ANNUAL COMBINED REPORT (GR-2000/11)

ON EL 27648, EL 27649 AND EL 27650

MARY RIVER PROJECT

FOR THE PERIOD

29 APRIL 2010 TO 28 APRIL 2011

Tenement Holder: Element 92 Pty Ltd

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Author: Zia U. Bajwah

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Element 92 Pty Ltd/Thundelarra Exploration Ltd
SUMMARY

Exploration Licences (ELs) 27648, 27649 and 27650 are located about 150 km SE of Darwin and about 25 km NE of Pine Creek in the Mary River area. These were granted to Element 92 Pty Ltd in 2010 for a period of 6 years. Element 92 Pty Ltd is wholly owned subsidiary of Thundelarra Exploration Limited and is involved in multi-commodity mineral exploration 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 Namoona Group (Masson Formation), Mt Partridge Group (Wildman siltstone, Mundogie Sandstone) and South Alligator Group 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 reporting period, technical review of the project area was undertaken together with detailed geological mapping and high resolution aerial geophysical survey which covered part of the project area. Some reconnaissance visits were also conducted for ground-truthing. In addition, research on previous exploration programs was undertaken and previous exploration data were retrieved from archive repository and being entered into company’s data bases.

In the next reporting period, collection and interpretation of historical exploration data will continue along with processing and interpretation of recently obtained high resolution geophysical data. Ground-truthing of the project area will be undertaken to check anomalous zones along with rock chip and soil sampling program. Geochemical sample collected during this program will be assayed for uranium, gold and base metal mineralisation. It is also expected to complete geological and geomorphological mapping program of the project area.
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1.0 INTRODUCTION

Exploration Licences (ELs) 27648, 27649 and 27650 are located about 150 km SE of Darwin and about 25 km NE of Pine Creek in the Mary River area. On 8 May 2011, this group of tenements were granted combined reporting status and assigned group report no GR-2000/11. Thundelarra Exploration Ltd/Element 92 Pty Ltd are exploring the project area for uranium, gold and base metals mineralisation.

2.0 LOCATION AND ACCESS

Mary River Group of tenements 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 leads to NE to the Frances Creek Iron mine. It is essentially a graded track which is sued 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 tenements 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 the 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.

3.0 TENEMENT DETAILS

EL 27648 was applied for on 21 October 2009 and was granted on 29 April 2010 to Element 92 Pty Ltd for a period of six years. It has 6 blocks and covers 19.04 km². Second tenement in the group is EL 27649, which 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 and occupies about 26.73 km². The third and last tenement in the group is EL 24650 and was applied for on 21 October 2009 and was granted on 27 May 2010 for a period of 6 years. Element 92 Pty Ltd is wholly owned subsidiary of Thundelarra Exploration Limited and involved in multi-commodity exploration in the Northern Territory.

Underlying cadastre is PPL 1111 and is held by Ban Ban Springs Pty Ltd.
Figure 1: Location of ELs in the Mary River project
4.0 GEOLOGICAL SETTING

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 (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 within EL 27648 (Figure 2) which has been intruded by the Minglo Granite towards south. 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 27648 and EL 27649 (Figure 2). In both ELs, 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. Minor
occurrences of vein type base metals and Au mineralisation is hosted by the Mundoglie Sandstone.

Lithologies of the Wildman Siltstone are present in EL 27648 and EL 27650 (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 from 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.

Rocks of South Alligator Group are exposed only in EL 27650 (Figure 2), and these are the Koolpin Formation and Gerowie Tuff. The Koolpin Formation mainly contains carbonaceous mudstone, siltstone, and limestone. Iron formation is mainly confined to the middle of the unit. Upper part of the formation mainly comprises carbonaceous mudstone along with minor siltstone and mudstone.

The Gerowie Tuff is mainly composed of siltstone, phyllite and tuff, Tuffs constitute about 25% of the formation and contains varying amount of curved or angular crystal fragments of quartz, alkali feldspar, and minor sphene, biotite and zircon in a matrix of devitrified glass shards (Ahmad et al.1993). In places, re-crystallised K-feldspar, sercite, chlorite, iron oxide and carbonates are also present. Many of the tuffaceous horizons range from 30-150 cm thick graded beds with laminated tops. These graded beds are interpreted as ashfall accumulations from a single eruption (Stuart-Smith, 1985). A number of gold, uranium and base metal deposits are associated with the rocks of the South Alligator Group.

5.0 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 have 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
Figure 2: Geological Setting of the Project Area
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 focussed on areas of non-outcrop for soil sampling along with ferruginous cappings of sulphidic and carbonaceous rock units in the Koolpin Formation and tourmalinised 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 disappointing.

Northern Gold NL explored most part of EL 27648 and EL 27649 under expired EL 9026 (Socic, 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. Part of EL 27648 was explored by Northern Gold NL under 8424 (Mottram, 1998). Exploration work done included technical review of exploration data available at that time and soil/rock chip sampling program, geological mapping and RC drilling. Samples collected were assayed for base metals and gold. The results identified a north-west trending anomalous area in gold, arsenic and lead. One anomaly returned peak gold value of 44 ppb. In addition, 43 rock chip samples (2 kg each) were also assayed for gold which returned a maximum value of 3375 Au and 1950 ppm As. A total of 8 RC holes were drilled for 613 meters. Samples were assayed for gold which were discouraged further exploration.

