

**FINAL REPORT OVER THE  
MATARANKA URANIUM-BASE METAL AND LIMESTONE  
PROJECT**

**DUNMARRA MINERAL FIELD,  
NORTHERN TERRITORY**

**Roper Project**

**Exploration Licence: 26115**

**BY**

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- 1. Northern Territory Department of Minerals & Energy*
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PROJECT NAME: MATARANKA

TENEMENTS: Exploration Licences 26115

MINERAL FIELD: Dunmarra Mineral Field

LOCATION:	KATHERINE	SD5309	1:250 000
	LARRIMAH	SD5313	1:250 000
	Maranboy	5468	1:100 000
	Mataranka	5588	1:100 000
	Elsey	5467	1:100 000
	Gorrie	5567	1:100 000

COMMODITIES: Limestone, Uranium and Base-Metals

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## **1.0 MATARANKA PROJECT**

### **2.0 INTRODUCTION**

The Mataranka Project is located approximately 420 km (260 miles) south east of Darwin, close to the junction of the Stuart and Roper Highways of Darwin in Northern Territory. The project comprises one Exploration Licence (EL 26115) which covers a total area of 1,529 km<sup>2</sup>. The area can be reached via the Stuart Highway from Darwin.

This report describes the final results of literature research and target generation based on re-interpretation of magnetic/radiometric data carried out during the whole year of tenure over the Exploration Licence area.

During July 2011 consulting geologists Kastellco Geological Consultancy (“**KGC**”) conducted a review of existing historical exploration data within the Northern Territory Geological Survey Database. This was conducted for all the Project area to identify any high potential base-metal and uranium exploration targets and resulted in the identification of several targets that warrant further work.

Based on the work completed during the term of the Licence area, the items below were outlined:

- The Project has numerous large magnetic anomalies which still remain untested – these anomalies could potentially host base metal mineralisation with further investigation.
- There are also abundant and extensive second and third order radiometric anomalies which remain untested – most of these uranium anomalies are hosted with sandstone and metamorphic units.
- To the SE of the project, there is presently a Non-JORC Resource of 7 million tons of limestone with dimension of 2,000m in length x 600 m in width x 6.5m in depth. The Resources contains 52% CaO (less than 1% MgO and 5% of silica and alumina). Although quality of limestone matches standards for cement production, mining did not commence due to the lack of sufficient demand for cement in the NT.

Through detail interpretation of airborne magnetic from the Northern Territory Geological Survey, the following magnetic anomalies were identified along with uranium anomalies. The location of the magnetic target anomalies targets is represented in Figure 3 and the radiometric target anomalies are represented in Figures 4.

### **3.0 LOCATION AND ACCESS**

The Mataranka Project is located approximately 420 km (260 miles) south east of Darwin, close to the junction of the Stuart and Roper Highways of Darwin in Northern Territory. The project comprises one Exploration Licence (EL 26115) which covers a total area of 1,529 km<sup>2</sup>. The area can be reached via the Stuart Highway from Darwin.

The board physiographic units which occur within the tenement are dissected uplands passing into lowland plains. Dissected upland rim the tablelands and typically incorporate both Cretaceous and Proterozoic rocks.

Lowland plains are undulating plains and low hills which typically overlie Cambrian-Ordovician rocks. The western portion of EL 26115 encompasses a drainage divide that forms part of the catchment of the south-east to east flowing Roper River. The south to south-east flowing Waterhouse River, an upper tributary to the Roper River, passes through the EL.

