ASX
ANNOUNCEMENT

15 November 2018

Positive DFS confirms Cyclone's potential as new zircon mine

Highlights:

- **Cyclone Zircon Project's potential as profitable new WA zircon mine confirmed by Definitive Feasibility Study (DFS) results, undertaken by China ENFI Engineering Corporation (ENFI)**
- **Positive after-tax financial results, including estimated net present value (NPV) of AUD$113 million, internal rate of return (IRR) of 27% and capital payback (post-production) in the first 2.7 years of a life of mine (LOM) estimate of 13.2 years**
- **Capital cost slashed to AUD$135m, a significant reduction on the previous independent estimate in 2016**
- **LOM production of 1.94 million tonnes (Mt) of heavy mineral concentrate (HMC), containing 936 kilotonne (kt) zircon, producing 772kt of zircon final product**
- **ENFI, part of major Chinese mining group China Minmetals, formally endorses the Cyclone project and recommends immediate development.**

Emerging mineral sands miner Diatreme Resources Limited (ASX:DRX) announced today positive results from the Definitive Feasibility Study (DFS) for its flagship Cyclone Zircon Project, which have slashed the project's estimated capital expenditure and reaffirmed its potential profitability amid growing demand for high-grade zircon.

Significantly, the results point to a potentially highly profitable new project located in the world-class Eucla Basin of Western Australia that will generate new jobs, investment and wealth for all stakeholders, including the traditional owners. Cyclone is one of only three significant zircon-dominant discoveries of the past decade, highlighting the lack of high-grade supply, with strong demand for zircon driven from Asia's rapid and continuing urbanisation.

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The DFS has identified significant savings on previous project studies in the project development costs (capex), which are now estimated at $135.7m, including significant contingencies, and with a rapid capital payback period post-production commencement of 2.7 years (life of mine estimate of 13.2 years). This compares to the AUD$161m capex estimate provided in the 2016 study by independent engineering firm Sedgman **(refer ASX announcement 15 June 2016).**

The post-tax project NPV is estimated at $113.3m using a 10% discount rate and base pricing assumption of US$1,500 per tonne for premium zircon product. Current base prices for zircon are in the range of US$1,580 (Iluka reference price as at October 2018) to US$1,700 per tonne for current "spot" price purchases.

ENFI has used a conservative evaluation method to ensure the DFS study not only satisfies the needs of general investors, but also the exacting criteria required by Chinese financial institutions (banks and institutional lenders) and Chinese state-owned enterprise (SOE) companies within the sector for the purpose of immediate investment decisions.

Welcoming the DFS findings, Diatreme's Chairman, Mr Gregory Starr said: "We are delighted by these results, which confirm that Cyclone's economics are sound and the project capable of attracting the necessary investment. In a market where zircon is entering a period of constrained supply, the development opportunity for Diatreme is immediately apparent.

"Diatreme will now seek to unlock the project's value for shareholders through its further development."

ENFI's Lead Cyclone Project Study Manager, Mr Shuxun Wang said: "ENFI was pleased to undertake the Definitive Feasibility Study for the Cyclone Heavy Minerals Zircon Project, a study undertaken using strict and conservative standards compatible with Chinese bankable feasibility requirements.

"Our study findings confirm this is an economically robust project and well worth attention for investment purposes. It is further recommended that Diatreme undertake the project's development and construction as soon as possible."

Following are further summary details regarding Cyclone and the DFS, comprising:

- Cyclone Zircon Project introduction
- Executive summary – ENFI Cyclone DFS, including:
- Base DFS assumptions
- Financial results and data
- Capital cost estimate
- Operating cost estimate

- Mineral Resource and Ore Reserve
- Process design
- Mine plan
- Final product prices
- MSP final products
- IRR sensitivity analysis
- Permitting and approvals
- Product offtake
- Development timelines
- Finance Strategy
- Key risks
- Summary
- Annexure 1: ENFI DFS report – detailed assumptions

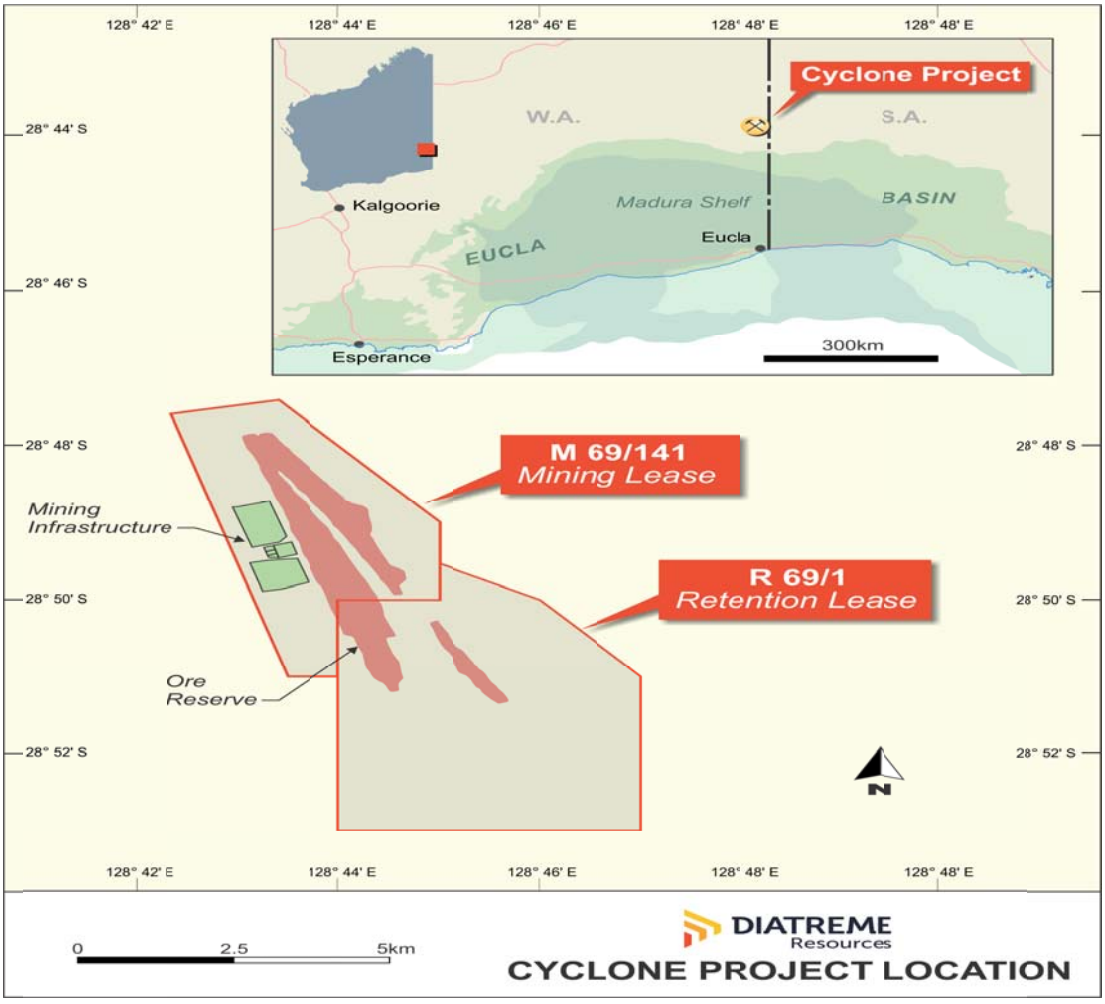
Cyclone Zircon Project Introduction

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.

