

HIGHLIGHTS

EXPLORATION ACTIVITIES REPORT QUARTER ENDED 30 JUNE 2016

HIGHLIGHTS

- * **Cyclone Project Enhancement and Update Study by independent consultant reaffirms financial viability and shows \$121M NPV, payback in under 3 years**
- * **Additional metallurgical testwork on tailings re-grinding and cyanide leach extraction of gold undertaken for Tick Hill Gold Project**
- * **EPM17795 Cape Bedford granted for a five-year term over prospective Cape Flattery / Cape Bedford sand dune field in North Queensland**

CYCLONE ZIRCON PROJECT (WA)

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.

Lost Sands has reviewed the draft conditions for environmental approvals 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.

TICK HILL GOLD PROJECT (QLD)

Further studies were undertaken during the quarter to help determine the optimal grain size required to balance leach extraction rates with energy requirements for re-grinding of the tailings. Work is now being planned to develop a detailed process flowsheet and confirm capital and operating cost estimates.

CAPE BEDFORD PROJECT (QLD)

The Cape Bedford EPM17795 lies some 40km north of Cooktown and covers the majority of the Cape Bedford – Cape Flattery dunefield, surrounding the Cape Flattery silica sand mining operations. Extensive silica sand has been identified by previous exploration, and Diatreme plans to follow-up previous reports of HM occurrences.

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 a number of 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
Tuan Do – CFO & Co. Secretary
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CYCLONE ZIRCON PROJECT (WA)

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.

Mineral Resource and Ore Reserve

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 (ASX Announcement 15 June 2016). 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.

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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 Ore Reserve estimate is based on the Cyclone Mineral Resource estimate (refer ASX announcement 9 April 2015). The Cyclone Mineral Resource comprises 211 Mt at an average grade of 2.3% HM. The Probable Ore Reserve has been estimated at 138 Mt at an average grade of 2.6% 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.

TABLE 1: CYCLONE 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 <53µm
- 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

Environmental Approval

The Western Australian EPA 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.

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.

As part of the approvals process DRX has been negotiating an offsets package for the proposed disturbance to the Great Victoria Desert Nature Reserve which will result from construction of the haul road from the Cyclone mine to the Forrest rail siding. A meeting to finalise this aspect of the PER report was held in Perth in late March 2016. DRX continues to provide additional project information as requested by the OEPA and other regulatory authorities during the environmental approval process.

TICK HILL GOLD PROJECT (QLD)

The Tick Hill Gold Project comprises three granted Mining Lease No's 7094, 7096 and 7097 (totaling 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.

QUARTERLY REPORT

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 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 the Tick Hill Gold Project in northwest Queensland (*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) 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.

Further studies were undertaken during the quarter 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 P₈₀ 35 µm and finer (based on previous testwork reported in October 2015). Gold extraction after 12 hours was consistently high at all grind sizes assessed (10 – 25 µm), and in most cases increases between 12 and 24 hours. Ultra-fine grinding testwork utilizing an Isamill™ was conducted to determine the likely energy requirements, with results summarized below. These 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.

IsaMILL™ SIGNATURE PLOT: SUMMARY OF RESULTS			
Sample	Media Type	Target Grind Size P ₈₀	Calculated Specific Energy
Tick Hill Tailings Composite	3mm Cenotec	45 µm	36.0 kWh/t
		35 µm	48.2 kWh/t
		25 µm	71.2 kWh/t

Additional metallurgical testwork is recommended 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.

EUCLA BASIN HM PROJECT (WA)