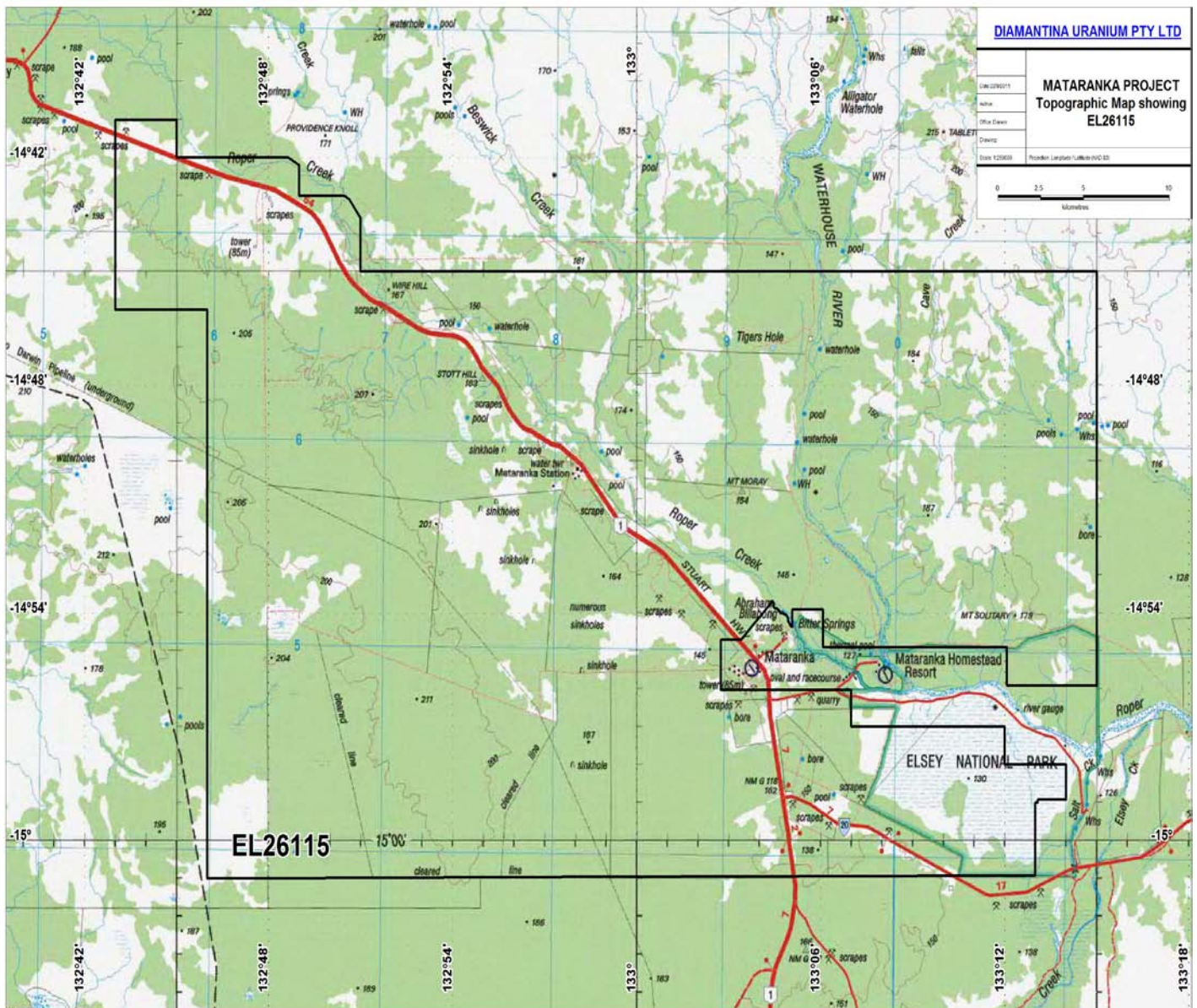
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**4.0 TENEMENTS**

The project is comprised of one granted exploration licence (EL) with the tenement details summarised in Table 1 and their locations are shown in Figures 1 and 2.

**Table 1: Mataranka Project - Tenement Summary**

Project	Tenement Number	Status	Current Area		Current Holder	Granted Date	Expenditure Covenant (\$)
			Blocks	(sq km)			
Mataranka	EL26115	Granted	169	1,529 km <sup>2</sup>	Diamantina Uranium Pty Ltd	15/07/2008	\$120,000



**Figure 1: Mataranka Project – Topographic Map**

## **5.0 REGIONAL GEOLOGY MINERALISATION**

The Dunmarra Basin is an intracratonic basin overlying the Georgina, Wiso and Daly Basins. The Basin unconformably overlies the sedimentary rocks of the Palaeo to Mesoproterozoic McArthur Basin.

The eastern portion of EL 26115 contains part of the north-western exposure of the McArthur Basin. The McArthur Basin comprises the principal element of the North Australian Platform Cover, a group of mid-Proterozoic basins that unconformably overlie the Palaeoproterozoic North Australian Orogenic Province. The basin outcrops over an area of 200,000km<sup>2</sup> and contains extremely thick units of relatively undeformed and unmetamorphosed sedimentary rocks that are subdivided into four groups or Mega sequences (Tawallah, MacArthur, Nathan and Roper Groups), separated by regional unconformities. The McArthur Group hosts the giant McArthur River (HYC) shale-hosted Zn-Pb-Ag deposits and is estimated to be between 1700-1800 Ma old (Price CR19960819).

