LEGEND INTERNATIONAL INVESTMENTS
PTY LTD

Annual report on EL 25789 from 9 July 2010 to 8 July 2011

Central Australia, Northern Territory

Tenement Holder: Legend International Investments Pty Ltd

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Exploration Licence (EL) 25789 is located about 1027 km south of Darwin and 27 km south of Tennant Creek. It now covers 29 sub blocks (~ 73.8 km²) on the Tennant Creek (1:250 000) sheet. EL was granted to Legend International Investment Pty Ltd on 9 July 2008 for a period of six years, and will expire on 8 July 2014.

The Palaeoproterozoic Tennant Creek Inlier comprises the Ashburton province to the north and Davenport province to the south, separated by Tennant Creek Province. Much of the project area is covered by thick sand sheets, relict fluvial system often covered by sand and uncommon colluvium and scree deposits. Interpreted geology of the project areas shows that it mainly contains rocks of Junalki Formation, Orradidgee Group and undifferentiated granite, which are all buried below surficial cover.

During the year under review, a number of field visits were undertaken in order to secure access within the project area. A program to obtain high resolution geophysical survey (magnetic and radiometric) of the project area was completed, and data were received from UTS Geophysics after processing. Geophysical survey was flown with 100 m line spacing at a height of 50 m. In addition, a soil sampling program was undertaken to test the mineral potential of the project area. A total of 237 soil samples were taken and analysed for a suite of 29 elements. In many soil samples some REEs show elevated concentrations.

New high resolution geophysical cover of the project area has provided new insights about the bed-rock geology, and will generate targets for drilling. This will lead to Air core/RC drilling program which should penetrate deep into bed rock geology. Samples retrieved during drilling will be petrographically examined, and assayed for a suite of elements, which should help to identify bed-rock geology and its mineral potential.
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1.0 INTRODUCTION

EL 25789 covers strategic landholding which is located about 1027 km south of Darwin and 27 km south of Tennant Creek township, which has been main gold mining centre in the previous century. This report covers the exploration activities undertaken during the reporting period year ending on 8 July 2011.

2.2 TENEMENT STATUS

EL 25789 was applied for on 7 December 2006 and was granted on 9 July 2008 for a period of 6 years and will expire on 8 July 2014. Originally, it had 33 blocks (84.71 km$^2$). To meet NT Mining Act requirement, 4 eastern blocks were surrendered in 2010. Now it has 29 blocks and covers about 73.8 km$^2$. Legend International is exploring the tenement for a number of mineral commodities.

1.0 LOCATION AND ACCESS

EL 25789 is situated in central Australia and is located about 1027 km south of Darwin and 27 km south of Tennant Creek (Figure 1). The tenement is transacted by Stuart Highway and Adelaide to Darwin Railway line in the east. It is situated in the southern part of Tennant Creek (1:250 000) and Tennant Creek (1:100 000) sheets. Access to the project area is available by Stuart Highway then by four wheels drive station tracks. The project area is mainly covered by red sandy plans with occasional sand dunes in the north. Underlying cadastre is covered by PPL 1142.

The area experiences a continental desert climate with annual rain of about 100 millimetres. Summers are dry and hot with maximum temperature over 50°C whilst winters are relatively cooling (maximum 30°C). Winter season is the most suitable for exploration.
Figure 1: Tenement Location Map
4.0 Geological Setting

The project area is located within the Palaeoproterozoic Tennant Creek Inlier which crops out over an area of 45 000 km$^2$ in central Australia. It comprises the Ashburton province to the north and Davenport province to the south, separated by Tennant Creek Province (Donnellan et al., 1999).

The main lithologies in the Tennant Creek Province are turbiditic flysch succession represented by the Warramunga Formation and granites. Extrusive subaerial volcanic rocks comprising rhyolite and rhyodacite, ignimbrite, lava and tuff and associated volcaniclastic and clastic sedimentary rocks are also present, and are broadly coincident in both space and time (Donnellan et al., 1999). The Tennant Creek Inlier was deformed and metamorphosed (D2) probably contemporaneously with the Strangways Orogeny.

