

EL 29048

PARTIAL RELINQUISH REPORT

3 JULY 2012 to 2 JULY 2015

By

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Target Commodities: Cu

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MAP REFERENCE

NT 1:250 000 VICTORIA RIVER DOWNS, SE 5204
NT 1:100 000 KILLARNEY, 5265

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Abstract

Exploration Licence EL29048 was granted to GRIGM Resources Pty Ltd by NT Department of Mines and Energy on 3 July 2012 for a period of six years. The original entitlement was 84 blocks. 44 blocks were surrendered in 2014 after the first phase of exploration. In July 2015, a further 16 blocks have been surrendered and this report summarises work carried out within the relinquished blocks.

EL29048 license area locates in Kalkarindji Continental Flood Basalt Province, within the outcrop area of Kalkarindji Suite. Kalkarindji Continental Flood Basalt is characterised by very low concentration of Platinum Group Elements (PGE). This was considered (Glass et al) to be comparable with that of Siberian Traps Large Ingeous Province at Noril'sk in northern Siberian, which is host to World-class nickel mineralization.

Work completed in the relinquished area includes:

- 1 A detailed review of the previous exploration.
- 2 Analyse the existing aero-geophysical images of the area;
- 3 Field reconnaissance.
- 4 Ground check stream sediment geochemical anomalies.
- 5 Ground check the gravity anomalies.

A copper occurrence was reported near Shoeing Tool Bore in the relinquished area. However field inspection has failed to locate any primary native copper and/or copper sulfide in the nearby area.

Positive Cu stream sediments geochemistry anomaly locates near Shoeing Tool Bore. Distribution of weak positive Ni, Pb and Zn anomalies are roughly in line with that of Cu anomalies.

Following works have been recommended for the next stage exploration:

1. Small scale mapping in the areas near contact zone between basalt and chert/limestone;
2. Ground geophysical survey to clarify the gravity anomalies.

Introduction

Exploration Licence EL29048 was granted to GRIGM Resources Pty Ltd by NT Department of Mines and Energy on 3 July 2012 for a period of six years. The original entitlement was 84 blocks. 44 blocks were surrendered in 2014 after the first phase of exploration. In July 2015, a further 16 blocks have been surrendered. This report summarises work carried out within the relinquished blocks.

Tenure details

EL29048, total of 40 blocks after 2014 partial relinquishment (Table 1), is located about 275km southwest of township of Katherine, with access by the Buntine Highway, Buchanan Highway, and local 4WD tracks.

Table 1 EL29048 blocks

SE52 355	O, P, T, U, Y, Z
SE52 356	L, M, Q, R, V, W
SE52 427	D, E
SE52 428	A, B
SE52 572	N, O, P, S, T, U, X, Y, Z
SE52 573	L, Q, V
SE52 644	C, D, E, H, J, K, N, O, P
SE52 645	A, F, L

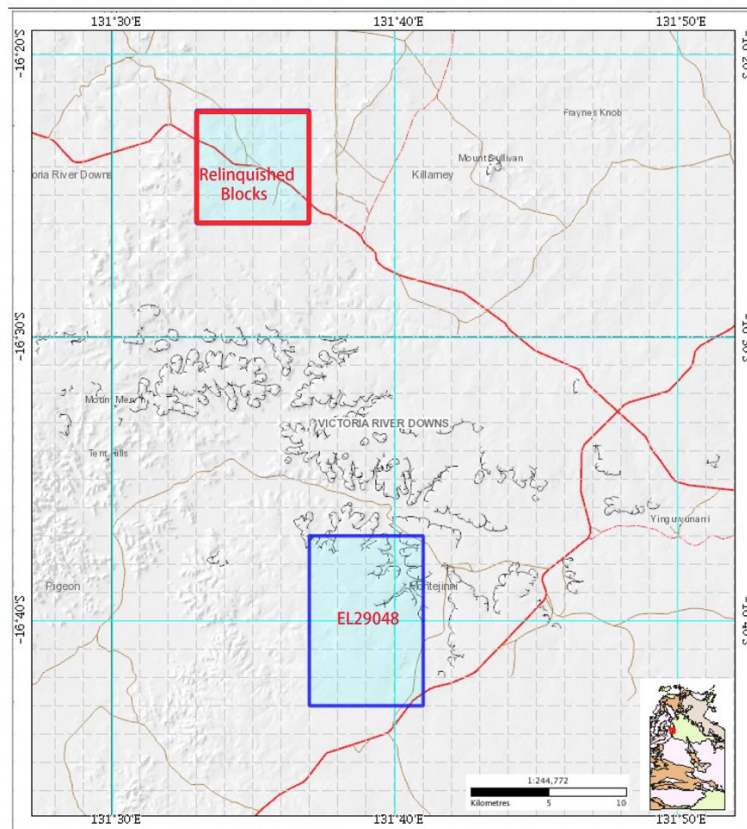


Figure 1 EL29048 location diagram

In July 2015, a further 16 blocks were surrendered. The surrendered blocks are listed in Table 2 and displayed in Figure 1.

