

Laramide Resources Ltd. PO Box 103 Spring Hill QLD 4004

> Phone: 07 3831 3407 Fax: 07 3831 3409

# Information Memorandum Benmara Project, NT

Laramide Resources, Brisbane

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### Abstract

A total of 13 high priority Uranium targets have been identified in the Benmara Region of the Northern Territory which is in the western extension of the Murphy Tectonic Ridge. These targets have been carefully selected on the basis of similarities in geological characteristics to the adjacent world class Westmoreland Project, located in Queensland. Westmoreland is an historic project that has received extensive exploration attention over the last 40 years, resulting in the delineation of in excess of 50M lb's  $U_3O_8$  in conjunction with excellent exploration potential suggestive of at least a further 30M lb's.

History suggests that mineral provinces that contain world class assets frequently reveal further similar assets once a full and complete understanding of the deposit is identified combined with a focused exploration program. At Westmoreland the key controls leading to the formation of the deposit are interpreted to be:

- The Westmoreland Conglomerate (high porosity/permeability)
- Major structural sutures or faults
- Proximity to unconformity surface with good cap rock

Geological indications of enhanced prospectivity in the region include:

- Presence of mafic dykes
- Anomalous uranium
- Host rock alteration

Datasets utilized to complete the targeting exercise include existing mapping data, airborne radiometrics and magnetics as well as previous exploration datasets. Laramide has systematically collated and interpreted the datasets to include these features. The net result is the targets defined in the following documentation.

#### **Introduction**

The Westmoreland Project in Queensland owned by Laramide Resources Ltd is a world class advanced U exploration and development project. Existing identified contained resources approach 50M lb  $U_3O_8$  with further evidence suggesting the scope for the delineation of significant material. Opportunity exists to participate in the exploration for, and potential development of, further U resources on the extensions of the favourable Westmoreland geological environment to the west in the Northern Territory.

#### About the Northern Territory Tenements

Geological extensions of the world class Westmoreland district extend to the west into the Northern Territory. Most recently, understanding of the controls on mineralization has been enhanced with improved magnetic and additional geophysical datasets which has meant that the projected extensions of the favourable stratigraphic and structural settings can now be well defined, even in regions of cover. Geological interpretation of all available data suggest that there are numerous high quality targets in the Laramide controlled regions equivalent to similar features at the Westmoreland Project. Previous exploration activity has defined small, scattered U occurrences highlighting the scope, but further work has been hampered by the post mineral cover sequences. However, significant structural, stratigraphic and radiometric U anomalies are evident in the region and require follow up activities.

#### **Geological Framework**

The Benmara (EL24645, EL24666) exploration titles are located on the geological extensions of the Westmoreland District. The Westmoreland region lies within the Palaeoproterozoic Murphy Tectonic Ridge which separates the Mt Isa Inlier from the McArthur Basin and Nicholson Basin as shown below. The Murphy Region has a significant cluster of U occurrences (figure 3).



Figure 1: Geology of the Northern Territory with significant Uranium occurrences.

Uranium mineralization has been recognized in the Westmoreland region in numerous structural and stratigraphic positions. These include:

- Faults and fractures in the Murphy Metamorphics (predominantly carbonaceous).
- Shear zones in the Cliffdale Volcanics near the Westmoreland Conglomerate Unconformity.
- Reverse faulted contact between the Cliffdale Volcanics and the Westmoreland Conglomerate.
- Within the Westmoreland Conglomerate.
- In the Westmoreland Conglomerate in close proximity to the overlying Seigal Volcanics (this is the setting of the Redtree mineralization).
- In association with mafic dykes.
- In shear zones within the Seigal Volcanics.

The overall stratigraphic section in the Westmoreland District showing the sequence relationships are shown below (figure 4).



<u>Figure 2:</u> Generalised geology of the Westmoreland area (D G Jones). For legend see figure 5. *NB: figure shows old tenure boundaries.* 



Figure 3: Simplified Stratigraphy in the Westmoreland Region (D G Jones).



The most significant Uranium occurrence to date is located along the Redtree Dyke along which a conservative cumulative resource total of 48.5M lb's has been defined. An outline of the resource is shown in the table below.

