



# QUARTERLY ACTIVITIES REPORT FOR THE PERIOD ENDED 30 June 2019

31 July 2019

# **Quarterly Highlights**

# Galalar Silica Project, Nth Qld

- Galalar Silica Resource upgraded with maiden Indicated Resource of 21.5Mt > 99% SiO<sub>2</sub>; balance of 8.7Mt in Inferred Resource gives total of 30.2Mt > 99% SiO<sub>2</sub> (Indicated and Inferred) Resource
- Exploration results confirm high grade silica potential resource extensions to existing resource immediately north-west at Elim Road North and South, together with potential heavy minerals discovery.
- Additional exploration areas applied for bordering on existing tenement (EPM17795) boundaries
- Offtake MOU agreed for supply of high-grade silica signed with China's Fengsha Group, underpinning
  potential development of new mine in North Queensland supplying fast-growing Asian solar PV market.

#### Tick Hill Gold Project, Qld

• Sale completed to Berkut Minerals (now ASX: CNB), with DRX shareholders benefitting from significant shareholding and exposure to WA/QLD gold assets.

# **COMING SEPTEMBER (Q3) ACTIVITIES - 2019**

Diatreme's operational focus for the third quarter 2019 comprises the following:

#### Galalar Silica Project

 Finalisation of proposed Mining lease area's environmental surveys with dry season survey planned for August commencement.



- Advancement of mining lease pre-lodgement meetings with regulator
- Further bulk product testing and product development targeting high end premium silica products
- Finalise project scoping study on receipt of testing results

### • Cyclone Zircon Project

- Further advance, document and examine various development, sale or Joint venture options with various interested parties and move forward to more formally binding documentation after detailed assessment targeting the best commercial outcome for the company.

# GALALAR SILICA PROJECT, QLD Regional Exploration Sample Testing Results

Located around 200km north of Cairns, the Galalar Silica Project lies within the same sand dune system and in close proximity to the world's largest operating silica sand mine at Cape Flattery. The Cape Flattery silica sand product is recognised as a global benchmark for quality silica sand and is widely used for industrial purposes throughout Asia.

Bulk testing results have demonstrated the project's ability to produce premium-grade silica using standard processing techniques, meeting the requirements for high-end glass and solar panel manufacturing and capable of attracting premium prices (refer ASX announcement 9 January 2019).

In March 2019, Diatreme announced an initial silica sands Exploration Target at Galalar, ranging from 210Mt to 2.1Bt of silica (refer ASX announcement 25 March 2019). In the same month, Diatreme completed an initial helicopter sampling program of target sand dunes (refer Fig 1.).

Sample testing results received in early April 2019 confirmed the existence of high purity silica sand in the priority target areas as well as highlighting significantly elevated TiO2 within the Gubbins Range sand dune system. Key outcomes from the regional exploration/sampling and testing program included:

• Potential Existing Resource Extensions - Elim Road North & South – High Purity Silica Sands: Sampling of the sand dunes where accessible returned high SiO<sub>2</sub> results, including a high of 99.67% in situ purity and averaging 98.95% SiO<sub>2</sub> over the whole sampling area. This confirmed the aerially large dune system could potentially host a large and significant occurrence of high purity silica sand. These areas will continue to be prioritised for their potential to add significant additional high purity silica resource to the existing discovery.

• **Heavy Minerals - Gubbins Range HMS:** Sampling highlighted elevated TiO<sub>2</sub> within the dune system immediately east of Gubbins Range. Gubbins Range is a large basement high which forms the western boundary to the sand dune system to the south of McIvor River (see Figure 1).

The Gubbins Range dune system consists predominantly of longitudinal sand dunes, all of which are approximately 6,000m in length and of varying height and size. The northern sand dune terminates into a large active elongate parabolic dune sometimes referred to as "Seagrens Dune" near the McIvor River.

In all, 12 sand auger samples were collected from the Gubbins Range dune system at six locations on three of the sand dunes. TiO<sub>2</sub> percentages ranged from 0.32 to 1.17% and averaged 0.8%. This confirmed historic sampling conducted in the dune system in 1981 by exploration company Essington Breen.