Table 2 Relinquished Blocks

SE52 355	O, P, T, U, Y, Z
SE52 356	L, M, Q, R, V, W
SE52 427	D, E
SE52 428	A, B

Geological Setting

EL29048 license area locates in Kalkarindji Continental Flood Basalt Province, within the outcrop area of Kalkarindji Suite (Figure 2).

During the early Cambrian, a widespread outpouring of sub-aerial basaltic lava covered a large area of northern Australia, central Western Australia, northwestern South Australia and possibly South East Asia that have subsequently been rifted from Australia (Glass, et al, 2013). These include the Antrim Plateau Volcanics, Nutwood Downs Volcanics, Helen Springs Volcanics, et, al. in the Northern Territory and equivalent exposures in Western Australia. Based on geochemical and isotopic similarities, Glass (2002) included all of these coeval mafic igneous units within a new province and named it Kalkarindji Continental Flood Basalt Province.

Late early Cambrian volcanic units of the Kalkarindji flood basalt province in northern Australia were previously formalized as the Kalkarindji Volcanic Group (Kruse in Rawlings et al 2008), this definition also included various minor intercalated and immediately underlying sedimentary units. However, given the dominance of the igneous component, the formal stratigraphic definition for this province is now redefined as Kalkarindji Suite, so as to include volcanic and intrusive constituents. Minor intercalated sedimentary components of the formal Kalkarindji Volcanic Group are not included within the formal definition of the Kalkarindji Suite, but are included within the constituent formations (Glass et al 2013).

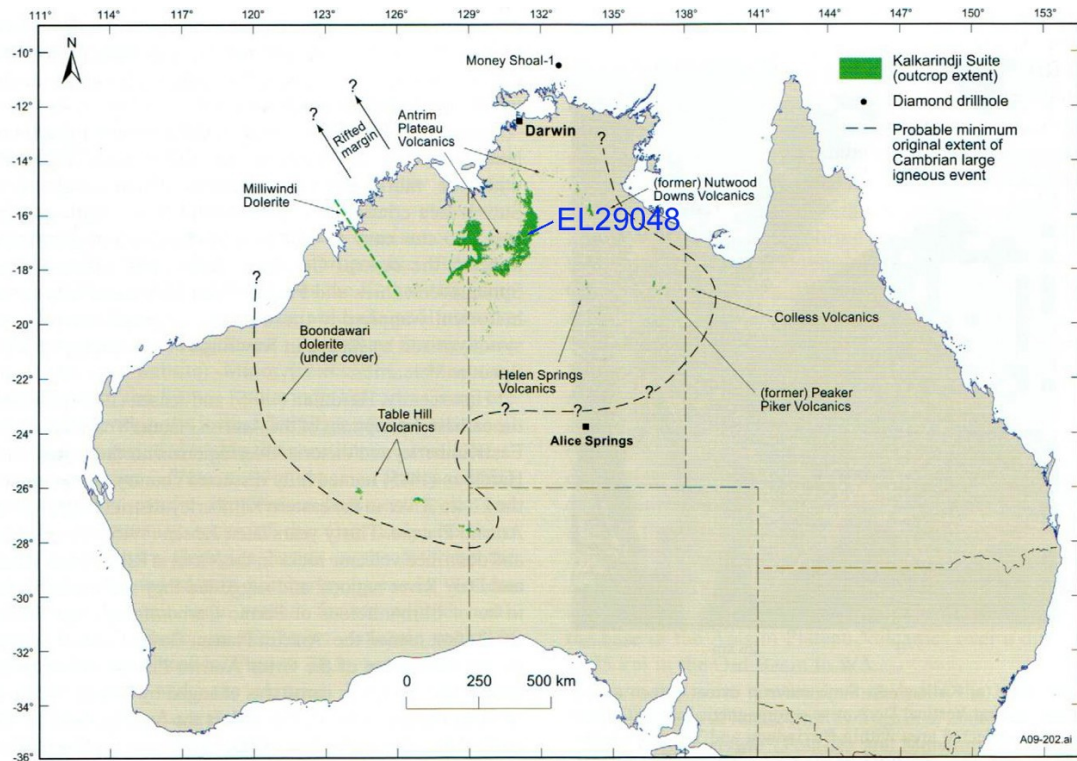


Figure 2 Map of Australia showing outcrop extent of Kalkarindji mafic rocks (green areas). Dashed line shows possible minimum original extent of Kalkarindji Large Igneous Province. (map taken from Glass L M, Ahamad M and Dunster L N, 2013)

The recorded K-Ar dating results for Kalkarindji basalts sit between 511 \pm 12 Ma and 500 \pm 12 Ma (Bultitude 1972). U-Pb SHRIM dating result at 513 \pm 12 Ma (Hanley and Wingate, 2000).

