# Partial Surrender Report For EL24693, for the Period 13 December 2005 to 12 December 2009.

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Map Sheets: 1:250,000 Tobermorey

1:250,000 Hay River

## SUMMARY

EL24693 forms part of Uramet Minerals Limited Marqua Project located within the Marqua Station in the Northern Territory, with this report detailing all work carried out on the surrendered portion of EL24693 between 13 December2005 and 12 December 2009.

The tenement, originally held by Elkedra Diamonds NL (Elkedra), was transferred to Uramet, with Elkedra retaining the rights to explore for diamonds. Uramet is currently exploring the Marqua Project for base metals, phosphate and uranium.

Exploration work conducted by Uramet and Elkedra since 2005 includes, interpretation of regional NT government aeromagnetic, radiometric, and gravity data; an infill ground gravity survey; reconnaissance mapping and surface sampling; a review of historical data including re-sampling of BMR holes; and a VTEM survey and interpretation

Other than magnetic anomaly CWN-169, no significant anomalies were generated within the surrendered portion of the EL by the geophysical method described above. CWN-169 was downgraded after a follow-up ground gravity survey revealed a gravity low corresponding to the gravity high. Reconnaissance mapping and surface sampling did not return any significant base metal or phosphate results within the surrendered portion of the EL, with only a weakly anomalous 68 ppm (Niton) uranium assay being returned. Uramet therefore does not consider the surrendered area to be highly prospective for base metals, phosphates.

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## 1. INTRODUCTION

EL24693 forms part of Uramet Minerals Limited Marqua Project located within the Marqua Station in the Northern Territory.

The tenement, originally held by Elkedra Diamonds NL (Elkedra), was transferred to Uramet, with Elkedra retaining the rights to explore for diamonds. Uramet is currently exploring the Marqua Project for base metals, phosphate and uranium.

An Aboriginal Areas Protection Authority (AAPA) clearance survey was conducted over EL24693 prior to field work being conducted, and any area of cultural significance (as delineated in the AAPA Authority Certificate) was avoided.

This report details all work carried out on the surrendered portion of EL24693 between 13 December2005 and 12 December 2009.

#### 2. SITE ATTRIBUTES

#### 2.1. Location and Access

The Marqua project area is located approximately 550km east of Alice Springs, NT (Figure 1).



Figure 1. Location plan showing EL24693.

Access from Alice Springs is via the sealed Stuart Highway, then east along the Plenty Highway (sealed from the Stuart Highway turn off to approximately 30km east of the Gemtree Caravan Park, then gravel highway) until the Marqua Station turn off, then 40km via good maintained station tracks to Marqua Station. Access within the project area is along well connected station tracks, which are may be degraded to bull dust cover and washed out by flash floods in certain locations.

The project area lies within the Tobermorey and Hay River 1:250,000 map sheets.

#### 2.2. Climate

The Marqua area is part of the Central Australian Desert climate zone with variable wet season from November to March.

The closest meteorological station (recording both temperature and rainfall) is at Jervois 150km west and Urandangi 170km northeast.

The climate of the project area can be loosely divided into a dry season generally from April to October, and a wet season from November to March. Unseasonal rain can however occur at any time. Maximum daily temperatures exceed 35 between October and April. The normal exploration field season runs from April to October.

Statistic for monthly and annual temperature and rainfall for Jervois (collected between 1967 and 2008) are given below in table 1.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Temperature													
Mean Max	38.5	36.9	34.7	30.5	25.4	22.0	22.0	25.0	29.8	33.3	36.0	37.8	31.0
Mean Min	22.6	22	19.2	14.2	1.9	6.4	5.1	7	11.2	15.5	18.7	21.2	14.4
Rainfall													
Mean Rainfall	48.8	56.4	29.9	17.5	19.2	11.5	12.6	8.2	5.9	15.9	22.6	38.4	286.2
Mean No of Days of rainfall > 1mm	4.2	3.9	2.3	1.5	2	1.2	1.2	1	1	2.8	2.9	3.5	27.5

#### Table 1. Mean Monthly Temperature Ranges and Rainfall for Jervois

Source: Bureau of Meteorology, Climate Statistics for Australian Locations, Jervois (1 December 1967 to 30 June 2008)

Prevailing wind direction is from the southeast, with strong gusty winds not uncommon.

