EL 29048

FIRST ANNUAL REPORT

FOR THE PERIOD

3 Jul 2012 to 2 Jul 2013

By

Company Geologists

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Target: Base metal

Related NT 1:100 000 Killarney, 5265 and Montejinni, 5264

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Abstract

Exploration title EL29048 has been granted to GRIGM RESOURCES PTY LTD on 3 July 2012. During the last year, a detailed review of the previous geological work and research have been conducted. Geologically the area of EL29048 is located in the early Cambrian Kalkarindji Large Igneous Province and northwestern boundary of Paleozoic Wiso Basin. Major rock types in the province include tholeiitic basalt, dolerite, andesite, minor trachyte, microdolerite, basaltic flow breccia, peperite, pyroclastic deposits, quartz sandstone, siltstone, sedimentary breccia, limestone, chert. The conformably overlying Wiso Basin is a Paleozoic structural down warp in the central northwestern portion of the Northern Territory between Victoria River Downs station and Tennant Creek. It forms a broad, intracratonic depression comprising an east and south-east trending trough in the south and an extensive shallow shelf to the north. It is a shallow marine to fluvial depositional environment with the lower and upper limits of the sequence defined by unconformity surfaces. Major rock types occurring in the basin are dolostone, limestone, shale, sandstone and siltstone.

Kalkarindji Large igneous Basin could be prospective for Norilsk-style Ni-PGE-Cu associated with its mafic-ultramafic rocks. Mineralisation in the Wiso Basin includes uranium, gold and base metal. There are two mineral occurrences in the EL29048 title area, Crowsons (Montejinni) mine at south and Unnamed 01536 copper prospect at north. Geochemical data show gold anomalies distributing along the creek system in the area of EL29048. However copper, nickel and cobalt have their anomalies in a trend in northwest-southeast direction. These anomalies may have a relationship with the positive anomalies of aero-gravity and implies a potential primary mineralisation associated with mafic-ultramafic rocks. Two mineral occurrences contain low-temperature copper mineralisation, such as malachite and azurite. Not significant high temperature alterations had been identified. These two mineral occurrences may be related to the copper mineralisation associated with the geochemical nickel and aero-gravity anomalies at depth. If so, it is very interesting to have a further explore for copper-nickel deposit in the area.
**Introduction**

Exploration Licence EL29048 was granted to GRIGM RESOURCES PTY LTD by NT State DEPARTMENT OF RESOURCES on 3 Jul. 2012 for a period of six years. This report summarises work carried out on EL29048 during the period 3 July 2012 to 2 July 2013.

**Tenure details**

EL29048, total of 84 units (Table 1), is located SW of Katherine in a distance of approximately 274km, accessing by Buntine Highway, Buchanan Highway, local 4WD tracks (Fig. 1).

The applied exploration area is located Geologically the area is Kalkarindji Large Igneous Province and northwestern boundary of Paleozoic Wiso Basin. The major rock types include Neoproterozoic-Palaeozoic basalt and metamorphosed sedimentary rocks. At Growsons Prospect, Geochemical surveys outlined about 3 m thick anomalous base metal horizon near the top of the Antrim Plateau Volcanics; close to the contact with the overlying Montejinni Limestone. It encourages us to have a further exploration for an economic deposit.

![Figure 1 Location of EL29048](image)

**Table 1** EL29048 unite

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<td>A, B, F, G, L, M, Q, R, V, W</td>
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</tbody>
</table>
Geological Setting

Geologically the area of EL29048 is located in the early Cambrian Kalkarindji Large Igneous Province and northwestern boundary of Paleozoic Wiso Basin (Fig.1). The Kalkarindji Large Igneous Province is a widespread continental flood basalt province and has been found over an area of at least 2.1 million km², from Queensland to the Kimberley’s, covering much of northern Northern Territory, and extending into Western Australia and Southern Australia. Major rock types in the province include tholeiitic basalt, dolerite, andesite, minor trachyte, microdolerite, basaltic flow breccia, peperite, pyroclastic deposits, quartz sandstone, siltstone, sedimentary breccia, limestone, chert. It conformably underlies the Cambrian successions of the northern Georgina, northern Wiso, Daly and Ord Basins and unconformity overlies the Birrindudu, Victoria, McArthur and South Nicholson Basins, the Tomkinson Province and the Tanami Region.

The unconformity overlying Wiso Basin is a Palaeozoic structural downwarp in the central north-western portion of the Northern Territory between Victoria River Downs station and Tennant Creek. This sedimentary basin covers approximately 160,000 km² in area from 15°- 22°S and 129° - 135°E. 80% of the Basin contains less than 300m depth of sediment. It forms a broad, intracratonic depression comprising an east and south-east trending trough in the south and an extensive shallow shelf to the north. It is a shallow marine to fluviatile depositional environment with the lower and upper limits of the sequence defined by unconformity surfaces. Major rock types occuring in the basin are dolostone, limestone, shale, sandstone and siltstone.

In the EL29048 title area, Kalkarindji igneous rocks cover most of the northern area and overlies by Wiso Basin sediments at south end (Fig. 1).

Mineralisation

Kalkarindji Large Igneous Basin could be prospective for Norilsk-style Ni-PGE-Cu associated with its mafic-ultramafic rocks. Mineralisation in the Wiso Basin includes uranium, gold and base metal.

There are two mineral occurrences in the EL29048 title area, Crowsons (Montejinni ) mine at south and Unnamed 01536 copper prospect at north.
Existing previous exploration data within the Northern Territory Geological Survey Database was reviewed. Analysis results of stream sediments within and adjacent area of EL29048 have been used to target anomalies and shown in Fig 2, 3, 4.

