



## **Exploration Activities Report Quarter ended 30 June 2011**

### **Highlights**

#### **HEAVY MINERAL (HM) SANDS PROJECTS**

- **Metallurgical testing underway on a seven (7) tonne bulk sample obtained by drilling over Cyclone Deposit.**
- **Infill drilling over Cyclone Deposit improving the conceptual mining reserve area to a minimum 250m x 50m spacing.**
- **Reconnaissance drilling along Cyclone/Hurricane DEM feature along with infill drilling over selected zone of Zephyr Deposit.**
- **Infill drilling along Oldea Range in South Australia successfully defined three sub-parallel beach strand systems, confirming potential to host significant concentrations of HM.**

#### **QUEENSLAND METALLIFEROUS PROJECTS**

- **Gilbert River Base Metal Project: Reconnaissance field work with anomalous gold and copper surface rock chip results upgrading the status of prospects.**

#### **CORPORATE**

- **Updated Independent Technical Review and Valuation Report on Cyclone Deposit released in June 2011, valuing the Project between \$270M and \$330M.**
- **BaoTi Group maintaining strong emphasis on pursuing their proposed interest in the Cyclone Project.**



Eucla Basin HM exploration - Diatreme's aircore drill rig in operation

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  
Codes: DRX and DRXO**

**Securities**  
Ordinary shares (DRX):  
354,597,423  
Listed 15c options (30/09/13)(DRXO):  
88,650,039  
Unlisted 47c options (31/07/11):  
3,000,000

**Board of Directors**  
**Executive:**  
Tony Fawdon - Chairman/CEO  
David Hall - Operations  
**Non-executive:**  
George White  
Andrew Tsang  
William Wang  
Neil McIntyre  
**Joint Company Secretaries:**  
Leni Stanley  
Tuan Do

**Key Projects:**

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

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## **EUCLA BASIN MINERAL SANDS PROJECT - (DRX 100%)**

Substantial drilling has been completed during the second quarter of 2011 including:

### **Western Australia**

- a drilling program to collect seven (7) tonnes of representative heavy mineral bearing ore from the Cyclone Deposit resource.
- two programs of infill drilling over the Cyclone Deposit to improve the conceptual reserve area to a minimum spacing of 250m x 50m, thereby allowing an updated measured resource estimate to be reported as part of the pre-feasibility study and assisting in the accuracy of preliminary mine planning.
- a program of reconnaissance drilling along the Cyclone / Hurricane Digital Elevation Model ("DEM") feature to follow-up anomalous results from previous drilling and to ensure that the northern extension of the Cyclone topographic feature has been drilled at a minimum 1km line spacing.
- a small program of infill drilling over a selected zone of the Zephyr Deposit resource to confirm the geological setting and continuity of HM mineralisation.

### **South Australia**

- an infill drilling program over a DEM feature existing within EL3616 along the Ooldea Range that had reported anomalous mineralisation from reconnaissance drilling in 2009 and 2010.

Drilling statistics for the quarter are provided in Table 1 below:

| <b>Tenement</b> | <b>Program</b>          | <b>Date From</b> | <b>Date To</b> | <b>Holes drilled</b> | <b>Metres drilled</b> | <b>Samples assayed</b> |
|-----------------|-------------------------|------------------|----------------|----------------------|-----------------------|------------------------|
| E69/1920        | Cyclone Bulk Sample     | 1 April          | 5 April        | 28                   | 1,002                 | 566                    |
| E69/1920        | Cyclone Resource infill | 5 April          | 15 April       | 94                   | 3,451                 | 1,304                  |
| E69/2408        | Zephyr Resource infill  | 11 May           | 13 May         | 12                   | 404.5                 | 108*                   |
| E69/2408        | Test DEM feature        | 13 May           | 24 May         | 60                   | 2,858                 | 532*                   |
| E69/1920        | Test DEM feature        | 14 May           | 22 May         | 16                   | 672                   | 57*                    |
| E69/1920        | Cyclone Resource infill | 25 May           | 30 May         | 37                   | 1,628.5               | 576*                   |
| E69/2425        | Cyclone Resource infill | 24 May           | 24 May         | 1                    | 36                    | 17*                    |
| EL 3616         | Ooldea Range DEM        | 11 June          | 26 June        | 80                   | 3,838                 | 470*                   |
| EL 3616         | Reconnaissance          | 27 June          | 30 June        | 11                   | 526.5                 | 122*                   |
| <b>TOTAL</b>    |                         |                  |                | <b>339</b>           | <b>14,416.5</b>       | <b>3,752</b>           |