#### 2.3. Environment

The project area falls within Marqua Station, the primary land use being cattle farming. Marqua Station owner is Charlie Chalmers, based at Mount Swan Station located approximately 350km west of Marqua. The station is managed by Malcolm Chalmers based at Marqua Station.

## 3. TENURE

Exploration License (EL) 24693 was granted on 13 December 2005 with the expiry date currently set at 12 December 2011, and originally comprising 488 blocks.

The previous reduction reduced the EL to 244 blocks. Uramet currently retains 40 blocks. A tenement plan showing the original and current tenement boundaries is shown in Figure 2.



Figure 2. Tenement plan showing original (pre 2009 surrender) area, and area surrendered.

#### 4. GEOLOGY

#### 4.1. Regional Geology

The project area is part of the southern Georgina Basin, comprising Neoproterozoic to Cambro-Ordovician platform cover of sedimentary rocks (dominantly sandstone, shale, limestone, dolostone) overlying the Precambrian basement of the Northern Australian Craton. This Precambrian basement is exposed along major fault systems on the southern margin of the basin.

The Northern Territory Geological Survey (NTGS) has recognised the mineral potential of the southern Georgina Basin and recently prepared a comprehensive review of both government and private exploration undertaken, and has now developed from various authoritative sources applicable ore genesis models (Dunster et al., 2007).

Since the 1960's, the basin has been considered prospective mainly for Mississippi Valley Type (MVT) lead-zinc mineralisation. More recently, however, the potential for other commodities in a variety of geological settings has been investigated, and the basin is now regarded as having potential for several styles of mineralisation. For example:

Mississippi Valley Type Pb-Zn (MVT),

Carbonate-Hosted Pb-Zn (Irish Type),

Stratiform Shale-Hosted Base Metals,

The area is considered to have potential for Cambrian limestone hosted phosphate. Prospective units within the Georgina Basin include the Middle Cambrian Beetle Creek Formation of the eastern basin, its stratigraphic equivalent in the south, the Arthur Creek Formation, and the underlying Thorntonia Limestone which is recognised basin-wide. Prospective ground for phosphate rock within these Middle Cambrian units occurs along the basin margins and adjacent to basement highs within the basin interior.

#### 4.2. Geomorphology

The Marqua area can be distinguished between the Simpson Desert linear, spinifex covered dunes covering the south, a mesa mulga and gidgee tree covered landscape in the centre, the Toko Ranges with barren nodule-paved plains to the east and a gently carbonate platform to the north (Figure 3). Locally basement rocks may form ridges or be deeply incised by rivers – the Marqua River and Hay River – both difficult to cross.

The vegetation ranges from savannah woodland near the creeks, to gidgee and acacia scrub to annual grasslands to rock and sand desert. The vegetation is consistent with a semi-arid to arid regime.



Figure 3. Landsat Image of the Project Area showing different landforms

## 4.3. Local Geology

The Marqua project area is located in the structurally complex south-eastern portion of the Georgina Basin, which is comprised of basement granitoids, Neoproterozoic tillites and arkosic sedimentary rocks, overlain by Cambrian and Cambro-Ordovician limestone, dolostone, shale and clastic sedimentary rocks of the Toko Syncline. These units have been disrupted by multiple folding and faulting events. Faulting in the project area generally trends northwest and individual faults have been locally offset by later northeast trending faults.

Part of the regionally significant Toomba Fault Zone lies in the eastern tenement (Toko) and segregates a structurally complex zone dominated by arkosic sediments to the southwest from limestone, dolostone and sandstone of the Toko Syncline to the north. The Toomba Fault Zone is a reverse fault which dips ~45° towards the southwest and lies in close proximity to a number of parallel folds and faults including the Field River Anticline (Figure 4.). A northwest trending fault zone in the Christmas Dam area represents a structural divide between gently north dipping sedimentary rocks to the west and vertical dipping sediments to the east (Figure 4.).



Figure 4. Simplified geology of the project area.

The Neoproterozoic Yardida Tillite, which comprises diamictite, siltstone, sandstone, and arkose, is exposed within the Field River Anticline core and the younger Black Stump arkose crops out further to the east.

