

Red Dog Exploration (Aust) Pty Ltd

(100% owned subsidiary of Ebony Coal Ltd)

EL 29142

Northern Territory Geological Survey

1: 250,000 map sheet: Auvergne

ANNUAL REPORT

For the Period 15/5/12 to 14/5/13

Red Dog Project

EXPLORATION TARGETTING RESERVES OF EXPORT QUALITY COAL

Prepared for Ebony Coal Ltd by

Jackray Mining Pty Ltd

ABN 150 338 506

Date: May 2013

DOCUMENT CONTROL SHEET

Jackray Mining Pty Ltd	
Postal Address	PO Box 5672 Chatswood West, NSW 1515
Phone	+61 437 356 005
Email	rickgreene@jackraymining.com

Project	Red Dog	Issue date	15 th December 2012
Title	Annual Report EL 29142 – Red Dog For Period 15/5/12 to 14/5/13.		
Operations Manager	Rick Greene		
Author	Nick Raffan		
Client	Ebony Coal Pty Ltd		
Client Contact	Rick Greene		

REVISION/VERIFICATION HISTORY

REVISION NUMBER	DATE	PREPARED BY	APPROVED BY
Rev. 1		Nick Raffan	Rick Greene
Rev 2		Nick Raffan	David Weidemier
Rev 3		Nick Raffan	James Chisolm

TABLE OF CONTENTS		Page
1.0	ABSTRACT	5
2.0	COPYRIGHT	6
3.0	GENERAL	7
	3.1 Tenure Information	7
	3.2 Tenement Location and Access	7
4.0	GEOLOGICAL SETTING	X
	4.1 Regional Geology	11
	4.2 Tenement Geology	11
	4.3 Exploration Rationale and History	12
5.0	EXPLORATION WORKS CONDUCTED	23
	5.1 Overview of Work Performed	23
	5.2 Committed Expenditure	25
	5.3 Year-2 Budgeted Exploration Expenditure	25
6.0	CONCLUSIONS AND RECOMMENDATIONS	25
7.0	APPENDICIES/ATTACHMENTS	26

FIGURES

Figure 1: Red Dog Project Regional Location Map	8
Figure 2: Details of EL 29008	9
Figure 3: Red Dog Project Area and Pastoral Leases	9
Figure 4: Google Image Showing EL 29008	10
Figure 5: Structural Elements of the Bonaparte Basin	14
Figure 6: Structural Elements of the Southern Onshore Bonaparte Basin	15
Figure 7: Stratigraphy of the Southern Onshore Bonaparte Basin	16
Figure 8: 1:250,000 Outcrop Geology Map	17
Figure 9: Gravity Map for Red Dog Project	18
Figure 10: Red Dog Prospectivity Domains	19
Figure 11: Historical Tenements and Exploration Drilling	21
Figure 12: Red Dog Project Revised Stage-1, 6-Hole Drill Programme	24

APPENDICES

1. **Site Investigation Report** - Red Dog Coal Project, Hanna Consulting Services, December 2011.
 2. **Red Dog Project Technical Review**, Global Ore Discovery, May 2012.
 3. **Proposed Exploration Red Dog, Northern Territory**, McElroy Bryan Geological Services Pty Ltd, August 14, 2012.
-

1.0 ABSTRACT

Red Dog Exploration (Aust) Pty Ltd applied for EL 29142 on 28/10/11. Together with EL 29006, EL 29007, EL 29008, EL 29009, EL 29010 and EL 29011, the seven tenements make up the Red Dog Project, which covers a total area of 4,263 square kilometres. EL 29142 was granted on 15/5/12 for a term of six years. EL 29142 is made up of 27 Blocks (41.72 sq. km) or 1% of the Red Dog Project area. The Notice of Grant has expenditure commitments of \$15,000 for Year-1 and \$17,000 for Year-2. The rationale for applying for EL 29142 and other Red Dog tenements are coal seams intercepted in Permian age Bonaparte Basin Kulshill Group sediments from drilling for coal and petroleum. Global Ore Discovery (GOD) reports that 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 14/5/13 was restricted to desktop studies, commissioning of reports from consultants, including a proposed exploration program for Red Dog Project.

2.0 COPYRIGHT STATEMENT

1. Subject to 2, the tenure holder acknowledges that this Report, including the material, information and data incorporated in it, has been made under the direction or control of the State of Queensland (the State) within the meaning of section 176 of the *Copyright Act 1968 (Cwth)*.

2. To the extent that copyright in any material included in this Report is not owned by the State, the tenure holder warrants that it has the full legal right and authority to grant, and does hereby grant, to the State, subject to any confidentiality obligation undertaken by the State, the right to do (including to authorise any other person to do) any act in the copyright, including to:
 - use
 - reproduce
 - publish; and
 - communicate in electronic form to the public, such material, including any data and information included in the material.

Without limiting the scope of 1 and 2 above, the tenure holder warrants that all relevant authorisations and consents have been obtained for all acts referred to in 1 and 2 above, to ensure that the doing of any of the acts is not unauthorised within the meaning of section 29(6) of the *Copyright Act (Cwth)*.

3.0 GENERAL

3.1 Tenure Information

Red Dog Exploration (Aust) Pty Ltd applied for EL 29142 on 28/10/11. Six tenements were previously applied for on 9/9/11, namely EL 29006, EL 29007, EL 29008, EL 29009, EL 29010 and EL 29011. These seven tenements make up the Red Dog Project, which covers a total area of 4,263 square kilometres. EL 29142 was granted on 15/5/12 for a term of six years. EL 29142 is made up of 27 Blocks (41.72 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. Before proposed works begin, the Company will make an application for an Authority Certificate.