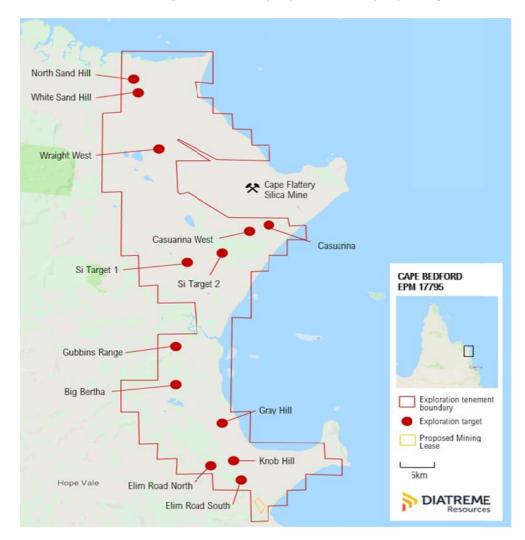


Figure 1. Galalar Exploration Tenement, Regional Targets and Existing Silica Resource Area



#### **Galalar Silica Resource Upgrade**

Based on an independent assessment (refer below) by consultants Ausrocks Pty Ltd, with the addition of a newly identified satellite deposit at West Nob Point, the project's Maiden Indicated Resource has now been established at 21.5Mt > 99% SiO<sub>2</sub>, with a balance of 8.7Mt in Inferred Resource giving it a significantly upgraded total of 30.2Mt > 99% SiO<sub>2</sub> (Indicated and Inferred) Resource.

Previous bulk testing results undertaken in specialist labs have demonstrated the project's ability to produce using industry standard processing techniques a premium-grade silica product (silica sand at 99.9% SiO2, refer ASX announcement 16 August 2018), including grain size being within a 30-120 mesh size range (125-600 micron) and iron content below 100ppm. This meets the requirements for high-end glass and solar panel manufacturing, capable of attracting premium prices (refer ASX announcement 9 January 2019).

Excellent recovery rates during testing were obtained for the final product of approximately 79% from raw sand feed. These results also showed the potential to obtain secondary, high-value heavy mineral sands during mining, adding to the project's value.

Note: Under the JORC Code, 2012 Edition an Indicated Mineral Resource is that part of a Mineral Resource for which quantity, grade (or quality), densities, shape and physical characteristics are estimated with sufficient confidence to support mine planning and evaluation of the deposit's economic viability. An Indicated Mineral Resource has a higher level of confidence than an Inferred Mineral Resource but a lower level of confidence than a Measured Mineral Resource.

Fig 2: Galalar Silica Project - Resource Boundaries

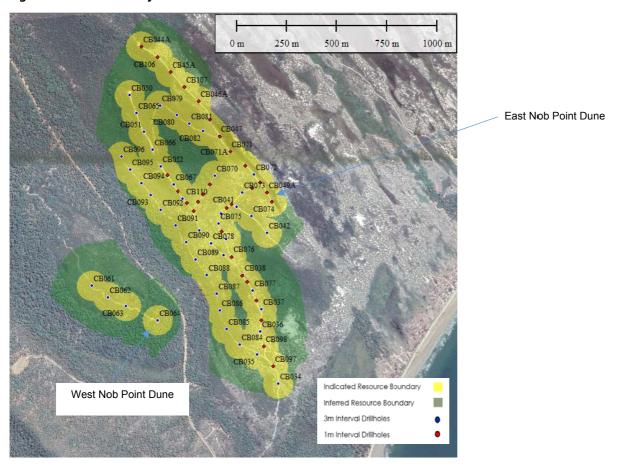


Table 1: Galalar Silica Project – Resource Update

		Silica Sand	SiO <sub>2</sub>	Cut-off				
Classification	Area	(Mt)	Grade	SiO <sub>2</sub> %	AL <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	LOI%	TiO₂%
Inferred	<b>East Nob Point</b>	6.6	99.26	99.00	0.12	0.09	0.11	0.10
	<b>West Nob Point</b>	2.1	99.16	99.00	0.11	0.16	0.04	0.15
	Total	8.7	99.25		0.11	0.09	0.11	0.10
Indicated	East Nob Point	20.2	99.26	99.00	0.12	0.09	0.11	0.10
	West Nob Point	1.3	99.16	99.00	0.11	0.16	0.04	0.15
	Total	21.5	99.25		0.11	0.09	0.11	0.10

