

# HIGHLIGHTS

## EXPLORATION ACTIVITIES REPORT QUARTER ENDED 30 JUNE 2017

### HIGHLIGHTS

- \* **Discussions underway with potential Chinese offtake partners for the Cyclone Zircon Project, following environmental approval from WA Government**
- \* **Cape Bedford Silica/Heavy Minerals Project set for exploration after negotiations finalised with traditional owners for the Cultural Heritage Agreement**

### CYCLONE ZIRCON PROJECT (WA)

Currently the largest undeveloped zircon project in the zircon-rich Eucla Basin, Diatreme's flagship Cyclone Zircon Project continued to progress with the commencement of discussions with potential project partners, funders and product offtakers in China for direct project participation. This would ensure the final aspects of the Definitive Feasibility Statement (DFS) can be funded and completed in a timely fashion to capitalise on the upturn in mineral sands prices and forecast constrained supply.

### CAPE BEDFORD SILICA/HEAVY MINERALS PROJECT (QLD)

Further progress in this project located near the world's biggest operating silica mine included the conclusion in June 2017 of a Cultural Heritage Agreement with the traditional owners, Hopevale Congress, to facilitate cultural heritage surveys and subsequent exploration access. Diatreme's exploration drill rig has been mobilised to site in preparation for exploration activity.

Diatreme has identified high potential targets within the EPM for silica sands and once surveys are completed a targeted exploration program will commence, testing the potential for a world-class deposit.

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

Key Projects:

- Cyclone Zircon Project
- Tick Hill Gold Project
- Cape Bedford Silica/HMS Project
- Clermont Copper Project

The Company seeks to develop the Cyclone Zircon Deposit in WA, through a joint venture arrangement, and conducts exploration over several project areas prospective for heavy mineral sands, silica sand, gold and copper.

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

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

Executive:  
Neil McIntyre – Chief Executive  
Ian Reudavey – Chief Geologist  
Tuan Do – Company Secretary

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## CYCLONE ZIRCON PROJECT (WA)

Currently the largest undeveloped zircon project in the Eucla Basin, the Cyclone Zircon Project continued to advance towards development in the June quarter. The project received final ministerial consent in early January, marking the conclusion of an extensive de-risking process. Diatreme has now entered into discussions with several China-based firms, all with mineral processing operations, with a view to securing formal agreements for product offtake. Several of the Chinese groups have the capability to access project finance, which could facilitate the finalisation of the project's DFS and progress the required debt funding for development.

During 2016, DRX engaged Sedgman Limited, a leading provider of mineral processing and associated infrastructure solutions to the mineral sands industry, to undertake a Project Enhancement and Update Study. Sedgman reviewed work undertaken for the PFS and subsequent studies and provided an updated assessment of the 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, compared to the Prefeasibility Study. 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.

### Mineral Resource and Ore Resource

Discovered in 2007, the Cyclone Deposit is located along the Barton shoreline within the northern Eucla Basin, 25 kilometres within Western Australia from the state border with South Australia. Cyclone is interpreted as a Tertiary beach strandline HM system with analogies to Iluka's Jacinth/Ambrosia HM deposit in the eastern Eucla Basin.

The Cyclone Mineral Resource estimate was updated in January 2017 and is reported as 203 Mt at 2.3% HM (at 1.0% HM cut-off grade), containing 4.70Mt of HM.

**TABLE 1: 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 %
<b>CYCLONE MINERAL RESOURCE ESTIMATE</b>													
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
<b>TOTAL</b>	<b>1.0</b>	<b>203</b>	<b>2.3</b>	<b>4.70</b>	<b>4.2</b>	<b>5.0</b>	<b>0.62</b>	<b>0.06</b>	<b>0.14</b>	<b>0.59</b>	<b>0.30</b>	<b>0.49</b>	<b>1,262</b>
<b>Mineral Assemblage</b>							<b>27%</b>	<b>3%</b>	<b>6%</b>	<b>26%</b>	<b>13%</b>	<b>21%</b>	
<b>CYCLONE ORE RESERVE ESTIMATE</b>													
PROBABLE		138	2.6	3.52	4.6	5.3	0.72	0.07	0.17	0.59	0.32	0.57	990
<b>TOTAL</b>		<b>138</b>	<b>2.6</b>	<b>3.52</b>	<b>4.6</b>	<b>5.3</b>	<b>0.72</b>	<b>0.07</b>	<b>0.17</b>	<b>0.59</b>	<b>0.32</b>	<b>0.57</b>	<b>990</b>
<b>Mineral Assemblage</b>							<b>28%</b>	<b>3%</b>	<b>7%</b>	<b>23%</b>	<b>13%</b>	<b>22%</b>	