Glass et al (2013) state that the Kalkarindji basalts consist of a series of 20-250m thick lava flows of mostly fine-grained massive basalt with conspicuous vesicular flow tops and less common plagioclase-phyric basalt. The basalt mineral assemblage comprises plagioclase, clinopyroxene (augite or pigeonite), rare orthopyroxene with lesser ilmenite, titanomagnetite, primary and secondary quartz and K-feldspar. Olivine, mica and hornblende are accessory components. Glass (2002) described the petrology of the Kalkarindji basalts in detail and this is cited here. Texturally the basalts vary from extremely fine-grained aphanitic rocks to porphyritic and coarse-grained rocks approaching doleritic textures. The primary phenocryst and microphenocryst phases are subhedral clinopyroxene, near-euhedral plagioclase feldspar and, in the most evolved rocks, abundant quartz. Secondary phases include chlorite, albite, K-feldspar, quartz and titanite. Rocks that have undergone hydrothermal alteration are commonly chloritic and haematitic, and have amygdaloids filled with secondary prehnite, malachite, calcite and silica. Groundmass phases are mostly coarse to medium-grained, ophitic to granular and intergranular (euhedral plagioclase laths and subhedral pyroxene).

Geochemical features for the Kalkarindji Province basalts were described in detail by Glass (2002) and Glass and Phillips (2006). The Most distinctive feature for the Kalkarindji Province basalt is the overall geochemical homogeneity across the entire province. The basalts are low-Ti tholeiites, MgO wt% values are variable and range from ca 9 to 3 wt% with a mean of ca 6 wt%. Mg# (molar100*Mg/(Mg+Fe2+)) for Fe2O3/FeO=0.15) varies from 72 to 34; however, values for most basalts cluster

between 65 and 50. The Kalkarindji basalts are distinguished by low high-field-strength element (HFSE) abundances, eg low elemental abundances of Ta, P, Ti and Nb relative to the incompatible elements. The basalts and dolerites further show extreme enrichment in the most incompatible elements, such as Th, U and Light Rare Earth Elements (LREE), far removed from normal basaltic compositions and more similar to continental crustal compositions. These distinctive geochemical characteristics serve to distinguish the Kalkarindji basalts from all other large igneous provinces worldwide (Glass et al 2013).

Platinum Group Elements (PGE) abundances are extremely low, in most cases below the detection limit (Glass 2002) and may indicate sulphide saturation at some stage in the basalt petrogenesis. Depletion in the PGE may indicate sulphide segregation associated with crustal contamination, which would have resulted in the sequestering of chalcophile elements; this has implication for nickel prospectivity for the Kalkarindji Suite (Glass et al 2013). Similar depletions in PGE patterns to Kalkarindji volcanic rock occur in Siberian Traps Large Igneous Province at Noril'sk in northern Siberia (eg Brugmann et al 1993), which is host to World-class nickel mineralization.

In and around EL29048 area, thickness of the flood basalts is up to 243 meters. BMR drilling project in the Victoria River region resulted in nine stratigraphic drillholes (Bultitude 1971). Three drillholes locate in and in the immediate vicinity of EL29048 licensed area (Victoria River Downs 1, 2, and three in Figure 3, and VR1, 2 and 3 in Figure 4). Lithological drill logs are shown in Figure 4. Drillhole Victoria River Downs 2 encountered 243.8 meters of basalt (VR2 in Figure 4).

