



FINAL REPORT

RANKEN (EL28797)

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Summary

Section 94 of the ***Mineral Titles Act*** requires the submission of reports prepared by the titleholder for each Exploration Licence about the authorised activities conducted under the title and other matters relating to the title. The purpose of the following Final Report for Exploration Licence (EL) 28797 is to provide a summary of the activities carried out over the entire area of EL 28797 up to the time when the title ceased to be in force, including any results produced by those activities.

Natural Resources Exploration's ('NRE') has carried out a detailed geological assessment of its Ranken Prospect, Exploration Licence (EL) 28797. To delineate prospective areas for phosphate, uranium and diamond mineralisation and define the next phase of exploration, NRE carried out extensive office-based studies including desktop reviews of all previous exploration across EL28797 and its surrounding tenures which form the group project area known as the 'Barkly Project'. NRE also attended the Darwin Core Facility with a view to analysing water bore cuttings held at the library. NRE carried out both XRF and ALS Analysis of water bores located within EL28797 and within the region.

Under section 102 of the *Mineral Titles Act* and Regulation 63 of the *Mineral Titles Regulations*, NRE made application to the Department to amalgamate EL28797. All future exploration activities conducted on this area will be reported under the replacement exploration licence number 29722.

1. Introduction

Natural Resources Exploration ('NRE') has carried out a detailed geological assessment of its Ranken Prospect, Exploration Licence (EL) 28797.

To delineate prospective areas for phosphate, uranium and diamonds mineralisation and define the next phase of exploration, NRE carried out extensive office-based studies including desktop reviews of all previous exploration across EL28797 and its surrounding tenures which form the group project area known as the 'Barkly Project'. Natural Resources Exploration ('NRE') is exploring for phosphate, uranium and diamonds in the Northern Territory's Barkly Sub-basin within the central Georgina Basin.

Investigations were intended to locate any outcropping of any mineralisation and any indicators of any sub-surface any mineralisation within the tenement.

2. Tenure

NRE's exploration licence (EL) 28797, is more commonly known by NRE as its 'Ranken Prospect'. EL28797 was granted to NRE on 22 February 2012 consisting of 97 sub-blocks over the Barkly Tablelands.

Table 1 lists the pertinent tenement details.

Table 1. Tenement Details

Project Name	Tenement Name	Title No. (EL)	Sub-blocks	Status	Grant Date	Term (Yrs)	Expiry Date
Barkly	Ranken	28797	97	Granted	22-Feb-13	6	21-Feb-18

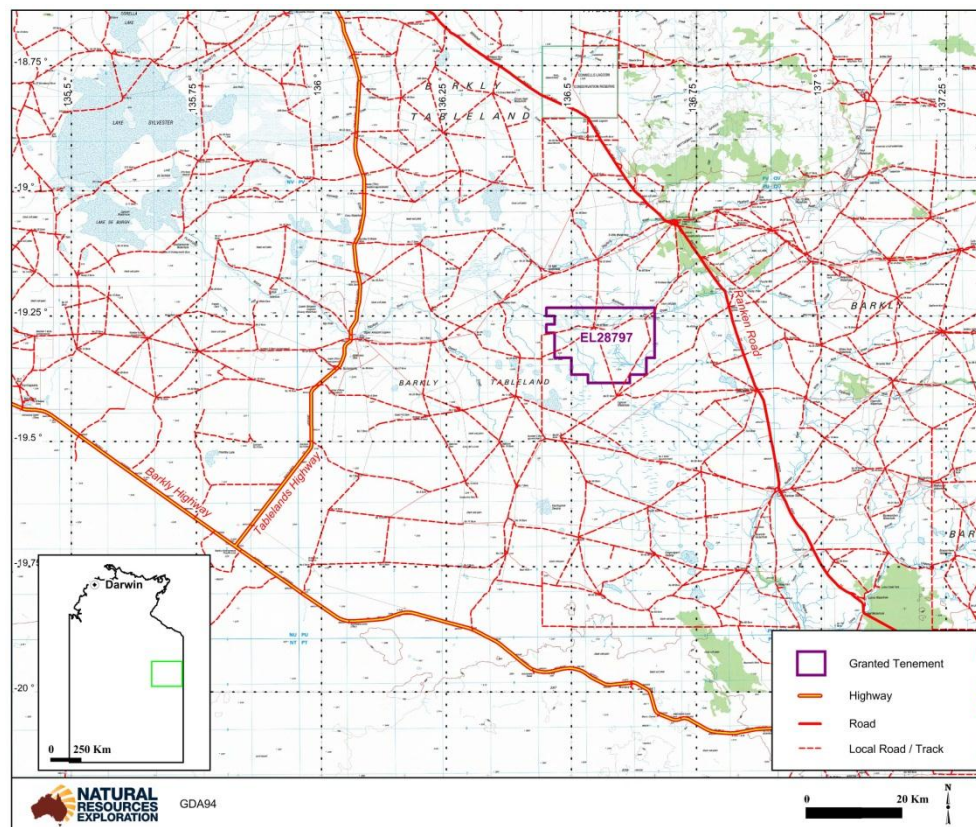
Under section 102 of the *Mineral Titles Act* and Regulation 63 of the *Mineral Titles Regulations*, NRE made application to the Department to amalgamate EL28797. All future exploration activities conducted on this area will be reported under the replacement exploration licence number 29722.