			U3O8	U3O8		
Category	Deposit	Tonnes	Uncut	cut	Metal	Metal
		(t)	(%)	(%)	(kt)	(Mlb)
Inferred	Redtree	4,466,750	0.069	0.067	3	6.6
	Huarabagoo	2,406,000	0.116	0.109	2.6	5.8
	Junnagunna	2,149,500	0.077	0.075	1.6	3.6
Sub Total		9,022,250	0.083	0.080	7.2	15.9
Indicated	Redtree	12,858,750	0.092	0.090	11.6	25.5
	Huarabagoo	1,462,000	0.092	0.083	1.2	2.7
	Junnagunna	4,364,750	0.082	0.081	3.5	7.8
Sub Total		18,685,500	0.089	0.088	16.4	36
Grand						
Total		27,707,750	0.087	0.085	23.6	51.8

The mineralization at Redtree is characterized by the following features:

- Well developed grade continuity.
- Strong stratigraphic control.
- Strong structural control.
- Well defined sharp ore boundaries which characterizes ore footprint.
- A large proportion of the ore is at shallow depths (figure 7).
- Spatial association with mafic dykes and large unconformities (figure 7).



<u>Figure 4:</u> Schematic cross section looking NE, showing mineralisation geometry (after Schindlmayr and Beerbaum, 1984)

The Westmoreland Mineral Field is by comparison to other regions poorly explored except around the previously identified mineralization. It is, however, characterized by scattered, sporadic surface U anomalism over a significant area defined by small zones of anomalous surface Uranium with coincident radiometric response. The mineral Field and geological similarities continue into the Northern Territory.

# Northern Territory Tenements

Extensions of the prospective Murphy Inlier are observed within the titles being explored by Laramide (figure 5).



<u>Figure 5:</u> Laramide Resources' Queensland and Northern Territory tenements on Geology with Uranium prospects.

The Northern Territory assets can be subdivided into projects based on the title status and geological location. Both the Benmara and NT Joint Venture Project area contain extensions of the Westmoreland geological setting. These project areas can be summarized as outlined below:

Project	Titles	Status	Prospecivity
Benmara	24645, 24666	100% Owned	High U, Au. Predominantly covered targets

## Benmara Project

The Benmara Project can be defined by the outlines of EL24645 and EL24666. Examination of all available data for the area suggest that the host sequence of the Westmoreland mineralization is predominantly under cover in this area (figure 6).



<u>Figure 6:</u> Left – published 1:250,000 Geological Map Sheet with titles showing the location of both the outcropping and covered portions of the Westmoreland Conglomerate. Right – Magnetic TMI image for the equivalent region.

Target styles that exist within this region include:

- 1. Westmoreland Conglomerate hosted association with mafic dykes
- 2. Seigal Volcanics/Westmoreland Conglomerate unconformity
- 3. Faults and fractures in the Murphy Metamorphics and Cliffdale Volcanics
- 4. Nicholson Granite/Murphy Metamorphics Contact

Interpretation of EL24645 has highlighted several high order targets that display multiple features that are considered important in the control of U mineralization at Westmoreland. These features include:

- Favourable stratigraphy ie Westmoreland Conglomerate
- Presence of regional scale unconformities eg Westmoreland Conglomerate/Seigal Volcanics
- Major structural features such as faults (NW NE)
- Local U anomalism in airborne survey's and occurrences (eg Anomaly 1)
- Mafic dykes

These features are identified in figures on the following pages.



<u>Figure 7:</u> Published geological map showing the interpreted regional structures in red, the major unconformity surfaces in green, and the interpreted position of the Westmoreland Conglomerate in blue.



<u>Figure 8:</u> Magnetic image showing the location of an interpreted mafic dyke in the Westmoreland Conglomerate (striking the same direction as the Redtree Dyke).



Figure 9: Airborne Radiometrics and their relationship to structural features in EL 24645.



Figure 10: Target areas as defined in EL 24645.

The targets can be summarized below:

Target	Geological Features to define Target
1	Large airborne radiometric U anomaly, scattered U occurrences, extensive alteration
	and anomalous previous exploration results, numerous regional unconformity
	surfaces and large structural intersections
2	Airborne U radiometric anomaly, structural fold closure with regional unconformity,
	structural intersection
3	U airborne radiometric anomaly located in post mineral cover sequence in large NE
	trending structural corridor (suggestion of leakage along structure
4	Major NW trending fault within Westmoreland Conglomerate (covered), fault
	reactivates Westmoreland upper and lower unconformities. Lower unconformity
	has a moderate U radiometric airborne response
5	Elongate NE trending dyke (interpreted) akin Redtree with both upper and lower
	Westmoreland Conglomerate unconformities and sequence preserved, minor
	structural inflexions
6	Major NW trending fault in contact with Westmoreland lower unconformity, minor
	intense U radiometric anomaly
7	Major structural intersection on lower Westmoreland unconformity, significant
	dislocation in left lateral NW faulting
8	Major fault propogated folded upper Westmoreland unconformity contact along
	intersection of major NW trending fault, cover sequence has highly anomalous
	scattered U radiometric response in post mineral cover sequence claypan

