ANNUAL AND FINAL REPORT
ON
EL 27649
MARY RIVER PROJECT
FOR THE PERIOD
29 APRIL 2014 TO 9 JUNE 2015

Commodities: Gold, Copper, Uranium

Date: June 2015
Author: Costica Vieru, Laura Petrella

Distribution: Department of Mines and Energy
Element 92 Pty Ltd/Thundelarra Ltd
Copyright Statement as per Regulation 126 of the Mineral Titles Act

This document and its contents are the copyright of Thundelarra Limited. The document has been written by Costica Vieru and Laura Petrella for submission to the Northern Territory Department of Mines and Energy as part of the tenement reporting requirements as per Regulation 78(1) of the Mineral Titles Act.

Any information included in the report that originates from historical reports or other sources is listed in the "References" section at the end of the document.

Element 92 authorise the department to copy and distribute the report and associated data.
SUMMARY

Exploration License 27649 is located about 150 km SE of Darwin and approximately 25 km NE of Pine Creek in the Mary River area. It was granted to Element 92 Pty Ltd in 2010 and surrendered in June 2015. Element 92 Pty Ltd is a wholly owned subsidiary of Thundelarra Exploration Limited, and is conducting multi-commodity mineral exploration programs in the Northern Territory.

The project area is located within central part of the Pine Creek Orogen, which is a folded sequence of Palaeoproterozoic pelitic and psammitic sediments, with interlayered cherty tuff units. These rocks have been intruded by the late-orogenic Palaeoproterozoic granites, causing wide spread contact/thermal aureole which contains most of the gold and other mineralisation in the Orogen. Rocks of the Nameona Group (Masson Formation) and Mt Partridge Group (Wildman Siltstone, Mundogie Sandstone) are exposed in the project area. During Top End Orogeny (1870 – 1780 Ma), rocks within the Pine Creek Orogen were metamorphosed and deformed, and granites were emplaced in the culminating stages of the Top End Orogeny. During deformation, Palaeoproterozoic rocks were folded, faulted and sheared. Folding is mainly tight to isoclinal with NW trending fold axis. At least five phases of folding is recognised and amongst these D3 is most conspicuous, and considered significant for gold mineralisation.

During the tenement life, a technical review of geological and geophysical data collected to date was undertaken. A number of field visits were undertaken to check rocks in the project area. In addition, historical geochemical results retrieved previously was examined for anomalous values, particularly for base metals and gold. Geological, structural and geophysical data interpretation has identified magnetically anomalous areas which may have potential for base metals + gold mineralisation.

A technical review of the project area shows that EL27649 has geological setting where granite-sediments contact supports the prospectivity for base metals + gold mineralisation. Of particular interest are the anticlinal structures which are considered important for hosting mineralisation in the PCO. Prospectivity of the project area is further highlighted by the magnetic nature of the Mundogie Sandstone, located in close contact with the Minglo Granite. Historical soil sampling also shows elevated levels of base metals values. However, difficult access to the North of the tenement due to numerous creek crossing and the abundant presence of swamps to the South decided Element 92 to relinquished EL27649 in June 2015.
1. INTRODUCTION
Exploration License (EL) 27649 is located about 150 km SE of Darwin and approximately 25 km NE of Pine Creek in the Mary River area. It has been part of group reporting (GR-2000/11) arrangement and also comprising EL 27648 and EL 27650, which were surrendered in 2013. Thundelarra Exploration Ltd/Element 92 Pty Ltd are exploring the project area for gold, base metals and uranium mineralisation.

2. LOCATION AND ACCESS
The License is located about 150 km SE of Darwin in the Mary River area (Figure 1). The project can be accessed via Stuart Highway up to Pine Creek which is located at a distance of 220 km. From here, Kakadu Highway leads towards east and at a distance of 4 km, Frances Creek Road takes off to the Frances Creek Iron mine. Frances Creek Road is essentially a graded track which is being used to service the iron ore mine. From this turn off, a track leads to the project area which may not be passable during wet season. Within the tenement, access can be achieved via station tracks. Alternatively, project area can also be approached via Mt Wells Road which is an unsealed road, and could be challenging during wet season.

