ANNUAL REPORT
MLN 1028
NORTHERN TERRITORY
FOR THE PERIOD
24 FEBRUARY 2011 TO 23 FEBRUARY 2012

Author: Zia U. Bajwah
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Element 92 Pty Ltd (Thundelarra Exploration Ltd)
SUMMARY

MLN 1028 is situated about 150 km SW of Darwin, Northern Territory on the north-western side of the Golden Dyke Dome (GDD). It was granted to Derek Dixon on 24 February 1984, and is expected to expire on 2 May 2014. Thundelarra Exploration Limited secured the exploration rights from the tenement holder in March 2010, and took over the control of the project area.

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. MLN 1028 underlies the Mt Bonnie Formation and Gerowie Tuff. Both of these are part of the South Alligator Group which is host to gold, uranium and base metals mineralisation in the PCO. The lithological sequence is interlayered by the Zamu Dolerite. The Cenozoic unconsidered gravel hosts the Sandy Creek alluvial gold mine in the Northern Territory.

During the reporting period, a technical review of available geological data was undertaken, along with detailed geological mapping, conducted by consultant geologists. The main aim of detailed geological and structural mapping was to understand geological and structural setting of gold, uranium and base metals mineralisation in the area. This involved incorporation of remote sensing imagery, high resolution geophysical data, photo-geological interpretation and mapping of the structural setting of the project area.

Geological, structural and geophysical data interpretation of the project area has highlighted mineral potential for gold, uranium and base metals mineralisation. It is highly likely that Thunderball uranium mineralisation trend may extend into the project area, in addition to gold potential. In the next reporting period, a program of soil/rock chip sampling will be undertaken along with ground radiometric survey. If encouraging results received then a program of RC drilling will be conducted to test exploration targets in the project area.
TABLE OF CONTENTS

SUMMARY 2
1.0 Introduction 4
2.0 Location and Access 4
3.0 Tenement Details 4
4.0 Geological Setting 6
5.0 Previous Exploration Activity 8
6.0 Exploration Activity year Ending 23 February 2012 8
7.0 Proposed Exploration Activity 12
8.0 References 13

LIST OF FIGURES

Figure 1: Location of MLN 1028
Figure 2: Geological Setting of the Project Area
Figure 3: Sketch map of principal structural elements – GDD area (from Isles & Rankin 2011). Magnetic data – contoured RTP-1VD data (regional 200m line-spaced dataset).
Figure 4: Geological mapping (MLN 1028) conducted during the reporting period (Taylor, 2011)
1.0 INTRODUCTION

MLN 1028 is situated about 150 km SW of Darwin, Northern Territory (Figure 1) on the north-western side of the Golden Dyke Dome (GDD). Element 92 Pty Ltd (wholly owned subsidiary of Thundelarra Exploration Ltd) is exploring the area for gold, uranium and base metals mineralisation. This document reports the exploration activities on tenement for the period ending 23 February 2012.

2.0 LOCATION AND ACCESS

The tenement is located about 45 km NW of Pine Creek township and approximately 150 km SW of Darwin (Figure 1) within Pine Creek (1:250 000) sheet. The tenement can be approached by Stuart Highway, which turns into Grove Hill Road approximately 40 km NW of Pine Creek. Grove Hill Road is mainly unsealed and runs through the GDD and joins with the Fountain Head Road in the north. Vehicle access within the tenement is possible by station tracks, which may be impassable during wet season.

3.0 TENEMENT DETAILS

MLN 1028 was granted to Derek Dixon on 24 February 1986, and is expected to expire on 2 May 2014. Currently, it has 28 hectares and is located north-west of MCNs 632 and 633 which were also granted to the same owner. The tenement is located within Pine Creek (1:250 000) and Batchelor (1:100 000) sheets. Underlying cadaster is covered by NTPL 903 (Douglas Station).

Under an agreement, Thundelarra Exploration Limited secured the exploration rights from the tenement holder in March 2010, and took over the control of the project area.

The climate of the area is semi-arid, tropical with a warm dry season from April to September which is followed by a hot wet season from October to March. The average annual rainfall is about 1200 mm and most of it falls during the wet season.
Figure 1: Location of the Project area
4.0 GEOLOGICAL SETTING

The project area is located within central part of the PCO which is a folded sequence of Palaeoproterozoic pelitic and psammitic sediments, with interlayered cherty tuff units (Ahmad et al., 1993; Needham and Stuart-Smith, 1984; Stuart-Smith et al., 1987). These rocks were deformed and metamorphosed to greenschist facies metamorphism during Top-End Orogeny, and 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 obscure parts of the Orogen lithologies.

