Victoria Highway

EL 28026

Partial Relinquishment Report

(Sixth Year of Tenure)

Tenement Holder: Australian Minera Resources Pty Ltd

January 31, 2017
Summary

EL 28026 “Victoria Highway” is located approximately 100 km southwest of Katherine and approximately 320 km south southeast of Darwin. It covers the nexus of the Daly and Dunmarra Basins and the Kalkarinji Province, all of these being important geological provinces. Modern mineral exploration in the region commenced in the late 1960s and has continued to the present day. Commodities sought have included base metals (copper and lead-zinc-silver), diamonds, phosphate and uranium.

AMR completed a detailed airborne magnetic and radiometric survey in late 2013. The data has been interpreted to place a new slant on the mineral potential of the title. Follow up detailed regional stream sediment geochemistry and prospecting of geophysical anomalies has been undertaken over the majority of the area with encouraging initial results that help to corroborate the geophysical interpretations. This suggests that modification of the original models may be warranted, with alternative interpretations of the setting as well as new target concepts that seem to warrant testing. While there is potential for sediment-hosted base metal mineralisation, there are uranium and separate thorium anomalies, the latter apparently in association with discrete magnetic dipoles generated by steeply dipping bodies that are unexpected on current interpretations of the geological setting. There are three target types that are identified from the programme:

1. Steeply dipping magnetic bodies that do not outcrop, but lie beneath topographic highs capped in Cretaceous? sediments that are heavily lateritised and have characteristic Th anomalies. It is speculated that these may be due to carbonatite dykes

2. Possibly structurally controlled uranium/ base metal/?REE mineralisation in sediment breccias near the western margin of the Daly Basin, similar to other anomalies recorded further to the north.

3. Possible base metal deposits in ?interbedded sediment units in the Antrim Plateau Volcanics on the plains surrounding and to the east of the mesas mentioned in 1. Immediately above.

When this report is prepared, some annual reports and appendices were taken for reference, AMR hereby also confirm that we consent to all annual reports containing relevant information on the relinquished area to be released by the government.

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<td><strong>1:250 000 Map Sheet</strong></td>
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<tr>
<td><strong>1:100 000 Map Sheet</strong></td>
</tr>
</tbody>
</table>
# Table of Contents

Summary .................................................................................................................................................. 1

Bibliographic Data .................................................................................................................................. 2

Figures in Text ......................................................................................................................................... 4

1.0 Introduction ........................................................................................................................................ 5

2.0 Tenure ............................................................................................................................................... 5

3.0 Geology and Prospectivity .................................................................................................................. 8

4.0 Historical Exploration .......................................................................................................................... 13

   4.1 Geological Survey Mapping ............................................................................................................. 13

   4.2 AP 1693 Continental Oil Company of Australia Ltd ................................................................. 13

   4.3 AP 2068, 2328 Metals Exploration NL / Freeport of Australia Inc ........................................... 13

   4.4 EL 1904 AO Australia Pty Ltd ........................................................................................................ 13

   4.5 EL 1847 & 3091 Mineral Deposits Ltd ......................................................................................... 13

   4.6 EL 3576 Freeport of Australia Inc .................................................................................................. 13

   4.7 EL 4766 Northern Cement Pty Ltd .............................................................................................. 14

   4.8 EL 6633 & 6881 Stockdale Prospecting Limited ........................................................................... 14

   4.9 EL 8868 NT Gold Ltd ....................................................................................................................... 14

   4.10 EL 25807 Imperial Granite & Minerals Pty Ltd ............................................................................. 14

5.0 EXPLORATION COMPLETED WITHIN THE RELINQUISHED BLOCKS ........................................ 14

   5.1 Imperial Granite & Minerals Pty Ltd (Year1:2010-2012) ............................................................ 14

   5.2 Work in the 3rd Year (23/11/2012-22/11/2013) ............................................................................. 15

   5.3 Work in the 4th Year (23/11/2013-22/11/2014) ............................................................................. 16

   5.3.1 Geophysical Interpretation ......................................................................................................... 16

   5.3.2 2014 Stream Sediment Survey ................................................................................................. 18

   5.3.3 Geological Mapping and Rock Sampling ................................................................................. 18

   5.3.4 Geochemical Survey Interpretation .......................................................................................... 18

   5.4 Work in the 5th and 6th Year (23/11/2014-22/11/2016) ................................................................. 19

6.0 Conclusions ......................................................................................................................................... 19

7.0 Bibliography ........................................................................................................................................ 20
Figures in Text