In November 2014, Western Australia's Department of Mines and Petroleum granted a Mining Lease (M69/141) for the project, which followed the signing of a Project Agreement with the traditional owners, the Spinifex People. In January 2017, the project received final ministerial consent allowing for the development of a mineral sands mine and associated infrastructure.

A Definitive Feasibility Study has now been undertaken by China ENFI, part of the leading China Minmetals group, reaffirming Cyclone's potential as the largest undeveloped zircon project in the world-class Eucla Basin (refer map).

Figure 1: Cyclone Project Location



Executive Summary - Cyclone Project DFS Results

Diatreme engaged ENFI, through Cooperation and Consulting Services agreements, (**refer ASX announcement 11 January 2018**) for the completion of the Cyclone Zircon Project DFS. Under the agreements ENFI will also use its network within China's state-owned enterprise and banking sectors to assist in sourcing potential project investors, offtakers and project debt funders. ENFI's engagement was to review previous Cyclone studies, including the 2012 PFS and the 2016 Enhancement Study by Sedgman, and then complete the DFS.

ENFI has adopted a conservative approach compared to previously reported study results for Cyclone. This has resulted in higher than Australian standards of projected working capital, sustaining capital, production ramp-up, and operating costs. This method is standard for a study to achieve bankable feasibility status with Chinese financial institutions and facilitates immediate funding options for potential Chinese investors.

Cyclone's DFS has demonstrated the project capable of generating significant value for shareholders, due to its projected profitability, reduced capex compared to previous estimates and clear pathway to development.

Base DFS Assumptions (Table 1)

USD:AUD Exchange Rate	0.735
CNY:USD Exchange Rate	6.8
Financial Model Discount Rate	10%
HMC Product Price	85% of final product value
Study accuracy	15%
Contingency	10%
Mining Rate	10 million tonnes per annum (Mtpa)
HMC Annual Production Rate	147,700 tonnes (average)
Mine life	13.2 years
Construction period	2 years

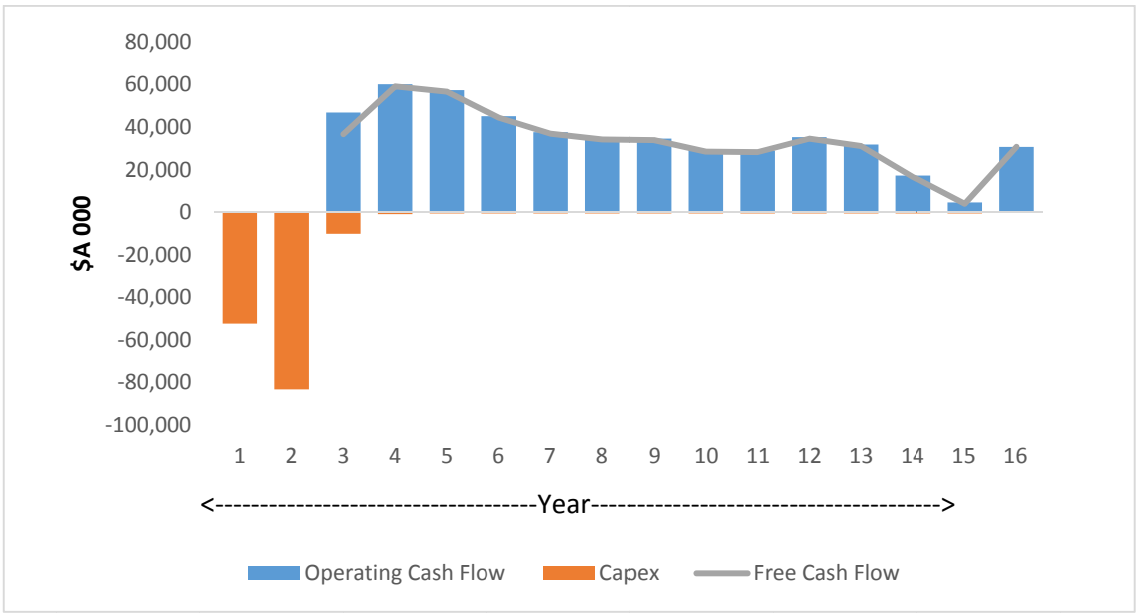
The project evaluation was completed using US dollars and the exchange rate used in the study for Australian cost inputs to the study was AUD$1 = US$0.735. The US$ results of the DFS have been converted to AUD using this exchange rate. All financial results are presented as after-tax values.

Financial Results & Data (AUD$) (Table 2)

Net Present Value	$113.3m
Internal Rate of Return	27.2%
Payback period (production years)	2.7 years
Construction Capital (capex)	$135.7m
Average Annual Revenue	$130.1m
Average Annual operating expenditure (opex)	$75.5m
Working Capital *	$11.7m in Year 1
Sustaining Capital *	$18.7m ($10.2m in Year 1)
Average Annual Company Tax (30%)	$11.6m
Average Annual After-Tax Profit	$26.6m
Average Annual Depreciation	$9.9m
Average Annual State Royalty	$6.5m

**Note: Working capital and sustaining capital contingencies at $11.7m and $10.2m ($21.9m total for first year) respectively for first year of operations are relatively high by Australian standards but compliant with Chinese bankable study standards. Removal or reduction of these contingencies could potentially enhance project returns and economics.*

Cyclone – Operating Cash Flow Chart (Figure 2)



Adding to the project's solid fundamentals, Diatreme considers the evaluation method used by ENFI to be extremely conservative. The Company expects working capital to be much lower than projected, while sustaining capital is unlikely to be required at all in Year 1. The financial outcome for the project is therefore likely to be better than these results reported by ENFI.

Capital Cost Estimate (AUD$) (Table 3)

ITEM	COST ESTIMATE ($m)
Wet Concentrator Plant and Mining Units	38.11
Roads and Transportation	27.88
Tailings Facilities	13.63
Bores and Water Supply System	12.04
Accommodation Camp, Offices and Amenities	10.00
Power Distribution System	4.00
Maintenance Workshop and Equipment	3.00
Telecommunications and Plant control System	2.33
Engineering, Procurement & Construction Management	11.28
Contingency	13.40
TOTAL CAPITAL COST	**135.67**

The capital cost estimate has been reduced to $135.7m during the ENFI study with the main areas of cost savings comprising:

- Processing equipment, plant fabrication and construction
- Haul road construction
- Product transport containers.