The prospectivity for uranium in the Northern Territory has previously been reviewed above in 'Uranium Exploration Potential - Northern Territory'.

All the economic diamond deposits and other significantly diamondiferous occurrences in Australia are located in the North Australian Craton (NAC). The NAC underlies the Kimberly region in northern Western Australia, the northern two thirds of the Northern Territory and the north-western part of Queensland. It is also host to many significant base metal, gold and uranium deposits. The NAC was formed at about 1,850 millions years (Ma) during the Barramundi Orogeny by the amalgamation of the Archaean and early Proterozoic rocks that now form the basement rocks of the NAC. Proterozoic (1820-1600 Ma) platform-cover sediments, Palaeozoic volcanics and sediments, and Mesozoic sediments cover these basement rocks. The Palaeozoic volcanics comprise the Lower Cambrian Antrim Plateau Volcanics (about 500 Ma in age) and its equivalents. The only volcanic activity that has occurred on the NAC for the past 500 Ma has been intrusion of diamondiferous kimberlite at 367 Ma (Devonian, Merlin Kimberlite field), 179 Ma (Jurassic, Timber Creek Kimberlite field) and the 25 Ma (Tertiary) lamproite field in the Ellendale (West Kimberley) area.

The large time span of intrusive diamondiferous activity makes the NAC very prospective for diamond exploration and indicates diamonds have been preserved in the lithosphere below the NAC and that eruptions of the diamond-bearing volcanic rocks can occur at any time during the last 500 Ma. It is expected that kimberlites would occur in the central parts of the NAC and lamproites would be favoured in the marginal areas and in cross-cutting Proterozoic mobile zones.

The kimberlites and lamproites of the NAC tend to occur along major north-west and north-east trending structures. These structures can be seen in the gravity data crossing the NAC and have strike lengths of many hundreds of kilometres. These structures are interpreted to be fundamental fractures in the NAC and are potential channel ways for diamondiferous intrusives.

The Cambrian Antrim flood basalt and their correlatives (the Peaker Piker, Helen Springs, Nutwood and Colless Volcanics) crop out over a large area along the Western Australia and Northern Territory border and extend to the east across the Northern Territory into the western-most part of Queensland. They underlie the Palaeozoic sedimentary successions of the Ord, Bonaparte, Wiso, Daly River and Georgina Basins. The Antrim pile consists predominantly of massive basalt lava flows with minor units of flow breccia and agglomerate.