Geological setting of the project area is shown in Figure 2. MLN 1028 is located on the north-western side of the GDD area and underlies the Palaeoproterozoic rock formations. In the project area, these rocks belong to the Mt Bonnie Formation and Gerowie Tuff. Both of these are part of the South Alligator Group which is host to gold, uranium and base metals mineralisation in the Pine Creek Orogen. The Zamu Dolerite is folded within the lithological sequence.

The Mount Bonnie Formation comprises slates, mudstone, phyllite, siltstone and greywacke along with minor beds of chert and tuff and rest conformably on the Gerowie Tuff. Rare beds of iron formation and dolomite may also be present. The Mt Bonnie Formation hosts a number of gold, base metals and tin deposits. The banded iron formation hosts Au-base metals deposits such as Iron Blow and Mt Bonnie. Recent discovery of high grade uranium mineralisation north-east of the project area within the Mt Bonnie Formation further highlights its metallogenic significance.

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, sericite, chlorite, iron oxide and carbonates are also present. At places, gold and uranium mineralisation are hosted by the Gerowie Tuff in the PCO.
Figure 2: Geological Setting of the Project area
5.0 PREVIOUS EXPLORATION

In the previous exploration programs, project area and surroundings were covered by a number of expired ELs, where geological mapping and geochemical sampling have been conducted by several exploration companies.

The Sandy Creek area, adjacent to MLN 1028 was explored by Geopeko in 1985. This region was seen to contain some of the most concentrated and extensive alluvial diggings in the Pine Creek Orogen. During March 1987, Dominion Gold Operations Pty. Ltd. collected 15 aggregate rock chip samples from the northern part of Sandy Creek.

Samples were collected from discontinuous, poorly exposed and brecciated, quartz veins, 50cm to 2m in width, around the pits which occurred partly in the project area. The peak assays returned ranged from 2.1 to 6.4 g/t Au. The samples of gossanous, BIF reefs, on the ridge further south returned values of 0.04 to 0.45 g/t Au.

During 2006-07, a structural look at the total magnetic intensity of part of the project area was undertaken as well the possibility of whether further geophysical work such as EM is warranted over the landholding and incorporating both Mt Bonnie and Iron Blow to the north. Of particular interest is the large anticlinal fold containing Palaeoproterozoic stratigraphy and its northern extensions and the eastern limb which hosts other gold and base metals deposits/prospects.

6.0 EXPLORATION ACTIVITY YEAR ENDING 23 FEBRUARY 2012

During the reporting year, a technical review of available exploration data was undertaken, along with detailed geological mapping, conducted by consultant geologists (Taylor, 2011, Rankin, 2011) on a regional scale that also included MLN1028. The main aim of detailed geological and structural mapping was to understand geological and structural setting of gold, uranium and base metals mineralisation in the area. This involved incorporation of remote sensing imagery, high resolution geophysical data, photo-geological interpretation and mapping of the structural setting of the project area.

Gold and Uranium Mineralisation

There are a number of gold and uranium deposits/occurrences which are located around the project area (Figure 2). An important alluvial gold deposit is Sandy Creek where Cenozoic
unconsolidated sediments host alluvial gold mineralisation. It is one of the oldest and largest deposits that have been renowned for its gold nuggets. It has total recorded production of about 155 kg of gold (Ormsby, 1989).

The auriferous material at Sandy Creek unconformably overlies the Gerowie Tuff and Zamu Dolerite. These alluvial sediments consist of a basal boulder wash overlain by a layer of gravels rich in sand, clay and soil. These gravels have mainly been derived from the Mt Bonnie Formation, Koolpin Formation and Zamu Dolerite. A number of other small gold deposits such as Port Darwin Camp and Gold Shepherd are hosted by Gerowie Tuff, Zamu Dolerite and Mt Bonnie Formation. An important discovery of uranium mineralisation at Thunderball (Figure 2) is a significant milestone by Thundelarra Exploration Ltd in recent times.

