

# Red Dog Exploration (Aust) Pty Ltd

(100% owned subsidiary of Ebony Coal Ltd)

## EL 29009

Northern Territory Geological Survey

1: 250,000 map sheet: Auvergne

### FINAL & ANNUAL REPORT

For the Period 17/7/12 to 22/7/13

### Red Dog Project

EXPLORATION TARGETTING RESERVES OF EXPORT QUALITY COAL

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Prepared for Ebony Coal Ltd by

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Date: July 2013

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## 1.0 ABSTRACT

Red Dog Exploration (Aust) Pty Ltd applied for EL 29009 on 9/9/11. Five other tenements were applied for on that day, EL 29006 (relinquished), EL 29007 (relinquished), EL 29008 (relinquished), EL 29010 and EL 29011. EL 29142 was applied for on 28/10/11. Three tenements now make up the Red Dog Project, which covers a total area of 1,488.79 square kilometres. EL 29009 was granted on 17/7/12 for a term of six years. EL 29009 is made up of 244 Sub- Blocks (726.73 sq. km). The Notice of Grant had expenditure commitments of \$47,000 for Year-1 and \$71,000 for Year-2. The rationale for applying for EL 29009 and other Red Dog tenements are coal seams intercepted in Permian age Bonaparte Basin Kulshill Group sediments from drilling for coal and petroleum. Desk-top study reveal multiple coal intersections >0.4 metres are reported with the greatest net coal thickness from historic drilling of 4 metres. The latter result was coal seams intercepted in drill hole Keep River-1 within EL 29010. Intercepts of coal seams are concentrated to the northeast of the Red Dog Project. The geological target is at least 100 million tonnes of thermal coal resources amenable to open pit mining. Red Dog Project is favourably located less than 100 kilometres from the deep-water port of Wyndham. The location in Northern Australian offers a competitive advantage for shipping costs compared with thermal coal shipped to Asian destinations from the Port of Newcastle in New South Wales. The work program for the year ending 16/7/13 was restricted to desktop risk/reward evaluation of EL 29009. The risk/reward balance did not support an application to renew this tenement.

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### **3.0 GENERAL**

#### **3.1 Tenure Information**

Red Dog Exploration (Aust) Pty Ltd applied for EL 29009 on 9/9/11. Five other tenements were applied for on 9/9/11; these were EL 29006, EL 29008, EL 29009, EL 29010 and EL 29011. EL 29142 was applied for on 28/10/11. Three tenements are retained making up the Red Dog Project, which covers a total area of 1,488.79 square kilometres. EL 29009 was granted on 17/7/12 for a term of six years. EL 29009 comprises 244 Sub- Blocks (726.73 sq. km).