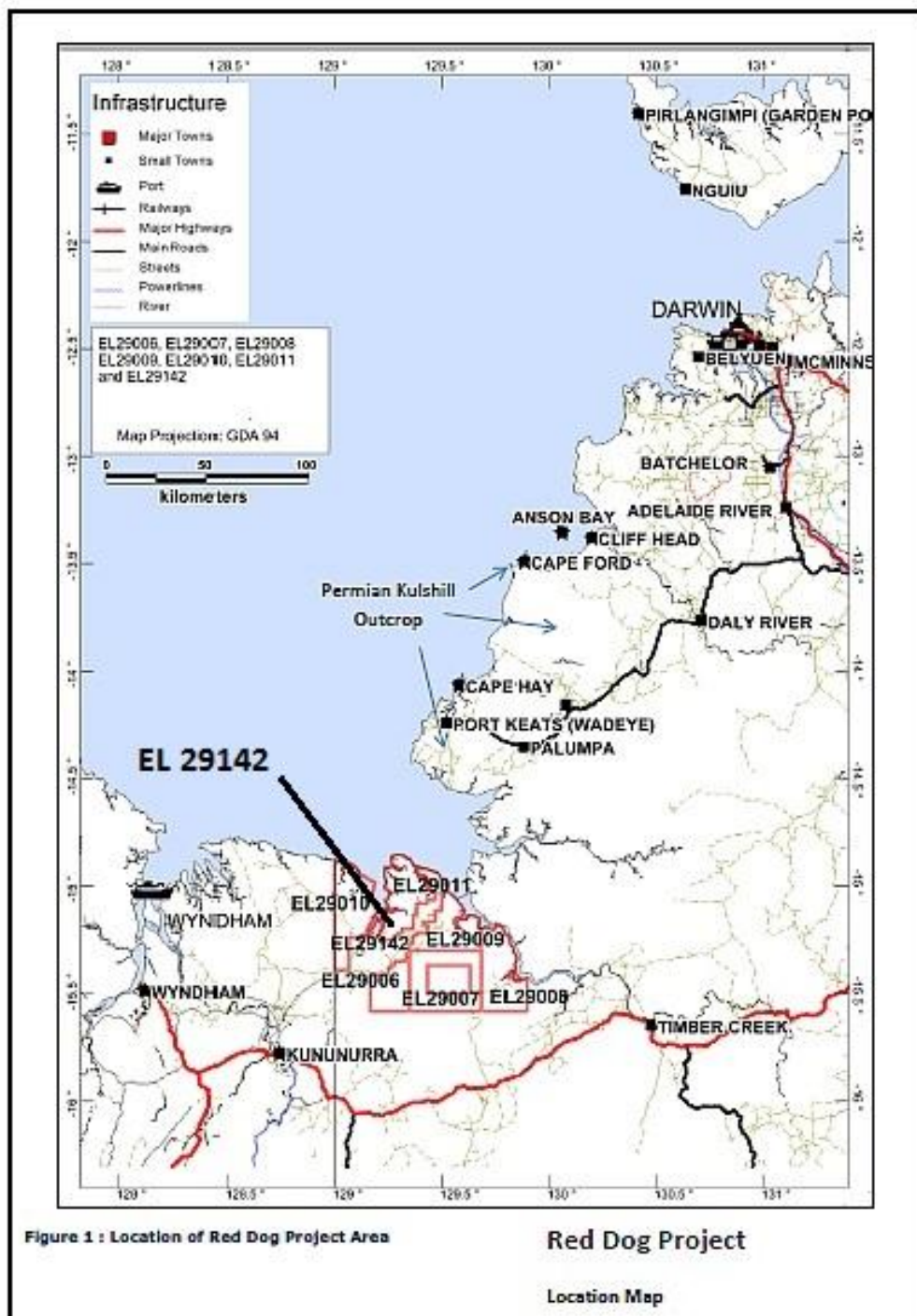
3.2 Tenement Location and Access

EL 29142 is the smallest Red Dog tenement sandwiched between EL 29010 and EL 29011. 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 29142 is shown in Figures 1-4.

This is a remote location with little infrastructure other than for a sparse distribution of tracks concentrated in the southern portion of the tenement..

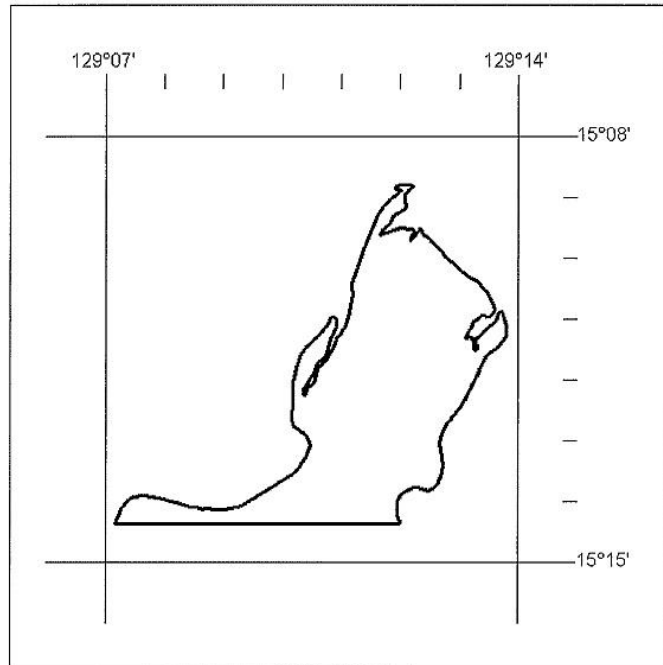
EL 29142 has low elevation below 9 metres ABSL. A profound wet season from November to March effectively limits the field season to eight months, April to November.