\*samples submitted to Diatreme's Ceduna Pre-Preparation Laboratory, assay results awaited.

**Table 1: Eucla Basin drilling statistics for the quarter**

Figure 1 shows the Company's tenements within the Eucla Basin, including the location of the Cyclone Deposit and EL 3616 (Eucla 4) where drilling was conducted during the quarter.

Figure 2 shows the Western Australia portion of the Eucla Basin with geological interpretation and drill hole locations.

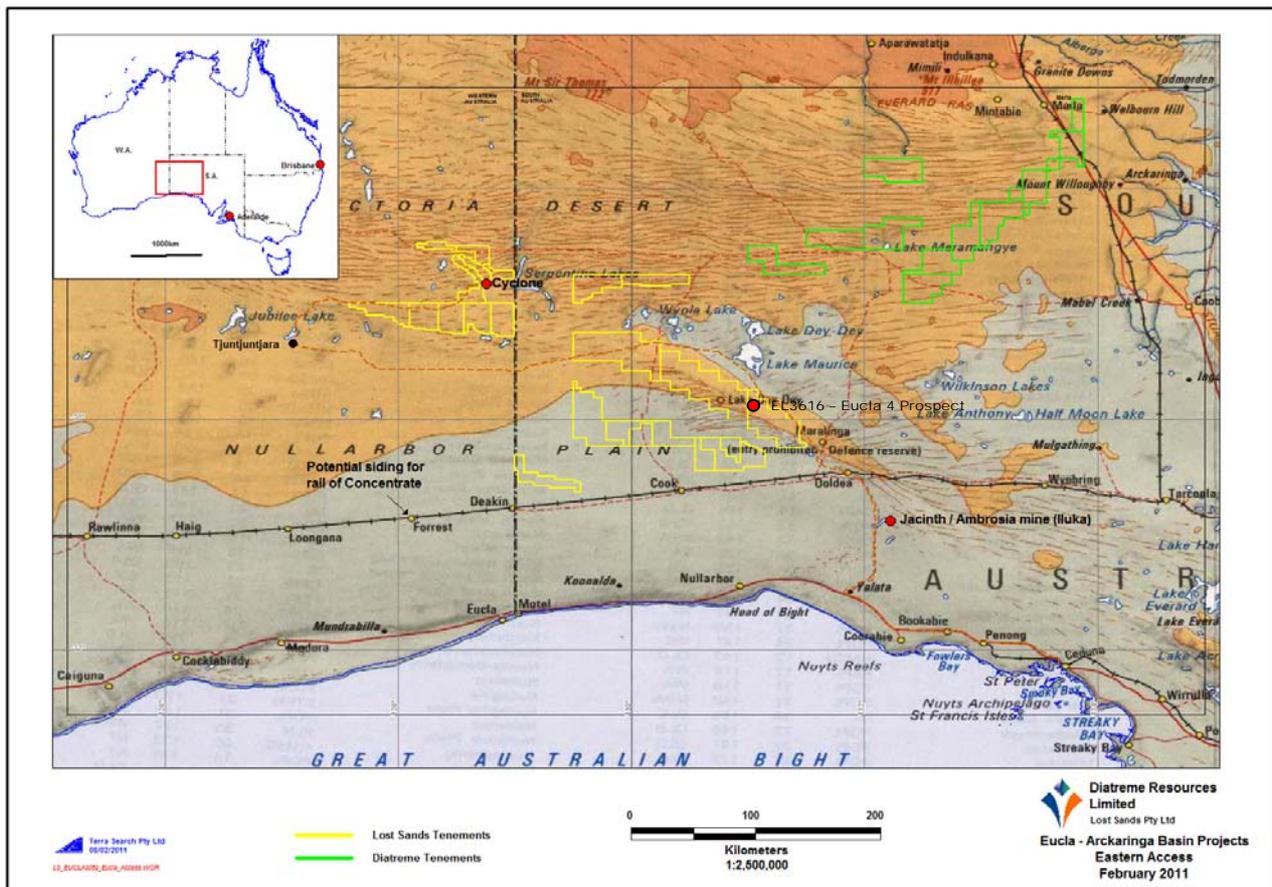


Figure 1: Lost Sands Pty Ltd tenements within the Eucla Basin

### E69/1920 Wanna Lakes (including Cyclone Deposit)

The bulk sample drilling program which commenced at Cyclone last quarter was completed in early April, with a total of 61 drill holes for 2,217m. Drill holes were sited across the full extent of the Cyclone resource to ensure a representative bulk sample, with around 7,000kg of mineralised material collected for metallurgical test work. Most of this drilling was also sampled and assayed as it also formed part of the resource infill drilling program being undertaken. Two drill holes were twinned with existing drill holes and samples collected by both Diatreme and BaoTi to assess any variance in drilling, sampling and assaying methods. As expected, the results displayed very good correlation between Diatreme and BaoTi assay data and between current and historical drilling results.

Infill drilling of the Cyclone resource was carried out in two phases:

#### Phase 1

Initial drilling in April aimed at ensuring that the core of the Cyclone resource is covered by a minimum 250m x 50 spaced drill pattern. Due to the dune landform a consistent evenly spaced drill grid cannot be readily achieved, but Diatreme believes the current drill pattern will be appropriate to upgrade the majority of the deposit to a measured resource. All HM assay results for this program have been received, and are in the process of being collated and interpreted. Further mineralogy will also be undertaken to upgrade the resource status. The drilling results have been largely as expected, although the extent and definition of high grade strand mineralisation has been upgraded, particularly for the east strand, and there is confirmation of significant nearshore mineralisation continuing south towards E69/2425, whereas this was