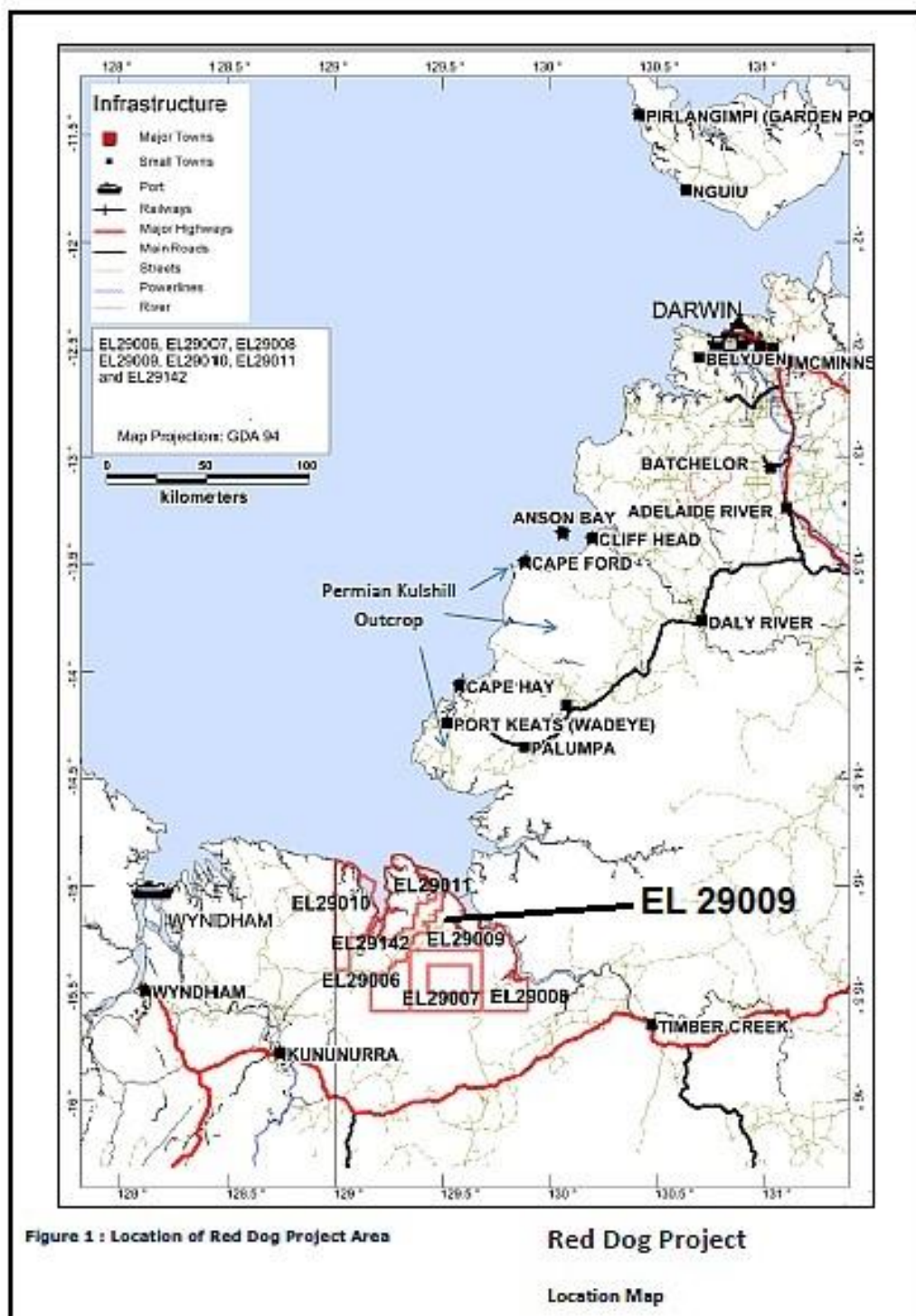
All Red Dog tenements are situated on Pastoral Leases. The Aboriginal Areas Protection Authority (AAPA) has advised that it have a number of records within Red Dog Project. An Authority Certificate has previously been issued over parts or all of the search area.

#### **3.2 Tenement Location and Access**

EL 29009 is the eastern Red Dog tenement. The closest towns are Kununurra and Wyndham in far northeast of Western Australia. Wyndham has a deep-water point and is 73 kilometres distant from Red Dog. The location and details of EL 29009 are shown in Figures 1-4. There is a network of tracks west of Proterozoic basement servicing Legune, a pastoral company serviced by dirt road and unsealed airstrip. This is a remote location with no significant infrastructure and restricted road access. The Proterozoic is rugged and best accessed via helicopter.

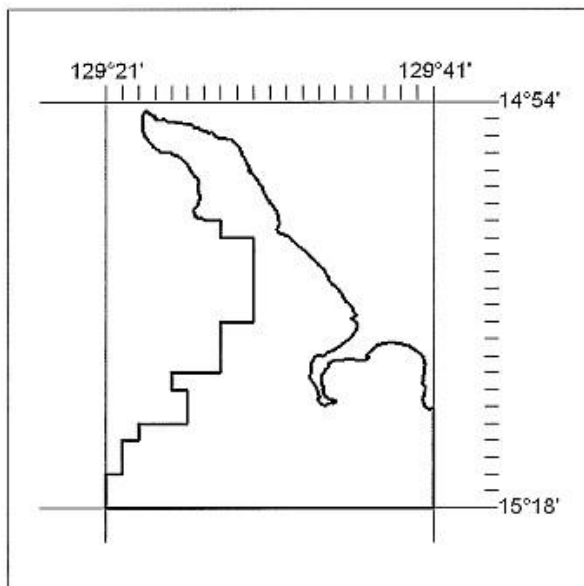
In the southeast corner of EL 29009, the elevation of Proterozoic basement rocks rises to over 200m at the highest point. Excluding basement geology, the elevation ranges for 0-12m with tidal flats along the western boundary of Victoria River. The jump-up from interpreted Permian outcrop is shown in Figure 4, a Google Earth image incorporating a north-south cross section through the tenement. The wet season effectively limits the fieldwork to eight months, April to November.

