



Exploration Activities Report Quarter ended 31 December 2010

Highlights

HEAVY MINERAL (HM) SANDS PROJECTS

- **Geological and exploration model proved correct for Wanna Lakes area with probable additional strand systems located.**
- **8,962 metres of air core drilling completed in WA sector of Eucla Basin.**
- **Cyclone Prefeasibility study continued – works including bulk sample assessment, groundwater studies, preferred processing and logistics strategy, and development of a preliminary production schedule.**

CORPORATE

- **BaoTi continue due diligence on participation in the Cyclone Project.**
- **Independent Technical Review of the Cyclone Heavy Mineral Deposit and Valuation Report prepared and released in mid January 2011.**
- **Share Placements conducted through PhillipCapital Australia raising \$2.17million in working capital.**



Diatreme Resources is an Australian based diversified mineral explorer with significant projects in heavy mineral sands, copper, base metals and gold.

The Company owns the zircon rich **Cyclone HM Deposit** in Western Australia, which is situated within the emerging world class **Eucla Basin heavy mineral sands province**, along with extensive areas of underexplored ground prospective for heavy mineral sands.

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

Australian Securities Exchange
Code: DRX

Securities
Ordinary shares:
265,947,384
Unlisted 47c options (30 June 2011):
16,800,000
Unlisted 47c options (31 July 2011):
3,000,000

Board of Directors

Executive:

Tony Fawdon - Chairman/CEO
David Hall - Operations

Non-executive:

Lawrence Litzow
George White
Andrew Tsang

Company Secretary:

Lawrence Litzow
Leni Stanley

Key Projects:

- Eucla Basin Heavy Minerals Project
- Clermont Copper Project
- Anabama Copper Project
- Bellfield Base Metals Project

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Share Registry:

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Eucla Basin Mineral Sands (Zircon) Project - SA and WA (DRX 100%)

Exploration drilling during the quarter took place within the Western Australia sector of the Eucla Basin (Table 1).

Tenement Name	Tenement No	No of Drill holes	Total Metres (m)
Wanna Lakes	EL69/1920	109	4,410.5
Wanna South	EL69/2425	25	1,008.0
Serpentine Lakes	EL69/2426	55	1,571.0
Marble Gum	EL69/2427	54	1,681.5
Jungooner	EL69/2428	11	291.0
TOTAL		254	8,962.0

Table 1: Drilling statistics during October-December 2010 quarter

Western Australia - Eucla Basin

At the start of the quarter, Diatreme held eight granted exploration licences in Western Australia and an additional five exploration licence applications. All licences were being explored for heavy mineral sand deposits.

Exploration drilling took place within five of the granted tenements; Wanna Lakes, Wanna South, Serpentine Lakes, Jungooner and Marble Gum. A total of 254 air-core drill holes were completed during the quarter for 8,962 metres of drilling (Table 1). The reconnaissance, wide spaced drilling, has been successful in defining a number of beaches along the interpreted Barton shoreline system and interpreted beach ridge systems within the immediate Wanna area behind the Barton shoreline. These discoveries have been drilled at very wide hole and line spacings and will be followed up in 2011 with closer spaced drilling. Table 2 outlines some of the intersections that require follow up drilling.

Infill drilling over the Cyclone Deposit was carried out collecting further samples for bulk sample testing to be undertaken in 2011 as part of the prefeasibility study, discussed below. The samples are also being used to confirm the grade and continuity of the deposit. Results from this drilling are pending.

Very little previous mineral exploration activity has been undertaken outside the Wanna area and therefore little is known about the geology. However, the original geological model used to peg the tenements seems to be correct with beach sands and HM mineralisation discovered along the Barton shoreline feature as modelled within this highly prospective region. However, further away from the Wanna area exploration drilling failed to locate prospective sand horizons or only low grade/deep mineral intercepts and significant tenement reductions took place during the quarter over areas deemed unprospective (Table 3). This will allow the Company to focus on the higher priority areas around Wanna/Cyclone during 2011.

Directly to the south of the Wanna tenements are located five tenement applications along the Ooldea Shoreline (which hosts the Jacinth/Ambrosia deposits to the southeast within South Australia). Although these tenements fall within a conservation park and are yet to be granted, prospectivity is considered very high due to the presence of 140km of potential multiple beach strand systems along the interpreted shoreline feature (Figure 1).