#### Table 1 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% TiO<sub>2</sub>, HiTi - Ti-oxides containing 70 - 85% TiO<sub>2</sub>, Altered Ilmenite (Alt Ilm) - Ti-oxides containing <70% TiO<sub>2</sub>, 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 geological interpretation of the mineralisation includes 3 distinct geological domains:

- a "Beach" domain of well sorted marine and reworked dunal sands occurring as 2 broadly tapered elongate mineralised sand units originating from a common point and extending for over 7km;

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- a “Strand” domain of higher grade (>4%) HM mineralisation occurring as a series of continuous elongate strandline features within the broader “Beach” domain;
- A “Nearshore” domain of bimodal marine sands with fine grained HM mineralisation underlying the western beach unit and extending for around 7km as an arcuate feature.

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 reported as 138 Mt at 2.6% HM, including 0.72% Zircon, containing 3.52 Mt of HM, including 0.99 Mt of Zircon (ASX Announcement 15 June 2016).

The Probable Ore Reserve represents 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.

### Environmental Approval

Final ministerial consent (approval) was received on 9 January 2017 as Ministerial Statement No:1052, which allows 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.”*

The ministerial approval is an important step in a project de-risking process undertaken by Diatreme, which has included securing an agreement with the traditional owners, the identification of suitable water supplies and the expansion of the project’s forecast mining life following the acquisition of the adjacent Cyclone Extended tenement area.

### Market Upturn Underway – Mineral Sands

Research by industry researcher TZMI has highlighted the continued upturn in the mineral sands market. According to TZMI’s mid year 2017 report, overall zircon supply is set to decline after 2017, with new projects necessary to avoid a potential supply deficit by 2019 and to meet continued expected demand.

Zircon sand shipments into China in the first quarter of 2017 were the strongest seen for many years, while a number of producers have announced price increases from the third and fourth quarters of 2017.

Commentary from analysts and producers has pointed to solid growth in both demand and pricing, as reflected by the restart of the Jacinth-Ambrosia mine in the Eucla Basin. A July 2017 report by analysts Beer & Co (available via Diatreme’s website) has also noted that the firming zircon market will support Cyclone’s development prospects.

### CAPE BEDFORD SILICA/HMS PROJECT (QLD)

The Cape Bedford EPM17795 is located approximately 200km north of Cairns in North Queensland, and covers the extent of a large Quaternary sand dune field, part of which is currently being mined by Cape Flattery Silica Mines Pty Ltd (CFSM), a wholly owned subsidiary of Mitsubishi Corporation. Cape Flattery has operated since 1967 and is the world’s largest silica sand mining operation.

The Cape Bedford / Cape Flattery region of north Queensland is dominated by an extensive Quaternary sand mass and dune field that stretches inland from the present coast for approximately 10km and extends 50km from north to south.

Previous exploration has focused on the Cape Flattery area, within the Mining Leases of CFSM, but reconnaissance exploration has been carried out over the entire dunefield in the late 1960’s and again in the early 1980’s. This exploration confirmed the presence of both silica sand and heavy mineral sands, and Diatreme intends to build on the existing data and initially target those areas (e.g. Nob Point) where prospective silica sand dunes have been identified and access is readily available.

The company executed a Conduct and Compensation Agreement (CCA) in January 2017, and a Cultural Heritage Agreement (CHA) in June 2017 with the traditional owners, the Hopevale Congress.

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The CCA allows access for ground disturbing exploration activity and ensures the traditional owners share in the potential economic benefits of this new project, while the CHA sets out the protocol for cultural heritage issues.

Diatreme's reconnaissance samples confirm the potential of the widespread silica sand dune material to generate high-quality silica sand.