Figure 1: Regional Map -- Red Dog Project



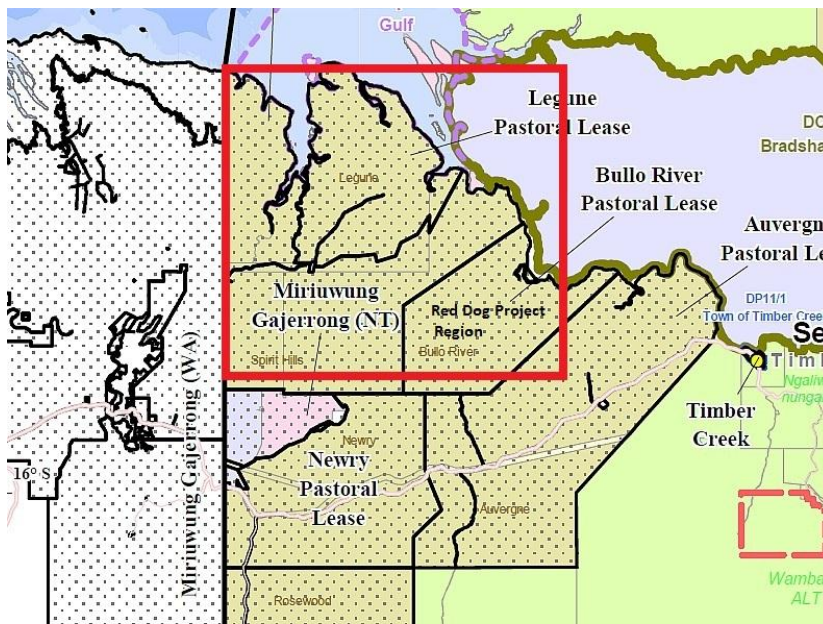
Source: Global Ore Discovery, May 2012

**Figure 2:** Details of EL 29009 – 244 Blocks / 726.73 sq km.



*Source: NTG Department of Resources, 2012*

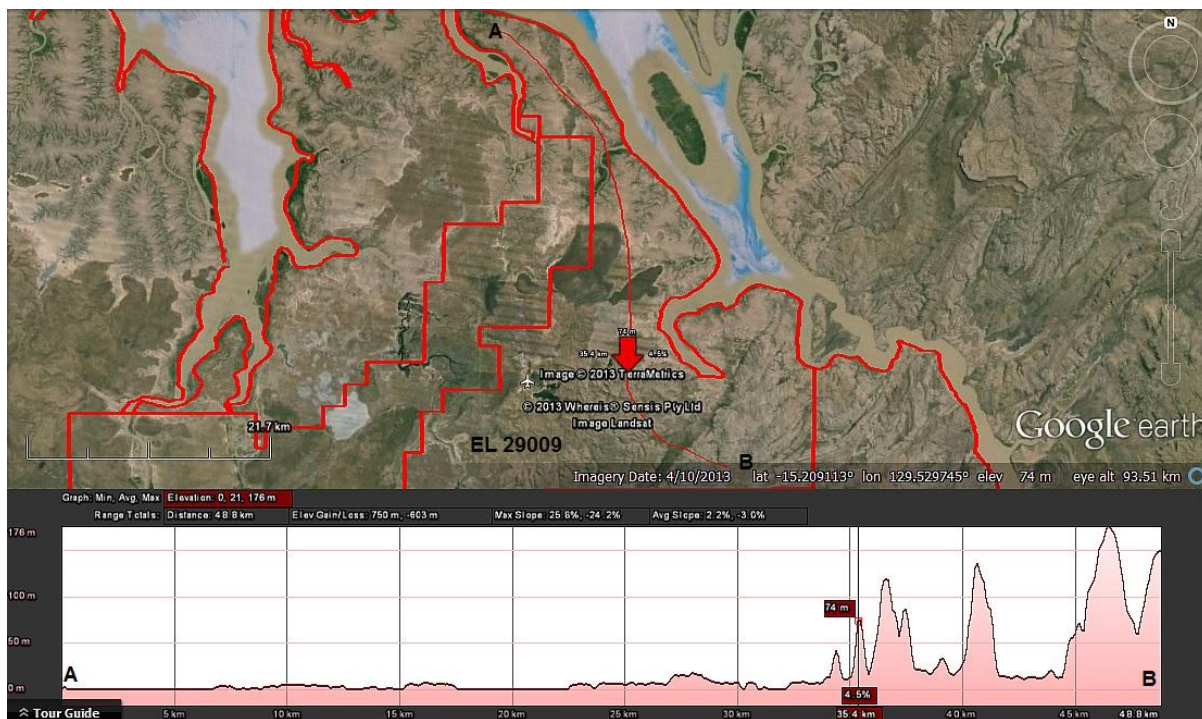
**Figure 3:** Red Dog Project Area and Pastoral Leases