Interpretation of EL24666 has also highlighted numerous high order anomalies where the full complement of geoscientific data is available. Extensions of NW trending structures that are radiometrically anomalous along strike are preserved within the EL confines. Stratigraphically, the same sequence of Murphy Metamorphics and Nicholson Granite is developed in the region . The Murphy Metamorphics have a high component of carbonaceous material.

In the area where radiometric data is available, large coherent Uranium anomalies are observed in close proximity to regional scale faults and favourable stratigraphy.



Figure 11: Geology of EL 24666.

A significant component of the area is comprised of post mineral cover sequences. Radiometric anomalies observed in the region are shown in figures 17 and 18. Note that a significant component of the region has not been flown for radiometrics or magnetics. Additional targets may be developed once the airborne surveys have been completed.



Figure 12: Geology overlain by Uranium anomalism from Airborne Radiometrics.



Figure 13: Targets identified in EL 24666.

Targets within EL 24666 are outlined below:

Target	Geological Features to Define Target
1	Large airborne radiometric U anomaly, significant structural intersection associated
	with productive NW and NE-E orientated faults in Murphy Metamorphics
	Unconformity (carbonaceous)
2	Significant airborne U radiometric anomaly, regional unconformity, structural
	intersection
3	Large NW trending crosscutting fracture associated with projected Murphy
	Metamorphics, weak scattered U radiometric response
4	Major NW trending fault within Murphy Metamorphics (covered), possible dyke
	magnetic signature on NE trending linear
5	Major NE trending fracture intersecting Murphy/Cliffdale unconformity contact

Further work on EL24666 would no doubt seek the extensions of the airborne survey data to include complete coverage of the titles.

#### Suggested Work Program

Given that a significant component of the region is covered by post mineral sequences, the suggested work program on the targets defined to date would benefit from the following:

- The completion of Alpha Cup Surveys to determine higher prospective zones
- RAB drilling of target to detect anomalism
- Further RC and diamond drilling

## **Interpretation and Conclusions**

A total of 13 well defined high order targets are outlined in two semi contiguous exploration licenses in the Northern Territory along the extensions of the Murphy Tectonic Ridge, host to the world class Westmoreland U-Au Deposit.

Exploration activities to date at Westmoreland (located on the QLD side of the Murphy Ridge) have defined in excess of 50M lb  $U_3O_8$  in one central region. However, the total  $U_3O_8$  endowment of the area on the basis of field evidence and data compilation suggest an even larger, more robust project approaching in excess of 80 M lb. This is after more than 40 years of activity and cumulative expenditure.

By comparison, the Northern Territory portion of the Murphy Ridge has not received the same attention as the QLD counterpart. Numerous U occurrences have been identified in regions of outcrop including the historic Cobar II Prospect where there has been a significant component of shallow drill testing.

The Benmara Licenses which consist of EL24645 and EL24666 are located on the western extensions of the Murphy Inlier in regions of variable outcrop. The dominant sequence of outcropping rocks are however post mineral cover sequences. Accordingly, limited exploration activity has been completed here as there are no significant exposed regions of outcropping high grade U mineralization.

Exploration activities at Westmoreland have demonstrated that significant zones of mineralization can have limited radiometric surface expression. However, other critical key geological factors such as structure, stratigraphy and perhaps even weak geochemical, gamma or radiometric anomalies will be the key in discovery of new mineralized regions.

With this in mind, the Benmara Region as defined in this document, has thirteen well defined high priority targets. Many of these targets have been generated by the combination of

structure, stratigraphy, location of unconformity surface, and the existence of near surface or surface expression U anomalism. The details of various aspects of each target region are outlined in the text.

The Benmara Project represents an opportunity to explore the prospective extensions of the World Class Westmoreland Uranium Province. This combined with the limited detailed work to date and current identified targets, exemplifies the prospectivity of the region.