A program of geological / geomorphological mapping, drilling and sample assaying is anticipated to quickly define silica sand resources. Bulk sample collection will allow process flowsheet development and product quality analysis, with scoping studies then undertaken.

Reconnaissance samples, together with the observation of HM slicks on some of the exposed beaches, suggests that HM mineralisation may be present at several locations within the EPM. The preliminary metallurgical testwork indicates the sands to be amenable to the use of standard mineral sands process methodologies and equipment.

### TICK HILL GOLD PROJECT (QLD)

The Tick Hill Gold Project comprises three granted Mining Lease No's 7094, 7096 and 7097 (totalling 390ha). The Tick Hill Gold Deposit was mined between 1991 and 1995 by Carpentaria Gold Pty Ltd (a subsidiary of MIM Holdings Limited) for the production of 513,333 ounces of gold from 705,000 tonnes of ore at a recovered grade of 22.6 g/t gold (source: MIM – Annual Reports). This makes it one of the highest grade gold deposits in Australia's recent gold producing history.

The transfer of the three ML's to Diatreme Resources was confirmed by the Department in March 2015, triggering the commencement of the DRX Farm-In and Joint Venture Agreement with Superior Resources Limited (ASX:SPQ) over the Tick Hill Gold Project. Under the Joint Venture Agreement, Superior Resources has the right to earn a 50% interest in the project by:

- Completing \$750,000 of exploration expenditure;
- Making a payment to DRX of \$100,000; and
- Lodging 50% of the Queensland Government security bond on the tenements.

Exploration and assessment of the surface material within the leases (including alluvials, tailings and waste dumps) is to be conducted as a joint operation, with each party contributing 50% of the costs.

The Tick Hill Gold Mine operated from August 1991 through to March 1995, with commissioning of the site processing plant in December 1991. The plant comprised crushing and milling circuits delivering a product with a p80 of 70µm to a CIL circuit. Tailings were discharged into a tailings dam comprising two paddocks of a "turkeys nest" construction in which a perimeter embankment with a clay core retains tailings. Wall heights range from 6m to 10.5m. Since decommissioning the surface has been capped and both the surface and batters seeded, with good vegetation cover now present.

The total reported production for the Tick Hill Gold Mine was 705,000t at 22.6 g/t Au for 15,900kg Au at 97% gold recovery. Some high grade open pit ore was mined and transported to the Carpentaria Gold operations at Ravenswood to provide early cash flow to the project, this has been estimated at 20,000t based on the reported 19,000oz produced at Ravenswood in the 1991/1992 financial year (with head grades for that year of 30.2 g/t Au). This suggests that approximately 685,000t of tailings remain on site, with an estimated grade of around 0.7 g/t Au.

In January 2016 Diatreme announced a maiden Mineral Resource estimate for tailings material located within the rehabilitated tailings dam at Tick Hill (refer *ASX announcement 19 Jan 2016*). The Indicated Resource is estimated at 630kt at 1.08 g/t Au (at 0.5 g/t Au cut-off) containing 680kg (22,000 troy ounces) of gold.

In March 2016, Diatreme announced that a scoping study completed by an independent external consultant (Metcor) had confirmed the viability of a standalone operation processing the identified tailings resource. Tick Hill has the potential for a 20-month operation processing the tailings via re-grinding and a standard CIP/CIL circuit.

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Metallurgical studies were undertaken to help determine the optimal grain size required to balance leach extraction rates with energy requirements for regrinding of the tailings. The cyanide leach testwork showed that gold extraction increases with increasingly finer grind size, but gold extraction of ~90% or higher can be achieved at grind sizes of around P<sub>80</sub> 35 µm and finer.

Ultra-fine grinding testwork utilising an Isamill™ was conducted to determine the likely energy requirements, with results reported slightly higher than parameters used in the Scoping Study, but further work is required to generate data suitable for use in feasibility studies.

Additional metallurgical testwork is required to allow detailed design of a process flowsheet, determination of capital and operating costs, and development of a financial model to further assess the economic potential for mining and processing of the tailings material.

### CLERMONT COPPER PROJECT (QLD)

A review of the Clermont project, primarily the Rosevale Porphyry Corridor (RPC), is continuing, with development of a proposed exploration strategy.