Figure 1: Regional Map -- Red Dog Project



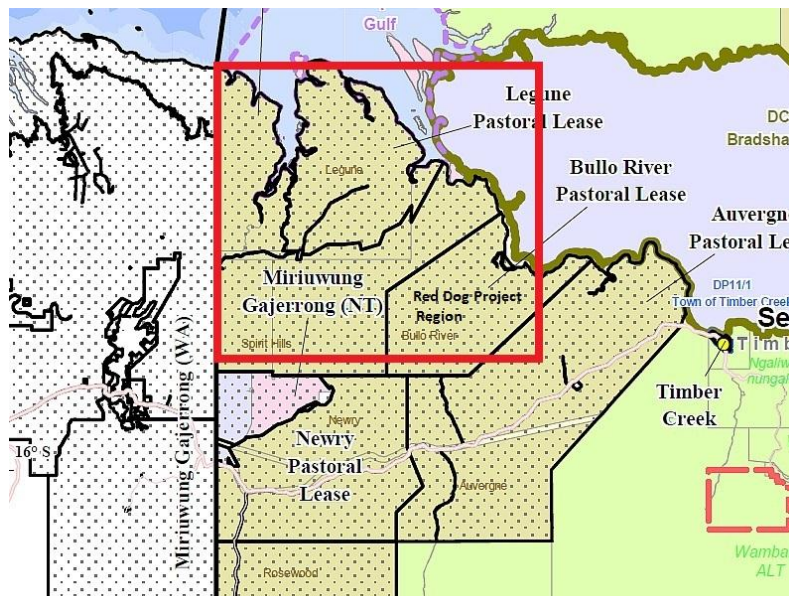
Source: Global Ore Discovery, May 2012

Figure 2: Details of EL 29142 – 27 Blocks / 41.72 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 29142 and EL 29010



Source: Jackray Mining Pty Ltd, April 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 an estimated 1,605 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 km² 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. GOD has interpreted that Red Dog tenements cover some 1,744 square kilometres of Kulshill Group under a shallow cover of 2-40 metres. To drill test the full Permian sequence will require drilling to depths up to 500 metres. Within EL 29142, nearness to Keep River-1 may result in the discovery of shallow coal with low stripping ratio amenable to open pit mining.

The key structural elements of the Bonaparte Basin are shown in Figure 5. Details of fault bounded southern onshore part of the basin are shown in Figure 6.

4.2 Tenement Geology

The tenement or local stratigraphy is summarised by GOD in Figure 7. GOD has also produced map showing outcrop geology over Red Dog Project, which shows in Figure 8. The east and southeast of Red Dog is not prospective for coal where outcrop geology is Proterozoic basement rocks. Within this tenement, exposure is Proterozoic basement in the northern and southern portions of the tenement. GOD sees potential for coal in a sub-basin that is conceptual in nature being inferred from satellite imagery and gravity data.

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. This thesis is yet to be tested.

An initial drilling programme would include replicating coal intercepts in Keep River-1, and produce samples of coal for proximate analysis, of which there is a dearth of available data. Keep River-1 intersected coal in the Keep Inlet Formation and Kuriyippi Formation (Figure 11).

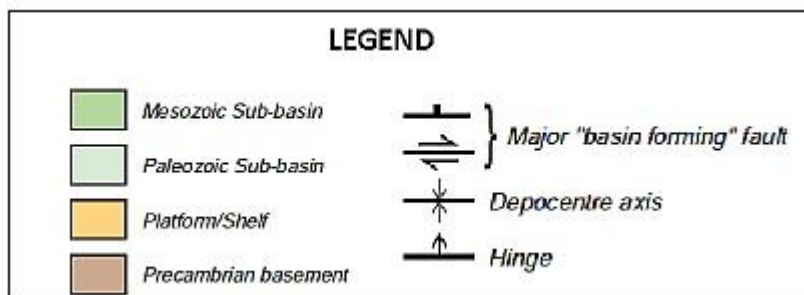
From 42m to 291m, the sequence is described as silty shale. Coal was intersected at 52m, 61m and 120m, with coal described as vitreous. Sandstone predominates between 219m and 480m. This latter unit is well sorted and from 304.8m contained traces of coal and pyrite. The net thickness of coal recorded in both formations was 4 metres.

GOD believes that there is potential for a scout drill hole to intersect the Upper Kulshill Package in the north-west part of EL 29010. The Completion Report for Kulshill-1 identified three formations comprising the Upper Kulshill. The Keyling Formation at the top is some 550m thick, consisting mainly of sandstone with minor siltstone, coal and limestone. The underlying Treachery Shale has a thickness of 510m.

Below the Treachery Shale is Kuriyippi Formation. This unit is 370m thick and is characterised by cycles of sandstones overlain by carbonaceous siltstone and shale. Coal is reported from several onshore stratigraphic holes with the depositional environment described as fluvial. This formation is best developed offshore and is believed to be at least a partial equivalent of the Keep Inlet Formation.