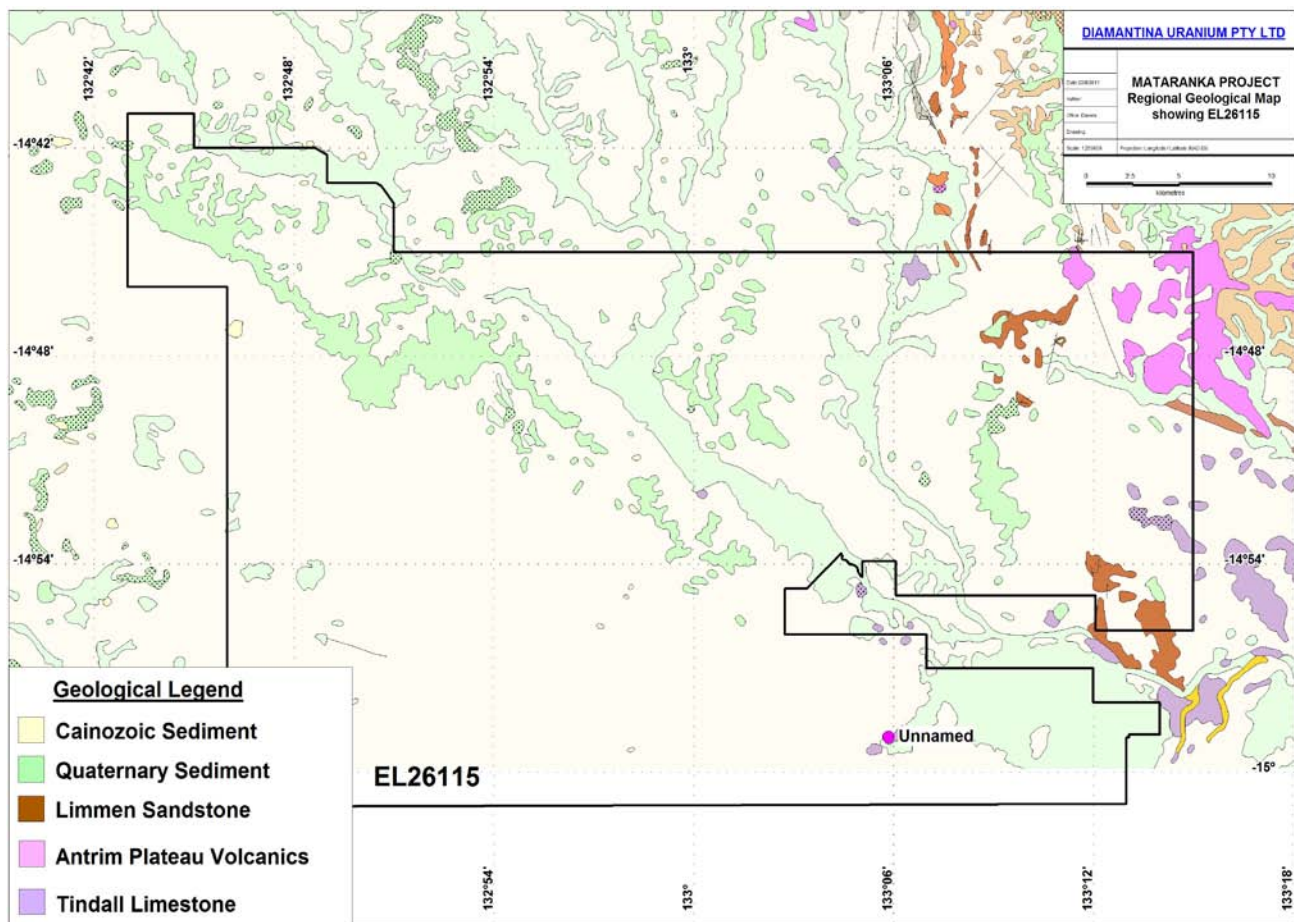
The depleted base metal component of the basalts could have potentially trapped sulphide cumulates in flow-through style feeder systems, similar to proposed models for the rich Noril'sk Ni-Cu-PGE deposits in Siberia.

## 6.0 LOCAL GEOLOGY & MINERALISATION

The Dunmarra Basin (Cretaceous) extends over most of EL 26115. Outcrops of the Daly Basin (Ordovician to Cambrian, Daly River Group), that underlies the former basin, extend east from near the eastern boundary of EL 26115. Exposures of the McArthur Basin (Mesoproterozoic, Roper Group within EL 26115), that underlies the former two basins, extend east from near the north-eastern corner of the EL 26115. Antrim Plateau Volcanics (Cambrian) overlie the McArthur Basin in the north-east corner of EL 26115. Cambrian flood basalts are considered prospective for Noril'sk-style Ni-Cu-PGE sulphide deposits and diamonds. The depleted base metal component of the basalts could have potentially trapped sulphide cumulates in flow-through style feeder systems, similar to proposed models for the rich Noril'sk Ni-Cu-PGE deposits in Siberia. To date no Ni-Cu-PGE mineralisation has been located.

The cover sequences consists of residual soil and sand underlain by Cretaceous sandstone, siltstone, claystone and conglomerate, then by Ordovician Daly River Group (Tindall Limestone) and finally by Cambrian Antrim Plateau Volcanics.

Outcrops of Cretaceous sediments of the Dunmarra Basin occur in western two thirds of the EL. Sparse outcrops of Tindall Limestone (Daly River Group, Cambrian, and Daly Basin) and Roper Group (Mesoproterozoic, McArthur Basin) occur in the eastern portion of the EL.



**Figure 2: Mataranka Project – Geology Map**

## **7.0 PREVIOUS EXPLORATION**

From 1983 to 1985, Blake Investments concentrated exploration over the Eley Limestone Deposit (excised from EL26115 – immediately east of EL26115 – approx 23 km). The Eley Limestone composed mainly of mottled grey-brown crystalline limestone (outcrops) and more friable porous chalky white limestone are present. Previous workers suggested the former are Tindall Limestone and the latter was Tertiary. The two have quite different chemical compositions that would influence their potential uses for manufacture of cement and/or quicklime. The deposits are held under EL 3333. In addition, several mineral claims have been applied for. Exploration and evaluation of the deposit was conducted by Eupene Enterprises. The area was gridded on 100 m centres. Following a single hole drilled by the current leaseholder Blake Investments, Eupene supervised an additional 23 short NQ core holes on the grid. Depths varied from 3 m to 9.45 m. The core was photographed and geologically logged. Assay of selective composite of diamond-saw cut core was undertaken by the Department of Mines and Energy. SG determinations and calculations were undertaken on 15 core specimens of both porous and nonporous types. Hard rock reserves were arbitrarily divided into first and second grade based on potential end use. First grade had over 95% CaCO<sub>3</sub>, less than 1% MgCO<sub>3</sub> and less than 3% SiO<sub>2</sub>.