2.1 Location and Access

EL28797 is located in the Barkly Tablelands approximately 315 kilometres to the northwest of Mount Isa.

Access is from Mt Isa via the sealed Barkly Highway or Darwin via the sealed Stuart and Barkly Highways. Alternatively, EL28797 can be accessed by helicopter. The location and access to the project is identified in **Figure 1**.

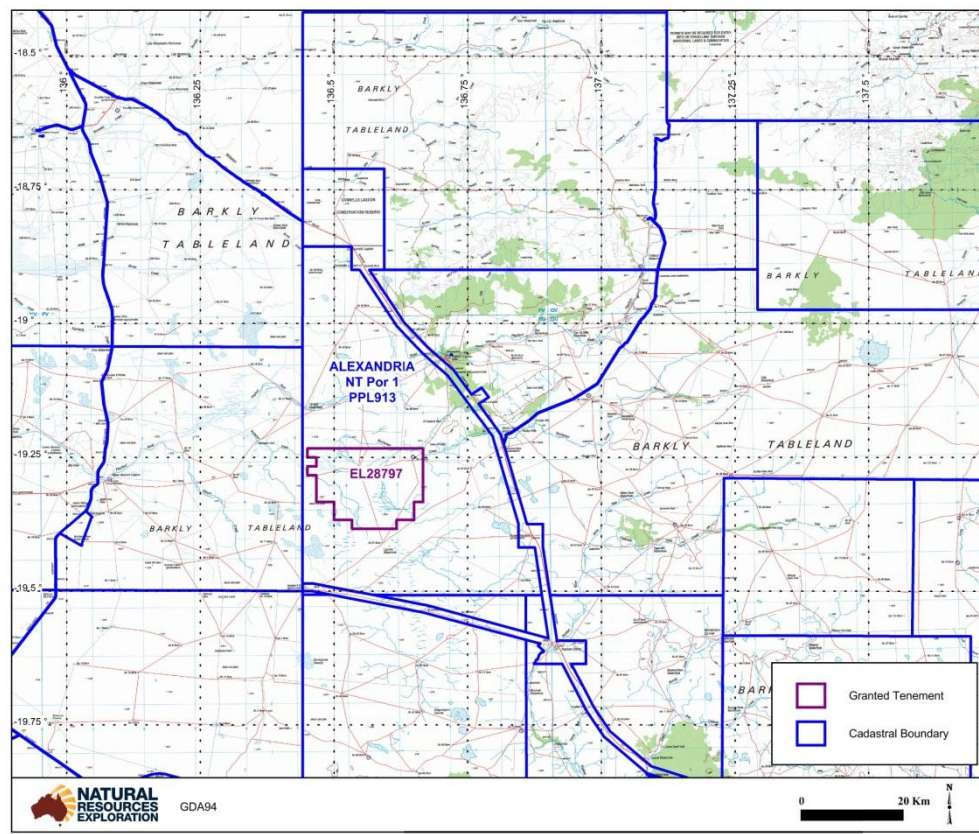
Figure 1. Location & Access Map



Pastoral Leases

NRE's EL28797, Ranken Prospect overlies one (1) Perpetual Pastoral Lease namely, 'Alexandria' NT Portion 1 PPL 913. This Perpetual Pastoral Lease has been identified in **Figure 2**.