*Source: National Native Title Tribunal*



Figure 4: Google Image Showing EL 29009. Proterozoic basement is light grey.



Source: Jackray Mining Pty Ltd, July 2013

## 4.0 GEOLOGICAL SETTING

### 4.1 Regional Geology

Key aspects of the geology of the Bonaparte Basin are summarised by Geoscience Australia. The Bonaparte Basin consists of a number of structural elements and extends over an area of 270,000 square kilometres. The basin has a history of both oil and gas production.

The Bonaparte extends both offshore and onshore. Red Dog tenements are within the most southern part of the basin where GOD estimates that Red Dog tenure covers over 1,500 square kilometres of the prospective Early Permian Kulshill Group that is considered prime target stratigraphy.

*“The Cambrian to Recent Bonaparte Basin is a fan-shaped hydrocarbon-bearing basin extending over 270,000 km<sup>2</sup> in the northwestern offshore and onshore Australia. The basin contains up to 15 km of sediments and has a multi-phase history, comprising the southern Palaeozoic and northern Mesozoic depocentres. The latter forms part of the Westralian Super-basin.*

*The Bonaparte Basin had produced 11 GL of oil to end-2000 but only 0.11 BCM of gas due mainly to market limitations. Remaining known reserves are 33.42 GL of oil and 668.55 BCM of gas.*

*The basin developed during two phases of Palaeozoic extension and Late Triassic compression prior to the onset of Mesozoic extension. Initial rifting occurred in the Late Devonian (NW-trending Petrel Sub-basin) and was orthogonally overprinted in the Late Carboniferous to Early Permian by NE-trending rift basins (proto-Malita and proto-Vulcan depocentres). Regional N-S compression in the Late Triassic resulted in widespread uplift and erosion, and, together with salt tectonics, produced inversion structures and anticlines in the Petrel Sub-basin. Erosion and collapse of these uplifted areas led to the widespread deposition of Lower-Middle Jurassic 'redbeds' and fluvio-deltaic clastics. Late Jurassic extension resulted in a series of linked, NE-trending (Vulcan Sub-basin, Malita and Calder Grabens) and SE-trending (Sahul Syncline) intracontinental grabens.*

*The Jurassic depocentres contain thick marine mudstones flanked by fan delta sandstones. A thick post-rift Cretaceous-Tertiary succession is dominated by fine-grained clastic and carbonate facies. Late Miocene-Pliocene convergence of the Australian and Eurasian plates resulted in flexural downward of the Timor Trough and widespread reactivation of the previous extensional fault systems.”*

**Source:** Australian Government, Geoscience Australia.

With recorded coal intersections, the focus of exploration is the Lower Permian Kulshill Group. This is the only onshore Permian sedimentary package in the Bonaparte Basin. Where Red Dog tenements are interpreted to cover Kulshill Group, the cover is expected to be a shallow 2-40 metres. Most of this area is within ELs 29010, 29142 and 29011.

