Annual and Final Report on EL 29055
for the Period
10 September 2012 to 17 September 2015
Northern Territory
(Gold, Base Metals and Uranium Project)

Title Holder: Australian Geoscience Pty Ltd

Zia U. Bajwah
November 2015
zbajwah@bigpond.net.au

Distribution: NT Department of Mines and Energy
Australian Geoscience Pty Ltd
EL 29055 is located in the northern part of the Pine Creek Orogen (PCO) in the Mt Bundey area. This tenement is being explored for gold, base metals and uranium mineralisation. It is situated about 95 km SE of Darwin. EL 29055 was granted to Australian Geoscience Pty Ltd on 10 September 2012 and will expire on 09 September 2018. It comprises 26 blocks that covers approximately 87 km². The tenement was surrendered outrightly on 17 September 2015.

EL 29055 is located within the Pine Creek Orogen, a tightly folded sequence of Palaeoproterozoic rocks, 10 km to 14 km in thickness, laid down on a rifted granitic Archaean basement during the interval ~2.2-1.87Ga. During the Top End Orogeny (Nimbuwah Event ~1.87-1.85Ga) the sequence was tightly folded and pervasively altered with metamorphic grade averaging greenschist facies to phyllite. The Cullen intrusive event introduced a suite of fractionated calc-alkaline granitic magma into the sequence in the period ~1.85-1.78Ga. In the project area, rocks of the Wildman Siltstone (The Mount Partridge Group), Koolpin Formation, Gerowie Tuff and Mt Bonnie Formation (South Alligator Group) along with minor occurrence of the Burrell Creek Formation (Finniss River Group) are present below the Quaternary cover. This stratigraphic sequence is prospective for gold, base metals and uranium mineralisation.

During the period under review, a desk top study of the project area was undertaken. It involved retrieval of exploration data from open file reports, GIS entry and interpretation of geological, geochemical and geophysical data. In addition, a number of field trips were undertaken for ground-truthing. A technical review of the project indicated that it has prospective lithology of the Wildman Siltstone, Koolpin Formation and Gerowie Tuff, which could hosts gold, base metals and uranium mineralisation. However, due to downturn in mineral exploration, enough funds could not be secured to undertake geochemical sampling and drilling program. As a result of that EL 29055 was surrendered on 17 September 2015.
CONTENTS

SUMMARY 2
1.0 INTRODUCTION 4
2.0 LOCATION AND ACCESS 4
3.0 TENEMENT STATUS AND CLIMATE 4
4.0 GEOLOGICAL SETTING 6
5.0 PREVIOUS EXPLORATION HISTORY 8
6.0 EXPLORATION ACTIVITY DURING THE TERM OF THE LICENCE 10
7.0 CONCLUSIONS AND RECOMMENDATIONS 12
8.0 REFERENCES 13

LIST OF FIGURES

Figure 1: Tenement Location Map of EL 29055
Figure 2: Geological setting of the project area
Figure 3: Exploration Index Map of EL 29055
Figure 4: TMI image of the project area
1.0 INTRODUCTION
EL 29055 is located in the northern part of the Pine Creek Orogen (PCO) in the Mt Bundey area. This tenement is being explored for gold, base metals and uranium mineralisation, and it is the final and annual report on the exploration activities undertaken during the reporting period.

2.0 LOCATION AND ACCESS
EL 29055 is situated about 95 km SE of Darwin (Figure 1) and is intersected by the Arnhem Highway (Figure 1). The project area can be approached via Arnhem Highway from Darwin which transects the tenement. Within the project area, vehicle access is provided by four wheel drive tracks which could be difficult during wet season. The tenement falls on the Darwin 1:250,000 sheet. The area underlain by EL 29055 is generally low-lying, open, black soil plains or rugged terrain. Mary River flood plain covers most of the north-western part of the project area.