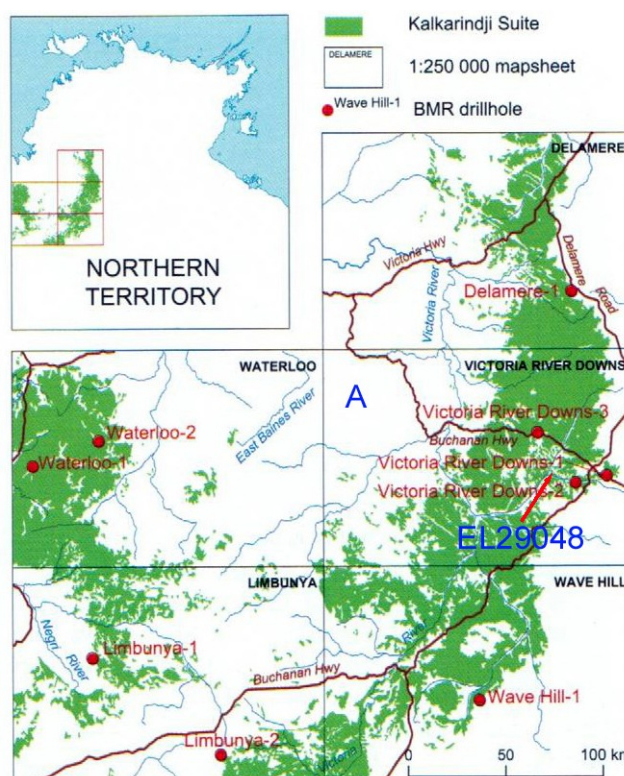


Figure 3 Location of BMR stratigraphic drillholes (drill log shown in Figure 4) (from Glass et al 2013)