Figure 1. Location map of EL 28026................................................................................................ 6

Figure 2: Relinquished and retained blocks of Victoria Highway EL 28026.................................7

Figure 3: Location map of EL 28026 with background 250k geology........................................... 9

Figure 4: Stratigraphic relationship of geology on the Delamere 250k geology mapsheet ...........10

Figure 5: EL 28026 TMI with Outlined Geological Regions..........................................................11

Figure 6: EL 28026 Bouguer Gravity Anomaly with Outlined Geological Regions.......................12

Figure 7: EL Outline and Sample Locations on 250 K Geology....................................................15

Figure 8: Area flown by UTS on EL28026.....................................................................................16

Figure 9: TMI image showing anomalies on retained and relinquished areas on EL28026...........17

Figure 10: 2014 RC and SSED Sample Locations within the retained and relinquished area.......18
1.0 Introduction

EL 28026 was initially granted to Imperial Granite and Minerals Pty Ltd in 2010 and transferred to Australian Minera Resources Pty Ltd in 2012. It falls upon the Delamere 1:250 000 scale map sheet area and is located on the western margin of the Palaeozoic Daly Basin.

EL 28026 Willeroo project is centred about 100 km southwest of Katherine and is cut by its namesake, the Victoria Highway (Figure 1). Access is excellent with station tracks and fence lines cutting the tenement. The tenement is within the wet-dry climatic region of the ‘Top End’ and so field work is difficult to impossible between November and April.

Two major physiographic regions are present within the licence, the ‘Delamere Plains and Benches’ and the Sturt Plateau. The former covers the western part of the licence and is underlain mainly by Antrim Plateau Basalts. The Aroona drainage complex is within this region. The latter covers the eastern half; it represents the remnants of an extensive peneplain underlain by Cretaceous sediments and now with extensive ferricrete cover.

Mineralisation documented from the Delamere map sheet include large native Cu nuggets up to 4kg occurring as surface float within soil overlying the Antrim Plateau Volcanics. Localised copper anomalies in Cambrian units have been traced to malachite coated geodes weathering from Antrim Plateau Volcanic flow tops. Other base metal mineralisation from Cambrian formations in the Delamere map sheet are suggested by anomalous Pb, As, Ba, Co and Zn that have been reported from stream sediments samples and areas of outcropping sediments along the interpreted margin of the Daly Basin. Although semi-detailed stream sediment sampling programs have been conducted no significant diamond or kimberlite indicator minerals have been recovered to date (Beier et al, 2002). AMR’s exploration program represents the most detailed exploration in the district in around 20 years, and has focused on a broader range of target commodities than past exploration, which was directed at diamonds and base metals, the latter in restricted target areas.

2.0 Tenure

EL 28026 was granted to Imperial Granite and Minerals Pty Ltd (100 %) on 23 November 2010. The tenement comprises 150 sub-blocks for approximately 497 km² when was granted, and half area was retained in 2014 under the Act, by end of 6th year of tenure, a further half (38 blocks) was relinquished and 37 blocks (122.65KM2) was retained and renewed. The tenement is within the Willeroo (PPL 1040; NT Portion 3983), Aroona (PPL 1038; NT Portion 3982) and East Mathison (PPL 1039; NT Portion 7061) pastoral properties. The area is subject to Native Title Claim NTD6011/02 (Willeroo / Delamere; 20/06/2002). See figure 2

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Table 1: Tenement details
Figure 1. Regional Location of Victoria Highway EL 28026
Figure 2. Relinquished and retained blocks of Victoria Highway EL 28026
3.0 Geology and Prospectivity

The tenement lies wholly within the 1:250,000 Delamere sheet, which was re-mapped by the Northern Territory Geological Survey (NTGS) and published in 2002 (Beier PR et al).

EL 28026 covers the junction between the Daly and Dunmarra Basins and the Kalkarinji Province (Figure 3 & 4); the latter underlies both the Daly and Dunmarra Basins. Much of the tenement consists of early Cambrian Antrim Plateau Volcanics, which belong to the extensive flood basalt event of the Kalkarinji Province. Sedimentary intercalations are known to occur within the basaltic rocks, having been identified by government (NTGS) mapping as sandstone and limestone. Field investigations during the IGM tenure (Green M, 2010) noted that these rocks were strongly ferruginous. There is little outcrop of the basaltic rocks with much of the area being soil and alluvium covered. The sedimentary component has been mapped in outcrop in the southwest and in the central northern portion of the licence.