3.0 TENEMENT STATUS AND CLIMATE
EL 29055 was granted to Australian Geoscience Pty Ltd on 10 September 2012 and was expected to expire on 9 September 2018. It comprises 26 blocks that covers approximately 87 km$^2$. Australian Geoscience Pty Ltd intends to explore the project area for gold, base metals and uranium mineralisation. Underlying cadaster belongs to Colin Ernest and J. Fink (NT Portion 03737), Faye Chester Investment Pty Ltd (NT Portion 05344), and Norbuild Pty Ltd NT Portion 04422). Due to extremely challenging environment what exploration industry is facing in Australia, interest in the tenement was low and enough funds could not be secured. As a result of that tenement was surrendered on 17 September 2015.

The topography of the area varies from 35 m to 300 m above the sea level. It has a tropical savannah climate characterised by two distinct seasonal patterns – the ‘wet’ monsoon and the ‘dry’ seasons. The wet season generally occurs from November through to April and the dry season between May and October. Almost all rainfall occurs during the wet season (mostly between December and March) and the area receives a total rainfall of approximately 1.5 metres in a year. The mean daily maximum temperature is 31°C in the coolest months (June to August) and 33°C in the hottest months of October and November.
Figure 1: Tenement Location Map of EL 29055
4.0 GEOLOGICAL SETTING

EL 29055 is located within the Pine Creek Orogen (PCO), a tightly folded sequence of Palaeoproterozoic rocks, 10 km to 14 km in thickness, laid down on a rifted granitic Archaean basement during the interval ~2.2-1.87Ga (Ahmad et al. 1993). The sequence is dominated by pelitic and psammitic (continental shelf shallow marine) sediments with minor inter-layered tuff units. Pre-orogenic mafic sills of the Zamu Dolerite intruded the sequence prior to regional metamorphism and deformation.

During the Top End Orogeny (Nimbuwah Event ~1.87-1.85Ga) the sequence was tightly folded and pervasively altered with metamorphic grade averaging greenschist facies to phyllite. The Cullen intrusive event introduced a suite of fractionated calc-alkaline granitic batholiths into the sequence in the period ~1.85-1.78Ga (Bajwah 1994). These high temperature I-type intrusives induced strong contact metamorphic aureoles ranging up to (garnet) amphibolite facies, and created more extensive biotite and andalusite hornfels facies.

In the project area, rocks of the Wildman Siltstone (The Mount Partridge Group), Koolpin Formation, Gerowie Tuff and Mt Bonnie Formation (South Alligator Group) along with minor occurrence of the Burrell Creek Formation (Finniss River Group) are present below the Quaternary cover. Bed rock geology of EL 29055 is shown in Figure 2. Towards north, the sequence is intruded by the Mt Goyder Syenite and Mt Bundy Granite intrudes the stratigraphy towards southwest. This stratigraphic sequence is prospective for gold, base metals and uranium and iron ore mineralisation.

The Wildman Siltstone is present mainly in the northern and northeastern part of the project area (Figure 2). It comprises carbonaceous and often pyritic siltstone along with laminated/bedded shale. Toms Gully gold mine is hosted by the Wildman Siltstone. )). Frances Creek iron ore field is hosted by the Wildman Siltstone, about 22 km east of Pine Creek, which is similar to the Wildman Siltstone in the project area, and may be fertile for iron ore mineralisation. In addition, a number of iron ore prospects are located in the northern part of the project area within the Wildman Siltstone. Amongst these Mt Bundey deposit was mined in 1970’s.

The Koolpin Formation comprises ferruginous siltstone and shale, which is commonly carbonaceous and pyritic. Chert bands and nodular horizons are common and lenses of ironstone occur occasionally, along with haematitic breccia throughout the sequence. Minor components of dolomite can also occur. The Koolpin Formation may also be the most
Figure 2: Geological setting of the project area
prospective units in the Mount Bundy Region for hosting gold mineralisation (West Koolpin, Taipan, BHS and North Koolpin Open Pits at Quest 29 are all within Koolpin sediments. In addition, it is also considered prospective for uranium mineralisation due to its location in between Archaean granite complexes (e.g., Nanumbu and Rum Jungle). It may be noted that the Koolpin Formation is the most significant lithological units which hosts uranium deposits in the south Alligator River Mineral Field (Lally and Bajwah, 2006).