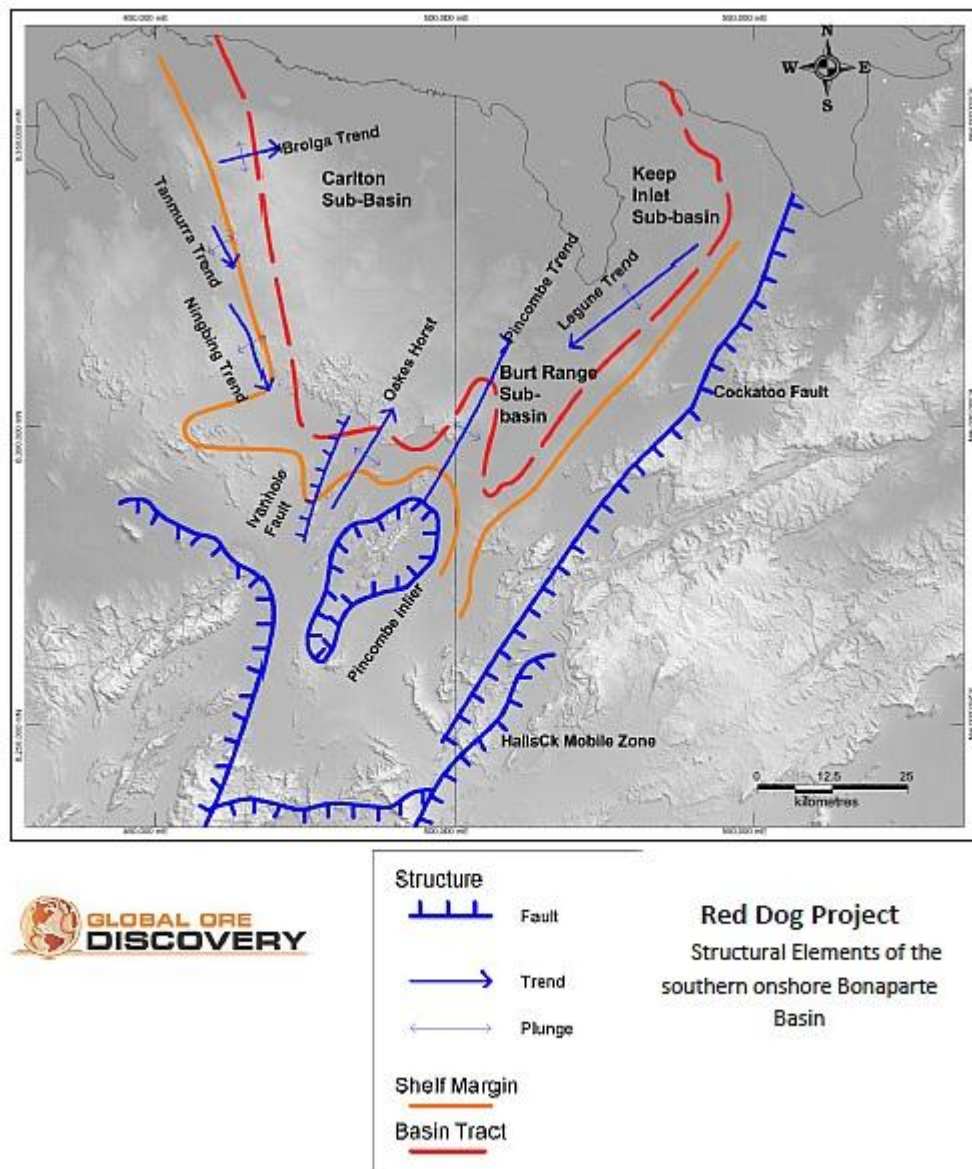
A Gravity Map (Figure 9) covering Red Dog Project highlights GOD interpreted depocentres outlined by a solid pink line. GOD's conclusion is that the marked depocentres are areas of thickest sedimentation and likely to have a higher proportion of marine sediment in the Permian stratigraphy. The geological interpretation supports a potential accumulation of coal in a discrete belt, a fluvial braided river environment. The key target is the southeast edge of the onshore part of the basin. GOD has summarised Red Dog Project prospectivity in Figure 10.

Figure 5: Structural Elements of the Bonaparte Basin



Source: Global Ore Discovery, May 2012.

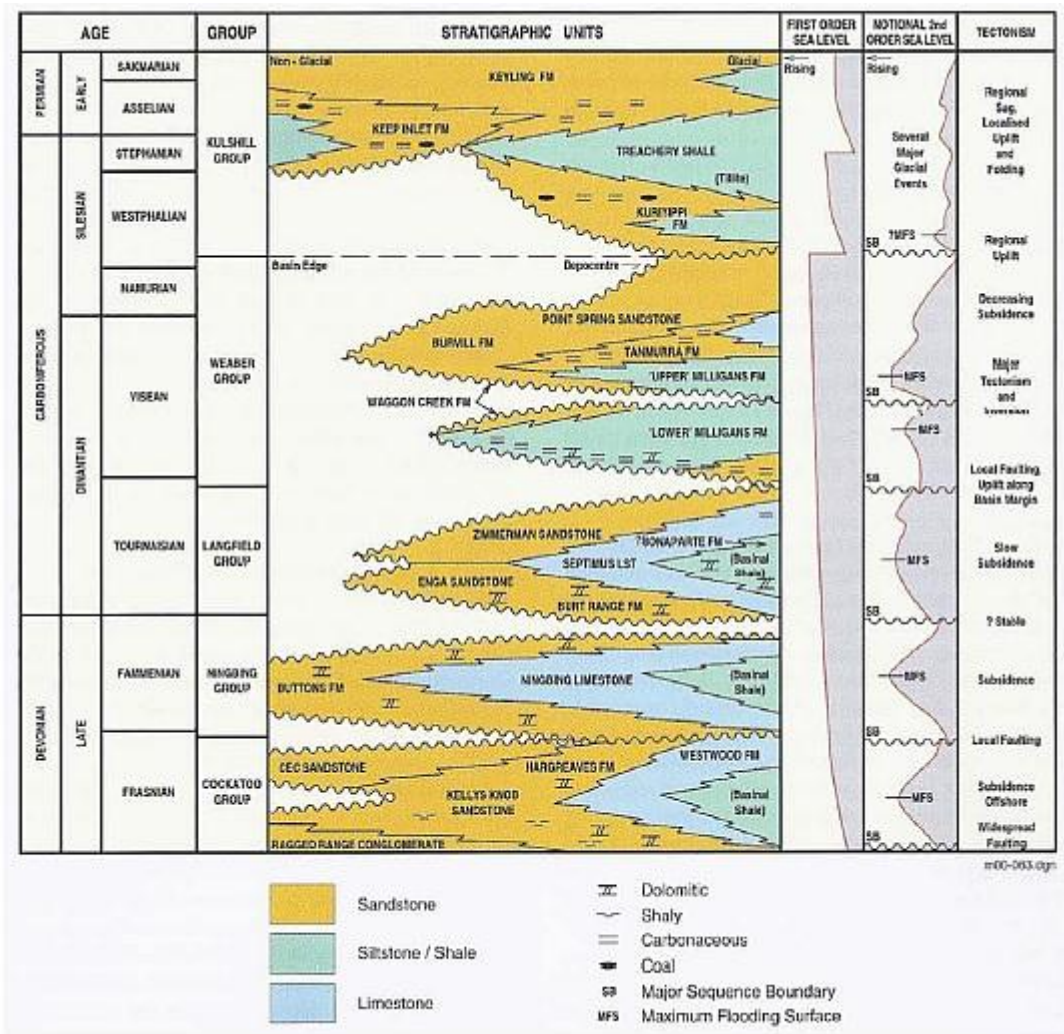
Figure 6: Red Dog Project Structural Elements of the Southern Onshore



Bonaparte Basin.