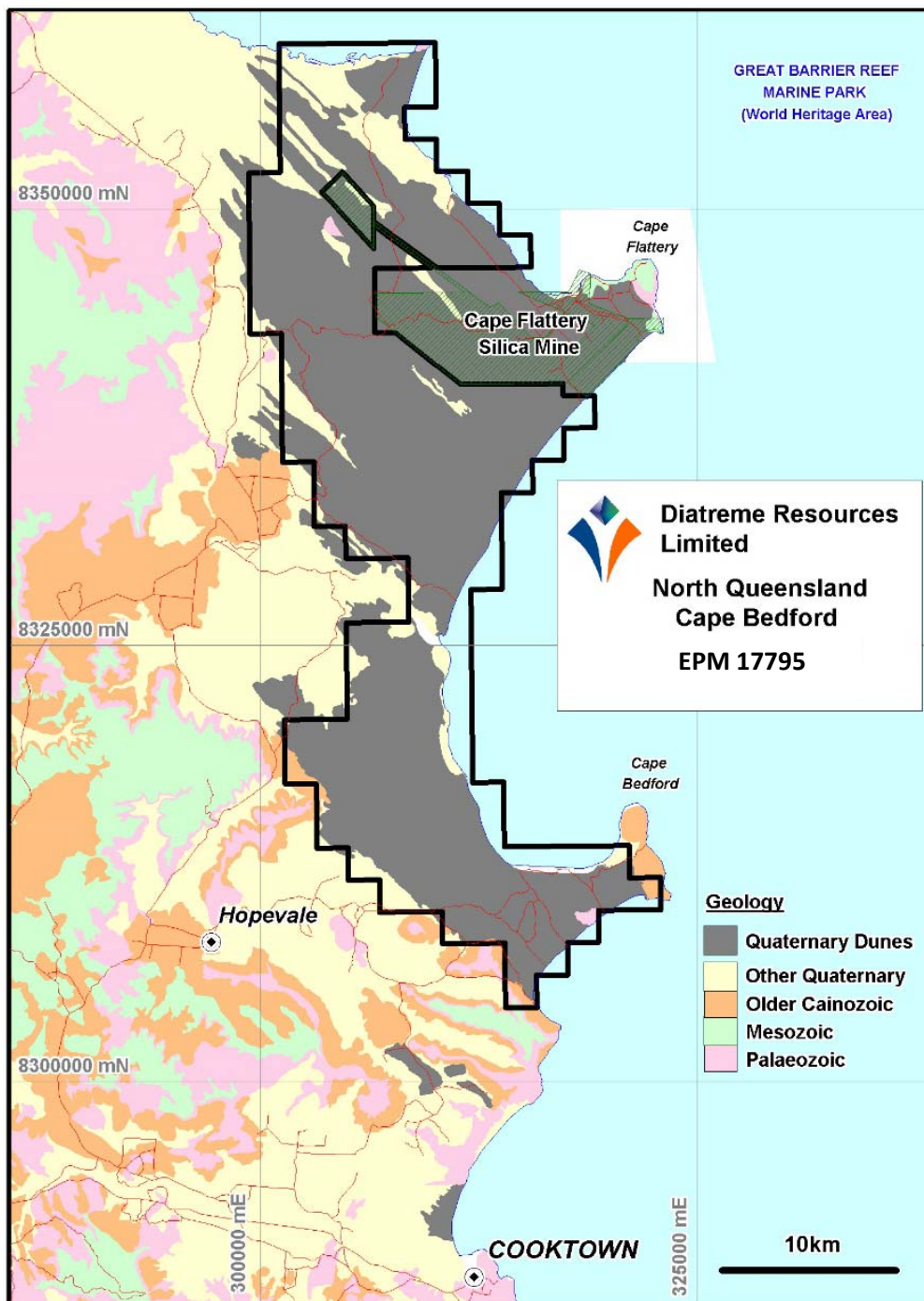
No field work was undertaken during the quarter, and no exploration field work is planned for the September quarter as the company will be focused on the Cyclone Project PER and Cape Bedford Project. E69/2425 was surrendered following receipt of notice from the WA Department of Mines that it was unlikely to grant an exemption from expenditure for the current or future terms.

CAPE BEDFORD SILICA/HMS PROJECT (QLD)

The Cape Bedford EPM application 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.

QUARTERLY REPORT

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 (see figure below).



The Cape Bedford/Cape Flattery Dune Field is one of several extensive areas of coastal dunes which occur on the tropical east coast of Cape York Peninsula. The dune field covers an area of 700sqkm and contains a variety of constructional and erosional sandy landforms. Active, large parabolic dunes up to 6km in length and over 100m high are notable.

The dune field lies to the east of an upland area consisting mainly of Mesozoic sedimentary rocks with a few outcrops of lower Palaeozoic metamorphics and volcanics. The source sand of the dune field is weathering of Mesozoic sandstone which outcrops widely in the area.

Most exploration has centred 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.

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

The EPM grant should facilitate the conclusion of discussions with the Hopevale Congress concerning a Conduct and Compensation Agreement, which will allow access for on-ground exploration activity and ensure the traditional owners share in the potential economic benefits of this new project.

CLERMONT COPPER PROJECT (QLD)

A review of the Clermont project, and in particular the Rosevale Porphyry Corridor, is continuing, with development of a proposed exploration program.

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.

CASH POSITION

The Company's cash position at 30 June 2016 (Appendix 5B) was \$48K *.

- * **Note:** Scheduled drawdown on convertible note amount of \$500,000 due in the June quarter was only progressively drawn to the amount of \$65,000 during the quarter. The balance of \$435,000 was drawn in early July 2016. A further \$ 754,000 was raised through an SPP (\$519,000) and shareholder placement (\$235,000) during July. Actual cash position as at 21st July was \$926,480. Additionally a further convertible note drawdown of \$500,000 is due to be drawdown during August 2016.

APPENDIX 1

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

Dated 22 July 2016

Neil J McIntyre

Chief Executive

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Competent Person Statements

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.

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.

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	Wanna Lakes East	E69/2408	Eucla Basin	100%	LSPL	Granted
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	Parapet	EPM19189	Clermont	100%	CHAL	Granted
QLD	Expedition Creek	EPM19544	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
WA	Wanna South	E69/2425	Eucla Basin	100%	LSPL	Surrendered

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 or child 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 June 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 or child 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	