Tenement No	Hole ID	From (m)	To (m)	Interval (m)	HM %	Slimes %	Width (m)	Easting MGA94 Zone 52	Northing MGA94 Zone 52	RL (m)	Comments
69/2428	JR006	48	51	3	5.0	27	?	420891	6846637	384	E-W trending Barton Shoreline
69/2428	JR009	28.5	38	9.5	1.4	4	2,950	447829	6842412	325	Northern extension of Hurricane Barrier
69/2428	JR010	28.5	41	12.5	1.1	4		448439	6842495	327	
69/2428	JR011	22.5	30	7.5	1.3	3		449012	6842676	320	
69/2428	JR012	18	27.5	9.5	1.4	4		449610	6842732	316	
69/2428	JR013	13.5	43.5	30	1.3	4		450176	6842773	312	
69/2428	JR014	12	19	7	0.9	7		450787	6842840	290	
69/2428	MG046	27	37.5	10.5	1.3	9	?	450319	6846120	304	Possible northern extension of Hurricane Barrier
69/2427	MG052	21	25.5	4.5	1.0	13	>1,400	454105	6843376	301	Hurricane Barrier, back beach
69/2427	MG007	12	28.5	16.5	1.7	7		454288	6843388	300	
69/2427	MG009	10.5	16.5	6	1.0	3		455485	6843283	306	
69/2427	MG018	13.5	19.5	6	1.2	8	2,100	472697	6844873	302	SW facing embayment on Barton shoreline
69/2427	MG018	28.5	33	4.5	3.2	11		472697	6844873	302	
69/2427	MG020	19.5	23	3.5	1.4	4		474793	6845431	314	

Table 2: Drilling statistics, better intersections, October-December 2010 quarter

Tenement Name	Tenement Number	Original Size (sub-blocks)	Size at beginning of Quarter (sub blocks)	Current Size (sub-blocks)
Wanna Lakes	E69/1920	70	70	70
Jubilee Lakes North	E69/2222	134	63	Nil
Wanna Lakes East	E69/2408	70	70	70
Wanna-South	E69/2425	197	197	97
Serpentine Lake	E69/2426	200	200	59
Marble Gum	E69/2427	198	198	98
Jungooner	E69/2428	200	200	64
Willeri	E69/2429	200	162	Nil

Table 3: Granted Exploration Licence details - WA Eucla Basin

Summary

Within the Eucla Basin, Diatreme continues to actively conduct both “green fields” and “brownfields” exploration for heavy mineral sands. The Company is confident that, with further drilling, significant mineralisation will be discovered in addition to the existing mineralisation associated with Cyclone.