Source: Global Ore Discovery, May 2012.

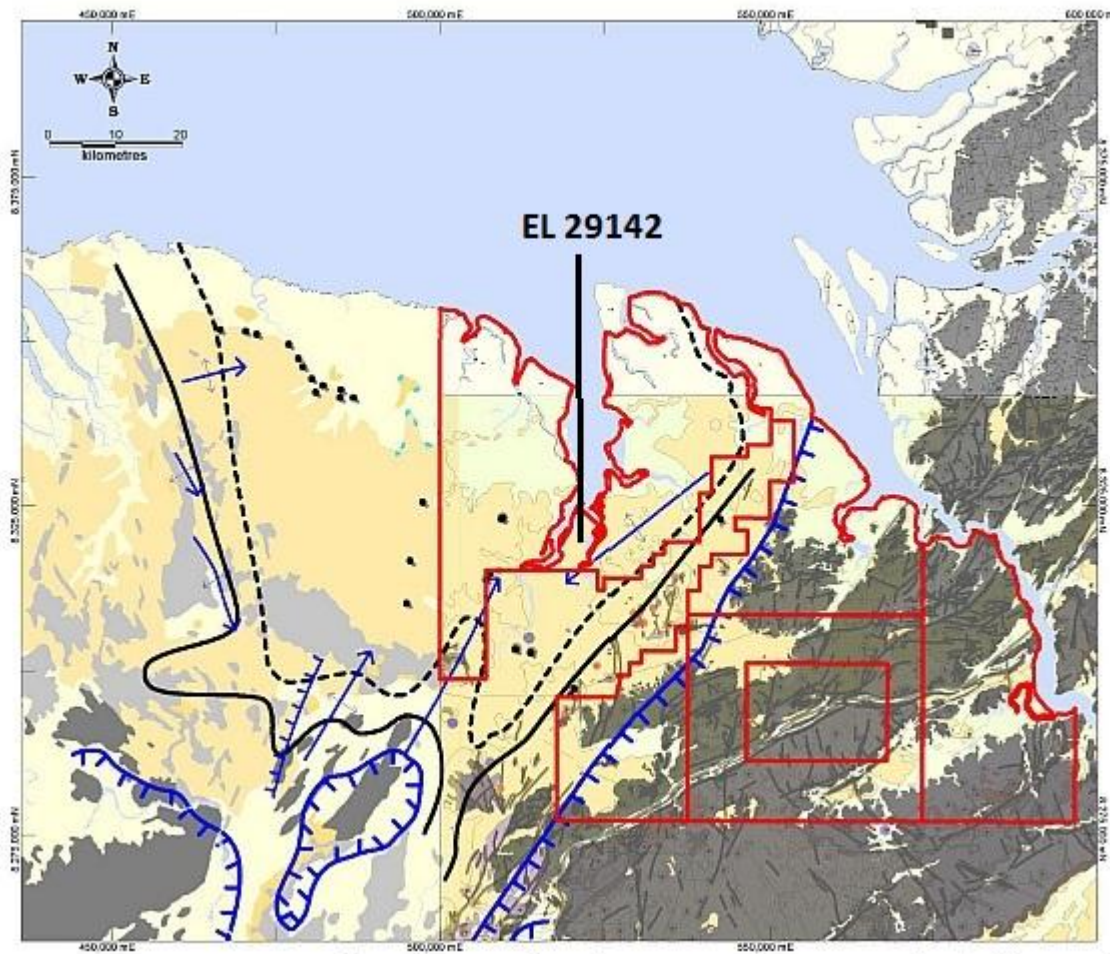
Figure 7: Stratigraphy of the Southern Onshore Bonaparte Basin



Source: Global Ore Discovery, May 2012

Figure 8 1:250,000 Geological Map Showing Interpreted Outcrop

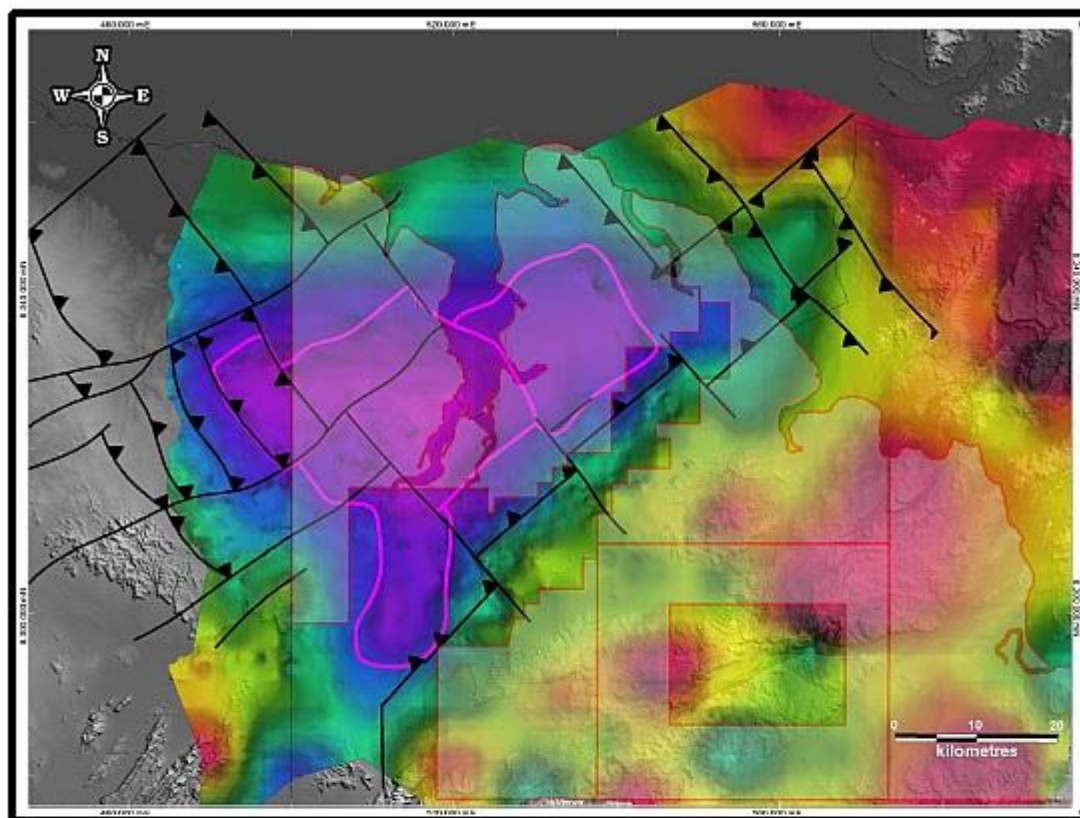
Permian outcrop is shown in blue. Proterozoic basement is dark grey, and coal intersections are black circles.