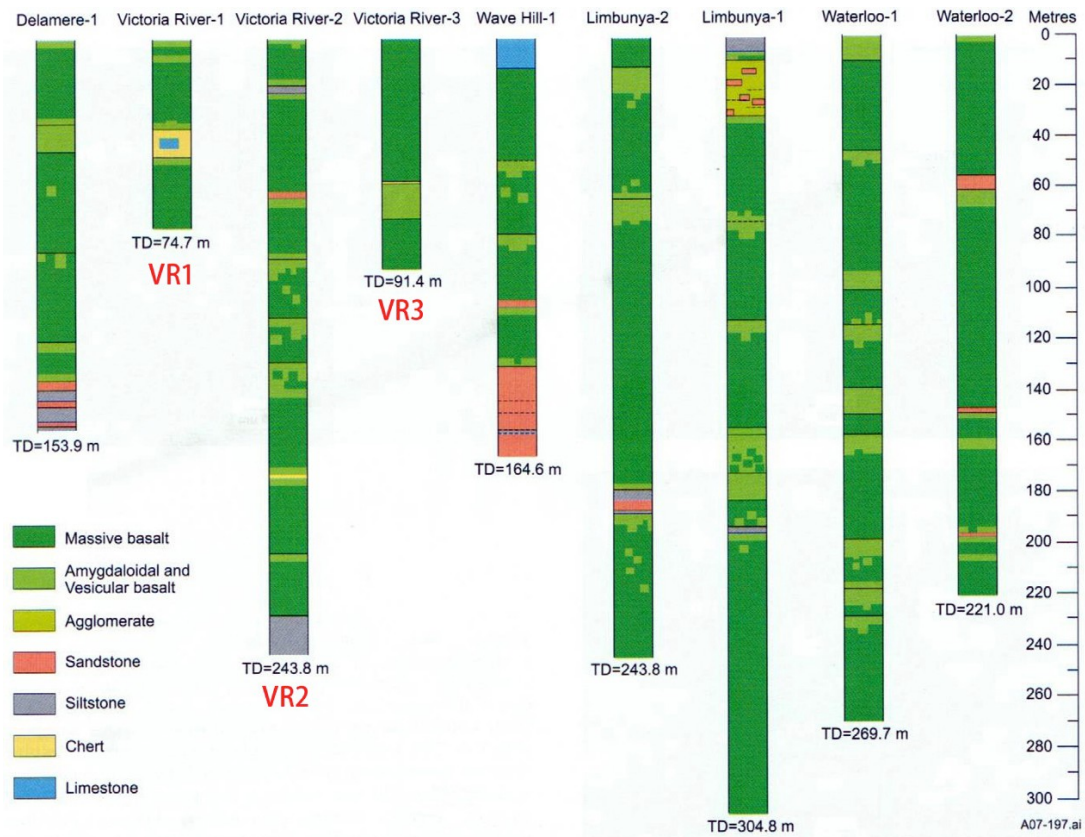
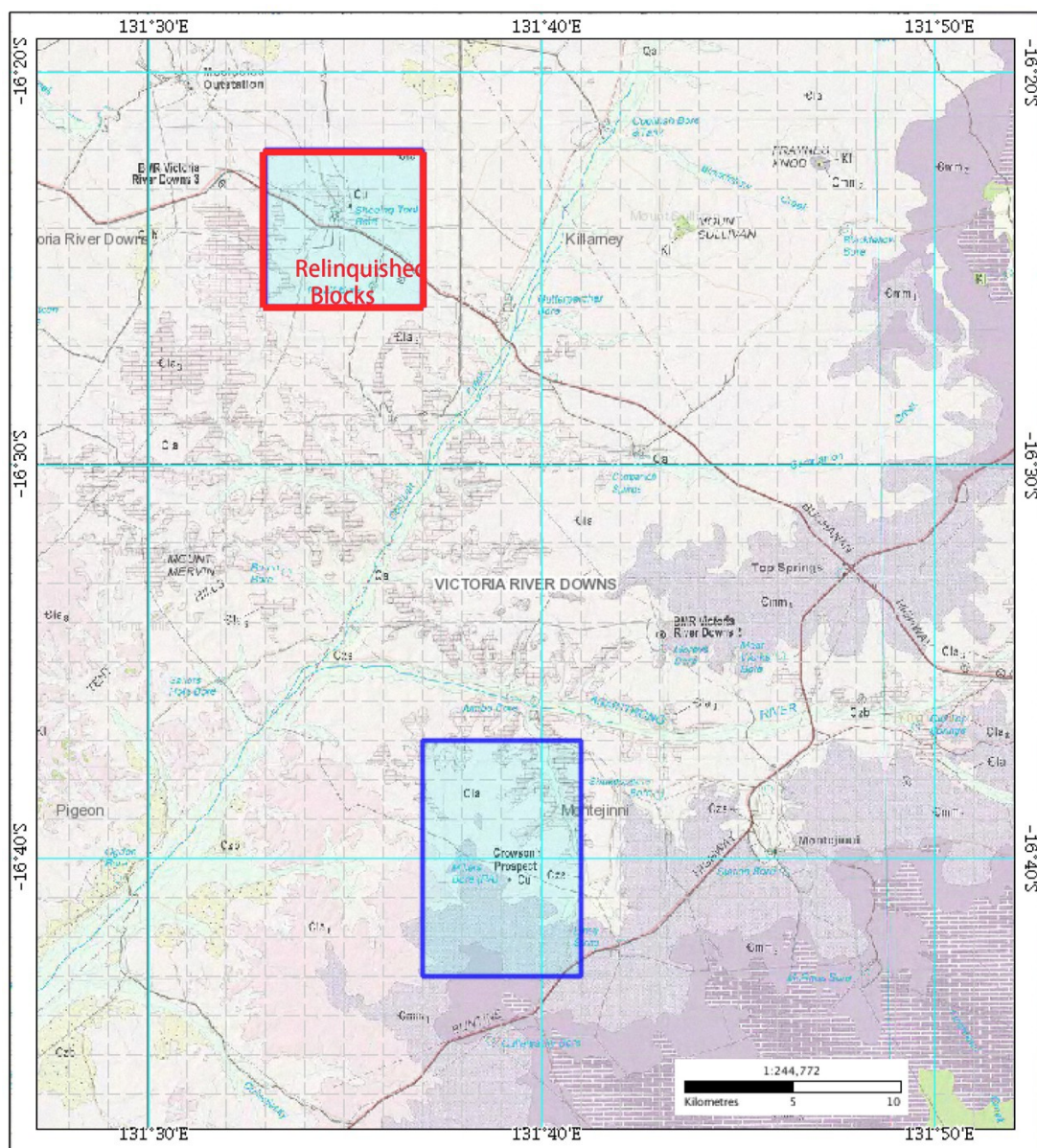


Figure 4 Lithological logs of stratigraphic drillholes in Victoria River region. TD= Total Depth (from Glass et al 2013)



known in Northern Territory (NTGS MODAT record, Glass et al. 2013). Extensive exploration for copper was conducted in the Northern Territory by a joint venture led by Metals Exploration NL. Glass summarized the various style of copper mineralization distinguished in early studies (Erskine et al 1970, Burt et al 1970, Miguel 1974) as follows:

- * Structurally controlled copper mineralization in fault and shear zones (eg malachite and chalcocite associated with fault and shear zones at the Cave prospect)
- * Copper mineralization in the basal three metres of the overlying Headleys Limestone (chalcocite, malachite and azurite).
- * Copper mineralization associated with secondary vesicle infills in basaltic flow tops, or disseminated in massive basalt in the upper Antrim Plateau Volcanics (native copper, chalcopyrite, cuprite, chalcocite and malachite).
- * Copper mineralization associated with agglomerate (chalcocite, malachite associated with barite veins).
- * Finely disseminated native copper and chalcopyrite in massive basalt flows (eg at Blackfella Rockhole, about 12km southwest of Mount Barton in LIMBUNYA).
- * Copper mineralization linked with black manganiferous limestone mounds of possible fumarolic origin (hot seeps).