Thunderball Uranium deposit is located along a northerly trending anticlinal axis and consists of veins and disseminations of uraninite (pitchblende) hosted within a folded brittle ductile shear zone that appears to plunge approximately 40 degrees to the north. In 2009, a 16 RC holes (2,383 metres) and 7 diamond holes (for 561metres) were drilled at Thunderball with the majority of holes returning significant intercepts including a best of 11 metres at 3.4% $\text{U}_3\text{O}_8$ within diamond hole TPCDDD026. The 4,000 ppm top cut affected five data composites that had uncut average grades of up to 76,000 ppm $\text{U}_3\text{O}_8$ and disproportionally increased contained metal by 200%. The uncut model comprises 775,000 tonnes at an average grade of 3,196 ppm $\text{U}_3\text{O}_8$ for 5.5 million pounds of $\text{U}_3\text{O}_8$ (400 ppm U lower cut). In similar geological setting, a number of other new uranium discoveries such as Bella Rose, Corkscrew and Mt Osborne are also located (Bajwah, 2012). Here, Hayes Creek fault and its subsidiary faults seem to play an important role for the concentration of uranium mineralisation. MLN 1028 underlies prospective geological setting where folded rocks of the Gerowie Tuff and Mt Bonnie Formation are intersected by the Hayes Creek Fault, a fertile geological setting for gold and uranium mineralisation. Furthermore, structural and geophysical interpretations also points towards prospectivity of the project area are discussed below:

Structural mapping and interpretation of high resolution geophysical data (Figure 3) indicate the presence of N- to NNE trending antiform (Rankin, 2011) that is secondary/parasitic to the more regional GDD. The fold axial trend swings from a SE-plunge in the south to a NE-plunge in the north. To the east of the primary fold axis, a series of secondary fold axes (including the Thunderball antiform) follow a parallel arcuate folds. These arcuate folds are interpreted as D1
structures. Figure 3 highlights the structural framework derived from the air photo interpretation and high resolution magnetic data (Rankin 2011).

The arcuate form of the F1 folds may be due to either:

- Contemporaneous (syn-D1) warping of the folds due to strain buttressing between granite plutons (assumes at least some major granites emplaced pre / early D1). In this model, the main Z-vergent warping of the GDD antiform from N-S through NE- to N-S may have been due to a component of dextral shear along the NE-trending stratigraphic belt forming the NW regional limb of the GDD.

- b) D2 E-W refolding of F1 during later N-S compression. In this model, N-S compression may have been accompanied by emplacement of the main regional granites.

In Rankin’s (2011) interpretation of structural and magnetic data, Hayes Creek Fault zone could not be identified. There are several ENE- to E-trending faults / fractures and / or veins in the west of the area that extend across part of the southern area where the Hayes Creek Fault zone has been previously interpreted, but these bend to the east, intersecting the GDD with limited to no displacements. The location of the fold hinge in the magnetic data is directly coincident with the previously – mapped location of the main Thunderball antiform. The possible tight fold closure to the east is considered a minor parasitic fold on the eastern limb of the Thunderball Antiform.

Taylor (2011) mapped the geology of the project area (Figure 4) and noted the presence of dolerite hosted Au-quartz vein system and alluvial gold present in the Sandy Creek area. It is important to note that alluvial gold has been derived from weathering of gold-bearing horizons present within Palaeoproterozoic lithologies such as South Alligator River Group (Mt Bonnie Formation, Koolpin Formation) and the Zamu Dolerite. Mapping revealed that underlying stratigraphy of the project area is prospective for gold mineralisation. Furthermore, structural and geophysical interpretation supports this contention. Recent mapping suggests that some of auriferous lodes might extend into the project area. Similarly, high grade uranium mineralisation at Thunderball which is located just outside the project area further highlights uranium potential of MLN 1028.
Figure 3: Sketch map of principal structural elements – GDD area (from Isles & Rankin 2011). Magnetic data – contoured RTP-1VD data (regional 200m line-spaced dataset).
7.0 PROPOSED EXPLORATION ACTIVITY

Geological, structural and geophysical data interpretation of the project area has highlighted mineral potential for gold, uranium and base metals mineralisation. It is highly likely that Thunderball uranium mineralisation trend may extend into the project area, in addition to gold potential. In the next reporting period, a program of soil/rock chip sampling will be undertaken along with ground radiometric survey. If encouraging results received then a program of RC drilling will be conducted to test exploration targets in the project area.

Figure 4: Geological mapping (MLN 1028) conducted during the reporting period (Taylor, 2011)
8.0 REFERENCES