Source: *Global Ore Discovery*, May 2012

Figure 9: Gravity Map for Red Dog Project

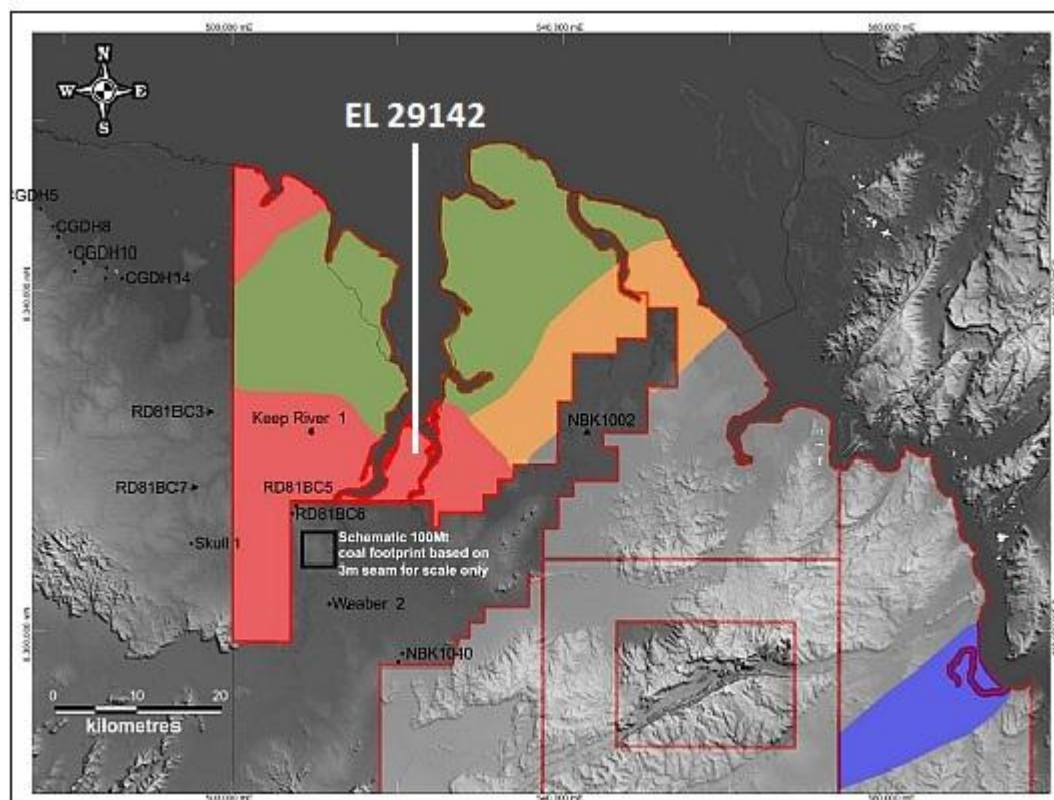
Depocentres are outlined by a thick pink border. Another key feature is the gravitational features of Proterozoic basement in SE quadrant of the Gravity Map.



Red Dog Project
Gravity Map

Source: Global Ore Discovery, May 2012.

Figure 10: Prospectivity Domains Showing Drill Holes with Coal Intersections and Area of Hypothetical 100Mt Coal Resource (3m thick seam – SG 1.45).



Red: Known coal occurrences, proximal to basin margin, indications that there is less weathering, probably less marine influenced. **Orange:** Carbonaceous occurrences, proximal to basin margin, indications of significant weathering, possibly less marine influenced. **Green:** No known coal occurrences, distal to the basin margin, possibly more marine influenced and **Blue:** Conceptual Early Permian sub-basin from satellite imagery and gravity data interpretation.

Source: *Global Ore Discovery, May 2012*

4.3 Exploration Rationale and History

The rationale for applying for EL 29142 and other Red Dog tenements are coal seams intercepted in Permian age Bonaparte Basin Kulshill Group sediments from drilling for coal and petroleum. Global Ore Discovery reports that 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 – see Figures 10 and 11. Australian Aquitaine Pty Ltd. drilled this hole. Two other coal bores within EL 29010 also intercepted coal in the Permian Kulshill Group with intersections of 0.9 metres and 0.4 metres. EL 29142 is 12km southeast of Keep River-1 and therefore believed prospective for a positive exploration results.