<sup>\*</sup>Note –Resource estimate current as at 9 May 2019; refer below for detailed resource study assumptions



#### **Resource Estimate Base Assumptions**

The following summary parameters, base assumptions, exploration activities and laboratory testing results form the basis for the Inferred Resource Estimate prepared independently by Ausrocks Consulting Mining Engineers:

- In-situ density of target material 1.62 t/m³
- Cut-Off grade material >99% SiO<sub>2</sub>
- Topography Sourced from Geo Image photogrammetry survey and Ausrocks UAV drone survey with DGPS by Veris used as ground control
- Topsoil Thickness 0.3m sourced from Cape Flattery topsoil thickness, anything that is less than 0.3m below the surface was excluded from the resource estimate
- Top and Base of Resource This was determined by completing weighed averages of each 3m composites by ensuring the top composite tested and all in between down to the bottom of the hole had a weighed average >99% SiO<sub>2</sub> by blending. The top could not exceed 0.3m below the surface (top soil) and the base was generally the bottom of the drillhole which either finished in clay or the water table was met
- No resource below the water table was considered, as the drilling method could not drill below this level and hence no data is available
- Resource Boundary was determined by modelling the top and bottom surface in SURPAC 6.6.1 and
  considering where the surface meets the topography and ensuring that the boundary was within 200m from
  the drillhole
- Grid Spacing used for interpolation 20m by 20m grid
- Spatial Interpolation Method Inverse Distance.

### **Geological Drilling (DRX)**

- September 2017 606m drilled over 29 holes Logged in 3m increments by Ian Reudavey (DRX)
- October 2017 670m drilled over 26 holes Logged in 3m increments by Ian Reudavey (DRX)
- April 2018 164m drilled over 9 holes Logged in 3m increments by Ian Reudavey (DRX)
- June 2018 659.5m drilled over 32 holes Logged in 3m increments by Neil Mackenzie-Forbes (DRX)
- November 2018 701m drilled over 30 holes Logged in 1m increments by Neil Mackenzie-Forbes (DRX).

# **ALS Assay Testing**

- November 2011 6 Silica Assay Tests
- September 2017 35 Silica Assay Tests
- December 2017 76 Silica Assay Tests
- April 2018 68 Silica Assay Tests



- June 2018 248 Silica Assay Tests
- November 2018 699 Silica Assay Tests.

### **ALS Moisture Sampling**

• November 2018 – 202 Moisture by percentage samples.

# **Insitu Density Testing**

• March 2019 – 55 Dormer Push tube Samples tests.

# **Regional Testing Confirms Large Targets**

Diatreme announced test results from hand auger exploration program sampling that confirmed potential resource extension targets Elim Road North and South contained extremely high purity silica sand suitable for the premium silica market (refer ASX announcement 21 June 2019).

Nearly all 20 auger holes returned >99% SiO<sub>2</sub>, showing the potential for a further resource upgrade following the maiden Indicated Resource estimate (refer ASX announcement 14 May 2019). Sampling was conducted using a sand auger to vertically drill test to a depth of 4m, which was the limit of available extension rods. Sampling was conducted on 1m intervals and generally three samples were taken between 1m and 4m.

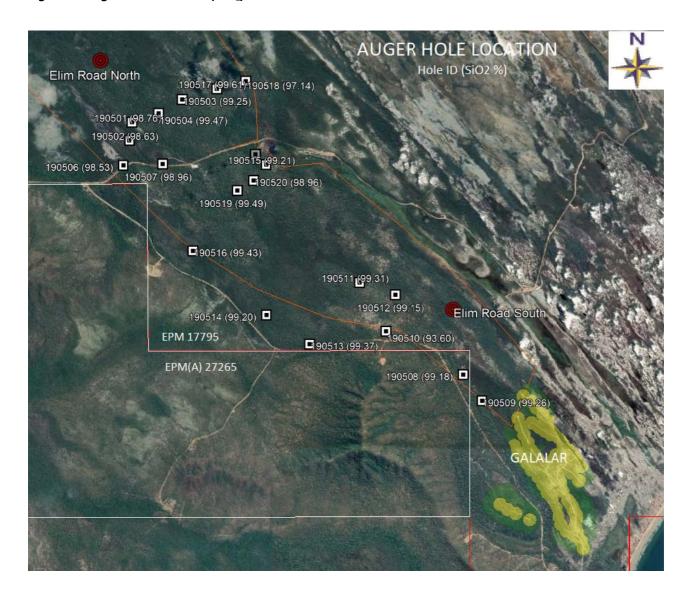
Table 2: Regional Exploration Targets - Galalar Silica Project

