain (i.e. a subset of the' Beach' domain). • The 'Nearshore' domain comprises bi-modal fine grained marine sands with grit and typically displays transitional contacts. • A nominal 4% HM grade was used to delineate the Strand domain, with lower grade material occasionally included to maintain continuity and smooth shape. • A nominal 0.8% HM grade was used to delineate the Beach and Nearshore domain boundaries, with lower grade material sometimes included to maintain geological continuity and a smooth geometry. • The use of pure geological domains would result in a much larger, but lower grade, mineral resource estimate for Cyclone due to the transitional grade boundaries. • Grade continuity is significantly shorter across strike than along strike due to factors relating to deposition and sorting of material in a beach environment.
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• The Beach domain has two primary 'arms' with a strike of around 7.0 and 9.5 km, a width of up to 0.8 km, with the top of ore reaching to 6m below ground surface, and the base of mineralisation typically between 24 to 30m below ground surface. • The Strand domain forms a higher grade core of the Beach domain, with 6 individual strands recognized. Strands range from 2.5 to 7km in length, from 50 to 400m in width, and 2 to 12m in thickness. • The Nearshore domain has a strike of 7.5 km, a width up to 1.1 km, but is typically only 4 – 6m thick. It often abuts the base of the Beach domain, but can be separated by up to 8m of low grade material, or occur without the presence of overlying beach mineralisation.
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).*	• Resource estimation was undertaken using Micromine software, with inverse distance cubed interpolation method used for HM, Slimes and Oversize, and Nearest Neighbour for mineral assemblage. Mineral tonnes are calculated for each block, then total mineral assemblage calculated i.e. mineral assemblage values applied locally (weighted) and not as an unweighted global average. • Parent blocks size of 50m x 20m x 2m with 5 x 4 x 4 sub-blocking to neatly fit wireframes. • Three domains (as discussed above) were modelled separately and then combined to form a single block model for reporting purposes. • A minimum 3m thickness was applied to domain shapes, as this represents a minimum selective mining thickness. • A primary search ellipse of 275m x 55m x 5m oriented at 340° with a

Criteria	JORC Code explanation	Commentary
	• *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	0.8° dip to the west was used, minimum 3 samples and maximum 16 samples. • The resource estimate shows good correlation with previous estimates and also with wireframe volumes and raw drill assay data. • No top cut was applied as the high grade assays are believed to be a true sample of the grade of well-developed continuous beach strandlines. • The domain boundaries do not extend beyond halfway to the adjoining drill hole or drill line. • The block model was validated visually and statistically against drillhole data. • A hard boundary between the 'Beach' and 'Strand' domains was used to estimate grades for the Strand Domain, to prevent excessive dilution and smoothing of what is interpreted as a distinct high grade strandline. • A soft boundary between the 'Beach' and 'Strand' domains was used to estimate grades for the 'Beach' Domain, to reflect the transitional upper and seaward contacts of the strandline mineralisation.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• Tonnages are estimated on a dry basis.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• A 1% HM cut-off grade was utilized for reporting of the resource as this is believed to represent an appropriate grade considering the mineral assemblage, proposed mining technique and project economics.
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	• Conventional open pit 'dry' mining for mineral sands, with overburden removal by truck and shovel, and ore mining utilising in-pit dozer traps and slurry pumping. A minimum mining dimension of 100m width and 3m thickness is considered practical. • As the resource estimate has been generated and utilised for feasibility studies the mining assumptions are considered to be rigorous.
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	• Several programs of metallurgical testwork and process flow development have been undertaken by Mineral Technologies (MT). • Conventional wet concentrator plant for mineral sands, primarily utilising spiral separation with secondary screening and classification to achieve high HMC quality. • Testwork indicates >90% recovery of zircon to HMC, the primary economic driver of the resource. • Conventional mineral separation plant, primarily utilizing magnetic and