The Gerowie Tuff conformably overlies the Koolpin Formation and is comprised of greenish-grey mudstone, siliceous shale, siltstone, dark grey chert and tuff. Within the Mount Bundy Region, it is dominated by graded beds of siliceous tuffaceous mudstones grading to greywacke and arenite, diagenetically altered, and up to 600 m thick. The Gerowie Tuff is host to gold and uranium mineralisation in the PCO. A recently found high grade Thunderball uranium deposit is partly hosted by the Gerowie Tuff, located about 10 km NE of Hayes Creek. Here, uranium occurs as disseminated massive uraninite (pitchblende) within a sheared and tightly folded sequence of meta-sediments and tuffaceous units of the Gerowie Tuff, and to a lesser degree in the Mt Bonnie Formation. The highest grade mineralisation occurs at or near the hinge zone of the interpreted anticlinal structure. Drill chip assays have returned some excellent results of high grade uranium mineralisation up to 20.3% U₃O₈ (1 m interval) at Thunderball (Thundelarra Exploration Limited, 2009).

The Mount Bonnie Formation conformably overlies the Gerowie Tuff and is dominated by a shallow marine sequence of interbedded and graded siltstone, chert and greywacke with occasional BIF’s. The unit can be up to 600 m thick and is generally iron-rich and may be siliceous in places. The Mount Bonnie Formation hosts the Rustler’s Roost gold deposit. Part of the Thunderball uranium deposit is hosted by the Mt Bonnie Formation. In addition, several gold and base metals deposits are hosted by the formation (e.g Enterprise gold mine, Iron Blow gold and base metals deposit)

Conformably overlying the Mount Bonnie Formation is the Burrell Creek Formation, interpreted as a flysch sequence of fine to coarse sediments and appears to be part of continuous sedimentation process. This Formation is considered prospective for gold deposits as typified by the Batman deposit at Mount Todd and Union Reefs goldfield. In addition, gold deposits such
as Bandicoot, Marrakai and Ringwood which are all located within the Burrell Creek Formation.

During Top End Orogeny, these rocks were deformed and metamorphosed to lower greenschist facies. Interpreted geology of the project area shows clear trends of southwest plunging anticlinal structures which are considered hosts for major gold deposits in the PCO. Anticlinal crusts such as Toms Gully, Rustler Roost, Union Reefs and several other locations host significant gold deposits together with gold mineralisation hosted by anticlinal limbs such as at Cosmo project area. These features are present within EL 29055 and points towards the prospectivity of the tenement for gold, uranium, base metals and iron ore mineralisation.

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.

The project area is located within Darwin 1: 250 000 sheet which was mapped by the Northern Territory Geological Survey (Pietsch and Stuart-Smith, 1987), and documented geology of the area included EL 29055. In the following years, project area was flown by airborne magnetic and radiometric surveys and that helped to understand geological setting and mineral potential of the area.

First record of exploration was undertaken by Geopeko under expired EL 142 which included part of the project area. Area under Licence was explored for gold and base metals mineralisation. It involved geological mapping, geochemical sampling and drilling. Assaying of surface sampling and drill chip did not encounter any encouraging results and as a result of that EL 142 was surrendered.

In 1978, part of the project area was explored under ceased EL 1559 and identified several low order anomalies during regional soil survey. Field checking of some anomalies showed that they were formed by minor background geochemical variation probably in metavolcanics. Assessment of all data provided no encouragement for further exploration and relinquishment of EL 1559 was recommended in 1978. A syndicate of two exploration companies (Pan D’Or Mining and Aquitaine Australia) explored part of the project area under EL 2097 by geological mapping, aerial geophysical survey and soil sampling program.
Gold and base metal potential of project area was evaluated by Newmont Enterprises and Newmont Holdings under expired EL 4703. Results of soil geochemistry identified elevated levels of Cu, Pb and Zn values that appears to be related to the tuffaceous unite of the Wildman Siltstone.