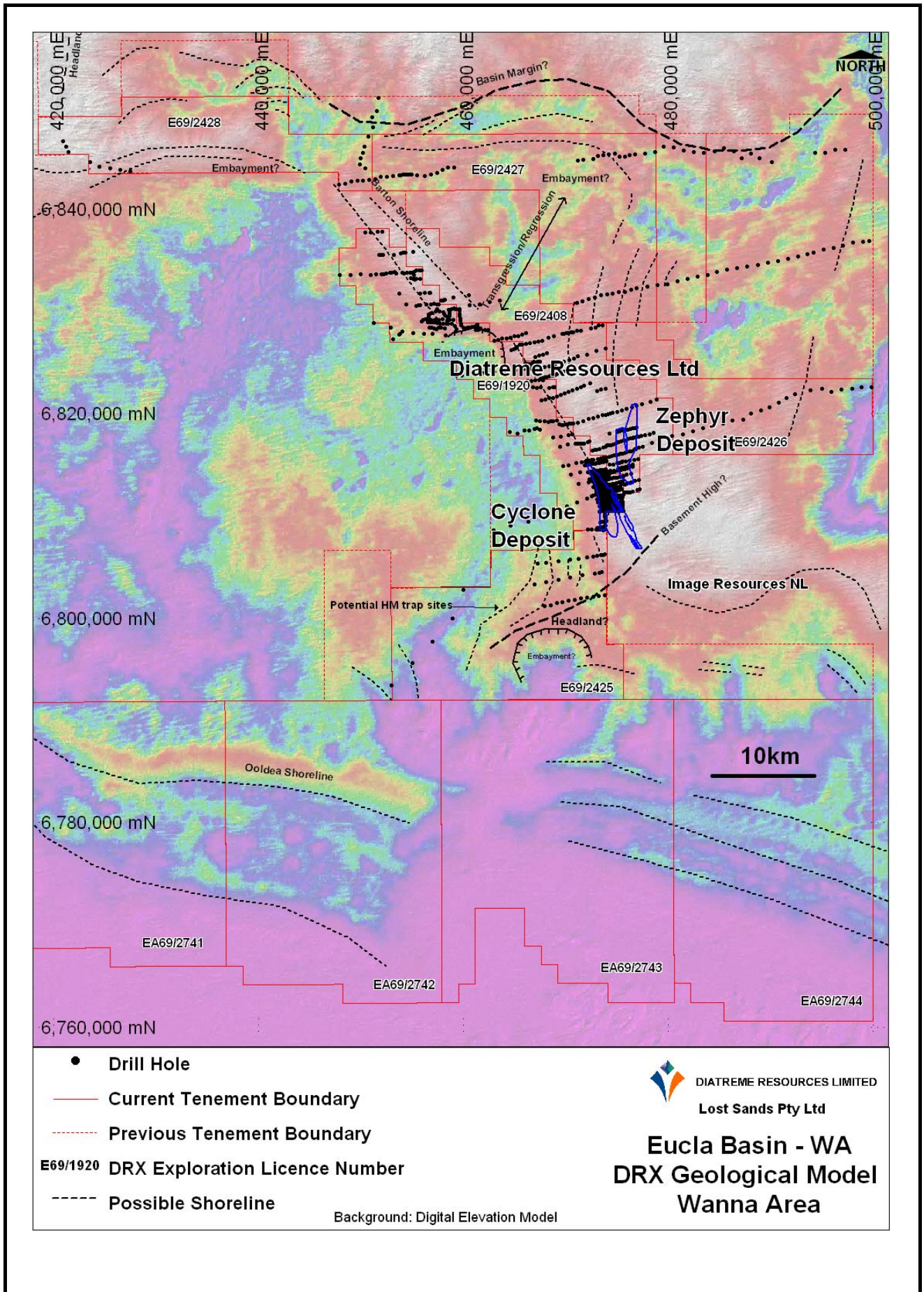


Figure 1: Location Map of Eucla Basin (WA) tenements in vicinity of Cyclone



Cyclone HM Deposit - Prefeasibility Study

Prefeasibility study ("PFS") activities during the quarter focussed on defining the processing and logistics strategy for the project in collaboration with BoaTi Group Ltd ("BoaTi"), and refining inputs to the financial model as part of the Independent Technical Review and Valuation Report prepared by Terence Willstead and Associates ("TWA"), Consulting Mining Engineers. The processing strategy was determined following mineral characterisation and process testwork on a bulk sample by CPG Mineral Technologies. A second bulk sample, sent to BoaTi in China, was tested by that group in an independent laboratory. An overburden bulk sample, with an average grade of 1.5% HM, was tested by Robbins Metallurgical to assess potential for mineral recovery and acceptable product quality.

The bulk ore sample tested in China produced similar results to the metallurgical testwork results obtained by Mineral Technologies in Australia. The results obtained by Mineral Technologies were released to the ASX on 23 November 2010 and were summarised as follows:

- Very high zircon recovery of 98% from spiral tests
- Premium grade zircon product generated from benchtop tests
- Zircon displays very low levels of radioactive elements
- Good recovery of high value titanium minerals

A preferred processing and logistics strategy has been defined for the PFS and "budget estimate" pricing has been obtained for road and rail transport. This information has been used in the TWA valuation of the project and the preferred processing strategy is summarised as follows:

- Production of a high grade concentrate at the mine site Wet Separation Plant.
- Concentrate transport via private haul road using 250 tonne road trains for 240 kilometres to an existing rail siding on the Trans Australian railway.
- Rail transport to either Adelaide or Esperance.
- Shipping to China in 40,000 tonne shipments.
- Production of final products at a Minerals Separation Plant located close to a Chinese port.
- Offtake agreement with strategic Chinese partner and additional spot sales.