Outcrops of Cambrian Daly Basin Tindall limestone have been mapped immediately to the north and east of the licence. It is likely that the limestone extends into the licence beneath cover rocks. Cretaceous sandstone, siltstone and minor conglomerate overlie the older rocks in the eastern third of the licence; the lateritised Cretaceous capping represent remnants of the peneplaned Sturt Plateau.

Existing regional, wide-spaced geophysical surveys (Figures 5 & 6) do not highlight anything unusual about the tenement area, probably because the adjacent basin margins are shallowly dipping and relatively transparent to the geophysics. A much more detailed survey conducted by AMR was completed and will be described in details in section 5 in this report.

The main regional structure is the extensive Dorisvale Fault, which in the licence area forms the boundary between the Antrim Plateau Volcanics and the Tindall Limestone i.e. the western edge of the Daly Basin. The trace of this structure is far more pronounced north of the licence, heading towards the Daly River region where older mid-Proterozoic rocks crop out along its western side.

Historically the region has been explored for a variety of commodities including bauxite, barite, copper, lead-zinc, diamonds, limestone and phosphate. Base metal exploration has been the regional focus since the mid-1960s whereas widespread exploration for diamonds gained impetus from the late 1980s onwards.

The licence was acquired to explore the Kalkarinji Province rocks as the principal target. The exploration model is based on the sedimentary units in the flood basalt package being mineralised with Cu-Pb-Zn-Ag during subsequent magmatism. The model is similar to known base metal deposits in North America, Russia and Greenland. Syn-sedimentary faults are also considered prospective.

Another potential target is for carbonate-hosted base metals in the Tindall limestone. The Mathison Creek prospect lies just outside the northeast corner of the licence, adjacent to Camp Oven Bore (mentioned by Green, 2011). The prospect, which lies on the Dorisvale fault, was investigated for Pb-Zn-Barytes by Normandy Poseidon in the 1990s. Mineralisation was described here as ‘being contained within zones of epithermal silica replacement of limestone’. Assays returned up to 1% Pb and 5500 ppm Zn associated with anomalous Ag-As-Sb-U.

Regionally, additional occurrences of Pb-Zn mineralisation and Barytes have been recorded from the older rocks units belonging to the Victoria Basin succession, which underlie the Antrim Plateau Volcanics. Some of these units outcrop to the north of the licence, along the western side of the Dorisvale Fault. Galena (lead sulphide) has been found disseminated in altered and brecciated barite-
rich veins within carbonate units. Sulphide-rich (pyritic) shale units have also been identified as carrying anomalous base metals. These rocks may exist beneath the volcanics within EL 28026.

Figure 3: Location map of EL 28026 with background 250k geology
Figure 4: Stratigraphic relationship of geology on the Delamere 250k geology mapsheet (Fig. 3).
Figure 5: EL 28026 TMI with Outlined Geological Regions
Figure 6: EL 28026 Bouguer Gravity Anomaly with Outlined Geological Regions
4.0 Historical Exploration

A study of the NTGS Strike database plus previous Imperial Granite & Minerals Pty Ltd work has shown that significant exploration has been completed historically in and around EL 28026.

4.1 Geological Survey Mapping

EL 28026 lies within the Delamere 1:250,000 mapsheet, for which the geological map was produced by the Northern Territory Geological Survey in 2002 (Beier et al., 2002; Cutovinos et al., 2002). The tenement lies at the outcropping contact between the Daly Basin and the Antrim Plateau Basalt (Figures 3 and 4). Mafic volcanic units and interbedded sediments of the Antrim Plateau Basalt from the Kalkarinji Province that underlies the Daly Basin. These are overlain by thin Cretaceous sediments (“Dunmarra Basin”), and subsequently lateritised in the Tertiary.

4.2 AP 1693 Continental Oil Company of Australia Ltd

(CR1967-0011,-0012,1968-0017)

Exploration in the Daly Basin looking for phosphate. Unit with most promise was the Cambrian Tindall Limestone with P₂O₅ consistently >0.5 %. None of their work extended on to EL 28026, though it may be present beneath cover.

4.3 AP 2068, 2328 Metals Exploration NL / Freeport of Australia Inc.

(CR1968-0035, 1979-0047)

The Antrim Copper Project covered 20,000 km², mostly in the NT but also extending into Western Australia. The project was focussed on finding copper mineralisation within the flood basalt package, similar to the Keweenaw Peninsula deposits in Michigan, USA. About 10,000 stream sediment samples were collected and tested for copper only. Numerous mineralised occurrences were discovered or re-located, and these were tested with geophysics and many were ‘prospect-scale’ drilled. Although some of this work covered EL 28026, no anomalies were identified within. Some of these samples are recorded in the NTGS STRIKE database, but none from within EL 28026 appear to have survived.