Much of the project area is covered by thick sand sheets, relict fluvial system often covered by sand and uncommon colluvium and scree deposits. Our current knowledge of sub-surface geology is based on geological and geophysical interpretation by the Northern Territory Geological Survey ((Donnellan et al., 1999), which is complimented by exploration and mining companies work in the area.

Interpreted geological setting of the project area is shown in Figure 2. The Junalki Formation, the oldest rock unit in the project which forms a small part in the northern corner (Figure 2). It mainly comprises lithic arenite, volcanilithic arenite, siltstone and mudstone, rhyodacitic lava, crystal-lithic tuff, lapilli tuff and ignimbrite.

Much of the southern part of the tenement is covered by undifferentiated granite which does not crop out in the project. It is buried by a thick cover of sand sheet or small dunes. It is believed to be equivalent to Tennant Creek Supersuite dated at 1848 ±7 Ma – 1853 ±10 Ma. There is also a possibility that it might be part of Treasure Suite. The Tennant Creek Supersuite is medium to coarse grained porphyritic with rapakivi textures and in places may
Figure 2: Geological Setting of the Project Area
also be gneissic in nature. Common minerals are plagioclase, orthoclase, biotite, magnetite with accessories such as ilmenite, magnetite, muscovite and sphene. Some of these mineralogical assemblages resemble to those of S-type granites (Chappell and White, 1974).

A distinct feature of the buried granite in the project area is that it has extensive system of NW-trending dykes as shown in Figure 2. Dyke system identified by Donnellan et al (1999) is shown on TMI image in the form of NW-trending magnetic ridges (Figure 4). North-eastern side of the project area shows more pronounced magnetic ridges which may be artefact of thin sedimentary cover. It appears that this distinctive feature of the project area has not been tested with appropriate drilling so far. Therefore, buried body of granite should be explored for Olympic-style gold, uranium and copper mineralisation. Devil Suite Granite body induces a strong contact aureole towards north-west (Legend International Annual Report 2010).

Northern part of the project area is covered by undifferentiated rocks of the Orradidgee Group/Junalki Formation. The problem has been in accessing the buried rocks which has hampered their proper identification and classification into proper formation and group. Further north, there are some rocks which belong to Orradidgee Group and mainly contain magnetic volcano-sedimentary succession.

5.0 Previous Exploration Activity

As mentioned previously that project area is mostly covered with Cainozoic sand sheets and occasionally colluvial and silcrete deposits, which masked bed rock geology. This discouraged companies to explore the area due to lack of geological knowledge.

Nevertheless, northern part of the tenement was explored by Nobelex NL (1973). It carried a campaign of geophysical survey and drilling. However, none of the geophysical anomalies or drilling covered the area.

Nobelex NL acquired another EL 143 which covered part of western part of the project area. During exploration program geophysical survey was carried out and some of the anomalies identified were drill-tested, however, none of these fell within the project area. Another geophysical survey was undertaken
in 1975 which identified a few magnetic anomalies in the project area. These anomalies were tested with drilling but revealed no prospective Warramnga Formation (Nobelex, 1976), and tenement was surrendered. During 1970’s western part of the project was explored by Geopeko Limited (Howard, 1978). It mainly involved geological mapping and vehicle-based magnetic survey. A number of magnetic anomalies were recognised, but during ground truthing none was considered worthy of further exploration, and EL was eventually surrendered.

In 2009-10, a desk top study of the project area was undertaken. For this purpose, data obtained during previous exploration programs were examined together with data collected by NT Geological Survey/Australian Geological Survey Organisation. Mapping conducted by the Government organisations has provided geological setting of the project area in regional context which is important in evaluating mineral potential of the project area. Also, high resolution geophysical survey of the project area commenced.

**6.0 Exploration Activity year Ending 8 July 2011**

During the year under review, a number of field visits were undertaken in order to secure access within the project area. A program to obtain high resolution geophysical survey (magnetic and radiometric) cover of the project area was completed, and data were received from UTS Geophysics after processing. In addition, a soil sampling program was undertaken to test the mineral potential of the project area.