previously reported as inferred resource. A slight increase in HM resources for Cyclone is therefore anticipated.

## **Phase 2**

The second phase of infill drilling in May focussed upon improving geological knowledge and grade continuity of mineralisation in the south eastern part of the deposit, where both high grade beach strandline and deeper estuarine mineralisation are known to occur, but required additional drilling to confirm their economic potential. Geological logging and field HM estimates suggest that mineralisation is more extensive than currently defined; however, assay results are awaited. This drilling will also help with the interpretation of the geometry of high grade strandlines across the tenement boundary into Image Resources' portion of the Cyclone Deposit, as there currently appears to be a break in the east strand mineralisation coincident with the southern boundary of E69/1920.

### **E69/2408 Wanna East (including Zephyr Deposit)**

Infill drilling, at 100m hole spacing, was carried out over two drill lines over the western arm of the Zephyr Deposit in order to confirm the geology and HM mineralisation interpreted from previous drilling. Although assay results are awaited, the continuity of mineralisation appears to be confirmed, and the mineralisation was interpreted as occurring largely within a moderate to poorly sorted nearshore or estuarine sequence with variable grain size. Minor mineralisation was also observed in the overlying beach and surf zone sands. Additional resource definition drilling is recommended for Zephyr, but the timing of this will be dependent upon a review of the strategic and economic potential of the Zephyr resource and the confirmation of mineralogy by additional mineralogical analyses.