The climate is semi-arid, tropical with a warm dry season from April to September and a hot wet season from October to March. The average rain fall is 1200 mm and most of which falls during wet season. Temperatures are highest in October – November with a mean 35 – 37°C. The Coolest months are June and July when mean maximum is 30 – 32°C and the mean minimum is 12 – 14°C.

3. TENEMENT DETAILS
EL 27649 was applied for on 21 October 2009 and was granted on 29 April 2010 to Element 92 Pty Ltd for a period of 6 years. It has 8 blocks, occupying about 26.73 km². Element 92 Pty Ltd has decided to relinquish the license and it was surrendered on the 9 of June 2015.

The tenement falls within Mary River Station area which is Perpetual Pastoral lease. The Mary River Station is currently operated as hunting and fishing safari park under the name of Mary River Australian Safaris. The property is now specially fenced to accommodate various species of deer, antelope, water buffalo and banteng which are bred for hunting purposes.

Element 92 Pty Ltd is wholly owned subsidiary of Thundelarra Exploration Limited.
Figure 1: Location and exploration index map of the project area.
4. GEOLOGICAL SETTING

The project area is located within central part of the Pine Creek Orogen (PCO) which is a folded sequence of Palaeoproterozoic pelitic and psammitic sediments, with interlayered cherty tuff units (Needham and Stuart-Smith (1984) and Needham et al. (1988). These rocks have been intruded by the late-orogenic Palaeoproterozoic granites, causing wide spread contact/thermal aureole which contains most of the gold and other mineralisation in the Orogen (Bajwah, 1994). Some uranium mineralisation is also confined to contact areoles. Less deformed Mesoproterozoic sedimentary and volcanic sequences unconformably overlie the Palaeoproterozoic rocks and is overlain by Cambrian-Ordovician lavas, sediments and Cretaceous strata. Cainozoic sediments, laterite and recent alluvium may cover parts of the Orogen lithologies.

Figure 2 shows geological setting of the project area, where rocks of Namoona Group (Masson Formation), Mt Partridge Group (Wildman siltstone, Mundogie Sandstone) and South Alligator Group are exposed. During Top End Orogeny (1870 – 1780 Ma), rocks within the Pine Creek Orogen were metamorphosed and deformed, and granites were placed in the culminating stages of the Orogeny. During deformation, Palaeoproterozoic rocks were folded, faulted and sheared. Folding is mainly tight to isoclinal with NW trending fold axis. At least five phases of folding is recognised and amongst these D₃ is most conspicuous and considered significant for gold mineralisation.

The oldest rock unit, the Masson Formation crops out towards north of the project area (Figure 2) which has been intruded by the Minglo Granite. It is a thick sequence of carbonaceous phyllite, slate, siltstone and dolomite. The dolomitic sediments are exposed towards the base of the formation. Some massive ironstone and muscovite-tremolite marble horizons are also present. The Masson Formation hosts significant uranium mineralisation towards south at Cleo, twins and Mercedes. In addition, it also contains some occurrences of base metals mineralisation.

The Mundogie Sandstone is exposed within EL 27649 (Figure 2). Here, the formation has been intruded by Minglo Granite. It contains a thick sequence of coarse clastic sediments deposited in shallow marine and fluvial environment. Pyritic lithologies are present at places and contain sedimentary structures such as graded bedding, cross-bedding and load clasts. In addition, thin hematitic interbeds of phyllite, carbonaceous phyllite and sandy siltstone probably comprise less than 50% of the formation. Southern part of EL 27649 contains small outcrop of the Zamu Dolerite. Minor occurrences of vein type base metals and Au mineralisation is hosted by the Mundogie Sandstone.
Lithologies of the Wildman Siltstone are present towards north and east of the project area (Figure 2). It predominantly consists of pelitic sediments and some sandstone (~10%). Stuart-Smith et al., 1987 divided the Wildman Siltstone into two units – lower sequence and upper sequence. The lower sequence comprises carbonaceous phyllite, ironstone, siltstone and phyllite. At depth, most of the rocks are pyritic and carbonaceous. The lower sequence has
produced significant tonnage of iron ore from several localities within the Frances Creek iron field. The upper sequence contains silty phyllite siltstone and carbonaceous phyllite. In this sequence minor sandstone and rare dolarenite are also present. This formation has iron, gold, tin and base metal mineralisation.