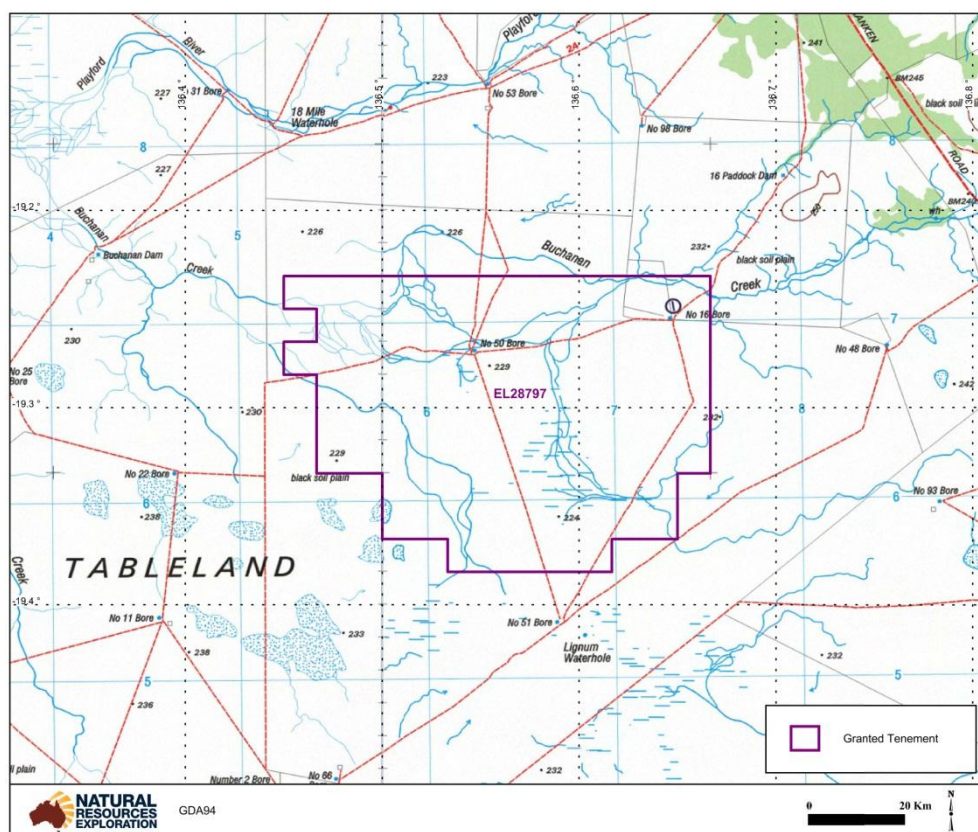
Figure 2. Cadastral Map



2.2 Topography and Drainage

The Barkly Tableland is a vast terrain of flat to very gently undulating black soil plains. The tenure is flat lying with clays soils and sheet wash. There are three lakes in the southern part of the tenure and minor outcrops of quartz sandstone and dolostone in the north eastern part of the tenure. The topography of the Ranken Prospect is depicted in **Figure 3** below.