![Fig. 2 Contours of gold and copper for the stream sediments samples in the area of EL29048.](image)

![Fig. 3 Contours of nickel and cobalt for the stream sediments samples in the area of EL29048.](image)
Fig. 4  Contours of lead and zinc for the stream sediments samples in the area of EL29048.

Fig. 5 Image of LandsatPC2_54_17

Fig. 5 shows the major creek is from northeast flew down to southwest with branches general in east-west direction in the area. A large brach of the major creek goes through the lower part of EL29048 in the middle from east to west. The gold anomalies distribute obviously along the major creek in north and the big branch in south respectively (Fig. 2). It means that the anomalies representative alluvial gold washed down from somewhere else. On contrasting, copper, nickel and cobalt show different anomalies which distribute in a northwest-southeast direction, not following the creek system in northeast-southwest direction with an exception of two copper anomalies occur in the spots of low-temperature copper mineral occurrences at north and south respectively (Figs. 2 and 3). As this area is gently undulating terrain, the ore-forming elements have been mobilised in a short distance. It
means that the ore-forming element anomalies are mostly closed to their primary source spots within the basaltic rock area. Anomalies of lead generally distribute in both directions, northwest-southeast with Cu, Ni and Co and northeast-southwest along the major creek, especially at north part of EL29048 area. Anomalies of zinc occur in a group of patches at south, completely different from other element anomalies. Also these anomalies are presented in the boundary between the Kalkarindji basaltic rocks at northwest and the Wiso Basin limestone at southeast. It is mostly associated with later stage hydrothermal mineralisation, not associated with primary mineralisation of Cu, Ni and Co in the mafic rocks.

Geophysical Images

Aero-geophysical images have also been reviewed in the last exploration year. Aero-gravity image shows a negative anomaly for the central granites in the EL29048 (Fig. 6). There is a gentle positive anomaly in the central of the upper part of EL29048, which is overprint the nickel anomaly in the same spot (Fig. 3). There is another positive peak anomaly at south boundary of EL29048. The nickel anomaly at south is just at east of the gravity anomaly. A small gully is located at east of the positive gravity anomaly and the water flows from west to northeast (detail in Fig. 7). It may result in a slight mobilisation of nickel from the west to east.

Fig. 6 Image of aero-gravity showing two granites in EL29048.
Aero-magnetic images is a very useful tool in the mineral exploration. Unfortunately, the data are in different resolution and could not give significant information (Fig. 8).

**Field Reconnaissance Works**

A field reconnaissance trip had been carried out in October 2012 with chief and senior geologists from Guilin Research Institute of Geology for Mineral Resources in China. The initial field work program includes checking
outcrops of the rocks in the area, two mineral occurrences and ore-forming element anomalies, alterations and structures associated with mineralisation in the occurrences and anomaly spots.

In the EL29048 area, Tertiary or Quaternary sediments mostly distribute along the creek and its branches. The limestone, dolostone and fine-grained clastic sedimentary rocks of the Wiso Basin sedimentary sequences are massively present in the southern part of EL29048 and scatter in the other areas. They overlie on top of the early Cambrian Kalkarindji basalt and porphyritic basalt (Photo 1).

![Photo 1](Hand Specimen of basalt from EL29048 area.)

Malachite has been found at Mineral Occurrence 01536, hosted by basaltic rocks at north of EL29048. Malachite and azurite are presented at the Crowson mine at south of EL29048. Both of them are low temperature copper mineralisation and fill in the host rock related to later stage hydrothermal activities, not primary copper mineralisation associated with mafic-ultramafic rocks. Other hydrothermal alterations are not remarkable in the two occurrences. However, it may still be an indicator for exploring primary Cu-Ni mineralisation because the ore-forming copper is must leached from underneath somewhere and brought up to the surface by the stage hydrothermal activities. It is uncertain whether the two mineral occurrences are related to the two nickel and gravity anomalies at north and south of EL29048 respectively at depth or not, but it is interesting to do more work to prove it.

Conclusion

Literature review revealed two aero-gravity anomalies which almost overprint the geochemical anomalies of nickel at middle of northern part and south part of the EL29048 area. Geochemical anomalies of gold distribute along the creek system. In contrasting, copper, nickel and cobalt have their anomalies in a trend in northwest-southeast direction. These anomalies may have a relationship with the positive anomalies of aero-gravity and implies a potential primary mineralisation associated with mafic-ultramafic rocks. It had been widely expected prospecting for Norilsk-style Ni-PGE-Cu associated with its mafic-ultramafic rocks in the Kalkarindji Large Ignious Basin although these anomalies only reveals a small scale. Field investigation had been carried out. Two mineral occurrences contain low-temperature copper mineralisation,
such as malachite and azurite. Not significant high temperature alterations had been identified. These two mineral occurrences may be related to the copper mineralisation associated with the geochemical nickel and aero-gravity anomalies at depth. If so, it is very interesting to have a further explore for copper-nickel deposit in the area.

Recommendation

Following works have been recommended for the next 12 months:

1. Systematically rock chip sampling for geochemical primary halo anomalies related to the existing aero-gravity and stream sedimentary anomalies;
2. Detail geological mapping, especially for the magma fractionation associated concentration of copper and nickel like what happening in the Norilsk-style Ni-PGE-Cu deposit;
3. Further geophysical survey, such as aero- and ground EMA to target interesting spots in the area of EL29048;
4. More literature review of geochemical data are needed for a large area, especially in the area at west of EL29048, where have more positive aero-gravity anomalies (Fig. 6). If it is necessary, apply for new EL in the area;
5. One or more test drilling hole are necessary to test the targets after the works mentioned above.

References


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