Sons of Gwalia (Brigden, 1992) evaluated mineral potential of EL 7159 (expired) which covered part of the project area. They mainly reviewed previous results of exploration programs which failed to identify any potential for base metals and gold mineralisation and subsequently EL 7159 was surrendered in 1993.

6.0 EXPLORATION ACTIVITY DURING THE TERM OF THE LICENCE

During the period under review, a technical review of the project area was undertaken. It involved retrieval of exploration data from open file reports, GIS entry and interpretation of geological, geochemical and geophysical data. In addition, a field trip was undertaken for ground-truthing. Exploration Index map of EL 29055 is shown in Figure 3.

Figure 3: Exploration Index Map of EL 29055
Previously north-western part of the project area was covered by some soil sampling programs, however, all assays were low and failed to revealed any mineral potential of the project area. During ground-truthing it was revealed that much of the area is covered by moderate to thick black soil cover or remnant of duricrust(?) which hampered access to bed rock geology. Surficial sampling program may be meaningless, if retrieved material is mainly transported which does not provide in situ material for assaying. Therefore, a suitable technique is required to sample the area for gold, base metals and uranium mineralisation.

A review of airborne magnetic data has provided important subsurface bed rock geology of the project area. Figure 4 shows the 1st VD image of the project area where anticlinal crests and limbs are marked by pronounced magnetic ridges. In the northwestern part of the project area (Figure 4), a significant magnetic anomaly is noted which may belong to fold crest or limb of an anticline, and is considered as an important exploration target. At this stage, significance of deep-seated structure located in the south of project area is not known.

**MINERAL POTENTIAL**

The PCO contains world class uranium, gold and base metal deposits uranium which are found in the Koolpin Formation (South Alligator River Uranium Field), Gerowie Tuff (Thunderball uranium deposit) and Mt Bonnie Formation (Enterprise, Quest 29, Thunderball), and these formations are well represented within the project area. EL 29055 is also located within two Archaean granite complexes (Rum Jungle and Nanambu complexes) which also points towards uranium potential of the project area. Geological history of the PCO strata shows that uranium has been mobile and many lithological units have been marked by elevated levels of the metals. It is highly likely that prospective lithological units along with fertile geological and structural settings may provide suitable traps for uranium deposition. The project area contains suitable lithological units such as Koolpin Formation, Gerowie Tuff and Mt Bonnie Formation, containing carbonaceous lithologies which could act as reducing agent for uranium deposition. During deformation anticlinal structures and faults could increase porosity of strata which may act as metal-rich fluid pathways. Although EL 29055 represents a Greenfield exploration target, however, it contains many features (discussed above) which makes it a good exploration target for uranium mineralisation along with other mineral commodities such as gold and base metals.
Figure 4: 1stVD Image of the Project area

However, much of the area is covered by a thick recent sedimentary cover which hampers access to bed rock geology. To retrieve samples for assaying, drilling is required. However, in this difficult economic environment what mineral exploration industry is facing, there is very low interest to investment dollars for Greenfield exploration. As a result of that it was decided to surrender the tenement on 17 September 2015.

7.0 CONCLUSIONS AND RECOMMENDATION

Appraisal and technical review of the project shows that it has prospective lithologies of the Wildman Siltstone, Koolpin Formation and Gerowie Tuff, which may hosts gold, base metals and uranium mineralisation. However, in this challenging economic environment, it is difficult to find necessary funds to invest in Greenfield project. As a result of that EL 29055 was surrendered on 17 September 2015.
8. REFERENCES


Thundelarra Exploration Limited 2009, Spectacular drill results from the Thunderbal Uranium prospect. Press Release to ASX.