Figure 4. Topography Map

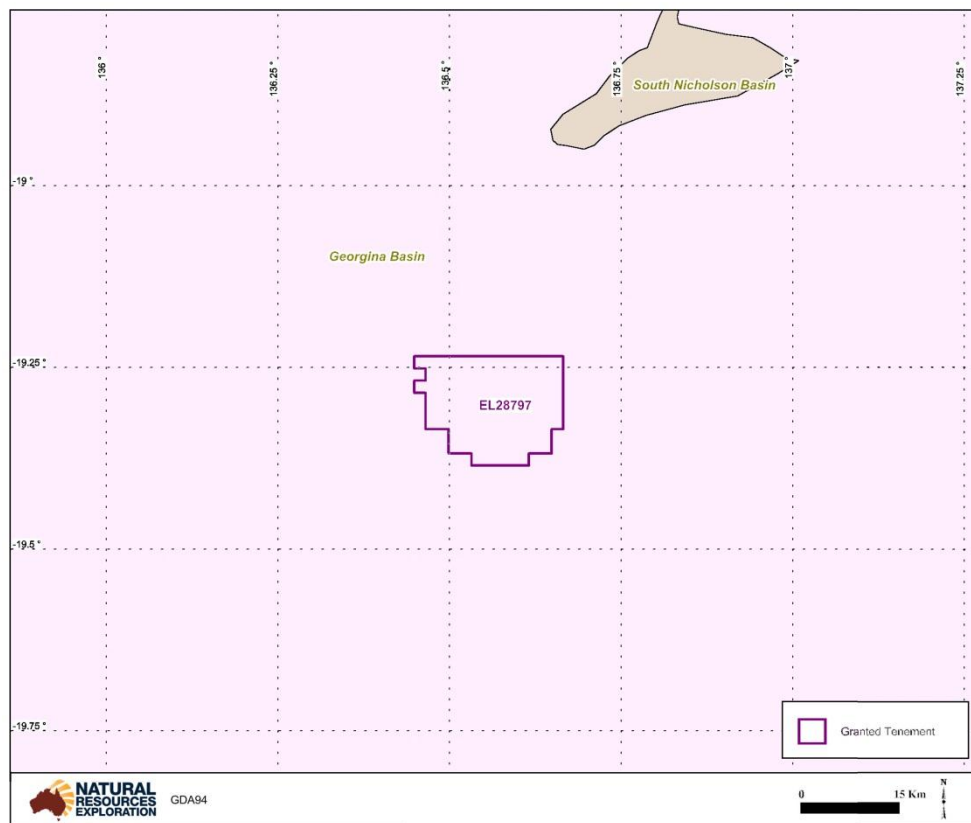


3. Geology

3.1 Regional Geology

EL28797 and the surrounding tenures within NRE's Barkly Project lie centrally within the Georgina Basin, straddling the boundary between the Barkly and Undilla Sub-basins (**Figure 4**). Together with the Wiso and Daly Basins, which lie to the west and northwest respectively, the Georgina Basin constitutes an extensive (360,000 square kilometres) remnant of the NeoProterozoic and Palaeozoic, sedimentary sequence that was originally deposited across an intra-continental platform that covered a large part of central Australia.

Figure 4. Regional Geology Map



The Georgina Basin comprises rocks ranging in age from Neoproterozoic to Devonian and covers an area of approximately 325,000 square kilometres. The Basin is elongated north west to south east and regional magnetic data can be used to infer a north west – south east structural grain with ridge and depression sub-basin topography.

Stratigraphy and sedimentology

Shergold and Druce (1980) subdivided the Basin sequence into three tectono-stratigraphic units or “tectotopes”.

- Tectotope 1 is Neoproterozoic to Early Cambrian in age and consists of glacial, siliciclastic sediments overlain by marine and marginal marine or continental siliciclastic sediments.
- Tectotope 2 is distributed widely across the Basin, is of Middle Cambrian to Ordovician in age and comprises sequences dominated by carbonates with some early siliciclastic units.

- Tectotope 3 is Ordovician to Devonian in age, dominated by siliciclastic rocks and occurs only in the south.

The significant phosphate deposits of the Georgina Basin occur in the Middle Cambrian and consequently the relevant part of the stratigraphy belongs to tectotopes 1 and 2. The sedimentology across the Basin is complex and consequently the stratigraphy developed by many people working in specific relatively localised areas includes a plethora of units and stratigraphic names.

As Cook (1989) noted that no single stratigraphic column can be provided for the Georgina Basin. **Figure 5** is an attempt to reconcile localised stratigraphic interpretations for the Early and middle Cambrian, which is most relevant to the discussion of phosphate mineralisation. The following outline of the geological history of the Georgina Basin from Neoproterozoic to Late Cambrian times is taken largely from Cook (1989). Sedimentation in the Georgina Basin was initiated in the Neoproterozoic in grabens formed by regional north east- south west extension. Tholeiitic basalts and felsic volcanic rocks were emplaced in the centre and north during the earliest Cambrian; these lie unconformably on Proterozoic basement and include the Helens Springs and Peaker Piper Volcanics. Elsewhere, the basal units of the Georgina Basin comprise conglomerates, sandstones, shales and glacial and fluvial sediments (e.g. Mount Birnie, Riversdale and Mount Hendry Formations).

Figure 5. Stratigraphic Summary of the Georgina Basin

GEORGINA BASIN					
WESTERN			EASTERN		
BARKLY SUB-BASIN		UNDILLA SUB-BASIN	UNDILLA SUB-BASIN	BURKE RIVER OUTLIER	
MIDDLE CAMBRIAN	Anthony Lagoon Beds	Camooweal Dolostone			
		Ranken Ls	Gowers Fm		Currant Bush Fm
		Wonarah Fm		Inca Fm	
		Burton Beds		Beetle Crk Fm	
	Gum Ridge Fm	Thorntonia Limestone	Thorntonia Limestone		
EARLY CAMBRIAN	Peaker Piker Volcanics	Helen Springs Volcanics	Mt Hendry Fm	Riversdale Fm	Mt Birnie Beds

Ongoing extension and subsidence were accompanied by a marine transgression and by the Middle Cambrian, the Basin was covered by a shallow intra-continental sea, rich in marine life. Extensive limestone and dolomitic sequences (e.g. Thornton Limestone and Gum Ridge Formation) were deposited. These also contain evidence for shallow, intertidal and highly saline conditions (e.g. algal structures and pseudomorphs of halite and gypsum crystals).

