Annual and Final Report on

EL 29002

for The Period

16 May 2012 to 23 June 2015

Northern Territory

(Gold and Uranium Project)

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SUMMARY

Exploration Licence (EL) 29002 is situated in the central part of the Pine Creek Orogen (PCO) in the Mt Ringwood area. The Licence has been explored for gold and uranium mineralisation. It is located about 110 km SE of Darwin. EL 29002 was granted to Australian Geoscience Pty Ltd on 16 May 2012 and will expire on 15 May 2018. It comprises 13 blocks covering approximately 43.5 km². On 23 June 2015, the License was surrendered due to low mineral potential of the project area.

EL 29002 is located within the PCO which is a tightly folded sequence of Palaeoproterozoic rocks, >4km in thickness, laid down on granitic and gneissic Archaean basement unconformably. The stratigraphic sequence is dominated by clastic, carbonate and carbonaceous sedimentary volcanics. Pre-orogenic mafic sills of the Zamu Dolerite intruded the sequence prior to regional metamorphism and deformation. The sequence was tightly folded and pervasively altered with metamorphic grade averaging greenschist facies to phyllite in a period ca 1867–1850 Ma. The Cullen intrusive event introduced a suite of fractionated calc-alkaline granitic magma into the sequence in the period ~1830–1800 Ma. During emplacement, magma experienced differentiation and fractionation which subsequently led to the emanation of hydrothermal fluids responsible for gold, uranium and base metals mineralisation in the adjacent meta-sediments.

During the period under review, an appraisal of geological, geochemical and geophysical data was undertaken. It involved retrieval of exploration data from open file reports which led to processing and interpretation of data. In addition, a field trip was undertaken for ground-truthing which indicated that EL 29002 is covered by a thick recent alluvial cover. TMI image of the project area has revealed some deep-seated structures along with subtle magnetic highs, which are considered important exploration targets for gold mineralisation. However, due to extremely difficult economic environment what exploration industry is facing, sufficient financial resources could not be secured to test the mineral potential of the project area. As a result of that on 23 June 2015, EL 29002 was surrendered in its entirety.
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1.0 INTRODUCTION

EL 29002 is located in the Mt Ringwood area and that is part of the Pine Creek Orogen (PCO), Northern Territory. The PCO is a world-class metallogenic province which contains significant uranium, gold and base metal deposits with the possibilities of new discoveries. The License has been explored for gold and uranium mineralisation, and this is the final and annual report on the exploration activities undertaken during the term of El 29002.

2.0 LOCATION AND ACCESS

The Licence area is situated about 120 km SE of Darwin (Figure 1) and about 40 km ENE of Adelaide River. The project area can be approached via Stuart Highway from Darwin to Tortilla Flats and then following the Ringwood Station Road. The project area can also be accessed via Arnhem Highway and turning on Rustler Roost road about 90 km from Darwin via Toms Gully gold mine as shown in Figure 1. Vehicle access is limited to the dry season tracks from the Ringwood Station homestead to the tenement. The tenement falls on the Pine Creek 1:250,000 sheet and on the Batchelor (1: 100 000) McKinlay River 1:100,000 sheets (Figure 1). The area underlain by EL 28845 is generally low-lying, open, black soil plains; the central and southwestern parts are moderately elevated, wooded hill ranges.

3.0 TENEMENT STATUS AND CLIMATE

EL 29002 was granted to Australian Geoscience Pty Ltd on 16 May 2012 and was expected to expire on 15 May 2018. It comprises 13 blocks that covers approximately 43.5 km$^2$. Due to low mineral potential of the project area, the tenement was surrendered on 23 June 2015. Australian Geoscience Pty Ltd has explored the project area for gold and uranium mineralisation. Underlying cadaster belongs to B. F. Coulter (PPL 1163), M. A. Rasthmann (PL 1182), and McKinlay River Cattles Station Pty Ltd (PPL 1184).

The project area has semi-arid, tropical climate with April to September warm dry season followed by wet season from October to March. The average rain fall is about 1200 mm and most of which falls during wet season. Temperatures are highest in October to November with the mean maximum 35$^\circ$ – 37$^\circ$ C, whereas mean minimum is 22 - 24$^\circ$ C. The coolest months are June and July when the mean maximum is 30$^\circ$ – 32$^\circ$ C, with the mean minimum of 12 - 14$^\circ$ C.
Figure 1: Tenement Location Map of EL 29002
4.0 GEOLOGICAL SETTING

EL 29002 is located within the central part of the Pine Creek Orogen (PCO) which is a tightly folded sequence of Palaeoproterozoic rocks, >4km in thickness, laid down on granitic and gneissic Archaean basement unconformably (Ahmad and Munson, 2013). The stratigraphic sequence is dominated by clastic, carbonate and carbonaceous sedimentary volcanics. Pre-orogenic mafic sills of the Zamu Dolerite intruded the sequence prior to regional metamorphism and deformation.