The Kalkarindji flood basalts have been considered analogous to continental flood basalts in other parts of the world, most importantly the basalts at Noril'sk in Russia, which are host to large Ni-Cu-PGE deposits. Drilling to date has failed to find any economically significant deposit.

EL29048 licensed area is considered to be prospective for Cu, as there are two copper occurrences in the area, Crowson's Prospect Cu in the south and an unnamed Cu occurrence near Shoe Tool Bore in the north (Figure 5).

Work completed in the relinquished area

Work completed in the relinquished area includes:

- 1 A detailed review of the previous exploration work.
- 2 Analyse the existing aero-geophysical images of the area.
- 3 Field reconnaissance.
- 4 Ground check stream sediment geochemical anomalies.
- 5 Ground check the gravity anomalies.

Results

Ground check copper mineral occurrences in the license area

A copper mineral occurrence was reported in the relinquished area, unnamed Cu prospect near Shoe Tools Bore (Figure 6). Randal and Brown (1967) reported that native copper was identified in basalt of the Antrim Plateau Volcanics from the BMR Shoeing Tool Replacement Bore. Field inspection has failed to locate any primary

native copper and/or copper sulfides in the nearby area. Only very fine-grained malachite was identified in weathered basalts. In the vicinity there are outcrops of intercalated chert and limestone (Figure 7).