Second grade was over 90% CaCO<sub>3</sub>, less than 1% MgCO<sub>3</sub> and less than 5% SiO<sub>2</sub>. The reserve was estimated by blocking using drillhole centres and a cavity factor to offset the SG. Some 821,000 tonnes of first grade limestone grading 96.5% CaCO<sub>3</sub>, 0.5% MgCO<sub>3</sub>, 1.8% SiO<sub>2</sub> and 0.2% Fe<sub>2</sub>O<sub>3</sub> can be regarded as proven. Second grade proven reserves are 631,000 t averaging 93.7% CaCO<sub>3</sub>, 0.7% MgCO<sub>3</sub>, 3.6% SiO<sub>2</sub> and 0.4% Fe<sub>2</sub>O<sub>3</sub>. When this is combined with the first grade, the total hard rock reserve is 1,451,000 t grading 95.3% CaCO<sub>3</sub>, 0.6% MgCO<sub>3</sub>, 2.6% SiO<sub>2</sub> and 0.3% Fe<sub>2</sub>O<sub>3</sub>. Eupene was confident that these reserves could be increased by further drilling. Mining by pit would be to a maximum of 10 m.

The second type of limestone present, the chalky limestone is associated with red soils. It has been tested by previously by auger drilling. Its quality is sufficient as direct shipping limestone. An additional 24 auger holes were drilled on 100 m centres. Drilling was in two campaigns and may have had slightly different recoveries and had different treatment prior to assay. Nearly 260,000 cubic metres or about 492,000 t of chalky limestone grading greater than 90% CaCO<sub>3</sub> and averaging 93% CaCO<sub>3</sub>, 4.4% SiO<sub>2</sub> is present. Eupene was of the opinion that, even at this grade, this could be doubled with further work. Lowering the cutoff grade to say 85% would also increase reserves within the area of existing drilling. It was suggested that blending the two limestone types should be further investigated.

From 1989 to 1991, exploration established that a large resource 7 million tonnes of limestone with assay of 52% CaO, <1% magnesium and 5% acid insolubles of limestone suitable for kiln feed and extractable by shallow open cut exists close to the Mataranka Limeworks (eastern portion of EL26115).. On average 3.5-5m soil cover and an average thickness of 6-7m of massive limestone. Water table encountered at an average depth of 12-15m. The main zone is 60m wide with an extent of 2km, NE-SW.

The limestone exposed in trenches was partly weathered and faces consisted of both massive limestone blocks and smaller broken limestone pieces with abundant clay pockets in places, especially along fractures in the rock. Cochrane noted in this respect the Mataranka deposit is less attractive than that at Eley, where the quarry faces are generally in more massive limestone. However, he considered that the Mataranka limestone could be screened on site to remove much of the clay, while the remainder should report in the spalls during crushing.



In 1996, Normandy Exploration Limited targeted base metal mineralisation in the Late Proterozoic Roper Group. Exploration included a regional gravity survey and the completion of a single vertical, stratigraphic diamond drill hole (VDD1).

A total of 232 gravity readings were taken at 1km intervals on available roads, tracks and fence lines.

A single stratigraphic hole (VDD1) was collared 5km south-south-west of the township of Mataranka to test a combination of gravity and aeromagnetic lineaments. The hole passed through Cambrian Tindall Limestone from 5-143.4 metres and then Cambrian Antrim Plateau Volcanics from 143.4-175.9 metres and thence a Proterozoic dolerite sill from 175.9 to 219.1 metres (end of hole).

Normandy concluded that the depth of Cambrian cover was prohibitive for the exploration of sediment-hosted Zn-Pb mineralisation.

In 1995, Normandy Exploration conducted base-metal exploration over a group of seven exploration licences (The Velkerri Project) that overlapped and extended north-west and predominantly south-east of the area encompassed by EL 26115. Of this group, EL 8449 overlapped considerably with the area now enclosed by EL 26115.