EL27650 has been explored by several Governmental agencies and exploration companies with the aerial magnetic and radiometric survey along with geological mapping of the
McKinlay (1:100,000) and Pine Creek (1:250,000) sheets by BMR in 1960's. In 1970's, Comalco Limited explored the area for alluvial gold deposits. Fifty samples were investigated and it was determined that source of gold was outside the tenement boundary.

Another investigation for uranium, gold and base metal mineralisation was undertaken on part of EL 27650 by Occidental Minerals Corporation of Australia in 1977. In September 1981, Aquitaine Minerals Pty Ltd carried out a systematic helicopter borne radiometric survey in the project area, targeting the Koolpin Formation and Gerowie Tuff (D’Auvergne and Miller, 1981). Ground investigations of radiometric anomalies showed that they were confined to the tuffaceous horizons of the Gerowie Tuff, clay pans and black soil and drainage alluvium.

Under EL 4500, part of EL 27650 was investigated for uranium (Fraser, 1987). It involved detailed airborne radiometric and magnetic survey. Anomalies found were checked by ground radiometric and magnetic survey. In addition, rock chip sampling, gravel and stream sediment sampling was undertaken without success and eventually EL 4500 was surrendered.

Under EL 6637, Magnum Gold NL explored northern part of EL 27650 for gold and base metals mineralisation (Milligan, 1992). Exploration program included drainage geochemistry, utilising the BLEG analyses method. Samples associated with the Koolpin Formation showed potential for gold mineralisation.

**6.0 EXPLORATION YEAR ENDING 28 May 2011**

During the reporting period, technical review of the project area was undertaken together with detailed geological mapping and high resolution aerial geophysical survey which covered part of the project area. Some reconnaissance visits were also conducted for ground-truthing. In addition, research on previous exploration programs was undertaken and previous exploration data were retrieved from archive repository and being entered into company’s data bases.

EL 27649 and part of EL 27650 were mapped, utilising 1:40000 aerial photographic cover and topographic, geological and structural interpretation was made with the help of remote sensing data. The main purpose was to add in our understanding of geological setting of uranium and gold mineralisation. Figure 3 shows geological setting of the area based on recent geological mapping (Cotton, 2011).

**Geological and Geomorphological Mapping**

Cotton (2011) mapped the project area in order to understand geological and geomorphological setting which is known for uranium and gold mineralisation.
Figure 3: Geological and structural setting of the project area (Cotton, 2011)
Data and information obtained from air photos, remotely sensed data (Landsat, Quickbird and SPOT) and high resolution geophysical survey was also integrated. It is believed that the Hays Creek Fault (HCF) has an important role in localising uranium and gold (?) mineralisation. One of the main aims was therefore, to look for prospective splays from the HCF, and similar structure in the project area. During this program, EL 27649 was mapped completely along with partial mapping of EL 27650, and it is expected it that this program will be extended to other tenements in the project area. Following discussion is based on geological and geomorphological investigation undertaken by Cotton (2011).

The pre-Cainozoic bed rocks include Palaeoproterozoic rock groups which are the Mount Partridge and South Alligator River Group. The lithological characters of each group and their formations have been discussed earlier in section 5.

Figure 3 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. These units have been intersected by dykes or sills of the Zamu Dolerite.

EL 27650 is dominated by rocks of the South Alligator Group which are the Koolpin Formation, Gerowie Tuff and small amount of Mt Bonnie formation that is exposed in the south-western corner of the EL. They unconformably overly the Mount Partridge Group. These rock units are easily differentiated on all data sets (geophysical, air photos and imagery). The Koolpin and Gerowie Tuff form hilly terrain while the Mount Bonnie is largely recessive. There is a strong radiometric contrast between the K-anomalous Gerowie and the U-anomalous, low K & Th upper part of the Koolpin Formation. Also, the Koolpin Formation is intruded by the Zamu Dolerite sills which are poorly radioactive.

Structure of the project area is dominated by granite intrusions, open folding and a number of major fault structures. Granites intruded the strata with approximate concordant contact. Each forms 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).

**Geophysics**

During the period under review, partial aerial geophysical cover for the project area was obtained and gdf formatted data are given in Appendix 1. In addition open file geophysical data were obtained and some interpretation was made. Figure 4 shows TMI image of the project area.

As mentioned earlier that 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 4). Magnetic character of the Masson Formation within EL 27648 and the Mundogie Sandstone within EL 27649 is well-defined (Figure 4). 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 and it should be tested for the presence of mineralisation. Similarly magnetic character of the Wildman Siltstone also signifies the metallogenic potential of meta-sedimentary sequence within EL 27649. Further processing and interpretation of geophysical data is in progress and will be reported in the next year.

Exploration expenditures for EL 27648, EL 27649 and EL 27650 are given in Appendix 2.

### 7.0 PROPOSED EXPLORATION PROGRAM

In the next reporting period, collection and interpretation of historical exploration data will continue along with processing and interpretation of recently obtained high resolution geophysical data. Ground-truthing of the project area will be undertaken to check anomalous zones along with rock chip and soil sampling program. Geochemical sample collected during this program will be assayed for uranium, gold and base metal mineralisation. It is also expected to complete geological and geomorphological mapping program of the project area. Expenditure program for each tenement is given in appendix 2.
Figure 4: TMI image of the project area
8.0 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.