ENFI reduced the projected cost of the Wet Concentrator Plant (WCP), Mining Unit Plant, and associated pumps and piping using Chinese equipment and procurement where appropriate. The haul road cost was reduced using a lower cost construction method, which was enabled by the selection of a more appropriate compaction enhancing and dust-suppressing agent.

Flinders Ports provided a price for container receival, handling, and ship loading at Port Adelaide, including the use of port-supplied containers. The cost that was previously included for purchasing product containers has therefore been removed from the capital project, resulting in a small increase in operating costs due to higher port charges to cover the container ownership costs.

The DFS includes an analysis by ENFI of the options to either produce final products in Australia, or export heavy mineral concentrate (HMC) from Australia and produce the final products in China.

The study recommended that the mineral separation plant (MSP) would have lower capital and operating costs in China and Cyclone should market the HMC to a Chinese customer with a suitably equipped MSP. More than one customer is also a possibility, given there is currently excess MSP capacity in China and very limited domestic HMC suppliers.

Consequently, the DFS financial evaluation is based on the sale of HMC on a CIF basis to China and the HMC price includes shipping to Shanghai.

The estimated average annual operating cost is $75.5m, which is slightly higher than estimated in the 2016 study due to the more conservative approach taken by ENFI. A summary of the operating cost estimate is presented in the following table:

Average Annual Operating Cost Estimate (AUD$) (Table 4)

ITEM	COST ($m)
Mining, Processing and Rehabilitation (ex-labour)	29.01
Logistics	21.07
Site Employee Remuneration	8.67
Fuel and Power	7.68
Corporate Overheads and Site Administration	5.00
Maintenance	4.07
TOTAL OPERATING COST	**75.50**

The improved market outlook for zircon and titanium products has increased the project's estimated average annual revenue to $130.1m. ENFI reviewed the mineral sands market and is confident that current prices are likely to form a solid base for the project and can be confidently used for its financial evaluation.

Mineral Resource and Ore Reserve Estimate

The Cyclone Mineral Resource estimate was updated in January 2017, comprising 203 Mt at 2.3% HM (at 1.0% HM cut-off grade), containing 4.70Mt of HM (refer ASX release dated 27 April 2017)

CYCLONE MINERAL RESOURCE AND ORE RESERVE ESTIMATE

Category	HM cut-off %	Material Mt	HM %	HM Mt	Slime %	OS %	Head Grade						Zircon Kt
							Zircon %	Rutile %	Leuco %	HiTi %	Alt Ilm %	Si TiOx %	
CYCLONE MINERAL RESOURCE ESTIMATE													
MEASURED	1.0	156	2.4	3.81	4.2	5.0	0.69	0.07	0.16	0.58	0.30	0.53	1,079
INDICATED	1.0	48	1.9	0.89	4.4	5.1	0.38	0.04	0.09	0.62	0.30	0.34	183
TOTAL	**1.0**	**203**	**2.3**	**4.70**	**4.2**	**5.0**	**0.62**	**0.06**	**0.14**	**0.59**	**0.30**	**0.49**	**1,262**
Mineral Assemblage							**27%**	**3%**	**6%**	**26%**	**13%**	**21%**	
CYCLONE ORE RESERVE ESTIMATE													
PROBABLE		138	2.6	3.52	4.6	5.3	0.72	0.07	0.17	0.59	0.32	0.57	990
TOTAL		**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 5 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 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.*
- *"Strand", "Beach" and "Nearshore" represent differing geological domains based upon varying sediment grain size and sorting (i.e. depositional environment), mineralogy and HM grade.*

The HM mineral assemblage at Cyclone has been determined by QEMSCAN analysis of composite samples taken throughout the deposit. QEMSCAN (Quantitative Electron Microscopy, Particle Mineralogical Analysis) was chosen as the analytical technique as it was recognised early in the exploration process that whilst the Cyclone HM contained high proportions of zircon, it also displayed a broad range of variably weathered (i.e. coated) and altered titanium minerals that would be difficult to quantify using more conventional techniques (eg magnetic separation and XRF analysis or grain-counting).

However, the development of QEMSCAN mineral lists and particle classification rules has required ongoing assessment to better align the determination of resource mineral assemblage with the production of mineral concentrates and products generated from benchtop metallurgical testwork.

Samples were composited from the HM (sink) sachets derived from HM analysis, with groupings determined by assessing the local geological characteristics (i.e. geological interpretation of drillhole logging) and visual analysis of the sachets to restrict the QEMSCAN sample to a distinct mineralised domain.

Around one third of the HM at Cyclone is zircon, ranking it as one of the highest value mineral assemblages on a global scale. The remainder of the HM comprises a broad range of weathered and altered titanium minerals ranging from rutile (95% TiO_2) through to altered Ilmenite (~60% TiO_2), with very low levels of trash HM.

Process Design

A bulk sample for metallurgical testwork was collected from drillholes across the entire area of the ore reserve. The bulk sample was initially prepared for Mineral Technologies as three separate bulk samples representing the three geological zones of dune, beach and nearshore. The table below provides a summary of three samples, including sample mass, HM%, oversize %, average particle size for the sand portion less than 2 millimetres and slimes.

Ore Zone	Mass (kg)	HM %	Oversize % (+2mm)	Particle size (micron)	Slimes %
Dune	2,235	2.14	16.6	220	4.17
Beach	3,792	3.50	3.3	220	1.61
Nearshore	948	2.12	8.8	149	3.22
Total (average)	**6,975**	**2.88**	**6.9**	**197**	**2.66**

Table 6: Bulk Sample Details

All zones are low in slimes and the dune zone is significantly higher in oversize due to the presence of weathering related induration. HM% and particle size are in the normal range expected for mineral sand processing.

Before undergoing processing testwork, sub-samples were taken from the three bulk samples and subjected to characterisation tests to understand the potential for processing variability of the samples and to identify any issues with the samples that could arise during processing testwork.

The samples were processed on a shaking table to produce HM concentrate, and the concentrates were subjected to magnetic fractionation and then separated in heavy liquid with a density of 4.05SG to check for potential variability in the recovery of zircon.

The results of the bulk sample characterisation tests demonstrated that 17% of the HM in the samples reported to the table tailings fraction. This is due to the relatively large component of light titanium minerals (coated and altered titanium minerals) in the samples.

Zircon recovered very well to concentrate and made up 94.3% of the +4.05SG fraction. All magnetic fractions and SG fractions were inspected under a microscope confirming the presence of coated and stained minerals, and significant proportions of altered ilmenite, and leucoxene grains.