4.4 EL 1904 AO Australia Pty Ltd

(CR1980-0103, 1981-0069)

Diamond exploration covered part of EL 28026. Twenty-one from 58 alluvial gravel samples contained chromite, but all were negative for kimberlite. The source of the chromite the Kalkarinji Basalts.

4.5 EL 1847 & 3091 Mineral Deposits Ltd

(CR1981-0050, 1982-0040, 1983-0026)

Soil sampling for base metals and gravel sampling for diamonds was carried out. The sampling did not extend in to EL 28026.

4.6 EL 3576 Freeport of Australia Inc.

(CR1983-0272, 1984-0126)
This licence covered the northwest corner of EL 28026. An airborne geophysical survey identified nine anomalies. None were within EL 28026. No diamonds or other minerals of economic interest were found.

4.7 EL 4766 Northern Cement Pty Ltd (CR20080780)
Exploration focused on the Tindall Limestone in the Daly Basin. There are no outcrops of this on EL 28026. The magnesia content was too high for cement production.

These licences involved a Joint Venture with Poseidon Exploration Limited, where Stockdale explored for diamonds and Poseidon for base metals. Initial sampling showed great potential for both commodities. An area of great interest to Poseidon was near West Camp Oven Bore (Mathison Creek Prospect), where baryte veins associated with Pb-Zn-Ag anomalies were investigated. West Camp Oven Bore is within EL 28026, adjacent to the rocks of greatest interest here. The results of the work here are not in the NTGS STRIKE database, but are recorded in Poseidon’s various reports to NTDME.

4.9 EL 8868 NT Gold Ltd (CR19976-0053)
No work completed, but mentions clean, high-grade baryte (1 to 6 m wide and 800 m long) in the Willeroo Fault. There is no map in the report to show this site, but there is a MODAT baryte occurrence ~13 km north of EL 28026.

4.10 EL 25807 Imperial Granite & Minerals Pty Ltd (CR2008-0806)
The focus was on base metal exploration within the Antrim Plateau Volcanics. Zones of greatest interest were intercalated sediments and faults. Ten rock chip samples were collected on EL 28026, including some iron-rich samples with weakly anomalous Au, Pb and Zn near West Camp Oven Bore. See Figure 7 for rock sample locations. The project was terminated due to the 2008 Global Financial Crisis.

5.0 EXPLORATION COMPLETED WITHIN THE RELINQUISHED BLOCKS

5.1 Imperial Granite & Minerals Pty Ltd (Year1:2010-2012)
In the first year of tenure, a brief field visit was made to EL 28026 to confirm whether previous reports of copper mineralisation in the area were correct. A sedimentary unit within the Kalkarinji Suite was identified. Much of this sedimentary unit, especially where it was originally laminated carbonate, has been replaced with iron and silica to form a mineralised unit. The iron-silica replacement is quite variable; this alteration is also found within cross-cutting faults. Although only a small portion of the tenement was visited, remote data suggest that this unit may be quite extensive. Therefore, there was a significant fluid event in the area and future work needs to constrain whether these fluids carried and deposited base metals.
Three rock chip samples were collected but none of them located in the relinquished area. Sample locations are recorded in Figure 7.

Further activities were planned by the tenement holder Imperial Granite and Minerals in the second year of tenure, but the work failed to go ahead due to lack of available funds as a result of the prevailing economic conditions. The licence was subsequently purchased by AMR.

![Figure 7: EL Outline and Sample Locations on 250 K Geology](image)

5.2 Work in the 3rd Year (23/11/2012-22/11/2013)

In the third year of tenure, the EL holder Australian Minera Resources Pty Ltd’s consulting geologists Eupene Exploration Enterprises P/L recommended a low altitude, close spaced magnetic-radiometric survey by UTS Geophysics of Perth be carried out. The survey was planned to take place during the 2013 dry season so that on completion there would be sufficient time to analyse the data and instigate ground follow up. Finally, UTS Geophysics completed a low level airborne geophysical survey between November 21 and December 5 2013 over EL 28026 with a total line length of 2,928km.