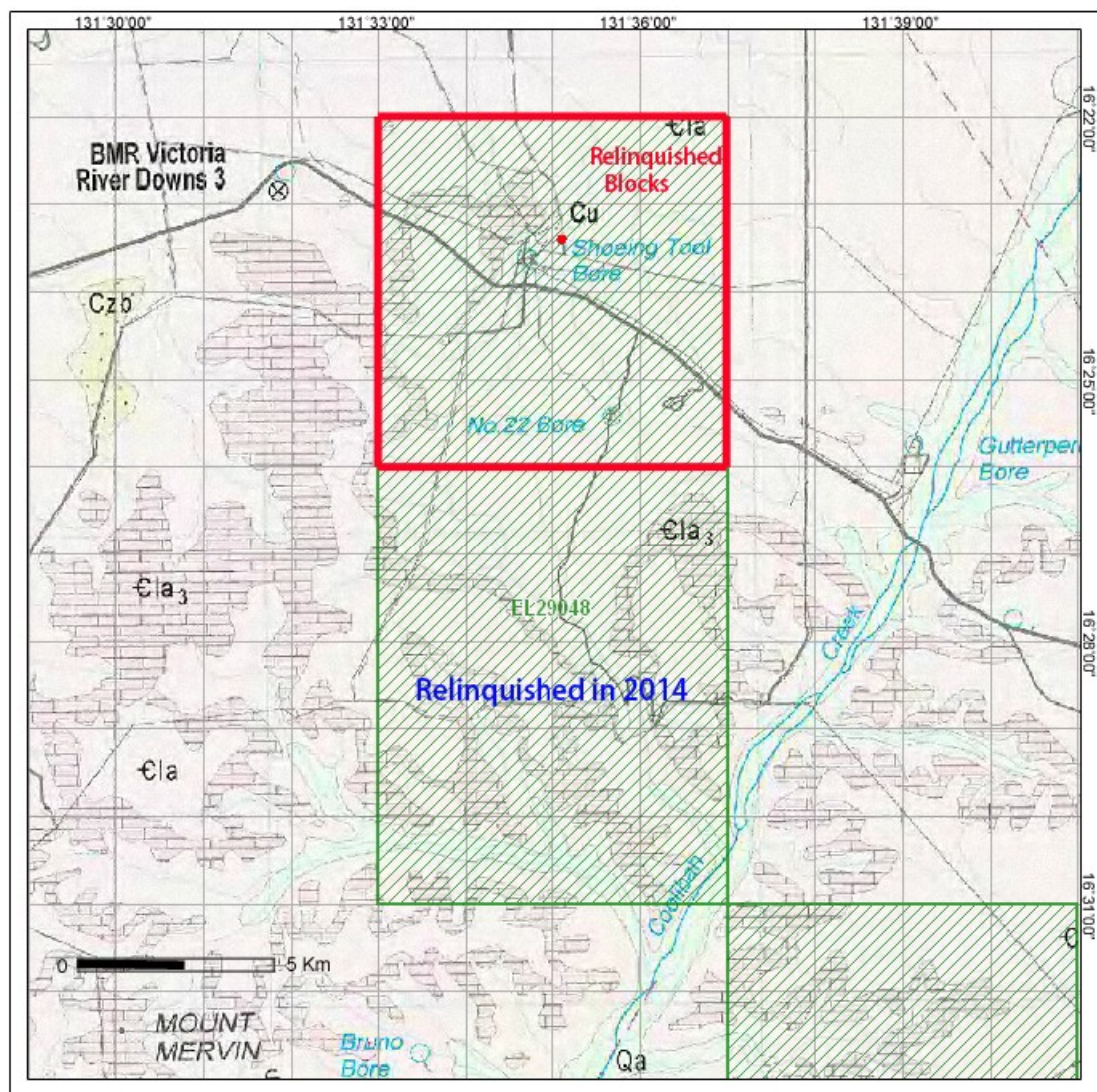


Figure 6 Geology setting of north part of EL29048, showing location of Copper occurrence at Shoeing Tool Bore



Figure 7 Intercalated chert in basalt (52K 776013 8186037)

Ground check stream sediment geochemistry anomalies

Existing stream sediments geochemistry survey results of the EL29048 and surrounding area by previous exploration companies have been extracted from the Northern Territory Geological Survey Database and displayed as Figure 8. Ground check throughout the EL29048 licensed area has been carried out. In the relinquished area, copper positive anomaly locates near the reported copper occurrence at Shoeing Tool Bore (Figure 6 and Figure 8). Distribution of weak positive Ni, Pb and Zn anomalies is roughly in consistence with that of Cu.