Following a short break in sedimentation, subsidence continued with the deposition of a sequence of siltstone and sandstones around the Basin margins and carbonate shoals in deeper water. Cook (1989) noted that this was a time when the Basin was characterised by a complex interplay of sedimentary environments, ranging from shallow marine, through intertidal and estuarine to lagoonal. It was also the time when the major phosphatic units (e.g. the Beetle Creek and Wonarah Formations and Anthony Lagoon and Burton Beds) and the phosphorites were deposited.

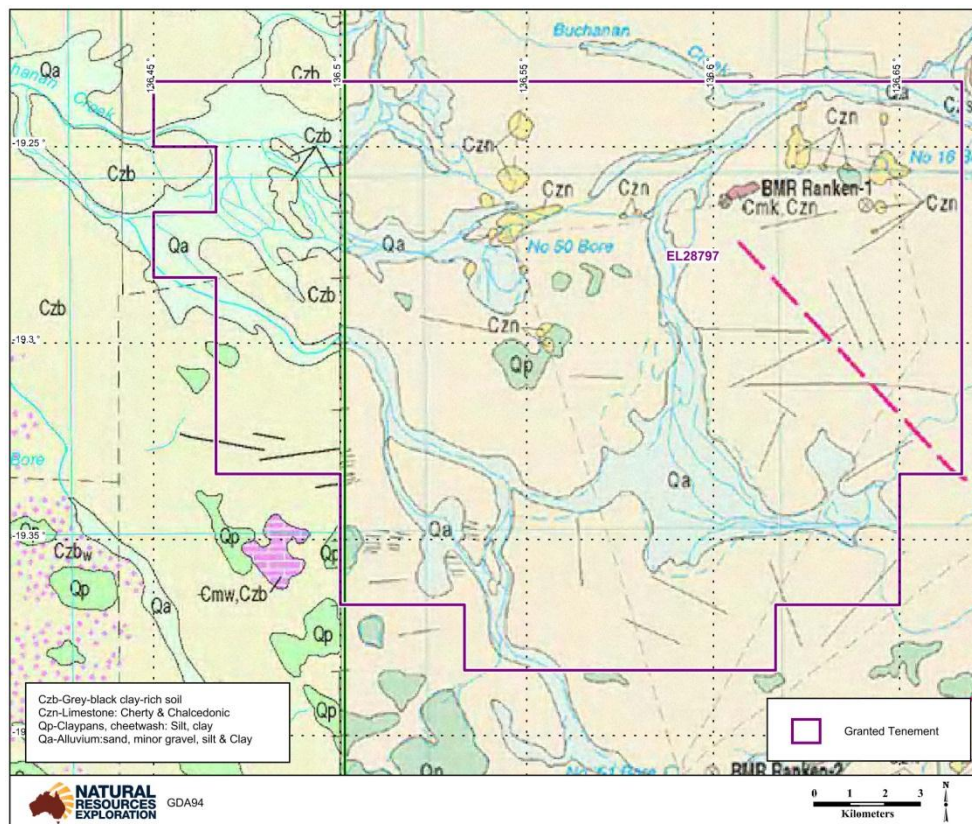
Formation of the phosphatic units of the Georgina Basin was followed by deposition of black organic-rich shales (Inca Formation) in near shore areas and shallow carbonates throughout most of the Basin. Carbonate sedimentation continued until uplift and erosion associated with the Delemarian Orogeny occurred in the Late Cambrian.

Howard (1990) used bore hole and drillhole, aeromagnetic and gravity data to define a phosphatic lithofacies within the Middle Cambrian of the Georgina, Wiso and Day Basins. The phosphatic horizon has an average width of 32 km and a thickness of between 10 and 190 metres. The strike length exceeds 2000 km. The phosphate deposits in the southeast are slightly younger than those found elsewhere. The dominant lithology of the phosphatic lithofacies is siltstone and the phosphatic horizon occurs either at basin margins, adjacent to Proterozoic basement (e.g. in the eastern Undilla sub-basin and Burke River outlier) or above structural basement highs (e.g. Barkly subbasin).