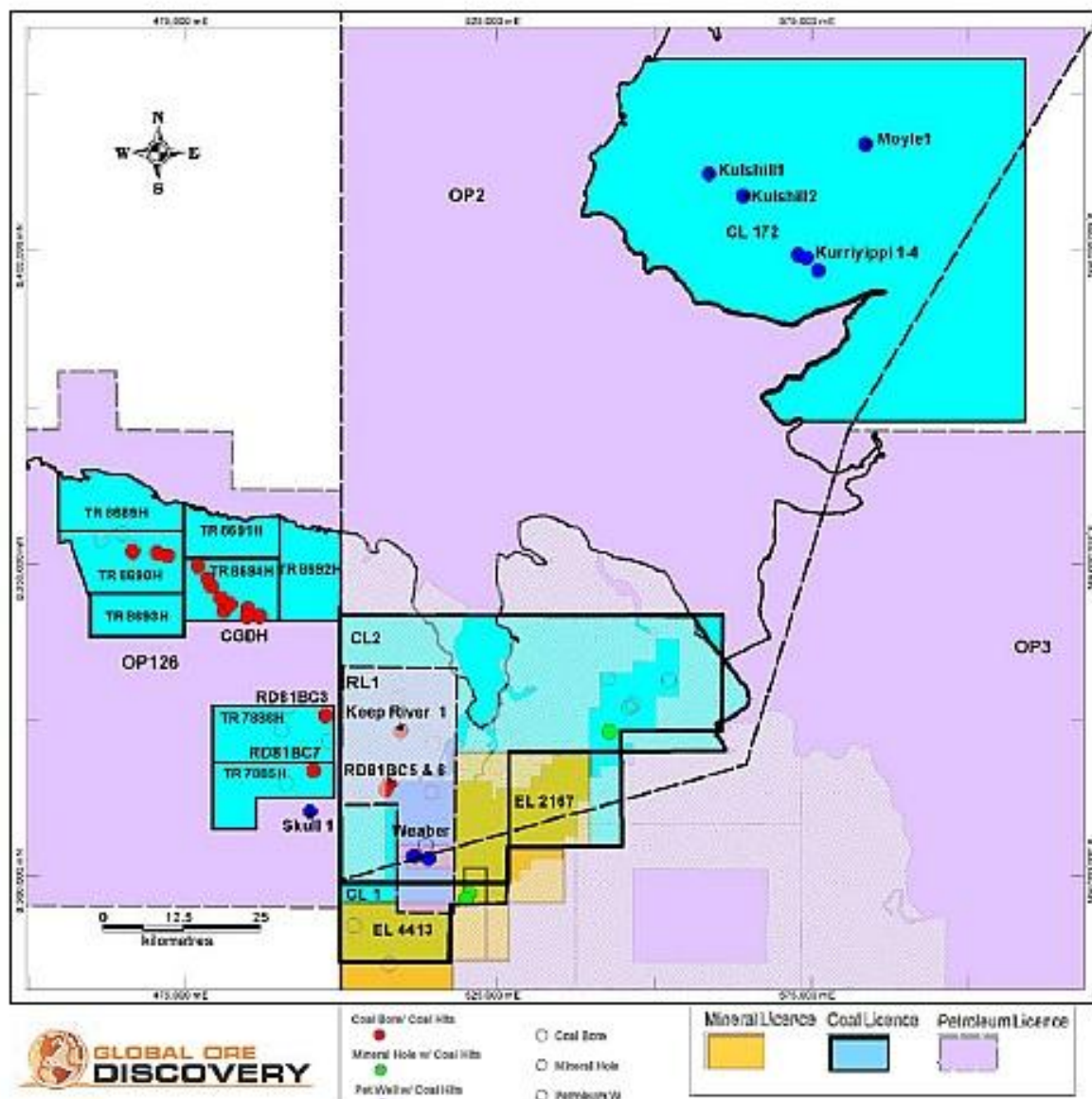
GOD noted that 21 from 38 coal boreholes did not find coal or carbonaceous material. However, the data is not particularly reliable because of a lack of geophysical down-hole logging and instances of high water flow washing away chips. On average, the 38 boreholes were wide spaced at 9 kilometres and drilled only to maximum depth of 134 metres.

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.

Figure 11: Historical Tenements and Exploration Drilling



Source: Global Ore Discovery, May 2012

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 0.6% of the Red Dog Project area.