The sequence was tightly folded and pervasively altered with metamorphic grade averaging greenschist facies to phyllite in a period ca 1867–1850 Ma. The Cullen intrusive event introduced a suite of fractionated calc-alkaline granitic magma into the sequence in the period ~1830–1800 Ma. During emplacement, magma experienced differentiation and fractionation which subsequently led to the emanation of hydrothermal fluids responsible for gold, uranium and base metals mineralisation in the adjacent meta-sediments (Bajwah, 1994; Ahmad et al., 1993).

Figure 2 shows geological setting of the Licence area, where the project area is exclusively underlain by the Burrell Creek Formation. Lithologies of the South Alligator River Group such as Mount Bonnie Formation and Gerowie Tuff area exposed towards north of EL 29002 as displayed on Figure 2. The Burrell Creek Formation mainly comprises grewacke, silts stone, slate and phyllite. In places, the Zamu Dolerite dykes intersect the Palaeoproterozoic stratigraphic sequence. The meta-sediments are tightly folded about axes, which swings from near N-S trends in the south, to NW-trending axes in the northwest. Plunges are to the north or northwest, mainly at low angles, although steep plunges are seen in the vicinity of the North Ringwood gold workings. The sheared sediments lie in the NW extension of the Pine Creek Shear Zone (Ahmad et al., 1993). However, much of the Palaeoproterozoic stratigraphic is under the recent sediments and regolith cover which could be over 70 metres deep, and it has been a major impediment to exploration. Gold mineralisation is found in saddle reefs in anticlinal closures (North Ringwood), fissure veins in N-S shear zones (South Ringwood), bedding parallel veins, and stock-works (Pelican prospect). Gold is associated with minor
Figure 2: Geological setting of the project area
sulphides in quartz veins. A significant gold deposit (Goodall) is located a few kilometer southeast of the project area.

5.0 PREVIOUS EXPLORATION HISTORY

A brief history of previous exploration in and around the project area is given below. It has been derived from open file company exploration reports and open file NTGS data.

Production of around 2800 oz Au came from the North Ringwood, Ringwood and South Ringwood mines between 1894 and 1902. The mines comprised shafts, pits, and small open cuts along a 6km trend.

In 1978, the NTGS drilled 4 diamond holes at North Ringwood, and intersected 2 zones of gold mineralisation, confirming that mineralisation continues to at least 40m below workings. North Ringwood is within an MCN located within EL 23532.

Gold potential of the Ringwood field was evaluated during the 1980’s and 1990’s by several exploration companies, including White Gold Mines, Carpentaria Gold, Delta Gold, Solomon Pacific, Acacia Resources, Billiton, Northern Gold and Dominion. These activities are described Orridge (2004).

Orridge (2005) identified anomalies from this work, and gave an interpretation of areas which have potential for further mineralisation, and this is below: At Pelican, programmes of soil sampling, trenching and drilling (26 holes) disclosed a zone of low-grade gold mineralisation, up to 60m wide, and extending along a SE-NW trend for around 400m. The areas to the NW and SE that may have further mineralisation potential remain untested. These areas are covered by superficial cover. At Old Workings prospect, programmes of mapping, sampling, costeasing and RC drilling were undertaken. White Gold Mines gave a combined estimate of around 4000oz Au from 3 zones.

6.0 EXPLORATION ACTIVITY DURING THE TERM OF THE LICENSE

During the period under review, an appraisal of geological, geochemical and geophysical data was conducted. It involved retrieval of exploration data from open file reports which led to processing and interpretation of data. In addition, a field trip was undertaken for ground-truthing. Exploration Index map of EL 29002 is shown in Figure 3.
Figure 3: Exploration Index Map of EL 29002