3.3 Permit Geology

EL28797 sits across the Barkly Tableland and overlies the Georgina Basin. The Barkly Tableland coincides closely with the north-central and northern parts of the Neoproterozoic to Palaeozoic Georgina Basin. Exposures of the basinal sediments in the area are rare, but where present, are typically composed of weakly deformed middle Cambrian carbonate sedimentary rocks. Locally overlying the Palaeozoic rocks are thin deposits of flat lying late Palaeogene limestone. Thin deposits of Cretaceous marine sediments also locally occur in the northern margin of the Barkly Tableland. The permit geology is illustrated in **Figure 6**.

Figure 6. Permit Geology Map



4. NRE's Exploration Activities over EL28797

In order to define the next phase of exploration, NRE's exploration program for its Ranken Prospect consisted of extensive desktop studies and a historic review of previous exploration over the tenure area as well as its surrounding tenures which form the group project area known as the 'Barkly Project'.

Our office-based studies have allowed us to delineate prospective areas for phosphate mineralisation. From these studies, NRE has begun modelling the phosphate horizon in the region with the view of conducting a future limited drilling program.

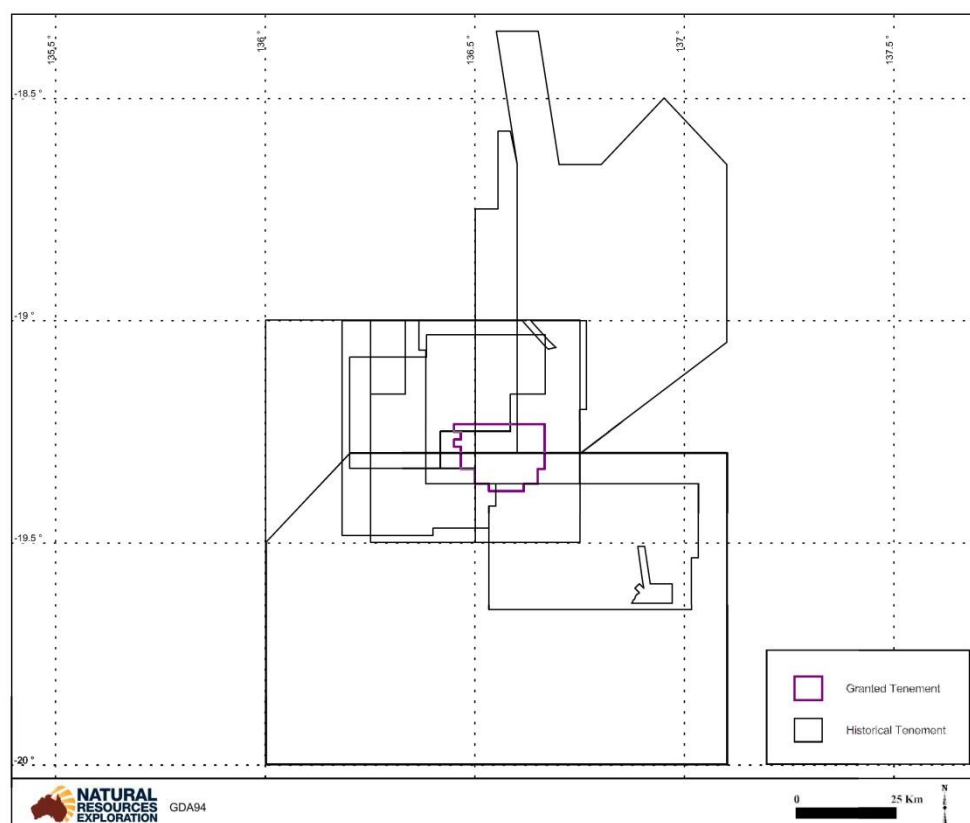
4.1 Previous Exploration Studies

NRE has conducted an extensive review of historic exploration over EL28797. Historic exploration in this region has largely been for phosphate and diamond exploration with some uranium exploration. Encouraged by IMC's success in locating high grade phosphate

in the late 1960's, a number of explorers have continued to search for phosphate in the region.

The Barkly region was part of the Australian Diamond Exploration Joint Venture regional programme to search for kimberlitic pipes. Results varied across the region with microdiamonds recovered, and intrusive pipes located. Recent exploration has favoured base metal mineralisation. A number of historic tenements have covered areas overlapping NRE's tenures and these are shown in **Figure 7** below.