Criteria	JORC Code explanation	Commentary
		electrostatic separation with secondary screening, classification and gravity separation to achieve mineral products. • As the resource estimate has been utilised for feasibility studies the metallurgical assumptions are considered to be rigorous.
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	• The Cyclone project occurs within a vast vegetated dune field of the Great Victoria Desert in a remote location and does not display any unique environmental characteristics. • Environmental management practices similar to those currently used in the mineral sands industry, but modified for the local environment, will be applied. • Tailings will initially be disposed of in purpose built facilities, before reverting to in-pit tailings backfill.
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• Assumed bulk density of 1.7 utilised for tonnage estimates, based on both the theoretical density of mature sand deposits with relatively low levels of slime and HM, and similar HM deposits in Australia. • The mineralised material is reasonably homogenous over the extent of the resource and there is not expected to be material changes in the bulk density throughout the resource.
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• The primary factor for resource classification is drill spacing i.e. HM assay data density, as the geological setting and style of mineralisation is well understood and relatively consistent. • Infill drilling during 2011 and 2012 confirmed HM grade continuity and allowed higher confidence in the current drill pattern. • Additional mineral assemblage data is required to achieve similar levels of confidence and continuity as for HM data. • The classification used reflects the Competent Persons understanding of the deposit.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• The 2015 Mineral Resource estimate utilised a similar approach to the 2010 estimate which was undertaken by an independent technical expert.
Discussion of relative accuracy/	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For*	• A high level of confidence is placed on tonnage estimates (for the stated cut-off grade) as the geometry of mineralisation is well understood and the bulk density is considered accurate.

Criteria	JORC Code explanation	Commentary
confidence	*example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• A high level of confidence is placed on HM grade estimates, due to the data density, sample analysis techniques and methods of estimation. However, there is some evidence from bulk sampling that HM grade may be under-estimated by drilling / modelling, but this is not unusual for air-core drilling of unconsolidated sand deposits. Further investigations will be undertaken. • A high level of confidence is placed on slimes grade estimates, due to the data density, sample analysis techniques and methods of estimation. • A moderate level of confidence is placed on oversize grade estimates, due to the use of mechanised drilling techniques which can grind/pulverise indurated material and hence lead to under-estimation of oversize. Induration can also occur in an irregular manner and therefore be difficult to quantify by drilling alone. • A moderate to high level of confidence is placed on the global mineral assemblage estimate, as there is a reasonable number of QEMScan assays of composite samples from across the full extent of the deposit and the grade interpolation method accounts for variation through the deposit • A moderate level of confidence is placed on the local mineral assemblage estimates, as the use of composites may mask short range changes in mineral assemblage vertically through the mineralisation. Similarly, there exist some significant lateral variations in mineral assemblage, and the current data density is not sufficient to accurately define the boundary of mineral assemblage domains

Section 4 Estimation and Reporting of Ore Reserves

(Criteria listed in section 1, and where relevant in sections 2 and 3, also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	• *Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.* • *Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.*	• Mineral Resource estimate as described above, released to ASX on 9 Apr 2015. • The modelling techniques used are considered to align with industry best practice. • Mineral Resource is reported inclusive of Ore Reserve.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	• Competent Person visited site in August 2011 to view exploration drilling and test pit excavation, and is familiar with the terrain, geological