### **E69/1920& E69/2408 - Regional Exploration**

The interpreted beach barrier topographic feature that appears to control HM mineralisation at Cyclone extends northwest for a considerable distance straddling the boundary between E69/1920 and E69/2408. Whilst reconnaissance exploration has been carried out over this feature over the past five years, significant gaps in drill coverage still existed, and it was felt that potential remained for the delineation of smaller strands or pods of HM mineralisation associated with localised embayment features or trap sites along the interpreted beach barrier.

A drilling program was carried out to both improve the drill density across the DEM feature, and to follow-up anomalous results from previous drilling. These anomalous results included both HM assay results, and beach sands which were not previously assayed but were subsequently logged as having zircon present by using a UV light. The drilling was successful in delineating a beach sequence at the expected elevation (base at 300m RL) along the entire length of the DEM feature, thereby confirming the potential of the feature. Minor HM mineralisation was logged, and assays are awaited. Once all assays are available, a re-assessment of the geology and mineralisation potential of the DEM feature will be undertaken and additional drilling planned to help locate additional satellite deposits to the main Cyclone resource.

Follow-up drilling of anomalous assays within a high level (335m RL) beach sequence near the top of the Cyclone beach barrier system was successful in delineating a visibly mineralised zone that is around 300m wide, 6m thick and currently extends for over 1.5km of strike. Recognition of HM mineralisation in this setting has allowed definition of other nearby exploration targets within E69/2408. These will be drilled in the near future to confirm this new style of mineralisation.