This zone characterisation information was used for planning the processing testwork. The results of the bulk sample characterisation tests demonstrated that there would be some metallurgical benefits in processing the ore zones separately.

However, the added complexity and inefficiency that would be encountered by site processing and mining resulted in a decision to combine the three samples for the metallurgical testwork and process design. The objectives for the metallurgical study were to maximise the recovery of zircon and to maximise the HM grade of the concentrate. The characterisation tests demonstrated these objectives could be achieved from the combined bulk sample.

Mineral Technologies concluded that the processing testwork demonstrated that three mineral products, zircon, HiTi87 and HiTi67 could be produced from Cyclone HMC.

The WCP will be located on the western side of the mine, approximately one kilometre north of the initial mining area. This WCP location will be fixed for the life of the mine and has been selected to ensure the pumping distances for both feed and tailings do not become excessive. Tailings storage facilities will be located north and south of the WCP to ensure short tailings pumping distances during the early years of the mine.

The WCP process flowsheet has been designed by Mineral Technologies based on metallurgical testwork completed on the bulk sample. The bulk sample was collected to produce a representative sample suitable for mine life process design. The bulk sample was screened at 3mm prior to commencing WCP spiral testwork.

Ore in slurry form will be received by the WCP surge bin which will feed a standard HM wet concentration process at a controlled rate. The surge bin will moderate variations in feed rate from two dozer traps to produce an average feed rate to the separating equipment of 1210 tph.

The WCP process will be a totally wet slurry process and will include screening and several stages of gravity concentration using spirals, classifier, and shaking tables to concentrate the valuable heavy minerals.

The first stage of gravity concentration testwork used MG6.3 spirals as the rougher spirals operating at 1.6tph and 2.0tph. Release curves were developed to provide a predictive tool characterising the separation performance of the prepared sample. The tests indicated that zircon in the sample readily responded to gravity separation using spirals, and titanium minerals were less efficiently separated due to a high proportion of lower SG Ti minerals. The middlings stream from the rougher spirals was also tested on MG6.3 spirals.

The concentrate from the rougher and mid scavenger spirals was screened at 1mm to prevent coarse sand becoming a problem with recirculating streams in the cleaner spirals and the +1mm oversize was rejected. The remaining -1mm HM concentrate was processed using HG10i spirals at 1.5tph and 1.8tph to generate separation data for the cleaner stage.

The lower feed rate produced better performance. HG10i spirals were also used for re-cleaner stage tests which indicated an additional finishing stage would be required to upgrade the concentrate to a high HM grade with high zircon recovery.

Finisher stage testwork involved HG10i and WW6 spirals, WHIMS and an up current classifier (UCC). The UCC tests produced superior performance with the underflow containing more than 80% of the stage feed HM and a grade exceeding 97% HM. The UCC overflow was then processed using HG10i spirals and shaking tables to produce a final concentrate from the fine sand fraction. The table concentrate grade was in excess of 98% HM with a stage recovery of 98% zircon.

Performance simulation of the WCP was conducted using data generated from the testwork. Small variations were noted for modelled intermediate stream data.

The simulation results indicated a HMC containing 97.8% HM would be produced at a rate of 25.9 tph for a mining rate of 1300 tph. Total HM recovery would be in the order of +65% from the plant feed while VHM (+4.05SG) recovery of +90% was achievable.

The majority of silica minerals, trash minerals and low SG titanium minerals will be rejected to tailings from the WCP. A high grade mineral concentrate (+97% HM) will be produced containing the zircon and valuable titanium minerals.

Metallurgical testwork has demonstrated good recovery of zircon and valuable titanium minerals in conventional spiral separators. The average rate of HM concentrate (HMC) production from the WCP is estimated to be up to 23 tph after applying the bulk sample results to the Ore Reserve HM grade.

Mineral recoveries have been estimated from mineral distributions using:

- QEMSCAN mineral classification and chemical analysis of the bulk sample
- Analysis of concentrate produced from the WCP gravity concentration process tests
- Analysis of final products produced from the MSP process tests
- Process simulation and back-calculation of feed grades.

The estimated mineral recovery from the WCP feed (bulk sample) to the WCP HM concentrate is shown below.

WCP Mineral Recovery	
Zircon	95.3%
Rutile	75.3%
Leucoxene	36.4%
HiTi	29.8%
Altered Ilmenite	68.0%
SiTiOx	36.7%

Table 7: WCP Mineral Recovery

These mineral distributions have been estimated from simulated flows and Qemscan particle classifications. When applied to the ore reserve these recoveries result in an hourly HM concentrate production rate of 19.2 tph.

CPG estimated a production rate of 21 tph from the bulk sample without simulating recovery from middlings streams. The estimated HM concentrate production rate increases to 25.9 tph when the additional production from process simulation is included. The average production rate of 19.2 tph used in this report allows for the lower grade of the ore reserve compared to the bulk sample and includes a portion of the simulated production.

Mine Plan

The area planned to be mined is lightly vegetated with spinifex, shrubs, and scattered acacia and eucalypt trees. The larger vegetation will be cleared using a bulldozer to push woody vegetation into heaps and where practical the heaps will be pushed off the mining area. Heaps which cannot be practically pushed off the mining area will be removed using an excavator and truck.

Approximately 150ha will initially be cleared of vegetation for project construction and an average of 50ha per year will be cleared for ongoing operations, including mining activities and support facilities.

Small vegetation that remains on the topsoil surface after the larger vegetation has been cleared will be removed along with the topsoil. Bulldozers will push 0.1m depth of topsoil into stockpiles which will be transported from the mining area to the rehabilitation area using trucks loaded by an excavator.

For the initial start-up pit when there will be no area available for rehabilitation, topsoil will be stored in stockpiles outside the mining area. The average annual topsoil removal rate is 50,000 cubic metres per year.

The ore to be mined is buried beneath varying depths up to 20m of weakly mineralised overburden including a zone of induration relating to a lateritic weathering profile. The overburden must be removed to expose the high grade ore zone for mining.

During normal operations, the overburden will be removed using an excavator and will be transported to the mined out areas in trucks where it will be dumped to backfill the pit. Overburden which is removed for development of the initial pit will be used to construct tailings storage facility walls.

Subsoil overburden will be stockpiled beside the mining area as required for the rehabilitation program and will be returned as subsoil to be placed on completed tailings before covering with topsoil.

A bulldozer and dozer trap method will be used to mine the ore. There will be two separate 650 tonnes per hour (tph) mining units at different sections of the face to ensure blending of higher and lower grade ore to produce a controlled feed grade to the WCP.

Bulldozers will push ore for a distance up to 100m into the traps which will convey the ore at a consistent feed rate to a trommel and slurry bin. The trommel will screen out coarse particles larger than 3mm as a coarse reject and water will be mixed with the finer ore particles to form a slurry.