### GRAYS HILL PROJECT (QLD)

The company has identified a number of topographic features within Quaternary sediments on the coastal plain in the eastern part of EPM25117 that may represent targets for HM accumulation. An agreement with the primary landholder is required to facilitate access for reconnaissance exploration and this was not advanced during the quarter.

### CASH POSITION

The Company's cash position at 30 June 2017 (Appendix 5B) was \$51k\*.

The final balance of \$85,000 on the convertible note facility was received during the June quarter. This has brought the convertible note facility total to \$3.0 million.

\*The company is currently undertaking a \$750,000 capital raising to sophisticated investors to fund specific exploration programs and working capital (refer ASX release 31/07/17). Diatreme has received \$500,000 in firm commitments to date and anticipates closing the fund raising by mid-August 2017.

### APPENDIX 1

Appendix 1 provides information required under ASX listing rule 5.3.3 for mineral exploration entities.

Dated 31<sup>st</sup> July 2017

Neil J McIntyre

Chief Executive

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### Competent Person Statements

The information in this report that relates to Exploration Results from the Cape Bedford Project is based on information compiled by Mr. Ian Reudavey, a Competent Person who is a Member of the Australian Institute of Geoscientists. Mr. Reudavey is a full-time employee of Diatreme Resources Limited. Mr. Reudavey has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity being 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 his information in the form and context in which it appears.

The information in this report that relates to Exploration Results and Mineral Resource from the Tick Hill Gold Project is based on information compiled by Mr. Ian Reudavey, a Competent Person who is a Member of the Australian Institute of Geoscientists. Mr. Reudavey is a full time employee of Diatreme Resources Limited. Mr. Reudavey has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity being 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 his information in the form and context in which it appears.

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The information in this report, insofar as it relates to Mineral Resources from the Cyclone Zircon Project 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 from the Cyclone Zircon Project 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.

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APPENDIX 1

Appendix 1 provides information required under ASX listing rule 5.3.3 for mineral exploration entities.

Mining tenements held at the end of the quarter and their location

State	Tenement Name	Tenement ID	Location	Interest	Holder	Comments
WA	Cyclone	M69/141	Eucla Basin	100%	LSPL	Granted
WA	Cyclone Extended	R69/1	Eucla Basin	100%	DRX	Granted
QLD	Clermont	EPM17968	Clermont	100%	CHAL	Granted
QLD	Grays Hill	EPM25117	Yeppoon	100%	DRX	Granted
QLD	Cape Bedford	EPM17795	Hopevale	100%	DRX	Granted
QLD	Tick Hill	ML7094	Duchess	100%	DRX	Granted
QLD	Tick Hill	ML7096	Duchess	100%	DRX	Granted
QLD	Tick Hill	ML7097	Duchess	100%	DRX	Granted

Mining tenements acquired and disposed of during the quarter and their location

State	Tenement Name	Tenement ID	Location	Interest	Holder	Comments
-	-	-	-	-	-	-

Beneficial percentage interests held in farm-in or farm-out agreements at end of the quarter

State	Project Name	Agreement Type	Parties	Interest held at end of quarter by exploration entity	Comments
WA	Cyclone Zircon Project	Farm-out Heads of Agreement	LSPL and Perpetual Mining Holding Limited	94%	HoA announced Jan 2014, initial 6% farm-out completed 18 Sept 2014
QLD	Tick Hill Gold Project	Farm-out and Joint Venture Agreement	DRX and Superior Resources Limited	100%	Proposed JV announced Aug 2011, formal Agreement announced Jun 2013, Joint Venture commenced Jan 2015

Beneficial percentage interests in farm-in or farm-out agreements acquired or disposed of during the quarter

State	Project Name	Agreement Type	Parties	Interest held at end of quarter by exploration entity	Comments
-	-	-	-	-	-

Abbreviations:

E	Western Australia	Exploration Licence	DRX - Diatreme Resources Limited
M	Western Australia	Mining Lease	CHAL - Chalcophile Resources Pty Ltd
R	Western Australia	Retention Licence	LSPL - Lost Sands Pty Ltd
EPM	Queensland	Exploration Permit for Minerals	
ML	Queensland	Mining Lease	