Prospects	Height		Resource Target Range (Mi		
Elim Road North	6,000m x 3,000m	(m) 40	100	1,000	
Elim Road South	4,000m x 800m	20	10	100	
Other Regional Targets	See Table 2 in for more infor	• •	100	1000	
Combined			210	2,100	

Note: The potential quantity and grade of the Exploration Target is conceptual in nature. There has been insufficient exploration completed to date to estimate a Mineral Resource in accordance with the JORC 2012 Edition Guidelines. It is uncertain if further exploration will result in the estimation of a Mineral Resource.

**Cautionary Statement**: An Exploration Target is a statement or estimate of the exploration potential of a mineral deposit in a defined geological setting where the statement or estimate, quoted as a range of tonnes and a range of grade (or quality), relates to mineralisation for which there has been insufficient exploration to estimate a Mineral Resource.

Figure 3: Auger Hole Location (SiO₂)





### Offtake MOU Signed with China's Fengsha Group

Post-quarter, in July 2019, Diatreme announced the signing of a Memorandum of Understanding (MOU) with the Anhui Fengsha Mining Group Co Ltd (Fengsha Group or the Group) regarding the potential supply of up to 500,000 tonnes of photovoltaic grade silica sand (sub 100ppm  $Fe_2O_3$ ) to be produced on-site at Galalar.

The privately owned Fengsha Group is China's largest domestic supplier to major glass manufacturers of photovoltaic (solar) and other specialty high end silica sand products used in the manufacture of photo-electric glass, TFT glass and high end automotive paints.

Fengsha Group currently produces and markets more than 2.5 million tonnes of product. Following a recently completed plant expansion at its facility in Anhui Province and some regional acquisition activity, it is targeting production and sales to increase to more than 6m tonnes per year from 2020.

Significantly, Fengsha Group undertakes quartz hard rock extraction and processing from mining activity within the Anhiu Province, but is unable to meet the rapidly increasing demand of glass manufacturers for both higher volumes and specialty requirements. Diatreme's Galalar project is considered a potentially reliable long-term high quality supply source.

Additionally, Fengsha Group and Diatreme will undertake a further silica product testing program to examine the potential for Diatreme to supply an additional 250,000 tonnes per annum (in addition to the 500,000 tonnes) of photovoltaic quality sand (sub 100ppm  $Fe_2O_3$ ) for further specialised processing in the Group's state of the art facility to meet the exacting silica product (low iron) requirements of the sub 50ppm and sub 30ppm  $Fe_2O_3$  categories used in further higher value applications.

The MOU contemplates for this additional 250,000 tonnes of product the use of the Group's existing facilities for a further chemical de-ironization process, colloquially referred to in China as "chemical pickling," a process that further removes contained iron levels and some other contaminants.

Further testing will now be undertaken to determine the existing silica product's amenability to this further beneficiation. If successful, bringing the  $Fe_2O_3$  levels down to these lower levels has a significant multiplier effect on product sales prices.

Final commercial arrangements on the further processing are subject to successful testing results, but may include a product tolling or end price profit sharing arrangement for the services provided by the Group, subject to further negotiation.



The Fengsha Group will also assist Diatreme with more detailed China market logistics planning, further product specification development, mine development and other technical assistance. Both parties will also discuss the potential for the Group to directly invest into the Galalar project.

The MOU is non-binding at this stage but sets a framework for further co-operation, leading potentially to more binding arrangements between the parties subject to final negotiations. The MOU term is for 12 months, with the potential for mutually agreed extensions.

# New Exploration Permit Applications (EPM's) at Cape Bedford (EPM 17795)

Continuing its active exploration of Cape Flattery regionally, small areas of prospective ground were identified outside of the existing EPM 17795 boundaries that have the potential to enhance existing identified resources and future development scenarios at Galalar and elsewhere.

The applications are primarily designed to ensure continuity of tenure over the Cape Flattery / Cape Bedford sand dunes system to maximise efficiencies in exploration and potential resource development.