Criteria	JORC Code explanation	Commentary
	• *If no site visits have been undertaken indicate why this is the case.*	setting and the nature of mineralisation.
Study status	• *The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.* • *The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.*	• Pre-Feasibility Study was completed by Diatreme Resources in March 2012 (ASX release 20 March 2012). This study developed a practical mine plan that considered relevant Modifying Factors, and subsequently generated a financial model that confirmed the economic viability of the Cyclone Project. • The December 2015 Ore Reserve represents the inclusion of additional material from the Mineral Resource within R69/1 (Cyclone Extended), which has been subject to development of a practical mine plan as for the 2012 Pre-Feasibility Study. • This Ore Reserve represents results from a "Project Enhancement and Update Study" completed by an independent consultant on the 2012 Pre-Feasibility Study.
Cut-off parameters	• *The basis of the cut-off grade(s) or quality parameters applied.*	• A nominal cut-off grade of 0.4% Zircon was applied, based on estimates of capital and operating costs, mineral recovery and sales price and operating margin. Consideration was given to overburden volume and the development of a practical mining path.
Mining factors or assumptions	• *The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).* • *The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.* • *The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc), grade control and pre-production drilling.* • *The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).* • *The mining dilution factors used.* • *The mining recovery factors used.* • *Any minimum mining widths used.* • *The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.* • *The infrastructure requirements of the selected mining methods.*	• The mining factors are based on preliminary design by experienced personnel. Mining method comprises overburden removal by truck and shovel, and ore mining by dozer push to in-pit traps and slurry pumping. Infrastructure requirements are minimal and will consist of a network of temporary haul roads, electricity and water reticulation to the mining unit and a mobile slurry pipeline. • Ore mining and overburden removal methods selected on the basis of personal experience and consultation with experienced mineral sands mining contractors. • Practical overburden removal, mining and tailings processes and sequence developed by experienced personnel to minimize cost whilst providing access to higher grade ore in the early stages of the mine. Proven techniques with low technical risk have been selected. • Overburden, ore and tailings volumes have been calculated on an annual basis. • A pit slope angle of 45° has been used for overburden material, based on the induration and minor clay present. A pit slope angle of 35° has been used for ore, based on free-flowing sand. An overall slope angle of 25° has been used for tailing material to reflect the use of retention walls. • No groundwater is present within the mine design. • Mining dilution was built in to the Ore Reserve by the inclusion of

Criteria	JORC Code explanation	Commentary
		'waste' material in the mine design, both as roof and floor dilution and internal waste (interburden) which occurs between the beach and nearshore mineralisation. • No mining recovery factor has been used as ore loss is negligible when using dozer push methods. • Ore Reserve tonnes are inclusive of any dilution and loss. • A minimum mining width was not applied given the nature of the mineralisation and the proposed mining methods. The pit design has a minimum floor width of 80m but averages ~300m, giving ample room for efficient mining. • No Inferred Mineral Resources were considered in the Pre-Feasibility Study, or in this revision and update of the mine plan. • The mining method is based on mobile equipment feeding an in-pit mining unit that requires power and water supply. Power will be supplied via portable cable from the site power station electricity network established alongside the mine path, water will be supplied via a portable pipeline from the mine borefield.
Metallurgical factors or assumptions	• *The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.* • *Whether the metallurgical process is well-tested technology or novel in nature.* • *The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.* • *Any assumptions or allowances made for deleterious elements.* • *The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.* • *For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?*	• Metallurgical testwork and process flowsheet design has been carried out by Mineral Technologies (MT) in Carrara on representative bulk ore samples (one from the life of mine, the other from initial 2-year path). All work has been reviewed by experienced personnel. • MT have proposed the use of conventional wet concentrator plant (WCP) for mineral sands, primarily utilising spiral separation with secondary screening and classification to achieve high HMC quality. • MT has proposed the use of a conventional mineral separation plant (MSP), primarily utilizing magnetic and electrostatic separation with secondary screening and gravity separation to generate mineral products. Hot acid leach of the HM is required to achieve optimal recovery and product quality, due to the presence of coated grains. • Three mineral products have been generated, Zircon, HiTi85 (rutile and non-mag leucoxene with +85% TiO_2) and HiTi65 (mag leucoxene with +65% TiO_2). Market reports by TZMI and Ruidow suggest all products will be readily saleable. The current project strategy is to produce HMC for sale and not produce the three final products. • Mineral products have low U+Th levels by global standards. • QEMScan analysis during the metallurgical testwork allowed calculation / correlation of product recovery with ore reserve estimates.
Environmen-tal	• *The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options*	• Detailed environmental studies have been completed to produce a Public Environmental Review Report which has is currently in the assessment phase with the EPA. The report has been made available