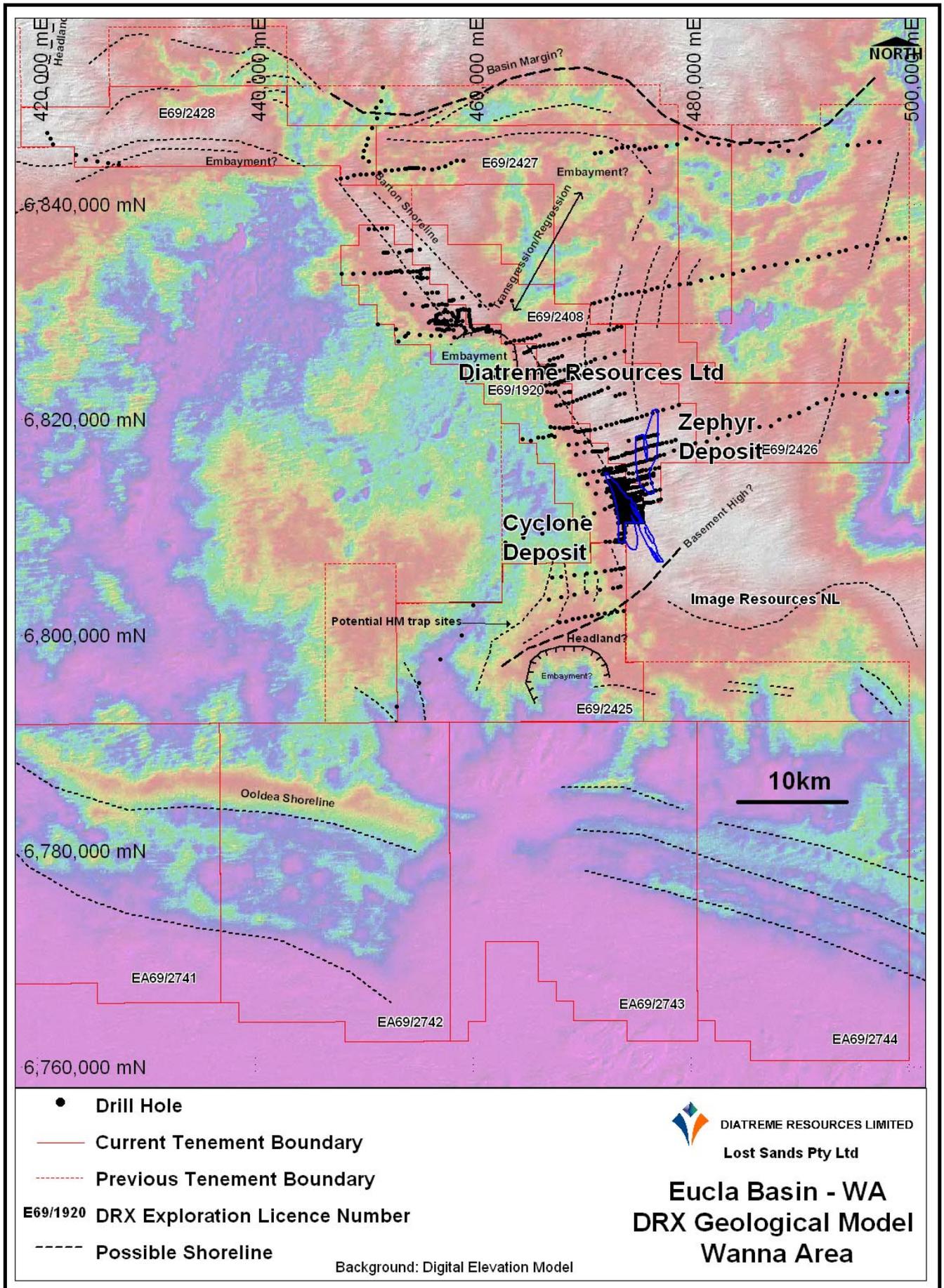


Figure 2: WA portion of the Eucla Basin - geological interpretation and drill hole locations

## EL 3616 Eucla 4

Follow-up drilling was completed over four separate 1.6km spaced drill lines that traversed and interpreted SW facing embayment feature along the Ooldea Range, SA. Previous drilling over the DEM feature during late 2009 / early 2010 had returned encouraging results including a best assay of 9m at 5.3% HM from 24m depth in Tertiary beach sands. However, additional drilling was required to confirm the geometry and continuity of this mineralisation. The follow-up drilling was planned at 200m hole spacing, but closed down to 100m spacing in areas of interest.

The drill program completed during June 2011 was successful in defining three sub-parallel northwest trending beach strand systems 2-3km apart associated with the embayment feature. The central strand is the better developed of the three, comprising visible HM mineralisation with an average width of 500m and thickness of 12m over a 9km strike length. The mineralisation commences around 25m below surface within a well-developed beach sand sequence, with best mineralisation occurring immediately above a coarse-grained to gritty surf zone. Assay results are awaited, but visual estimates range from 1-6% HM for the strand mineralisation. No estimates of HM assemblage have been made at this time and upon receipt of all assays, mineralogical samples will be submitted for analysis.

The southern strand appears restricted to two drill lines based on current drilling, but further drilling may well expand its known strike. The northern strand displays a relatively narrow width (~100m), thickness (~6m), and occurs at a greater depth below surface compared to the central strand, but does display a similar strike continuity to the central strand.

The discovery of beach strand mineralisation within EL3616 confirms the potential of the Ooldea Range to host significant concentrations of HM, and further work will be undertaken in the second half of the year to assess the economic potential of this discovery.

A line of reconnaissance drilling was commenced in the north-eastern part of EL3616 to follow-up the widespread occurrence of low to medium grade HM mineralisation associated with a deep estuarine or nearshore sedimentary sequence intersected immediately behind the Ooldea Range. The traverse was not completed during the June drill program, but geological logging of the completed holes has confirmed the presence of thick (>20m) sequences of fine-grained sand with visible HM mineralisation. Further drilling and geological interpretation is required to assess the economic potential of this mineralisation style.

## Cyclone Zircon Deposit - Prefeasibility Study

The Prefeasibility study ("PFS") work continued during the quarter.