Desert Syncline (Figure 4.)towards the south of the Field River Anticline comprises of a repetition of rock units found in the anticline. Sandstones of the latest Neoproterozoic Grant Bluff Formation and the early Cambrian Red Heart Dolostone are present within the core of the Desert Syncline. Desert Syncline is bound to the north and south by two significant curvilinear fault zones: the Adam Fault Zone in the north and the Gnallan-A-Gea Fault Zone in the south. Basement granitoids of the Mt Dobbie complex are exposed in the southwest part of the tenement.

Younger rock units that typically form hill capping plateaus and mesas include the Tertiary Austral Downs limestone, a partly silicified lacustrine limestone underlain by a lateritic palaeosol, and Cretaceous clastic sedimentary rocks. The Cretaceous beds are commonly associated with zones of silicification both within beds and penetrating the underlying Cambro-Ordovician strata. The prospective Cambrian Thorntonia Limestone is sparsely outcropping along an E-W trend and terminates against the Toomba Fault.

#### 5. PREVIOUS WORK

The Marqua project area has been subject to lead-zinc exploration for over 30 years. Mapping of the Marqua area (Tobermorey map sheet) was carried out by BMR 1959-1960 and subsequent re-mapping was done throughout the 1970's and 1980's. Exploration for base metals during that time was mainly focusing on rock chip and stream sampling. During 1977-1978 and 1983 BMR drilled four cored stratigraphic holes in the area. Anomalous zinc levels were found in these holes (BMR1979/36).

Subsequently Agip showed interest in base metal exploration in 1981 covering the tenement area (CR19830328). Reconnaissance mapping and rock chip sampling demonstrated that base metals are anomalous within the Late Proterozoic Wonnadinna Dolostone and Thorntonia Limestone. Sixteen holes were drilled during 1982 to test the zinc anomalies over a strike length of 8km.

Saracen Minerals drilled nineteen percussion holes in 1988 (CR19880057) with the aim of detecting possible platinum-group element mineralisation. No platinum group elements were detected.

MIM explored the area in the early 1990's to test for Pb, Zn and Carlin-style Au and Pt (CR19920506). Re-assays of Saracen Minerals percussion drill holes and ten additional drill holes within the prospective units concluded that mineralisation is structurally controlled.

In conjunction with regional re-mapping of the Tobermorey map sheet, NTGS drilled cored stratigraphic hole NTGS99/1 within the current tenement area.

The NTGS re-evaluated the area as part of the southern Georgina Basin Geology and Resource Potential Report in 2007 and concluded that the Marqua area remains prospective for base metals since the lithostratigraphy of the area was not fully understood until recently (Dunster et al., 2007).

#### 6. URAMET AND ELKEDRA ACTIVITIES

Exploration work conducted by Uramet and Elkedra since 2005 includes:

- Interpretation of regional NT government aeromagnetic, radiometric, and gravity data
- Infill ground gravity survey
- Reconnaissance mapping and surface sampling
- Review of historical data including re-sampling of holes
- VTEM survey and interpretation

#### 6.1. Magnetics Interpretation

During the reporting period NTGS magnetic survey data was stitched and reprocessed by Dr D.R. Cowan (geophysics consultant). The separation filter product was found to be the most useful for highlighting structural elements and an interpretation of magnetic linears is shown below in Figure. 5. A previously identified dipolar magnetic anomaly, CWN-169, is located within the Adam Fault Zone and has a modelled depth to source of 120m. The anomaly was considered to be of interest and was followed up with a ground gravity survey (see section 6.4).



Figure 5. Separation filtered magnetics for EL24693 (stitched from several NTGS surveys) showing interpreted magnetic linears (yellow) and Toomba Fault Zone (red).

#### 6.2. Radiometric Interpretation

During the reporting period NTGS radiometric survey data was stitched and reprocessed by Dr D.R. Cowan (geophysics consultant) to give the imagery presented below (Figure. 6). The Yardida Tillite has a high total count radiometric response. U anomalies of interest were identified at the Yardida North and Desert Syncline sites.



Figure 6. RGB (red = K, green = Th, blue = U) radiometrics draped over total count radiometrics. Zones high in Th and K are outlined and uranium anomalies of different intensity are identified.

#### 6.3. Regional Gravity Interpretation

During the reporting period the NTGS East Arunta Gravity Survey data was reprocessed by Dr D.R. Cowan (geophysics consultant) to give the residual gravity image presented below (Figure 7). Of interest the linear gravity high associated with the NW-trending Adam Fault Zone.