Criteria	JORC Code explanation	Commentary
	considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	for public comment. Draft environmental conditions for the project have been tabled and are awaiting approval by the Minister • The proposed mining and on-site processing methods are consistent with industry best practice and any environmental impacts can be well managed and mitigated • Two off-path tailing storage facilities will be required to accommodate overburden and tailings during the initial phase of operations, but will revert to pit backfill once space is available. Overburden will be used to construct walls to contain tailings slurry. Overburden will comprise a mix of sandy loam, sand and lateritic gravel, whilst tailings slurry will comprise a mix of sand with minor silt and clay.
Infrastructure	• *The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.*	• The project is located in a remote region of WA within dune fields of the Great Victoria Desert and as such no infrastructure exists. The project development plan includes construction of a temporary camp for accommodation, airstrip for personnel movement, installation of diesel gensets for power generation, drilling of deep bores for water supply and construction of a road to the Trans Australia Railway at Forrest for logistics and product transportation. The road is planned to pass through the Great Victoria Desert Nature Reserve, and the environmental approvals process for a road corridor is well advanced.
Costs	• *The derivation of, or assumptions made, regarding projected capital costs in the study.* • *The methodology used to estimate operating costs.* • *Allowances made for the content of deleterious elements.* • *The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co- products.* • *The source of exchange rates used in the study.* • *Derivation of transportation charges.* • *The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.* • *The allowances made for royalties payable, both Government and private.*	• A total capital cost of $A161 M has been estimated. This capital estimate is lower than the PFS estimate due to removal of the MSP from the project and reductions in wet processing capital. Use of recently developed processing equipment has resulted in a modified plant arrangement and a more efficient wet concentration process. • The average annual operating cost is estimated to be $A72 M. • Detailed capital cost estimates for project construction have been derived from multiple sources (including independent consultants) and compiled and checked by an experienced mineral sands project manager. Capital cost estimates were verified by the “Project Enhancement and Update Study”. • Detailed capital and operating cost estimates for mining and general mine support activities have been provided by experienced mineral sands mining contractors and validated by the study manager. Cost estimates were verified by the “Project Enhancement and Update Study”. • Detailed capital and operating cost estimates for the WCP have been derived by MT and validated by the study manager. The WCP design and costs include all processing required to generate high grade HMC, and is based on the bulk sample metallurgical testwork. Cost estimates

Criteria	JORC Code explanation	Commentary
		were verified by the "Project Enhancement and Update Study". • Detailed capital and operating cost estimates for a MSP suitable for Cyclone HMC have been derived by a Chinese party (BaoTi) based on MT's design and validated by the study manager. The MSP design and costs include all processing required to generate saleable product, as based on the bulk sample metallurgical testwork. This information is required for potential customers of Cyclone HMC. • Transportation charges were derived in consultation with recognized trucking, rail haulage and port logistics companies and consultants • Allowance has been made for Government royalty of 5% of Australian revenue. The mining agreement with the Pila Nguru People includes a royalty and this royalty has also been considered in the study.
Revenue factors	• *The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.* • *The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.*	• Project revenue is based on head grade (as determined for resource block model), mining and processing recovery (as determined by MT metallurgical testwork and process flow design) and mineral product prices (as below). • Estimates of future commodity prices were determined by analysing recent reports from various sources including mineral sand producers and market analysts. The final product prices ($US) used in the project evaluation was, zircon $1,300, HiTi85 $700, and HiTi65 $300. The prices were then used to estimate the value of Cyclone HMC. • The project has been evaluated with the AUD:USD exchange rate set at 0.74. This rate is based on the generally accepted outlook for the exchange rate.
Market assessment	• *The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.* • *A customer and competitor analysis along with the identification of likely market windows for the product.* • *Price and volume forecasts and the basis for these forecasts.* • *For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.*	• The general downturn in the world economy has suppressed demand and prices for these industrial mineral products. The timing of an upturn is uncertain and new projects will be watching this closely to time their entry into the market. • Market studies by TZMI and Ruidow confirm ready market acceptance of the Cyclone mineral products, with China identified as the primary market. • Zircon is suitable for ceramics, foundry and refractory use. • HiTi85 is suitable for Ti-sponge or as a blend feedstock for chloride pigment plant. • HiTi65 is suitable as a blend feedstock for chloride pigment plant. • No specific customer testing or acceptance requirements / specifications have been undertaken. • Iluka Resources is the dominant producer in the zircon market, however several smaller scale producers also supply the market and a number of HM projects are undergoing assessment and development. Cyclone is