Slurry pumps will pump the ore from the slurry bin to a surge bin at the WCP. Oversize material rejected by the trommel will be stockpiled on the pit floor and pushed away as necessary using a bulldozer. The planned annual mining rate is 10 million tonnes per year.

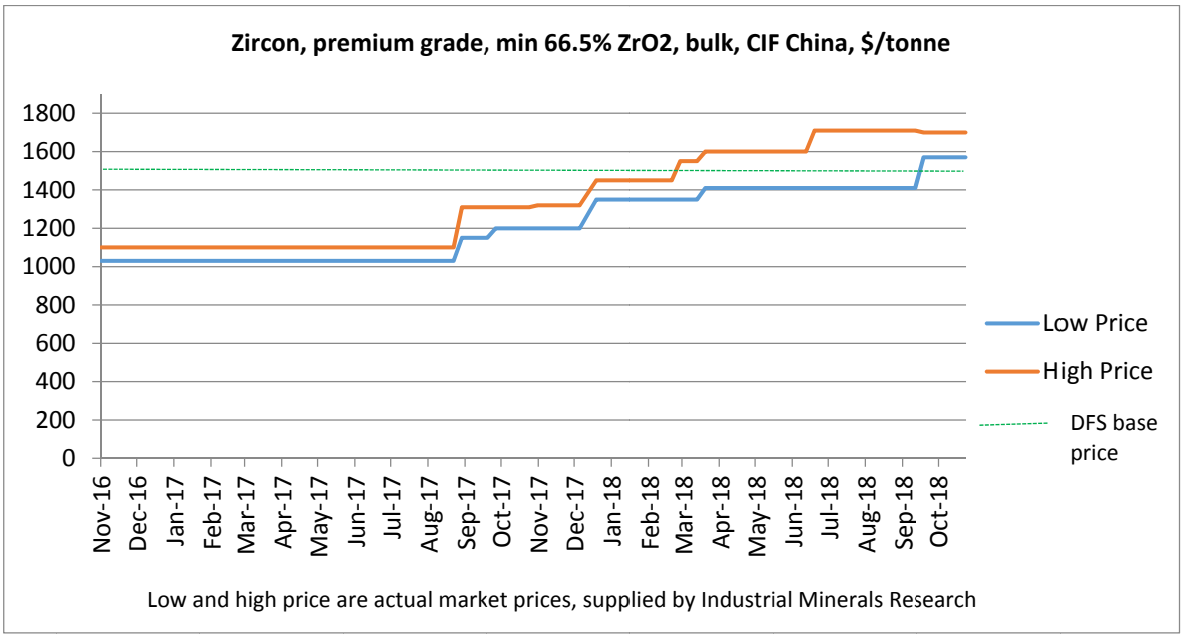
Final product prices used in the DFS financial evaluation (Table 8)

Zircon	US$1,500 per tonne
HiTi87	US$800 per tonne
HiTi67	US$350 per tonne

The average annual production of HMC is projected at 147,700 tonnes, with the HMC having a heavy mineral grade of 97.9%. Average HMC production for the first four years will be 167,469 tonnes per year.

The sale price for HMC delivered to Shanghai is estimated to be 85% of the value of the final products (zircon, HiTi87 & HiTi67) that would be produced from the HMC. The average HMC sale price over the life of the project is projected at approximately US$647 (A$880).

Zircon Pricing Chart (Figure 3)



The value of the final products will vary annually and is dependent on the mineral assemblage in the HMC and the MSP recovery of the minerals from HMC to final products. The estimated average annual production of MSP final products from the HMC is presented in the Table 9 below:

MSP Final Products (Table 9)

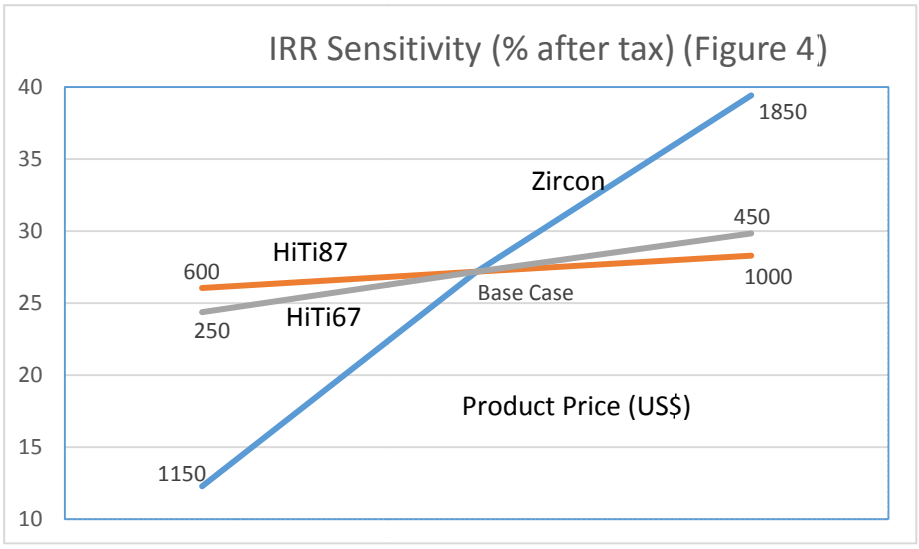
MSP PRODUCT	AVERAGE ANNUAL PRODUCTION
Zircon	58,790 tonnes
HiTi87	9,179 tonnes
HiTi67	48,647 tonnes

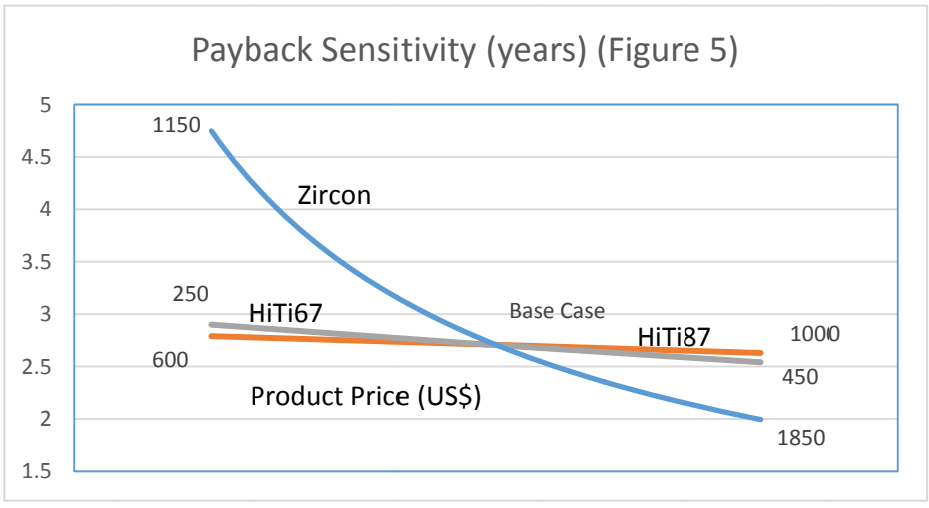
Zircon contributes approximately 80% of the value of the total final products and is the critical mineral for obtaining a high price for the HMC. The HMC is typically more than 50% zircon by weight.