Figure 7. Residual gravity image processed by Dr D.R. Cowan from the 2006 East Arunta Gravity Survey data.

## 6.4. Gravity Infill Survey

A helicopter-supported in-fill gravity survey at 500m spacing over magnetic anomaly CWN-169 was undertaken in conjunction with the 2006 NTGS East Arunta Gravity Survey. The gravity data was processed by Dr D.R. Cowan giving the imagery presented below (Figure. 8).



Figure 8. Residual gravity image draped over separation filter magnetic image. Centroid of magnetic anomaly CWN-169 is identified (777513E, 7439706N, MGA94, zone53).

The area around magnetic anomaly CWN-169 consists of a gravity high with a steep gradient and a local elliptical gravity low. The gravity anomaly trend is parallel to the NW-trending Adam Fault Zone as seen in the magnetic imagery (Figure 5). The interesting elliptical gravity low is located approx. 200m south of the anomaly CWN-169 centroid.

#### 6.5. Field Reconnaissance and Mapping

Reconnaissance work and field mapping was undertaken during several field campaigns, with the following rock types and stratigraphic units (largely described by Kruse et al., 2002) occurring in the area:

#### **Intrusive Rocks**

*Mount Tietkens Granite Complex and Mt Dobbie Granite Complex (Pg)* – grey to pink coarse grained muscovite-biotite leucocratic granite and porphyritic leucocratic granite, with associated pegmatites.

#### **Proterozoic Rocks**

**Black Stump Arkose (Pus)** – is a red-brown to purple brown micaceous, fine to very coarse arkose, sandstone and laminated micaceous mudstone. It rests disconformably on the uppermost dolomitic shale of the Yardida Tillite. The upper boundary of the formation is gradational into the Wonnadinna Dolostone.

*Wonnadinna Dolostone (Puw)* – is a purple-red to yellow-brown and green-grey, locally quartzitic dolostone, interbedded with more or less dolomitic arkose, siltstone and shale. The dolostone marks deeper water as well as intertidal to shallow subtidal deposition.

*Gnallan-a-Gea Arkose (Pun)* – is a brown to grey, fine to very coarse arkose, sandstone, siltstone and shale. Cross-stratification is common in the arkose and sandstone. The lowest pebbly arkose or sandstones denotes the lower boundary with the underlying Wonnadinna Dolostone, which is disconformable (Figure 7).

#### Cambrian

*Adam Shale (Cal)* – maroon and olive green to dark grey mudstone, fine grained and underlying the Red Heart Dolostone.

**Red Heart Dolostone (Cld)** – is a grey and tan styolitic, mottled, brecciated and vuggy dolostone above basal dolomitic, coarse quartzofeldspathic sandstone with thin interbeds of green mudstone. The lower contact of the formation is disconformable on the Adam Shale or older units; the upper contact is an irregular microkarst surface beneath Thorntonia Limestone.

#### 6.6. Rock chip sampling

A total of 16 samples from eight locations were analysed using a Niton portable XRF analyser, with 6 of these samples being submitted to a commercial laboratory. No significantly anomalous base metal or phosphorous assays were returned.

One moderately anomalous 68 ppm uranium assay (Niton) was encountered in sample QMRS630c

All sample locations and assays are attached in digital form in Appendix 1.

## 6.7. Examination of historical drill holes Examination and XRF analysis of archived core

Archived drill core for BMR holes Hay River 10 and Hay River 11, 11A, and 11B (housed at Geoscience Australia, Canberra) were analysed using a Niton XRF spectrometer. The measurements can be considered as spot assays taken from selected areas of core about 1 cm<sup>3</sup> in volume. A total of 94 measurements were completed on the four drill cores in July and August of 2007. The holes are all located within the Hay River-Mt Whelan 1:250,000 special sheet.

All recorded measurements are supplied as digital data accompanying this report. The Limits of Detection (LOD) have been obtained from literature supplied with the XRF Spectrometer by Niton Mining Technologies and are based on a 60 second test time. Not all elements have had the LOD documented. The Niton XRF LOD's are dependent on the following factors: testing time, rock matrix composition, chosen level of statistical confidence and excitation source. To obtain a measure of the statistical accuracy of the XRF spectrometer, an error measurement is calculated for each element for each analysis and this information is included in the digital data. Drill hole locations are shown in Figure 3.