EPM 27212 Cape Flattery covers mainly coastal areas around the Cape Flattery Silica Mines mining leases. This tenement ensures continuity of tenure between the existing port facilities at Cape Flattery and EPM 17795.

EPM 27265 Gubbins Range is a small area of both silica and heavy mineral potential not currently covered by EPM 17795. These areas may contain extensions to identified sand dune systems which have been identified as targets.

These applications also minimise the likelihood of other exploration companies obtaining small satellite resource areas which potentially may cause third party access issues for Diatreme in the future.

Diatreme will continue to prioritise its further exploration activity with a focus on areas of highest value to the Company. These activities will include further targeted drilling to undertake a selective deeper sampling program and testing of bulk sample mineralogy, with a particular focus on identifying the silica deposits that are capable of meeting the standards required for the high value product.

Advanced desktop commercial assessments continue with a focus on identifying key infrastructure requirements for the establishment of export and product loading facilities and associated logistics. Diatreme anticipates release of its initial Galalar project commercial scoping study in the third quarter 2019.



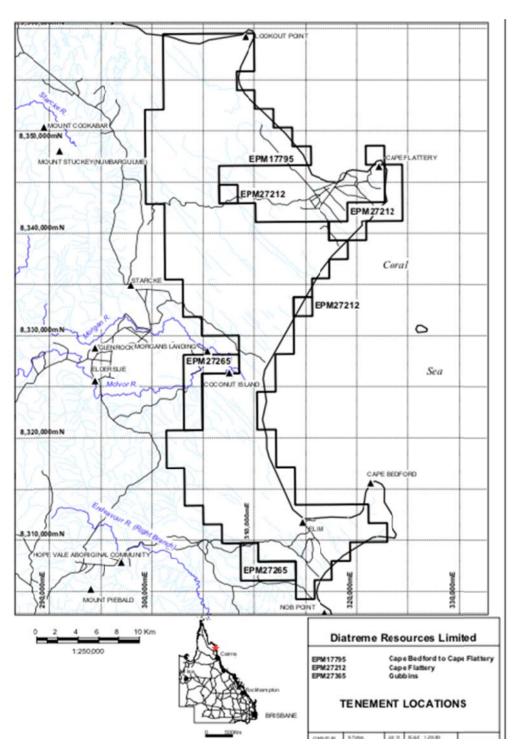


Figure 4: Cape Flattery tenement locations



#### CYCLONE ZIRCON PROJECT, WA

Following the appointment of independent corporate advisory firm Blackbird Partners (refer ASX announcement 23 January 2019) and dissemination of detailed project information to a wide variety of interested parties, Diatreme has been involved in detailed discussions following various expressions of interest being received for various levels of project participation.

These discussions have included specific detail surrounding potential HMC product offtake, provision of EPC services, direct project equity participation (investment) and assistance in packaging and sourcing bank debt facilities for project construction and development.

These discussions are ongoing as Diatreme seeks to further define, document and structure a transaction that ensures maximum value for the Company and shareholders.

Diatreme has been greatly assisted by the fact that the project is very advanced with all primary project approvals in place (shovel ready) and underpinned by rising demand for heavy minerals, both zircon and titanium, where product is still very much in short supply.

Last year's definitive feasibility study for Cyclone showed positive after-tax financial results, including an estimated NPV of A\$113 million, an internal rate of return of 27% and capital payback within three years, with an estimated mine life exceeding 13 years (refer ASX announcement 15 November 2018).

Study authors China ENFI Engineering Corporation are also assisting with securing a major development partner, as per the terms of the "Cooperation and Consulting Services" agreement signed with China ENFI (refer ASX announcement 11 January 2018).

The current commercial entry discussions are advanced and subject to the receipt of more formal documentation, Diatreme envisages providing a detailed progress update to the market in the coming weeks.

# TICK HILL GOLD PROJECT, QLD Tick Hill Sale Completes

Under the now completed Heads of Agreement with Berkut Minerals Limited (ASX:BMT) (refer ASX announcement 12 March 2019), Diatreme agreed to the sale of its three related mining tenements (ML7094, ML7096 and ML7097) and associated mining information to a Berkut nominee.