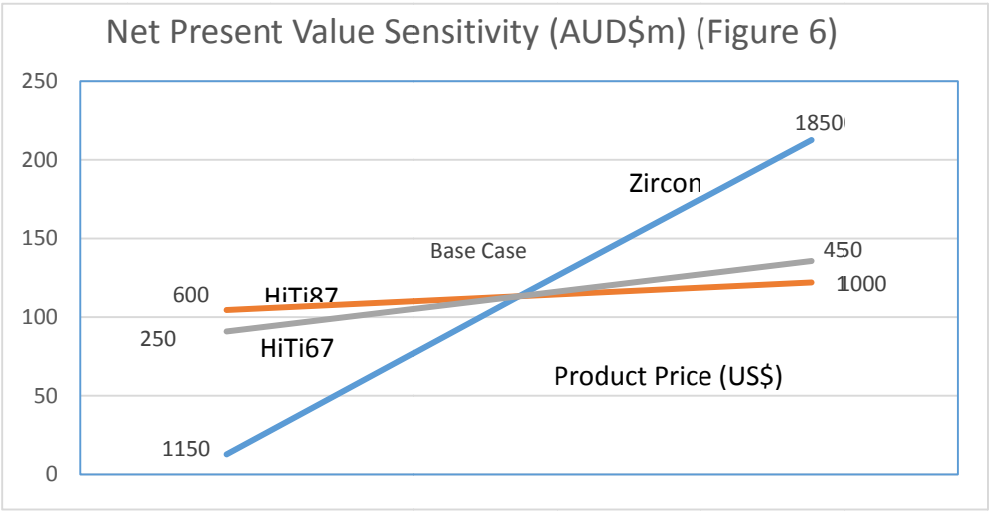
MSP production of zircon will average in excess of 70,000 tonnes per year for the first four years of the operation. This is a consequence of a mining schedule designed to exploit the highest grade area of the orebody during the early years of operation.

ENFI completed a sensitivity analysis to evaluate changes to input variables relating to revenue and costs and how these changes could impact on the project's financial results. The analysis showed that the project is more sensitive to variations in revenue and less sensitive to variations in operating costs and capital cost.

Variations in the value of the zircon component of the HMC will have the greatest influence on revenue and its significance to the financial results is demonstrated in the following charts (Figures 4-6):


IRR Sensitivity (% after tax) (Figure 4)
40
35
30
25
20
15
10
1850
Zircon
450
HiTi87
600
1000
Base Case
250
HiTi67
Product Price (US$)
1150


Payback Sensitivity (years) (Figure 5)
5
4.5
4
3.5
3
2.5
2
1.5
1150
Zircon
250
HiTi67
Base Case
HiTi87
1000
600
450
Product Price (US$)
1850


Net Present Value Sensitivity (AUD$m) (Figure 6)
250
200
150
100
50
0
1850
Zircon
Base Case
450
600
HiTi87
1000
250
HiTi67
Product Price (US$)
1150

Permitting and Approvals

The Cyclone project has been de-risked following an extensive work and regulatory program, including the identification of a suitable water supply, Native Title and Mining Agreement, award of a Mining Lease, extension of the project's mine life with the acquisition of Cyclone Extended and environmental approvals:

(i) 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 (**refer ASX announcement 17 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 DFS project financial model.

(ii) 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 Cyclone Extended resource is currently held under a Retention Licence (R69/1).

(iii) Environmental and Miscellaneous Approvals

Following an extensive PER process, final ministerial consent was received on 9 January 2017 (Ministerial statement No 1052), allowing the Cyclone project to "Develop and operate the Cyclone Mineral Sands Mine, including open cut pits, mining and processing infrastructure, airstrip, accommodation camp, bore fields and haul road construction from the mine site to the Forrest rail siding."

Further details are available in the Company's **ASX announcement dated 10 January 2017**.

Product Offtake

Diatreme has been in discussions with a number of potential HMC processing companies in China (**refer ASX announcement 27 June 2017**) who have current capacity to refine the HMC product. These discussions have been centred principally around the provision of "pure" product tolling arrangements.

The zircon pre-domination within Cyclone's HMC is extremely attractive to processors and end users, particularly given its low radioactivity in a market where supply is becoming increasingly constrained..

As a development strategy the Company has deliberately not sought to "lock-away" offtake too early in the development process. This is to allow completion of the DFS study and provide the maximum suite of development options for incoming parties, who may look to acquire all or significant portions of the HMC offtake within their own development scenarios.

This strategy also acknowledges that given Diatreme's relative balance sheet to the anticipated project development cost, the Company will need development partners to assist in providing the necessary project financing for mine development.

Further to this, the Company has recently entered into discussions with a major China-based party, an existing processor and refiner of heavy mineral products, to explore the potential for establishing a joint venture processing plant in China specifically to refine Cyclone's HMC product. This arrangement may also include direct investment by this party into Cyclone through a form of cross-ownership.

With the release of the DFS study, Diatreme will now seek to formalise those discussions through a Memorandum of Understanding, which may lead to more binding agreements. The Company will keep the market informed as these discussions progress.

Finance Strategy

The Company, based on the DFS reports outcomes, the reports' compliance with Chinese banking and investment requirements (SOE's and private investors) and given market buoyancy generally within the heavy minerals commodity sector, can move forward with a high level of confidence that credible project financing and investment parties can be assembled with terms acceptable to the company that can lead to the Cyclone Project being developed in the short term.

ENFI are also directly assisting the Company in this regard as part of the commercial understanding between the parties.

Key Risks

Key risks have been identified and plans to mitigate these will be part of next stage implementation. These risks include:

- Securing project capital funding or identifying suitable development partners that may assume that risk
- Negative movements in commodity prices or foreign exchange
- Inability to secure offtake arrangements
- Implementation delays to project commencement.

Development Timelines/ Go-Forward Plans

The Company has set a target following completion of the DFS to formalise entry of its potential major development partner(s) by mid-first quarter 2019.

The Cyclone project has some natural commercial and market advantages that will assist greatly in this process:

- DFS now complete by China ENFI Engineering – showing robust economics
- DFS compliant with Chinese SOE and lender requirements
- ENFI's significant Chinese SOE contact base to assist in sourcing development partners
- Cyclone project has all primary project approvals in place – it is "shovel" ready
- Heavy minerals sector buoyant and potential zircon supply side shortage identified and acknowledged by market
- Cyclone product mix heavily zircon dominated – highest value heavy mineral product
- Project structure and ownership allows all development options to be explored, including development by Diatreme, joint venture, earn-in or project sale.