5.0 EXPLORATION WORKS CONDUCTED

5.1 Overview of Work Performed

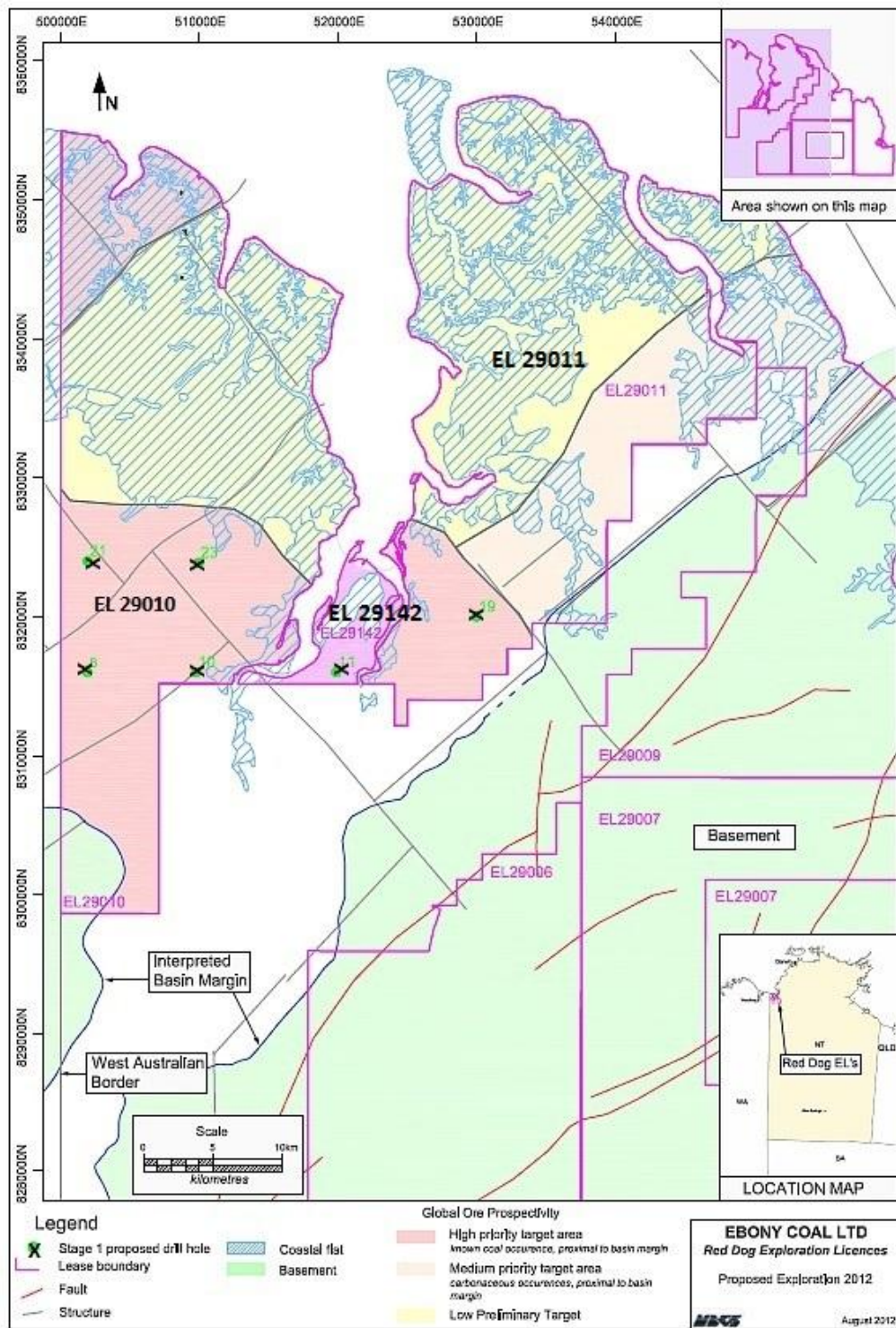
The work program for the year ending 14/5/13 was restricted to desktop studies and commissioning of reports from consultants. Jackray Mining Pty Ltd, GOD and MGBS completed this work.

GOD completed a Technical Review of Red Dog Project. This study includes an examination of structures that controlled development of the Bonaparte Basin. There is a thorough analysis of historical exploration results with a focus on boreholes that intersected coal within EL 29010 and northwest of the project area. This work allowed GOD to highlight prospective and barren areas and make specific recommendations to explore the Permian Kulshill Group. This work is summarised in a map of Prospectivity Domains (Figure 10). GOD's Technical Review of Red Dog is attached as Appendix 2.

McElroy Bryan Geological Services Pty Ltd (MGBS) was commissioned to recommend a "Proposed Exploration Red Dog, Northern Territory". The final recommendation was received on August 14th, leaving no time to plan and commence fieldwork with a drilling programme before onset of the wet season. With the window of opportunity closed to commence drilling in 2012, a thorough analysis was made of MGBS's proposed exploration program and budget. A 3-stage exploration programme with two stages of drilling included 21 drill holes in EL 29010, one drill hole in EL 29142 and 11 drill holes in EL 29011. The budget for 33 drill holes is \$4.7M.

After careful consideration it was decided that on a risk adjusted basis, the initial level of expenditure recommended by MGBS was too high. A smaller programme has been budgeted for the 2013 field season. The revised programme includes four drill holes scheduled for EL 29010, one drill hole each for EL 29142 and EL 29011. The sites for these drill holes are located in Figure 12.

Figure 12: Red Dog Project Revised Stage-1, 6-Hole Drill Programme



Source: McElroy Bryan Geological Services Pty Ltd.

5.2 Committed Expenditure

The expenditure commitments for EL 29142 are \$15,000 in the first year and \$17,000 in the second year of grant. For the Red Dog Project as a whole, the expenditure commitment for the first year of grant is \$285,000. This amount of expenditure was not met in full. The aggregate expenditure of the period 15/5/12 to 14/5/13 is \$190,000. It has already been mentioned that the reason for the under-spend was a timing event with the delivery of a proposed exploration programme in August which did not leave sufficient time to implement an exploration programme in 2012 before the onset of the wet season.

5.3 Year-2 Budgeted Exploration Expenditure

Site costs for the revised exploration programme for Stage-1 drilling of six drill holes is a budget of around \$460,000 plus offsite costs of \$290,000, for total expenditure of \$750,000. The under-spend for the year ending 14/5/13 will be more than made-up for in the year ending 14/5/14. An Authorisation has been obtained for a Stage-1 six-hole drilling programme during the 2013 field season. This programme is designed to test the thesis that economic deposits of thermal coal may occur in the Lower Kulshill Group.

6.0 Conclusions and Recommendations

A Technical Report from Global Ore Discovery highlights the prospectivity of Red Dog Project and is supportive of the proposed Y-2 exploration programme. The aim of exploration is to test the thesis that significant reserves of thermal coal may occur in the Lower Permian Kulshill Group. An interpretation of the geology suggests that coal finds might be amenable to open pit mining. A timing issue shifted a proposed schedule of works into the 2013 field season. A shortfall in expenditure in 2012 will be compensated for in 2013 with a budget for exploration of around \$750,000.

APPENDICIES/ATTACHMENTS

- **Site Investigation Report** - Red Dog Coal Project, Hanna Consulting Services, December 2011.

- **Red Dog Project Technical Review**, Global Ore Discovery, May 2012.

- **Proposed Exploration Red Dog, Northern Territory**, McElroy Bryan Geological Services Pty Ltd, August 14, 2012.