Consideration for the sale was the issue of 7,211,539 fully paid ordinary shares to Diatreme in BMT, valued at that time at \$562,500 @ \$0.078 per share, with the shares subject to voluntary escrow for a 12-month period from their expected date of issue. Diatreme holds immediately post-settlement 7.51% of the issued capital of Berkut (subsequently renamed Carnaby Resources Limited; ASX code CNB).

Following a successful company restructure and various asset acquisitions, including the Tick Hill assets, the value of the BMT shares as at settlement date (23 April 2019) had significantly increased, being valued at \$937,500 (at \$0.13 per share), amounting to a significant windfall for DRX shareholders.

BMT also, as a condition of settlement and title transfer, agreed to replace existing tenement environmental bonds held by the regulatory authority (Queensland's Department of Natural Resources Mines and Energy) totalling \$336,844. These bonds are currently supported by cash equivalent security (\$336,844) deposited by Diatreme, which will be refunded to Diatreme on final discharge.

#### **CLERMONT COPPER PROJECT, QLD**

Diatreme management and external consultants continue to review the Clermont Copper Project, particularly the Rosevale Porphyry Corridor, to determine its potential for further exploration or disposal.

#### **CORPORATE**

Diatreme supported by lead manager Hartleys completed a successful bookbuild, raising total funds (before costs) of \$1,380,733 through the issue of 125,521,205 fully paid ordinary shares at an issue price of 1.1 cents (refer ASX announcement 4 April 2019). The placement shares were issued under the Company's existing Listing Rule 7.1 capacity. The placement was well supported by new sophisticated and professional investors and existing shareholders.

The Company's cash and liquids positions as at 30 June, 2019 totaled \$1,583,458\*

\*Note: This total comprises cash of \$237,000, security bond refund due of \$336,844 (expected during August 2019) and CNB shares \$1,009,614.

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#### **MINERAL SANDS AND SILICA - COMPETENT PERSON STATEMENTS**

The information in this report that relates to Mineral Resources at the Cape Bedford Project is based on information compiled by John Siemon from Ausrocks Pty Ltd who has significant experience in Industrial Minerals and Quarry Resource assessments. John Siemon has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity for which he is undertaking 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 (The JORC Code). John Siemon consents to the inclusion in the report on the matters based on their information in the form and context in which it appears.

The information in this report that relates to Exploration Results and Exploration targets from the Cape Bedford Project is based on information reviewed and compiled by Mr. Neil Mackenzie-Forbes, a Competent Person who is a Member of the Australian Institute of Geoscientists. Mr. Mackenzie-Forbes is a director of Sebrof Projects Pty Ltd (a consultant geologist to Diatreme Resources Limited). Mr. Mackenzie-Forbes 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. Mackenzie-Forbes 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 at the Cyclone Project 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 at the Cyclone 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.

Interest in Mining tenements at end of the quarter

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State	Tenement Name	Tenement ID	Status	Location	Interest	Holder	
WA	Cyclone	M69/141	Granted	Eucla Basin	100%	LSPL	
WA	Cyclone Extended	R69/1	Granted	Eucla Basin	100%	DRX	
QLD	Clermont	EPM17968	Granted	Clermont	100%	CHAL	
QLD	Cape Bedford	EPM17795	Granted	Hopevale	100%	DRX	
QLD	Cape Bedford	EPM27212 EPM27265	Applications	Hopevale	-	-	
QLD	Tick Hill	ML7094	Granted	Duchess	100%	DRX	
QLD	Tick Hill	ML7096	Granted	Duchess	100%	DRX	
QLD	Tick Hill	ML7097	Granted	Duchess	100%	DRX	

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

quui	quarter							
State	Project Name	Agreement Type	Parties	Interest held at end of quarter	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	Sale of tenements (ML 7094, 7096, 7097)	DRX and Carnaby Resources Limited (CNB)	100%	Sale to CNB completed 23 April 2019. Final regulatory transfer of ML's still to be completed			
		Farm-out and Joint Venture Agreement	DRX and Superior Resources Limited (SPQ)	0%	Agreement between DRX and SPQ terminated 11 Mar 2019			

# Abbreviations:

M Western Australia Mining Lease DRX - Diatreme Resources Limited
R Western Australia Retention Licence CHAL - Chalcophile Resources Pty Ltd

EPM Queensland Exploration Permit for Minerals LSPL – Lost Sands Pty Ltd

ML Queensland Mining Lease