Summary

The ENFI DFS study confirms the Cyclone project's economic fundamentals are sound and worthy of advancing to immediate development. Subject to Board approval, it is anticipated that Diatreme will now advance its discussions with potential development partners to facilitate project development as a matter of priority.

In all these dealings, whether through major party entry, joint venture, earn-in or sale the Company will, at all times pursue options that provide maximum benefit to Diatreme shareholders.

Diatreme's CEO, Neil McIntyre said: "Diatreme has progressively de-risked Cyclone with the award of a Mining Lease, identification of suitable water supplies, environmental approvals, acquisition of Cyclone Extended and various independent studies, making the project 'shovel-ready' for advancement. The completion of the DFS by ENFI marks a new milestone in the project's development and we are now focused on delivering maximum value from this important new project for Western Australia.

"Elsewhere, we continue to advance our Cape Bedford Silica/Heavy Minerals Project in North Queensland, as part of our valuable project portfolio of mineral sands and silica projects. These are exciting times for Diatreme shareholders and we look forward to further gains ahead, for the benefit of all."

Neil McIntyre
Chief Executive Officer

Greg Starr
Chairman

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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 was 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.

Annexure 1: Cyclone Zircon Project – ENFI Engineering Study DFS Report Extracts - Detailed Assumptions

Contents

1) Total initial capex estimate
2) Mining costs WCP – Australia
3) OPEX
4) Economic evaluation and key assumptions

1) TOTAL INITIAL CAPEX ESTIMATE

The total initial capex estimate of this project is shown in Table 14-3.

Table 14-3 Total initial capex estimate Unit:KUS$

No.	Description	Value (1000USD)					% of capital cost
		Construction work	Equipment procurement	Installation work	Other costs	Total value	
	Part I: Engineering cost						
1	Slurry making in stope		4,472	1,351		5,824	5.84
2	Roughing plant	10,109	5,963	2,227		18,299	18.34
3	Laboratory	1,452	592	89		2,133	2.14
4	Pipe network for beneficiation process			1,765		1,765	1.77
5	Tailings dam	2,768				2,768	2.77
6	Tailings delivery system	1,443	1,585	898		3,926	3.94
7	Tailings delivery pipeline			2,194		2,194	2.20
8	Return water system for tailings		647	303		950	0.95
9	Return water pipeline for tailings			185		185	0.19
10	Comprehensive maintenance shop[1]	662	463	199		1,324	1.33
11	General warehouse[1]	441	309	132		882	0.88
12	Water intake pump station	299	2,692	1,117		4,109	4.12
13	Water purification station	445	485	311		1,241	1.24
14	Domestic water pump station	118	114	71		303	0.30
15	Return water booster pump station	445	635	341		1,421	1.42
16	Domestic sewage treatment station	118	94	25		237	0.24

No.	Description	Value (1000USD)					% of capital cost
		Construction work	Equipment procurement	Installation work	Other costs	Total value	
17	Water supply and drainage network	1,544				1,544	1.55
18	Onsite power supply system[1]	2,941				2,941	2.95
19	Onsite telecommunication system	44	1,305	365		1,715	1.72
20	Camp[1]	4,412	2,206	735		7,353	7.37
21	General layout and transportation	860	1,299	7		2,166	2.17
22	Road[1]	15,335				15,335	15.37
23	Airport[1]	1,532				1,532	1.54
24	Railway transportation system[1]	1,471				1,471	1.47
	Total of Part I	46,438	22,862	12,315		81,614	81.81

No.	Description	Value (1000USD)					% of capital cost
		Construction work	Equipment procurement	Installation work	Other costs	Total value	
	Part II: Other expenses for project construction						
1	Land royalty						
2	Management expense of construction unit				1,722	1,722	1.73
3	Construction supervision fee				1,102	1,102	1.11
4	Research tests fee				588	588	0.59
5	Engineering survey fee[1]				200	200	0.20
6	Engineering design fee				2,212	2,212	2.22
7	Site preparation costs[1]				500	500	0.50
8	Additional construction expenses[1]				750	750	0.75
9	Engineering insurance premium				204	204	0.20
10	Cold commissioning fee				371	371	0.37
11	Hot commissioning fee				223	223	0.22
12	Production staff training fee				306	306	0.31
13	Tools and production furniture purchase fee				114	114	0.11

No.	Description	Value (1000USD)					% of capital cost
		Construction work	Equipment procurement	Installation work	Other costs	Total value	
	Total of Part II				8,293	8,293	8.31
	Total of Part I and Part II	46,438	22,862	12,315	8,293	89,908	90.12
	Contingency				9,853	9,853	9.88
	Capital cost	46,438	22,862	12,315	18,147	99,761	100.00
	% of capital cost	46.55%	22.92%	12.34%	18.19%	100%	

Note: The investment values marked [1] in Table 14-3 are provided by Diatreme Resources Limited and confirmed by ENFI.

2) Mining Costs WCP in Australia

(i) Range of costs of mining and WCP in Australia

Open-pit mining of this project includes four production links, i.e., surface cleaning, overburden removal, mining & stripping and rehabilitation. After being scrubbed in mobile scrubbing equipment, ores will be screened, with oversize > 3mm) delivered to the mined-out area, undersize (< 3mm) pumped to roughing system WCP after slurry making. The roughing system adopts spiral, UCC and concentrating table to produce HMC.

The estimated Factory Cost of mining and WCP includes outsourcing costs for mining and labour costs, materials & power costs in WCP, as well as labour costs, repair costs and other costs in factory management.

As required by Diatreme, mining outsourcing cost shall follow the following price determined in PFS of the project:

- Vegetation removal & Return: 2000A$/t(1470.59US$/t)
- Topsoil Removal & Return: 2.5A$/bcm (1.84US$/m^3)
- Overburden & Waste Removal & Return: 2.5A$/bcm (1.84US$/m^3)
- Ore Mining: 0.4A$/t (0.29US$/t)
- Rehabilitation: 3000A$/t (2205.88US$/t)
- Oversize Removal: 0.5A$/t (0.37US$/t)
- Tails Management: 5000A$/t (3676.47US$/t)

(ii) Estimated results of mining and WCP in Australia

The estimated Cash Cost of mining and roughing WCP in full-capacity years is 36,339KUS$/a, converted to unit cost of 3.63 US$/t ores; the estimated Factory Cost including depreciation cost is 43,633KUS$/a, converted to unit cost of 4.36 US$/t ores.

As to the average mining and WCP cost in full-capacity years, see Table 15.2-2 for details.