The Velkerri Project targeted shale-hosted Zn-Pb mineralisation in the Middle Velkerri black shales of the Roper River Group along the northern margin of the Beetaloo Sub-basin. This sub-basin margin is well-defined by regional gravity data and is the interpreted location of a major NW structure, the Mallapunyah Fault (Accommodation Zone). Metalliferous brines, generated deeper in the sub-basin, are interpreted to have been expelled towards the basin margins along sandstone aquifers and focused by north trending structures into structural and chemical traps of carbonaceous black shales of the Velkerri Formation, where precipitation of Zn-Pb sulphides may have occurred.

Exploration utilised a lot of data derived from work completed by Pacific Oil and Gas in their petroleum exploration of the Beetaloo Sub-basin. Approximately 9000km of aeromagnetics were flown and combined with various open file surveys. The survey outlined repetitions of the Mallapunyah structure. Normandy was seeking to identify structural settings that may participate in potentially focusing basinal brines from deeper parts of the Beetaloo Sub-basin into the hanging wall of the Mallapunyah structure.

Diamond drill hole VDD2 (EL 8464) was drilled approximately 55 kilometres south-east of diamond drill hole VDD1 (refer to CR1996-0819), a hole collared within the area now encompassed by EL 26115.

Although outside EL 26115, VDD2 intersected the Velkerri Formation (Upper Roper Group, Mesoproterozoic) at 64.7 metres and drilled in it to 207.5 metres whence the hole intersected a dolerite sill to 240 metres (end of hole). The drill log shows carbonaceous shales were first intersected 91.9 metres. Normandy noted preliminary analyses of the Velkerri shale results indicate that the carbonaceous intervals (particularly 126.0-203.8 metres) contain the highest base metal values.

Of regional significance, Normandy provided extracts from work by Pacific Oil and Gas on the Beetaloo Sub-basin that included the following with regards to the "Middle" Velkerri Formation. "Dark grey to brownish black claystone, mudstone and minor siltstone, massive to finely planar-laminated and dominantly organic-rich, comprising three broad pulses mostly ranging 4-7 percent Total Organic Carbon (TOC), with intervening zones of variable organic carbon. Complete sections range from 280-350 metres thick. This unit is sharply defined at the base, with a rapid increase in TOC, phosphorus, pyrite and base metals (most notably copper, zinc, molybdenum, nickel and vanadium) marking the rapid transition from the typical disorganised blue claystone of the Lower Velkerri into a massive

organic-rich rock. Where least affected by maturation, TOC values range up to 12.5 percent, but generally TOC values are in the range of four to six percent in the more massive units. Downhole geophysical logs show a characteristic triple peak response to the three massive organic units, the high gamma count reflecting uranium concentrations of up to 15ppm in the more organic-rich layers.” This formation underlies the area occupied by EL 26115, albeit at a depth that would require quality target definition to warrant exploration

On a regional scale the “Middle” Velkerri Formation has the potential to host, through interaction of with organic matter, uranium deposits where it occurs in close the proximity to uranium-enriched source rocks.

## **8.0 DIAMANTINA PTY LTD EXPLORATION DURING THE TERM OF LICENCE**

During July 2011 consulting geologists Kastellco Geological Consultancy (“**KGC**”) conducted a review of existing historical exploration data within the Northern Territory Geological Survey Database. This was conducted for all the Project areas to identify any high potential base metal and uranium exploration targets and resulted in the identification of several targets that warrant further work.

Work during this term included literature searches and data base compilation. Open file company reports were obtained from the Northern Territory Geological Survey and a review of past exploration data and geological concepts undertaken.