5. PREVIOUS EXPLORATION HISTORY

Mary River project area (ELs 27648, 27649 and 27650) has been explored moderately in the past and number of research and exploration programs has been conducted by Government and exploration companies. Perhaps early systematic study of the geological setting of the areas covered by the current group of tenements was undertaken by BMR in 1963, when first version of geology map of Pine Creek (250,000) sheet was produced and mineral potential was assessed. In 1960’s, aerial magnetic and radiometric survey was carried out over the project area. This was followed by a number of exploration programs within and around the tenements by several companies. These activities have been airborne magnetic, radiometric, surveys, principally designed to target uranium, gold and base metal mineralisation. A brief history is given below.

In 1991, Carpentaria Gold Pty Ltd explored the southern blocks of EL 27649 and part of EL 27648 (Simpson, 1991). A total of 84 stream sediment samples were collected from EL 6164 and were assayed for gold. Only 4 samples returned anomalous gold with a maximum value of 1.75 ppb. From EL 6303, 62 stream sediments samples were collected. Only seven samples revealed gold anomalous values peaking at 4.40 ppb. Some rock chip samples were also collected which returned a maximum value of 0.10 g/t Au.

Northern Territory Gold Mines NL held part of the project area under EL 7155. They focused on areas of non-outcrop for soil sampling along with ferruginous cappings of sulphidic and carbonaceous rock units in the Koolpin Formation and tourmalinisied rocks were also carried out (Hosking, 1995). Structural interpretation using detailed aeromagnetic data, satellite imagery and aerial photography were undertaken with an emphasis on faults, shears and anticlinal axial zones.

Under EL 7674, NW blocks of the EL 27649 were explored from 1992 – 1995. Investigations of old tin mining area were undertaken to assess their gold potential. Panning of sand returned some specs of gold but results were generally disappointing (Biddlecombe, 1993). In 1994, another exploration program reported in which rock chip and soil sampling program was undertaken within EL 7674. Some elevated values of gold 9.06 ppm were reported but overall results were disappointed.
Northern Gold NL explored most part of the EL 27649 under expired EL 9026 (Socić, 1997). In 1996/97, company analysed open file digital data and planned a soil sampling program for the next year. Landsat and SPOT imagery was obtained from AGSO to assist in exploration program. A total of 110 soil samples were collected and assayed for gold and base metal mineralisation. These results were generally disappointing for gold and base metals. The high value returned was 1.4 ppb Au.

6. EXPLORATION DONE BY ELEMENT 92

During the tenement life, a technical review of geological and geophysical data collected to date was undertaken. A number of field visits were undertaken to check rocks in the project area. In addition, historical geochemical retrieved previously was examined for anomalous values, particularly for base metals and gold. Geological, structural and geophysical data interpretation has identified magnetically anomalous areas which may have potential for base metals + gold mineralisation.

YEAR ENDING 28 APRIL 2011

High resolution aerial geophysical (magnetic and radiometric) over of the project area was obtained in 2010 and .gdf formatted data are given in Appendix A. Processing and interpretation of the data revealed some important geophysical features of the project area, which are important for further exploration of EL 27649.

The Minglo Granite intrudes the meta-sedimentary sequence in the south where contact zone around the granite body is clearly defined by magnetic rim (Figure 3). It may be noted that Masson Formation hosts significant uranium deposits (Cleo Group), and magnetic feature of the Masson Formation within the EL 27648 suggest evidence of hydrothermal activity, which is indication of hydrothermal fluid flow from granite into meta-sediments, generating magnetic rim around the granite body. This type of magnetic rim around the Burnside Granite is also evident, where a number of gold deposits such as Zapopan, Rising Tide and Alligator have been found. These magnetic rims should be considered important exploration targets.
During the year under review, an appraisal of geological and geophysical data collected, so far, was undertaken, together with ground truthing to assess the mineral potential of the project area. In addition, 151 soil samples were retrieved from historical exploration reports and
entered into in-house GIS data base (Figure 5). Geological and geophysical data interpretation has identified magnetically anomalous areas which may have potential for gold and base metals mineralisation.

In 2011, EL 27649 along with other tenements were mapped in detail by a consultant geologist (Cotton, 2011), using 1:40000 aerial photographic cover. Geological and structural interpretation was made with the help of remote sensing data. This mapping program along with geophysical data interpretation has added much to our understanding of geological setting of gold, uranium and base metals mineralisation. Figure 4 shows geological setting of the area based on recent geological mapping program.