As reported above, a seven (7) tonne bulk sample was collected from holes drilled across the entire Cyclone ore body and the average grade of the sample is consistent with the conceptual mining reserve estimate. The three ore zones (dune, beach and nearshore) were initially prepared as separate samples for individual characterisation before combining for separation testwork. Wet Concentration Plant ("WCP") testwork on the sample is nearing completion and an interim processing report is being prepared by CPG Resources (Mineral Technologies). Mineral Separation Plant ("MSP") testwork will commence on completion of analysis of the WCP results. The main objective of the WCP work has been to maximise zircon recovery and concentrate grade.

Additional resource drilling has been undertaken within the proposed initial mining area for the purpose of mining reserve definition and mine planning.

Mine product transport investigations have involved site visits to seaports at Adelaide and Whyalla in South Australia and Kwinana and Esperance in Western Australia along with the engagement of a bulk transport consultant to develop a rail transport strategy, including an evaluation of existing rail sidings along the Trans Australian Railway, 240km south of the Cyclone Deposit.

Environmental consultants have been engaged for the environmental component of the PFS, including development of a plan and cost estimate for the Bankable Feasibility Study (BFS) environmental approval process. Desktop studies have commenced to identify any significant environmental issues and preliminary site surveys are planned for early September.

Site works to be undertaken next quarter involve:

- Excavation of a test pit in a harder (indurated) section of overburden to provide information for development of an efficient overburden removal system. The target pit depth is eight (8) metres to intercept zones that have been interpreted as weak layers of calcrete and sandstone. Samples of potential road construction materials will be collected for determination as to suitability of local materials for road construction.
- Test holes exploring for water are to be drilled in at least three target areas identified by groundwater and environmental consultants. The Company's own exploration rig will be used to drill holes up to 100 metres deep and recover samples for aquifer analysis and water samples for basic quality tests.
- The commencement of MSP testwork.

## QUEENSLAND METALLIFEROUS PROJECTS - (DRX 100%)

### **Gilbert River Base Metal Project (formerly named Bellfield)**

Four new exploration permits totalling an area of 673 sq km (EPMs 18213, 18262, 18353 and 18547) were granted during the quarter. This has increased the Company's total holding in this greenfields exploration area to sizable 1,127 sq km, with a further 775 sq km remaining under application.

Reconnaissance work in the past has highlighted the area as highly prospective for gold and base metal targets. With the grant of the new areas a targeted exploration program is being planned, particularly around the two initial areas of primary interest – the "Carsons Prospect" and "Big Bend Prospect" in the vicinity of the Gilbert River.

A recent field trip to reassess the potential of the Gilbert River Project encompassing EPM12888, EPM18213 and EPM18353 has been completed and upgraded these prospects to highly important. Prospects visited included Carsons, Castle, Ortona and Big Bend. There has been considerable work undertaken over these prospects including mining over Carsons, Castle and Ortona and exploration over Big Bend. Recent reassessment by Diatreme geologists has upgraded the status of these prospects following a review of all the previous exploration data and examination of the rocks and mineralisation potential. Table 2 below indicates a number of anomalous rock chip assay results from the Carsons and Castle prospects:

| Sample Number | Easting        | Northing | Prospect | Au  | Ag   | Cu    | Pb    | Zn    |
|---------------|----------------|----------|----------|---|------|-------|-------|-------|
|               | MGA94, Zone 54 |          |          | All assay results are in parts per million (ppm)<br>except as indicated |      |       |       |       |
| 3008202       | 768242         | 7869465  | Castle   | 0.76  | 5.9  | 503   | 37    | 2     |
| 3008204       | 768156         | 7869457  | Castle   | 1.05  | 324  | 41.5% | 240   | 876   |
| 3008213       | 766758         | 7869262  | Carsons  | 6.47  | 25.7 | 4.08% | 1,210 | 243   |
| 3008214       | 766865         | 7869279  | Carsons  | 0.45  | 23.3 | 1,795 | 275   | 143   |
| 3008215       | 766970         | 7869305  | Carsons  | 0.47  | 79.3 | 5.78% | 1.10% | 2,170 |