Deep-seated geophysical feature
Geological and geophysical data interpretation indicated that almost all of the project area is underlain by the Palaeoproterozoic Burrell Creek Formation. It contains tightly folded sediments about axes, which swings from near N-S trends in the south, to NW-trending axes in the northwest. Plunges are to the north or northwest, mainly at low angles, although steep plunges are seen in the vicinity of the North Ringwood gold workings. The sheared sediments lie in the NW extension of the Pine Creek Shear Zone. However, much of the Palaeoproterozoic stratigraphic column is under the recent sediments and regolith cover, which could be over 70 metres deep. This cover has been a major impediment to exploration. Towards north, a cluster of gold deposits/prospects (Rustler Roost area containing Dolly Pot, Backhoe, Beef Bucket) are found (Figure 2), where Rustler Roost has produced 46,300 OZ of gold and still has significant resource of 18.5 Mt @1.14 g/t. Here gold mineralisation occurs in the Mt Bonnie Formation/Burrell Creek Formation. It is located at the closure of a regional scale south plunging anticline. Gold mineralisation is concentrated within three stratigraphic intervals of thinly bedded variable dolomictic carbonaceous and pyritic laminated shales and thin cherty interbeds. A persistent 15° – 25° southeast dipping set of 1 cm to 3 cm thick sheeted quartz-pyrite veins crosscut all units and appear to be associated with the highest grade of gold mineralisation.

Towards south of EL 29002, gold mineralisation is found at Ringwood area (Bajwah, 2013; Ahmad et al., 1993). Here, mineralisation occurs in saddle reefs in anticlinal closures, fissure veins in N-S shear zones (Ringwood), bedding parallel veins, and stock-works (Pelican prospect). Gold is associated with minor sulphides in quartz veins. A few km southwest of the project area a major gold mine (Goodall) is located within the Burrell Creek Formation (Figure 3). It has produced 1.9 MOZ of gold in 1990’s. Here, gold mineralisation occurs as north-trending zone of quartz vein stock-work within sheared greywacke. The mineralised zone is located along an upright anticline striking 320° and plunging 30-35°. These features are in general similar to those gold deposits found within the PCO.

Good example of gold mineralisation such as Toms Gully and Quest 29 are located towards north, which have produced significant quantities of gold in the last 30 years. Figures 1, and 2 show that project area is located within major gold producing part of the PCO, where
prospective rocks of the Palaeoproterozoic Burrell Creek Formation are present below recent sedimentary cover.

Figure 4 shows TMI image of the project area with a deep-seated structure running though the southern part of the tenement area. In the south-west, it appears to be the continuation of Pine Creek Shear Zone – a major gold producing structure in the region. Probably a dyke is running in the north-westerly direction which has been interpreted due to the magnetic contrast and that is worthy of further investigation. In addition, a number of subtle magnetic anomalies are present within the Licence area which is considered important exploration targets for gold mineralisation.

Gravity modeling of the area also indicates the presence of the alternating sequence of contrasting competence and presence of granite pluton which must have induced thermal metamorphism in the adjacent strata - a significant feature for localisation of gold mineralisation in the Orogen (Wygralak and Findhammer 1997). It is noteworthy that exposed strata is folded into anticlinal Structure (zones of dilation) and that should have been repeated in the rock formations under recent sedimentary cover. Geochemical sampling program carried over the tenement area shows significant anomalous element concentration of the Palaeoproterozoic basement (Wygralak and Findhammer 1997). Shallow samples taken from the top silty horizon at an average depth of 0.2 m, although depleted in all elements, still show the same anomalies as the lower horizon but of lower magnitude.

A review of historical exploration data shows that significant exploration (geochemical sampling, drilling) has been undertaken around the project area. However, within the tenement area very little on-ground exploration has been conducted to date. Much of the project area is covered by a thick Quaternary cover, which hampers access to bed rock geology. Under the current depressed economic environment, it is difficult to attract any investor to commit funds for deep drilling to access bed rock geology.

7.0 CONCLUSIONS AND RECOMMENDATION

Appraisal of geological, geochemical and geophysical data indicates that EL 29002 has little mineral potential for gold and uranium mineralisation. Although, much of the project is covered by a thick recent alluvial cover, but TMI image of the project area has revealed some
Figure 4: TMI image of the project area
deep-seated structures along with subtle magnetic highs, which may be important exploration targets for gold mineralisation. However, overall project mineral potential is low to find any economic size gold deposit. Furthermore, under the difficult economic environment what exploration industry is facing, it is difficult to commit funds to undertake any drilling to retrieve bed rock samples for assaying. As a result of that EL 29002 was surrendered on 23 June 2015.

8. REFERENCES


Bajwah, Z.U., Annual report on EL 28845 for the period 28 February 2012 to February 2013, Northern Territory. Australia Geoscience Pty Ltd annual Report to Northern Territory Dept of Mines and Energy, Darwin


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