Figure 7. Historic tenements over EL28797



NRE has reviewed a number of previous companies' exploration reports overlapping EL28797, including those listed in **Table 2** below.

Table 2. Historical Reports Reviewed by NRE

Tenement	Period	Company Reports	Company
EL 22983	2002-2003	CR2004-0044	De Beers Australia Exploration
EL 22979	2002-2003	CR2004-0044	De Beers Australia Exploration
EL 22982	2002-2003	CR2004-0044	De Beers Australia Exploration

EL 4349	1983-1989	CR1985-0024,CR1986-0100	Australian Diamond Exploration
EL 4534	1985-1991	CR1986-0116	Australian Diamond Exploration
EL 3536	1982-1988	CR1983-0151	CRA Exploration
EL 1081	1976-1977	CR1977-0038	Australia Fertilizers
AP 1874	1967-1971	CR1968-0016,CR1970-0079,CR1971-0012,CR1971-0192	Continental Oil Company of Australia
AP 2161	1968-1970	CR1968-0032,CR1969-0022,CR1970-0036,CR1970-0038,CR1970-0040	IMC Development
AP 1802	1967-1968	CR1968-0030	IMC Development
AP 1766	1967-1971	CR1968-0030,CR1968-0031,CR1969-0022,CR1970-0037,CR1970-0038,CR1970-0039,CR1970-0082	IMC Development

4.2 Water Bore Cuttings Analysis

NRE attended the Northern Territory's Alice Springs Core Facility and conducted XRF Assaying of all water bore chips available within EL28797 as well as its surrounding tenures which form the group project area known as the 'Barkly Project'.

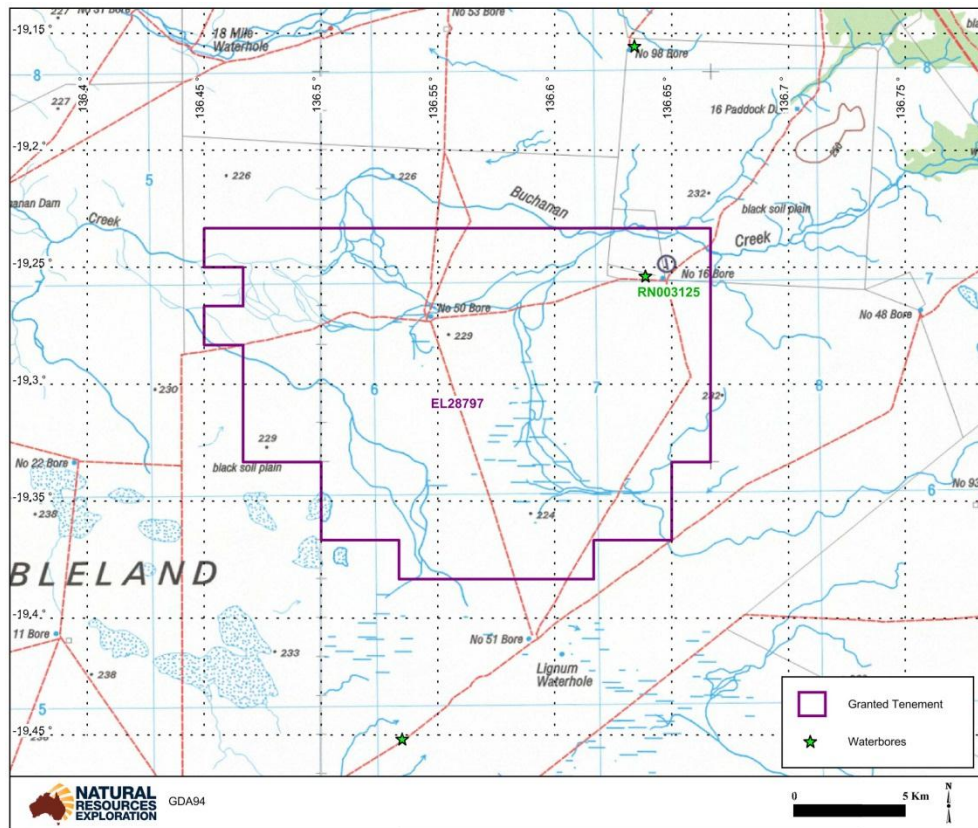
This exploration activity was completed in order to define any mineral potential within EL28797. The XRF Assaying of water bore chips at the Darwin Core Facility involved:

- Delineation of all water bores drilling in the project areas;
- Compilation and data entry of all relevant information recorded at the time of drilling, including geology intersected and water chemistry;
- Determination of water bore chips available for XRF analysis held at the Darwin Core Facility;
- Assessment and correlation of XRF results and geological data within each hole and across the project areas.