The composite stratigraphic column for hole 11 from Dunster et al. (2007) is shown in Figure 4, along with the geochemical results from the XRF analyses for U, Pb, Zn, Cu, and S. The composite section was prepared on the assumption that the Hay River 11A section directly underlies the lowest stratigraphic unit observed in Hay River 11 which is 73 m deep (Shergold and Walter, 1979; page 16). Note that there is an assumed fault offset between holes Hay River 11 and 11A. The analyses allow geochemical anomalies to be correlated with specific stratigraphic elements, as is shown in Figure 5. Anomalous values of particular interest are given in Table 2.

Hole	Depth	Lithology	Unit	Anomaly		U ppm	Zn ppm	Cu ppm	Mo ppm
10	76.3	Black Shale	Yackah Beds	Zn	0.52%	BLD	5,260	BLD	BLD

11A	30.6	Black Shale	Arthur Creek	Cu	234 ppm	42	BLD	234	38
11A	45.0	Black Shale	Thorntonia Lst	Zn	0.63 %	BLD	6,262	BLD	59
11A	45.4	Black Shale	Thorntonia Lst	Zn	0.58 %	BLD	5,823	BLD	64
11A	45.4	Phosphorite	Thorntonia Lst	U	313 ppm	313	1,650	BLD	BLD
11A	51.3	Phosphorite	Red Heart	Zn	0.52%;	115	5,184	BLD	BLD
			Dolostone	U	115 ppm				
11	65.3	Black Shale	Thorntonia Lst	Мо	149 ppm	BLD	1,472	114	149
11	66.6	Black Shale	Thorntonia Lst	Мо	108 ppm	BLD	95	120	108

Notes (1) the Zn value for Hole 10 is the average of 2 samples

(2) BLD = below the limit of detection

(3) the accuracy of the anomalous results is within the following ranges (relative percent).

- U 15 to 30%, Zn 4 to 8% Cu 33 to 35%
- Mo 9 to 12 %

# 6.8. Helicopter EM (VTEM) Survey

A helicopter-borne EM (VTEM = versatile time domain electromagnetic) survey amounting to 1650 line-kilometres over the tenement was flown by Geotech Airborne Ltd (www.geotechairborne.com.au) in October 2007 (Figure . Airborne EM data was collected using the VTEM electromagnetic and magnetic system, with a base operating frequency of 25 Hz. Real times differential GPS was used for navigation and the data was collected at nominal 150 - 200 meter line spacing.



Figure 9. VTEM Image of the Syncline Prospect.

Interpretation the VTEM data indicates relatively resistive basement, with a thin conductive cover contributing to most of the conductivity within the survey area. Anomalous conductivity features are usually associated with different stratigraphic units and major structural lineaments. Black shales of the Thorntonia Limestone and some Cretaceous rock units give rise to most of the conductivity highs (indicated by the "hot colours" in Figure 9).

The detailed study on each individual flight line indicates characteristic high electromagnetic responses being associated with 1) the Thorntonia black carbonaceous shale and 2) the purple shale beds of the Wonnadinna Dolostone.

Data for the VTEM survey over EL24693 has previously been submitted to the NTGS.

#### 7. CONCLUSION

Other than magnetic anomaly CWN-169, no significant anomalies were generated within the surrendered portion of the EL by the geophysical method described above. CWN-169 was downgraded somewhat following a follow-up ground gravity survey, resulting in a gravity low corresponding to the gravity high. Reconnaissance mapping and surface sampling did not return any significant base metal or phosphate results within the surrendered portion of the EL, with only one moderately anomalous 68 ppm (Niton) uranium assay being returned. Uramet therefore does not consider the surrendered area to be highly prospective for base metals, phosphates.

#### 8. REFERENCES

- *Dunster JN, Kruse PD, Duffett ML and Ambrose GJ. 2007*. Geology and resource potential of the southern Georgina Basin, Northern Territory, NTGS
- *Kruse PD, Brakel AT, Dunster JN and Duffett ML. 2002.* Tobermory, Northern Territory (Second Edition), Sheet SF53-12, 1:250 000 Geological Map Series Explanatory Notes, NTGS

#### APPENDICES

Appendix 1 – Digital data of surface sampling