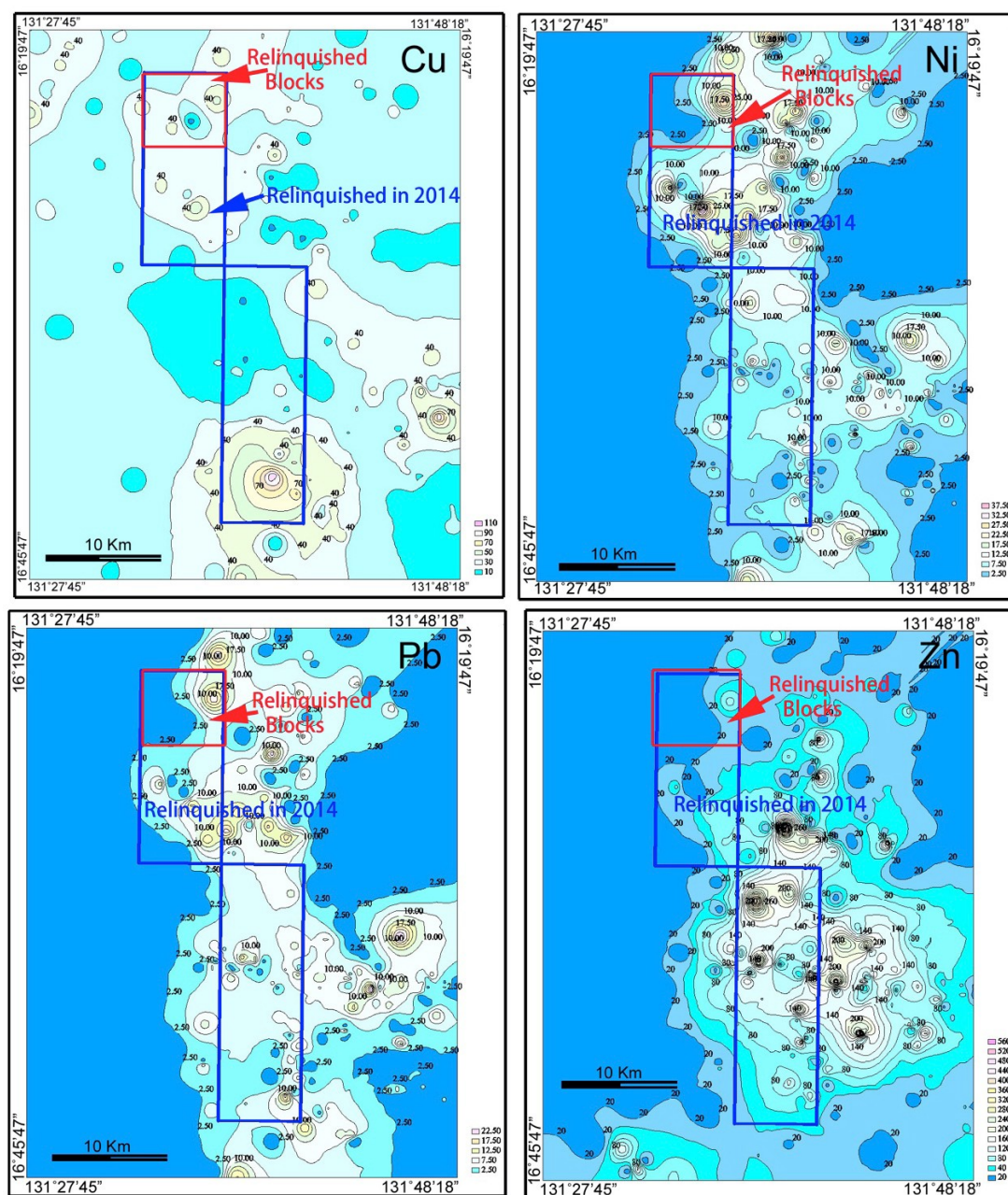


Figure 8 Cu, Ni, Pb, and Zn stream sediments geochemistry survey results

Ground check gravity anomalies

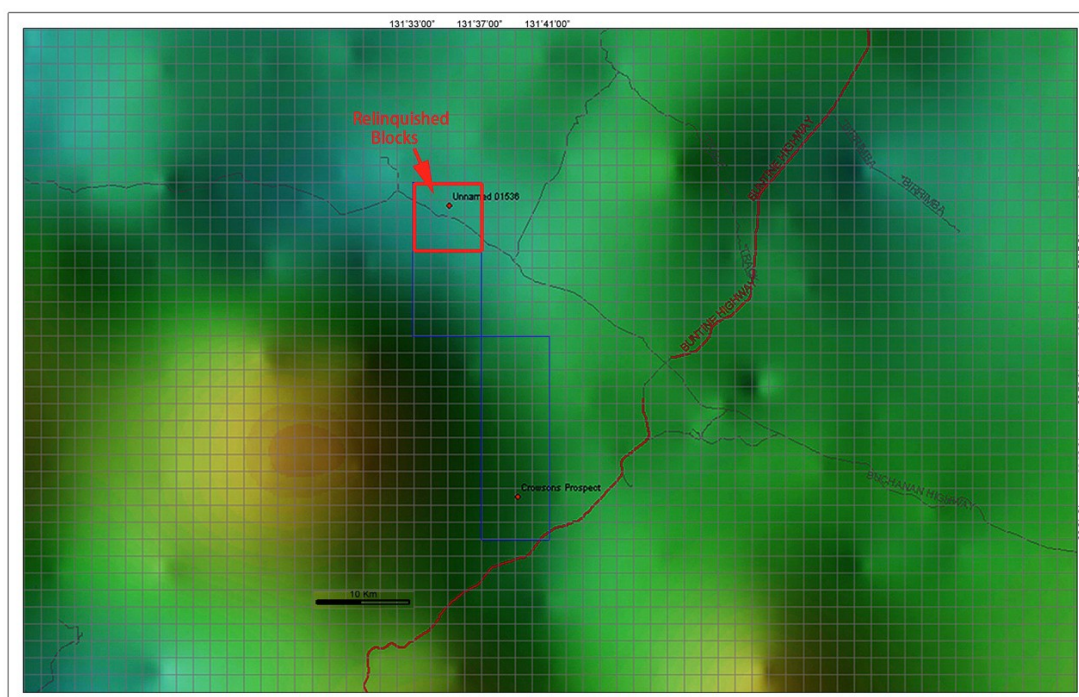


Figure 9 Regional Aero-gravity image around EL29048
(From NTGS Web-page, *STRIKE*)

Figure 9 is regional aero-gravity image around EL29048 area. There is a northwest extending gentle positive anomaly covering the relinquished part of 29048, which is roughly in consistence with positive nickel stream sediment geochemistry anomalies. The gentle positive gravity anomaly might indicate existence of mafic dykes. Ground check has failed to get any meaningful result as the Quaternary cover is very thick in the area. Ground geophysical survey may be needed to further clarify the anomalies.

Conclusion and recommendation

1. A copper occurrence was reported near Shoeing Tool Bore in the relinquished area. However field inspection has failed to locate any primary native copper and/or copper sulfide in the nearby area.
2. Positive Cu stream sediments geochemistry anomaly locates near Shoeing Tool Bore. Distribution of weak positive Ni, Pb and Zn anomalies are roughly in line with that of Cu anomalies.

Following works have been recommended for the next stage exploration:

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4. Ground geophysical survey to clarify the gravity anomalies.

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