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		well placed to compete due to its simple low cost mining operation and relatively high zircon grade.
Economic	• *The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.* • *NPV ranges and sensitivity to variations in the significant assumptions and inputs.*	• Discount rate of 8% was used and is commonly used with this type of project under current economic conditions. The exchange rate range of 0.74 AUD:USD is in line with generally accepted outlook. The evaluation did not use escalation of prices or costs. • NPV ranges were obtained using a range of mineral prices from the current depressed prices to the general outlook for longer term prices. The project is marginally viable at current mineral prices. The project NPV is $121M for longer term prices of zircon $1,300, HiTi85 $700, and HiTi65 $300. • The "Project Enhancement and Update Study" completed by an independent consultant confirmed the viability of the Cyclone Project and provides DRX with an independent consultant's financial analysis which shows improvements to the project economics.
Social	• *The status of agreements with key stakeholders and matters leading to social licence to operate.*	• A mining agreement with the Native Title party (Pila Nguru people) was finalised, signed and lodged in November 2014.
Other	• *To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:* • *Any identified material naturally occurring risks.* • *The status of material legal agreements and marketing arrangements.* • *The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.*	• No significant naturally occurring risks have been identified which may impact the estimation of ore reserves • No marketing arrangements have been established for the project • Permitting process for the access and haul road has commenced, no significant impediments have been identified to date and approval to establish a road corridor through the Nature Reserve is anticipated based on progress with relevant authorities to date, • The Cyclone Mine Lease M69/141 was granted in November 2014 • The time frame for project development reported in the Pre-Feasibility Study has been delayed while the Public Environmental Review is proceeding and development work is scheduled to recommence when the EPA approval is obtained.
Classification	• *The basis for the classification of the Ore Reserves into varying confidence categories.* • *Whether the result appropriately reflects the Competent Person's view of the deposit.* • *The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).*	• The Ore Reserve has been classified as Probable based on the accuracy of the cost estimate (PFS quality) and additional work required for the marketing of Cyclone HMC in China. • The Probable Ore Reserve appropriately reflects the Competent Persons view of the deposit • Greater than 90% of the Probable Ore Reserve has been derived from Measured Mineral Resources
Audits or	• *The results of any audits or reviews of Ore Reserve estimates.*	• The 2012 Ore Reserve estimate was reviewed by Terence Willstead & Associates and verified as an appropriate estimate.

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reviews		• The 2016 Ore Reserve estimate has not been independently reviewed in detail but utilises the same project development principles as the PFS Ore Reserve Estimate. • The "Project Enhancement and Update Study" completed by an independent consultant confirmed the viability of the Cyclone Project.
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.* • *It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• The accuracy and confidence level in the Ore Reserve estimate is considered appropriate for the level of supporting studies undertaken for the Pre-Feasibility Study and subsequent resource, metallurgy, heritage, and environmental studies. • The Mineral Resource, Mining and Metallurgical Factors are well understood and have been developed by experienced mineral sands personnel familiar with this style of heavy mineral deposit. Details of the Mineral Resource modeling technique and parameters are provided earlier in this document. Standard mineral sand mining parameters have been applied to the Mineral Resource block model to produce the Probable Ore Reserve estimate. • The project is sensitive to mineral product prices and the AUD:USD exchange rate. These are the main external factors impacting on the Ore Reserve estimate.