Flied lines on the relinquished blocks is showed in figure 8 below (boundary in green is retained area), and for full details of the airborne geophysics survey, see Appendix 1 of EL28026_2014_A
Figure 8: Area flown by UTS on EL28026

5.3 Work in the 4th Year (23/11/2013-22/11/2014)

5.3.1 Geophysical Interpretation

Alterrex Pty Ltd were commissioned to review the airborne geophysical data in the light of some features of interest in the data and the complexity introduced by the widespread presence of flood basalt at or near surface. Their report is present in Appendix 3 to EL28026_2014_A.

For the magnetic anomalies and uranium anomalies as interpreted from the airborne geophysical data, pls see Figure 9 for reference, there’re some small uranium anomalies on the relinquished blocks, and the anomalies seems not due to radon leakage from springs as is often the case, and seems to be associated with a geological structure and needs to be explained.
Figure 9: Interpretation Image of Airborne Survey showing anomalies on retained and relinquished areas
5.3.2 2014 Stream Sediment Survey

In July 2014 EEE implemented a stream sediment survey of EL28026. The intention was to collect samples over the entire EL on a sampling density of one sample per 1-2km². Some 143 samples were collected totally, some were located at the relinquished area, see Figure 10 for the location of these samples. Results are presented in Appendix 4 of EL28026_2014_A.

5.3.3 Geological Mapping and Rock Sampling

Prospecting of the geophysical anomalies and reconnaissance rock sampling thereof was conducted in conjunction with the stream sediment sampling programme. A total of 18 rock samples were collected of which 3 samples were on relinquished area, location of rock sampling as showed in Figure 10 and the results of this work are presented in Appendix 4 to EL28026_2014_A including the assay results.

Figure 10: 2014 RC and SSED Sample Locations within the retained and relinquished area

5.3.4 Geochemical Survey Interpretation

For a first pass consideration of the significance of the stream sediment results, values were divided by the abundance of the element in the continental crust, (Wedepohl, 1995), and then ranked
according to this index. This showed strong anomalies for lead, zinc, and vanadium, and elevated values for copper and cobalt. When the values are plotted, they are associated with a north- south belt that surrounds the belt of magnetic and thorium anomalies referred to earlier in this report. They are also associated with a zone of potassic radiometrics and geochemistry, which is not easily reconciled with the mapping of the bedrock units as basalt. However the only sample of basalt collected during field work (see below) contained elevated potassium, which may suggest hydrothermal alteration of the basalt.

The base metal anomalies generally do not appear to be shedding from the geophysically anomalous mesas, but from the surrounding plains dissected by the drainage. It is not clear that the stream sediment anomalies shed from the area of the uranium anomaly mentioned in Section 6.3 above either, though it may be that Pb and Cu are associated with this. The anomalies for zinc, vanadium and cobalt however extend throughout the north- south zone and are more elevated in the south of the area. The distribution of most elements in stream sediments and rock samples are illustrated in Appendix 5 of EL28026_2014_A. These are layered PDF files in which thematic layers have been prepared to illustrate the relative contents of each rock sample by size and colour intensity of location symbols, while the stream sediment values have been used to produce gridded data across the survey area based upon the elemental values of individual samples. The stream sediment sample locations are indicated on another layer. Any individual layer can be toggled on and off using the “layers” facility in Adobe Reader.

5.4 Work in the 5th and 6th Year (23/11/2014-22/11/2016)

Because of the access problem and financial pressure under the overall downturn of mining industry, no field work was undertaken on the tenement including relinquished area during this period.

6.0 Conclusions

Since the acquisition of the Exploration Licence from IGM, AMR has done the necessary preliminary exploration on the entire tenement, based on the work as completed by end of 6th year of tenure, AMR’s exploration consultant Mr. Geoff Eupene of Eupene Exploration Enterprises recommended the company to surrender some blocks which are not prospective as expected. As recommended, the area retained contains the edge of the Daly basin. To the immediate east of this is a quite strong uranium anomaly which is most likely associated with the basal sediments of the Daly basin as they are further north. There is also potential for base metals, mainly lead and zinc, and also rare earths in this anomaly. The M1 and M2 magnetic anomalies as interpreted from the airborne survey result are also important targets for further work, so these areas should be retained.

The tenement is covered by three stations including Willeroo, Aroona and Mathison, however, the latter two stations have some problems of access, but were concluded as not so prospective and not worth to make further efforts based on the available exploration data and information, in order to focus exploration on the most prospective area, and as required by Section 29 of the Act, AMR decided to relinquish half of the blocks again and submitted the application to the department on Nov., 2016, this application of title area reduction was approved by the department on Nov. 25, 2016.
7.0 Bibliography


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