Table 15.2-2 Estimated average Factory Cost of mining and WCP in full-capacity years

No.	Items	Unit	Unit consumption	Total consumption	Unit price	Unit cost	Total cost
					US$	US$/t ores	kUS$
1	Raw materials	US$					
2	Auxiliary materials & Mining outsourcing Cost	US$				1.9693633	19,694
	Vegetation removal & Return	ha	0.0000057	57	1470.59	0.0084129	84
	Topsoil Removal & Return	bcm	0.0054347	54,347	1.84	0.0099903	100
	Overburden & Waste Removal & Return	bcm	0.7570950	7,570,950	1.84	1.3917188	13,917
	Ore mining	t	1.0000000	10,000,000	0.29	0.2941176	2,941
	Oversize Removal	t	0.0517692	517,692	0.37	0.0190328	190
	Flocculant	kg	0.0149040	149,040	2.90	0.0432216	432
	Tails Management	ha	0.0000054	54	3676.47	0.0200071	200
	Rehabilitation	ha	0.0000054	54	2205.88	0.0120042	120
	Others					0.1708580	1,709
3	Fuel	US$					
	Diesel	kg					
	Natural gas	GJ					
4	Power					0.56	5,644
	Electric power	kWh	3.49	34,889,768	0.162	0.56	5,644
	Water	t					
5	Production staff remuneration			43		0.38	3,794
6	Factory expense	US$				1.45	14,502
	In which: depreciation cost	US$				0.73	7,294
	Repair expense	US$				0.30	2,993
	Manage staff remuneration	US$		18		0.26	2,581
	Other relevant cost	US$				0.16	1,634
7	Subtotal Factory Cost for mining & WCP	US$				4.36	43,633

No.	Items	Unit	Unit consumption	Total consumption	Unit price	Unit cost	Total cost
					US$	US$/t ores	kUS$
	In which: opex for mining and roughing	US$				3.63	36,339
8	Output (ore)	t		10,000,000			
9	Output (ore&rock)	t		12,870,615			

3) Total OPEX (i.e. total cash cost; acid washing and MSP in China not included)

Apart from the above cash cost for mining and WCP in Australia, the operating cost also includes Marketing Overhead Cost (i.e. Selling Cost) and Administrative Overhead Cost.

By calculation, the average operating cost in full capacity years is 55,509 KUS$/a, an equivalent of 5.55 US$/t for per ton of ore, and an equivalent of 375.82 US$/t for per ton of HMC.

Table 15.2-3 lists seven elements of the operating cost in this project.

For details of average operating cost (cash cost) in full capacity years, please refer to Table 15.2-3.

Table 15.2-3 Average OPEX in full capacity years (HAL and MSP in China not included)

S/N	Cost element	Total cost	Percentage of the Total Cost	Unit cost	Unit cost
		KUS$/a	%	$/t Ore	$/t HMC
1	Raw materials				
2	Auxiliary materials	19,694	31.4%	1.97	133.34
3	Fuels				
4	Power	5,644	9.0%	0.56	38.21
5	Employee remuneration	7,774	12.4%	0.78	52.63
6	Repair cost	2,993	4.8%	0.30	20.26
7	Other cost	19,405	30.9%	1.94	131.38
8	Total opex (cash cost)	55,509	88.4%	5.55	375.82
	Ore processing capacity (t)			10,000,000	
	Average HMC output (t)				147,506

For the estimated year-by-year operating cost (cash cost), please refer to Table 15.2-4:

Table 15.2-4 Operating cost (cash cost) year by year Unit: KUS$

S/N	Item	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

	Production load (%)				100	100	100	100	100	100	100	100	100	100	100	100	100	19
	ROM ore processing (kt)	131,900			10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	1,900
1	Raw materials																	
2	Auxiliary materials	257,005			12,604	13,193	14,195	17,918	18,342	21,742	22,678	25,744	22,324	17,247	17,373	22,145	30,511	988
3	Fuels																	
4	Power	74,395			5,644	5,644	5,644	5,644	5,644	5,644	5,644	5,644	5,644	5,644	5,644	5,644	5,644	1,024
5	Employee remuneration	103,666			7,774	7,774	7,774	7,774	7,774	7,774	7,774	7,774	7,774	7,774	7,774	7,774	7,774	2,610
6	Repair cost	39,450			2,993	2,993	2,993	2,993	2,993	2,993	2,993	2,993	2,993	2,993	2,993	2,993	2,993	543
7	Other cost	257,101			21,087	22,283	21,262	21,282	17,393	18,471	19,853	19,559	17,705	19,566	20,166	17,265	16,371	4,838
8	Total opex (cash cost)	731,616			50,101	51,886	51,867	55,610	52,145	56,623	58,941	61,714	56,439	53,224	53,950	55,821	63,292	10,002

4) Economic evaluation and key assumptions

Comprehensive Economic Evaluation

The Cyclone project in Australia is owned by Diatreme Resources Co., Ltd. The total resource is 203Mt, the grade of heavy mineral is 2.3%, and the amount of heavy minerals is 4.7Mt. According to JORC 2012, about 75% of ore tonnages and about 80% of heavy mineral tonnages are defined as measured resources and the remaining part as indicated resources.

The deposit, an ancient coastal placer, is a surface deposit with low-grade overburden of about 9m to 18m, under which is a mineralised layer with an average thickness of about 13.5m, suitable for mining through an open-pit bulldozer mining method and conveyed by slurry pump.
For beneficiation, a combined process comprising gravity roughing (WCP)-acid leaching- electric separation, magnetic separation and gravity separation will be employed. Through roughing, HMC is produced while the tailings are backfilled to the goaf area.

The heavy minerals will then undergo the MSP process after acid leaching, producing the following three types of final concentrate products: zirconite, HiTi67 non-magnetic concentrate and HiTi87 magnetic concentrate.

Through options comparison and selection in the design, it is suggested that the HAL & MSP be built in China, that is, the HMC produced is transported by truck to Forest Railway Station located 240km away, followed by 1300km railway transport to Adelaide Port for shipment and sale to HAL and MSP facilities in Shanghai, China.

Total project capex (excluding HAL & MSP in China), including total working capital, is estimated at US$108,375,000, including initial capex of US$99,761,000 and working capital of US$8,614,000.

Financial evaluation shows the project is able to deliver high profitability indexes under the base case (CIF price of the products at a port in China: Zircon at US$1,500/t, HiTi87 at US$800/t, HiTi67 at US$350/t; CIF price of HMC is calculated at 85% of income from MSP products): Financial internal return rate IRR of investment is 27.18%; financial net present value NPV is calculated to be US$83,302,000 at a discount rate of 10%; and payback period is 4.7 years (including the 2 year construction period).

It is suggested that Diatreme Resources should implement development and construction as soon as possible.
(ENFI Extract – End).