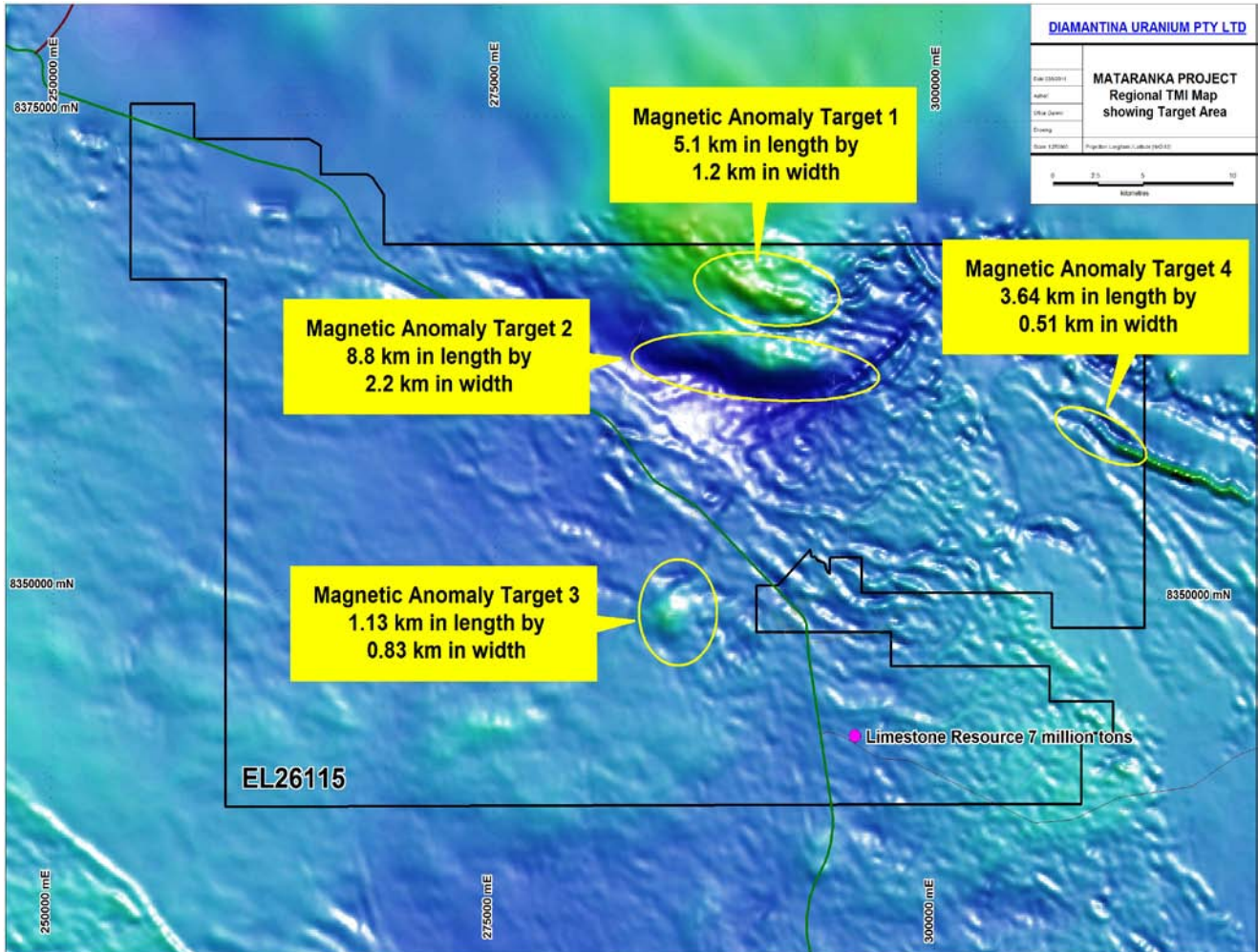
The targeting was undertaken at a high level to identify areas of interest that stand out in the regional re-interpreted geophysical data. Historical prospects were reviewed to determine the effectiveness of the previous exploration and evaluate remaining potential within the Exploration Licence area.

On a regional basis the tenement is located in the highly prospective Dunmarra Mineral Field. Through detail interpretation of airborne magnetic from the Northern Territory Geological Survey, the following magnetic anomalies were identified as shown in Table 2 and 3 shows the uranium anomalies. The location of the magnetic target anomalies targets is represented in Figure 3 and the radiometric target anomalies are represented in Figures 4.

**Table 2: Magnetic Targets warranted for follow up exploration work over EL26115**

<b>Tenure Number</b>	<b>Magnetic Anomalies</b>	<b>Strike Length of Anomaly</b>	<b>Width of Anomaly</b>	<b>Geological Setting</b>
EL26115	1	5.1 km Max	1.2 km Max	Cainozoic Sediments
EL26115	2	8.8 km Max	2.2 km Max	Cainozoic Sediments
EL26115	3	1.13 km Max	0.83 km Max	Cainozoic Sediments
EL26115	4	3.64 km Max	0.51 km Max	Cainozoic Sediments