## **4.2 Tenement Geology**

The east and southeast of Red Dog is not prospective for coal where outcrop geology is Proterozoic basement rocks. Within EL 29009 most of the southeast and south central areas of the tenement are covered by Proterozoic basement and are not prospective for coal.

Kulshill Group sedimentation is characteristic of a fluvial environment with formation of alluvial fans. Depositional sites suitable for accumulation of coal, such as swamps and lakes, may have occurred near the margins of the basin.

## **4.3 Exploration Rationale and History**

The rationale for applying for EL 29009 and other Red Dog tenements are coal seams intercepted in Permian age Bonaparte Basin Kulshill Group sediments from drilling for coal and petroleum. Desk-stop study revealed multiple coal intersections >0.4 metres are reported with the greatest net coal thickness from historic drilling of 4 metres. The latter result was from drill hole Keep River-1 within EL 29010.

Coal exploration within the onshore Bonaparte Basin began in 1906 when the South Australian Department of Mines completed a number of boreholes around Port Keats, Cliff Head, Cape Ford, Anson Bay and Cape Hay. Coal is in outcrop at Cape Hay but the location of boreholes is unknown as are the thicknesses of seams intersected. It seems that the seams were discontinuous, considered uneconomic, and exploration ceased.

In the mid-1960s, Australian Aquitaine Petroleum Pty Ltd drilling for oil (Authority to Prospect OP2) intersected coal in Kulshill 1, Kulshill 2 and Keep River-1. This

success led to further exploration by Theiss Brothers Pty Ltd (Coal Licence 172), but it was concluded that bands of coal were thin, discontinuous, and occurred in unconsolidated sediments and not mineable. Utah Development Corporation (UDC) drilled a number of holes near Port Keats in 1972. Western Mining Corporation Limited (WMC) completed a desktop study of the work completed by UDC in 1982 and completed coal quality analysis of historical petroleum well cuttings. WMC concluded that mining coal around Port Keats would not be economic.

The target of this earlier exploration was the shallow Lower Permian coal in the Upper Kulshill Group that outcrops in the Port Keats area. Red Dog Exploration is not targeting the Upper Kulshill Group. Rather the target of the current exploration programme is the Lower Kulshill Group.

Inspired by Keep River-1, CRA mounted an exploration effort on three tenements, Coal Licence 1 (NT), and two tenements in Western Australia. The only noteworthy drill result was net 1.8 metres of coal from five seams in WA (DH RD81BC7). CRA concluded that coal seams were shaly, thin and discontinuous, and the tenements were relinquished.

The crux of the matter is that sparse wide space coal bores, absence of core drilling and a paucity of down-hole logging, mean that the Red Dog area has not been adequately explored. A conceptual target of 100 million tonnes with 3 metres of net coal represents an area of only 25 square kilometres, or less than 2% of the Red Dog Project area.

A large portion of EL 29009 is covered by Proterozoic basement rocks and not prospective for coal. The tenement is distal to the basin margin and carries higher exploration risk than the northern Red Dog tenements.

## **5.0 EXPLORATION WORKS CONDUCTED**

### **5.1 Overview of Work Performed**

The work program for the year ending 16/7/13 was restricted to a risk/reward study concerning the allocation of exploration funds to EL 29009. Jackray Mining Pty Ltd completed this work.

### **5.2 Committed Expenditure**

The expenditure commitments for EL 29009 are \$47,000 in the first year and \$71,000 in the second year of grant. The amount spent on the tenement of \$1,450 did not meet the expenditure commitment for the year ending 16/7/13. A subsequent review of the Red Dog Project resulted in relinquishment of EL 29009.

## **6.0 REASON FOR RELINQUISHING EL 29009**

Large areas, southeast and south-central domains of EL 29009 are covered by Proterozoic basement rocks, and are not prospective for coal.

Junior explorers are finding it difficult to raise new equity capital to fund exploration. The current state of affairs necessitates continuous review of the portfolio of tenements that comprise the Red Dog Project. On a risk/reward basis, EL 29009 is considered to have too high risk because of the large area covered by Proterozoic basement and that the tenement is distal to the margin of the Bonaparte Basin.

EL 29009 was relinquished to preserve funds that are better allocated towards exploring what are now considered the most prospective Red Dog tenements.