A production schedule has been generated from a preliminary pit design using a 1.5% HM cut-off grade for the main ore zone. Overburden contiguous with the ore zone and with a grade higher than 1% HM has been included in the production schedule following positive results from metallurgical testwork on the bulk sample of overburden. The production schedule is based on mining a total of 98 million tonnes at an average grade of 2.6% HM over a period of ten years with forecast average production rates of 66,000 tonnes per year for zircon and 69,000 tonnes per year for titanium minerals (rutile, HiTi and altered ilmenite). Zircon is currently estimated to make up 72% of project revenue.

Australian Groundwater and Environmental Consultants has completed a review of groundwater supply targets for the project. Potential water supply target locations were identified within a 50 kilometre radius of the Cyclone Deposit and Tertiary paleo-channels have been identified as the primary targets. The project area is likely to have sufficient groundwater resources to supply the operational requirements and a water bore test drilling program is now being planned.

A representative bulk sample for the preliminary mining reserve is planned to be collected from a drilling program during February 2011. The bulk sample will be collected from the three ore zones (dune, beach and nearshore) comprising the currently defined mine pit design. Metallurgical testwork will include ore characterisation by zone followed by wet and dry mineral separation testwork to provide the final recovery, product quality, and process flowsheet data for the PFS.



Corporate

During the quarter:

- BaoTi Group Ltd signalled their continuance of their due diligence process toward the signing of a Heads of Agreement in relation to the feasibility and development of the Cyclone Deposit.
- With the assistance of PhillipCapital Australia, the Company completed share placements to sophisticated and professional investors totalling 31,082,650 shares at a price of \$0.07 per share. Before costs, this raised approximately \$2.17million in working capital.
- The Company's Chairman, Tony Fawdon, presented at the 11th Annual AJM Mineral Sands Conference in Melbourne. He addressed the conference on developments relating to Diatreme's Cyclone Zircon Project and its relationship with the BaoTi Group.
- In accordance with changes to the ASX Listing Rules the Company issued a revised Securities Trading Policy in late December.
- Long serving director and secretary to the Company, Mr Lawrence Litzow retired.

Post quarter:

- In January 2011, the Company released the **Independent Technical Review of the Cyclone Heavy Mineral Deposit and Valuation Report** prepared by Terrence Willstead & Associates ("TWA"). Important outcomes from the report included:
 - A suggested current value range for the Cyclone Project falling between A\$142 Million and A\$170 Million, with the most likely value being A\$156 Million.
Note: This valuation would be adjusted as technical and economic criteria are further confirmed and the project studies proceed to acceptable feasibility study levels.
 - Comparable values of other similar mineral sand projects are provided.
 - A financial analysis of the Cyclone Project indicated a good return on investment:

○ Capital investment including predevelopment	A\$201.5 million
○ Average annual sales revenue	A\$137 million
○ Average annual cash operating cost	A\$67 million
○ Average annual sustaining capital cost	A\$2 million
○ Average annual tax payable	A\$14 million
○ Average annual net operating cash flow	A\$54 million

The Cyclone Project net cash flow after tax (including CAPEX) is estimated to be \$336 Million, with capital repaid in approximately 3.5 years of operations.

- Product price outlooks for 2014 (US\$ per tonne) are zircon \$1,200, rutile \$750, HiTi \$350 and altered ilmenite \$190.
- Zircon and titanium mineral prices are expected to escalate at a higher rate than the Cyclone Project operating costs, but this assumption has not been included in TWA's financial model.

This highly encouraging report reflects well on the contribution that development of the Cyclone Deposit could play in the global mineral sands market.



Dated 31 January 2011

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Competent Person Statement

The information in this report, insofar as it relates to Exploration Results and Mineral Resources is based on information compiled by company personnel under the supervision Mr David Jelley, of David Jelley Pty Ltd, who is a Member of the Australasian Institute of Mining and Metallurgy. Mr Jelley 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 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Jelley consents to the inclusion in the report of the matters based on the information in the form and context in which it appears.