**Table 2:** Rock Chip Sample Results from Carsons and Castle Prospects, Gilbert River Project



**Figure 3; Gilbert River Project: Historic mine pit with high grade copper at the Castle Prospect**

### **Clermont Copper Gold Project**

A recent field trip by Diatreme geologists continued to establish the highly prospective nature of many of the local prospects, including the under-explored Palm Trees Prospect, 5km south of Clermont township. This prospect is interpreted as being similar to the Pine Creek Orogen, NT, or Bendigo/Ballarat district of Victoria, with anticlinal structures hosting quartz/gold saddle reefs and stockworks. A geophysical Sub Audio Magnetics Survey was completed by Diatreme in 2010, followed up by a structural mapping exercise outlining a number of potential anticlinal folds that host historic gold workings. Minor further mapping over the area is required prior to drill testing.

## **CORPORATE**

### **Board Appointments**

In May (ASX release 27/05/11), the Company welcomed Mr Cheng (William) Wang to the Board. Mr Wang's high level of expertise in corporate dealings and business relationships with Chinese and Asian interests will benefit DRX as it seeks to advance its mineral projects. At the same time, Mr Tuan Do, the Company's Group Financial Controller, was appointed as Joint Company Secretary.

In July (ASX release 29/07/11), the Company welcomed Mr Neil McIntyre to the Board. With Mr McIntyre's experience in merchant banking, finance and corporate advisory services, DRX will benefit in the assessment of new funding mechanisms and financial instruments for the development of the Cyclone Project.

## Updated Independent Technical Review and Valuation Report – Cyclone Project

In June (ASX release 21/06/11), the Company released an updated Independent Technical Review and Valuation Report on Cyclone prepared by Terrence Willstead & Associates (“TWA”). This report was prepared as a replacement to the TWA report released 17 January 2011 and took into account all relevant data previously discussed, but was updated with the current trends for mineral pricing, supply and demand as at June 2011. The review did not provide an opinion on share value or corporate capital value of DRX.

During the first half of 2011, significant improvements have occurred in the pricing of mineral sand products. Based upon a range of criteria detailed in the report, TWA have suggested the following current value range for the Cyclone Project (equivalent January 2011 value comparisons in brackets):

|                     | <u>Updated Valuation</u>  | <u>Previous valuation</u> |
|---------------------|---|---------------------------|
| <b>Low:</b>         | <b>\$270 million</b> indicated by the base case after-tax value and allowing for Pre-development Study bases and medium risk levels.                    | (\$142 million)           |
| <b>High:</b>        | <b>\$330 million</b> to provide for suggested revenue improvement, resource increase and lower risk levels, and for current comparative project values. | (\$170 million)           |
| <b>Most Likely:</b> | <b>\$300 million</b> – Valuation between Low and High cases.  | (\$156 million)           |

It is to be noted that this valuation would be adjusted as technical and economic criteria are further confirmed and the project studies proceed to acceptable feasibility study levels.

## BaoTi Group Ltd – Cyclone Project JV Status

The Company has been advised by BaoTi Group Ltd (“BaoTi”) that they maintain a strong emphasis on pursuing their proposed interest in DRX’s Cyclone Project, as initially indicated in the MOU signed in August 2010. Commissioning of international legal and accounting advisors is proceeding along with corporate due diligence.

## Expiry of Options

On 30 June 2011, a total of 16,800,000 unlisted options (ex 47cents) expired.

**Dated 29 July 2011**



**Anthony J Fawdon**  
Executive Chairman/CEO

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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 of Mr David Jelley, who is a full time employee of Diatreme Resources Limited and 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.