The XRF Analysis of water bore chips held at the Northern Territory Department of Resources' ('the Department') Darwin Core Facility has proved to be valuable to NRE in determining the mineral prospectivity of each of its project areas and specifically, in respect of each tenement.

After compilation and detailed interrogation of all currently available data within each tenement with the XRF results, NRE was provided with valuable insight into the mineral potential of EL28797, its surrounding tenements and the region in general. The location of the water bores within or near NRE's Ranken Prospect are depicted in **Figure 8**.

Figure 8. Water Bore Location Map



The Department kindly allowed NRE to set-up in the Darwin Core Facility where NRE's geologists undertook analysis of the water bore cuttings using a hand-held XRF device.

NRE lodged an Exploration Report with the Northern Territory Department of Resources' Geoscience Division on 7 June, 2011. This report was required in respect of the XRF and ALS Assaying of Water Bore Chips at the Darwin Core Facility. The Exploration Report was titled **'XRF & ALS Assaying of Water Bore Chips – Core Facility: Darwin'**.

5. Reports lodged during the reporting period

NRE believes that no other reports were required to be lodged during this reporting period.

6. Conclusions

Natural Resources Exploration's exploration activities over EL28797 have been focused on determining the mineral prospectivity of the area, modelling phosphate horizons present in

EL28797 and its surrounding tenements as well as delineating targets and developing a limited drilling program.

Under section 102 of the *Mineral Titles Act* and Regulation 63 of the *Mineral Titles Regulations*, NRE made application to the Department to amalgamate EL28797. All future exploration activities conducted on this area will be reported under the replacement exploration licence number 29722.

7. Bibliography

Cook P.J. (1989). Phosphate deposits of the Georgina Basin, northern Australia. In: Notholt, A.J.G., Sheldon, R.P. and Davidson, D.F (Eds). Phosphate deposits of the world Volume 2: Phosphate rock resources. International Geological Correlation Programme 156: Phosphorites. Cambridge University Press Cambridge, 533-550.

Edgoose, C. (2003). Barkly Tableland Region, Northern Territory. Department of Lands, Planning and Environment, Alice Springs.

Hirschmann, C. (2011). Natural Resources Exploration Pty Ltd, Northern Territory Phosphate Project Summary. Terra Search Pty Ltd Report. 22 pages.

Howard P.F. (1986). The Wonarah phosphate deposit, Georgina Basin, Australia. In: Cook P.J., Shergold, J.H. (Eds). Phosphate deposits of the world. Volume 2. Proterozoic and Cambrian phosphorites. Cambridge University, Press, Cambridge, 545–550.

Howard, P.F. (1990) The distribution of phosphatic facies in the Georgina, Wiso and Daly River Basins, northern Australia. Geological Society London, special Publication 52, 261-271.

Jarvis, I. (1992). Sedimentology, geochemistry and origin of phosphatic chalks: the Upper Cretaceous deposits of NW Europe Sedimentology 39, 55-91

Khan M., Ferenczi P.A., Ahmad M., Kruse P.D. (2007). Phosphate testing of waterbores and diamond drillcore in the Georgina, Wiso and Daly basins, Northern Territory. Northern Territory Geological Survey, Record 2007-003. 93 pages.

Lyndsay-Park, K. (1980). Regional assessment and exploration model, Barkly Project. CSA Global Pty Ltd, Report No. 275.2008, for Mantle Mining Corporation Ltd.

Shergold, J.H., Druce, E.C. (1980). Upper Proterozoic and Lower Palaeozoic rocks of the Georgina Basin. In: Henderson, R.A., Stephenson, P.J. (Eds) The Geology and geophysics of northeastern Australia. Geological Society of Australia, Queensland Division, Brisbane, Australia, 149-174.

Shergold, J.H., Southgate, P.N. (1986). Middle Cambrian phosphatic and calcareous lithofacies along the eastern margin of the Georgina Basin, western Queensland. Australian Sedimentologists Group Field Guide No. 2, Geological Society of Australia, Sydney, Australia, 89 pages.

Note many more references are also located in the References section of the Alroy, Brunette Downs, Mt Drummond and Ranken 1:250,000 geological map series explanatory notes.