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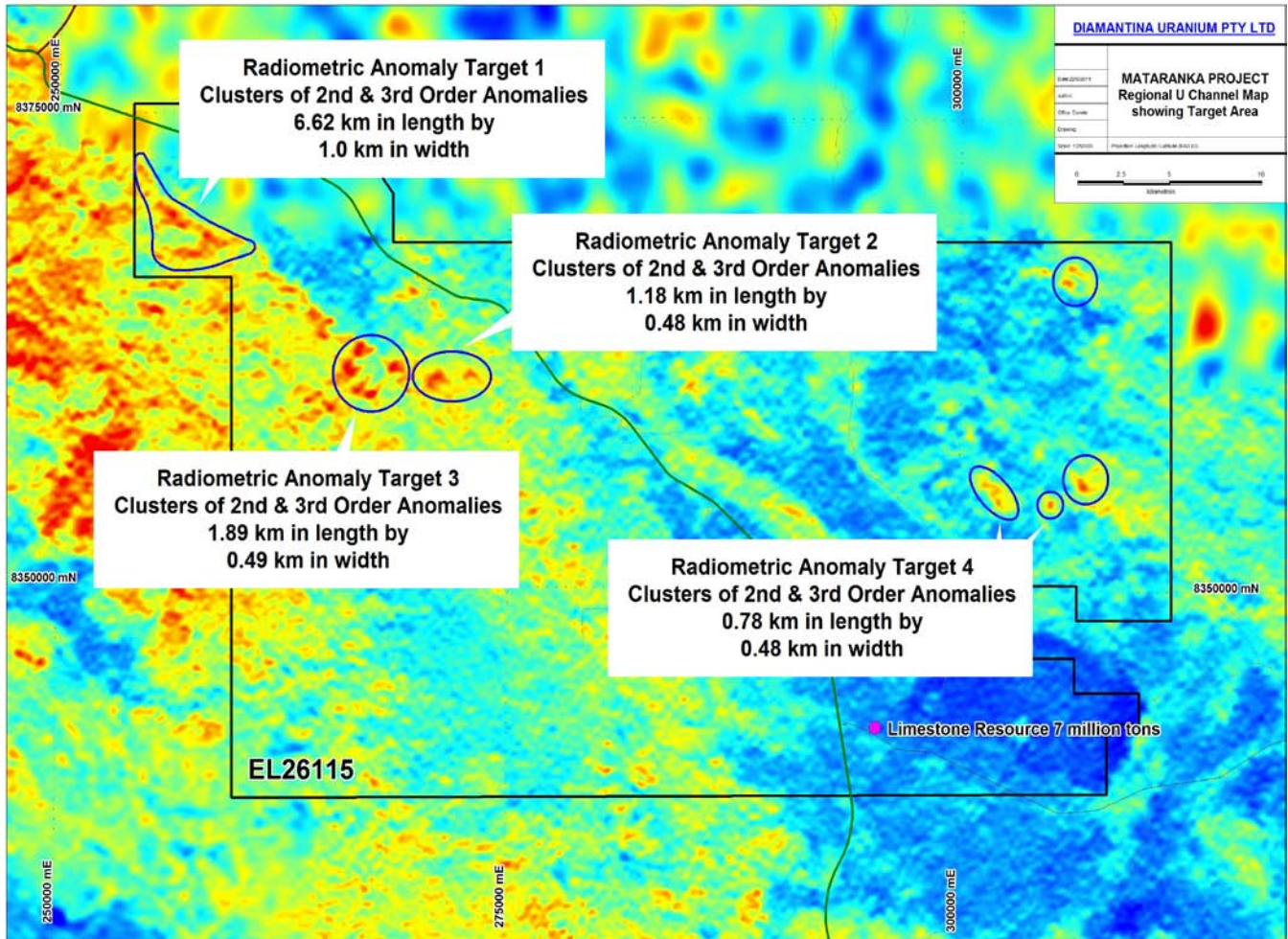


**Figure 3: Mataranka Project Areas showing Magnetic Target Anomalies**

The project areas has been shown to contain a number of clusters and linear first and second order magnetic anomalies which have never been investigated in great detail (Figure 3).

**Table 3: Uranium Anomalies warranted for follow up exploration work over EL26115**

Tenure Number	Radiometric Anomalies	Intensity of Anomaly	Strike Length of Anomaly	Width of Anomaly	Geological Setting
EL26115	1	Moderate	6.62 km Max	1.00 km Max	Sandstone, Siltstone
EL26115	2	Moderate	1.18 km Max	0.48 km Max	Sandstone, Siltstone
EL26115	3	Moderate	1.89 km Max	0.49 km Max	Sandstone, Siltstone
EL26115	4	Moderate	0.78 km Max	0.48 km Max	Sandstone, Siltstone, Clay Sediments



**Figure 4: Mataranka Project Areas showing Uranium Channel Anomalies**

## 9.0 REFERENCE

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