**Geological Interpretation**

All the geological and structural information suggest that the Hays Creek Fault (HCF) has an important role in localising uranium and gold mineralisation such as recently discovered Thunderball uranium deposit. One of the main aims was therefore, to look for prospective splays like HCF, and similar structures in the project area. During this program, EL 27649 was mapped completely along with partial mapping of EL 27650 which is now surrendered. It is expected that this program will be extended to other tenements in the project area. Following discussion is based on geological and geomorphological investigations undertaken by Cotton (2011). The pre-Cainozoic bed rocks include Palaeoproterozoic rock groups which are the Namoona Group, Mount Partridge and South Alligator River Group. The lithological characters of each group and their formations have been discussed earlier.

Figure 4 shows that the Mundogie Sandstone is predominant in EL 27649 and have been divided into two units; the Mundogie Sandstone 1 and Mundogie Sandstone U. Similarly, the Wildman Siltstone can also be divided into upper and lower units and has strong contrast between the lower recessive, U-anomalous unit to the upper boldly outcropping poorly radioactive unit. The radiometric response of the Mundogie Sandstone is dominated by the U-anomalism within the contact zones of the Minglo Granite. Structure of the project area is dominated by granite intrusion, open folding and a number of major fault structures. Granite intruded the strata with approximate concordant contact. Each formation has a topographic rim which may be discontinuous, marked by contact aureoles.

D3 folding is prominent in all data sets and is responsible for the present disposition of strata. The folds have shallow to flat plunges and overall change in plunge from north to north-easterly may be observed. There are a large number of axial plane faults some of which can be accurately traced for tens of kilometres. They are more often than not dislocating synclinal
axes. The strongest of these, which is confined to the Burrell Creek Formation, has a sinistral shift of around three kilometres (Cotton, 2011).

Figure 4: Geological and structural setting of the project area.
Geochemistry

Figure 5 shows historical soil sampling undertaken in the project area and in the surrounding region. All geochemical data is included in Appendix B.

Within EL 27649, a total of 138 samples were collected by CRA Exploration Limited and this program was also targeted base metals exploration. Assay data only contain results of Cu, Pb, Zn and Mn. Figure 5 shows spatial distribution of soil sampling within the project area. Cu concentrations varied from 5 ppm – 117 ppm with an average of 18 ppm. Pb is also in similar range (5 – 117 ppm; average 17 ppm). Zn is low and ranges from 5 – 167 ppm with an average of 16 ppm. Mn returned highest concentrations in soil/rock chip samples and varied from 11 – 5750 ppm with an average of 253 ppm.
Figure 5: Spatial distribution of historical soil sampling within project area.

YEAR ENDING 28 APRIL 2013

During year ending in April 2013, geology reconnaissance was done over the license however no sample was taken.
YEAR ENDING 28 APRIL 2014
During year ending in April 2014, a technical review of geological and geophysical data collected to date and a field visits were undertaken to check rocks in the project area. In addition, historical geochemical retrieved previously was examined for anomalous values, particularly for base metals and gold.

YEAR ENDING 28 APRIL 2015
During year ending in April 2015, a desktop study was undertaken including geological, geochemical and geophysical data appraisal.

7. CONCLUSIONS AND RECOMMENDATIONS
A technical review of the project area shows that EL27649 has geological setting where granite-sediments contact indicates prospectivity for base metals and gold mineralisation. Of particular interest are the anticlinal structures which are considered important for hosting mineralisation in the PCO. Prospectivity of the project area is further highlighted by the magnetic nature of the Mundogie Sandstone, located in close contact with the Minglo Granite. Historical soil sampling also shows elevated levels of base metals values. However, difficult access to the North of the tenement due to the lack of access track and numerous creek crossing and the abundant presence of swamps to the South decided Element 92 to relinquished EL27649.
8. REFERENCES


Cotton, B., 2011, Photogeological Mapping at 1:40 000 Scale of the Pine Creek Regional Area 2, Northern Territory. Consultant Report for Element 92 Pty Ltd.


9. APPENDICES
Appendix A: Aerial geophysical data
Appendix B: Historical soil geochemistry data