Almost all the project area is covered by a thick soil cover (Figure 3). Composition of cover suggests that probably it is the result of weathering of duricrust, which formed during Cainozoic, and it covered much of northern Australia. Best available geological information is based on the interpretation which has been derived from the geophysical and inferred geological interpretation with no information on the lithological and mineralogical characters of rocks in the project area. This way this project represents a real “Greenfield Target”. Previous investigations in the 1970’s have been unsuccessful. However, new high resolution geophysical survey which has
recently been flown by Legend International, offers new hope to reveal sub-surface geological information, which may help in developing an exploration strategy.

**Geophysical Survey**

During the reporting period, airborne geophysical cover of EL 25789 was completed by UTS Geophysics along with data processing. A total of 1024 line kilometres were covered with 100 m line spacing at a height of 50 m. All geophysical data (GDF formatted) along with logistic report is given in Appendix 1.

TMI image of the project area is shown in Figure 4, where a magnetically anomalous area is well marked in north-eastern corner of the project area. Dyke system identified by Donnellan et al (1999) is also shown in the form of
Figure 4: TMI Image of the Project Area
NW-trending ridges. North-eastern side of the project area shows more pronounced magnetic ridges which may indicate area of mineralisation. It appears that this distinct feature of the project area has not been tested with drilling. Therefore, buried body of granite should be explored for Olympic-style gold, uranium and copper mineralisation. Devil Suite Granite body induces a strong contact aureole towards north-west of the project area (Legend International Annual Report 2010). This effect of this contact aureole could have extended into EL 25789 by the fault systems present in the area. Faults intersecting Junalki Formation and Orradidgee Group rocks are also areas of interest because they could have acted as conduit zones by fluids emanating from deep seated granites supported by gravity data.

Total Uranium image of the project area is shown in Figure 5 which lacks any significant areas of high radioactivity. Although, eastern part of the tenement appears to be more radioactive as compared to western part of the project area.

**Soil Geochemical Survey**

In September – October 2010, Legend International undertook soil sampling program in the project area, and 237 soil samples were taken. The main purpose was to find, if any geochemical signature can be picked up from sampling. For this purpose, soil samples were taken from ‘B Horizon’ and a 20 – 30 pit was excavated and 1-2 kg sample was taken from each site. These samples were dispatched to Amdel Laboratories for assaying of a suite of 29 elements. These results are given in Appendix 2 along with their detection limits.

**Analytical Methods**

Samples were dried to a core temperature of approximately 100°C. The total sample was then milled in an LM5 pulveriser to 90% passing 106 μm. An analytical pulp of 250 g will be taken from the bulk and the residue retained, where practical, in the original bag.
Figure 5: Total uranium image of the project area
Atomic Absorption Spectrophotometry (AAS) technique was used to analysed gold from sample submitted. A subsample of 40 g of the analytical pulp is fused in a lead collection fire assay. The resultant prill is digested in aqua-regia and the gold content of the sample determined by AAS.

A group of elements (Cu, Pb, Zn, Ni, Ti, Mn, Fe, V, P) was analysed by ICP-OES technique. A subsample of up to 0.2 gram of analytical pulp is digested using an HF/multi acid digest and the solution is presented to an ICP-OES for the quantification of the elements of interest. As Ca, Cr and Mg were assayed by ICP-OES. ICP-MS was used to analysed Bi, Cd, Cs, Ce, Ga, In, La, Nb, Th, Y and Zr.

An examination of data show that elements of interest such as Au, U and base metals (Cu, Pb, Zn) are considerably low in concentrations, and in particular gold in most of the samples is below detection limit. Uranium concentration varies from 1.0 to 2.5 ppm with an average of 1.4 ppm. Cu concentrations vary from 6 to 34 ppm with an average of 10.8 ppm. Similarly, Pb and Zn are also low. It may be noted that Th in soil samples shows elevated concentrations, ranging from 6.5 ppm to 11.0 ppm with an average of 8.0 ppm.

However, REEs show elevated values from many soil samples analysed from EL 25789. Amongst these Ce, La, Nb, Y and Zr are significant and should be followed by auger/air core drilling. Ce appears to have most elevated concentrations within soil samples which ranged from 22.0 ppm to 40.0 ppm with an average of 27.0 ppm. Soil samples are also characterised by elevated concentrations in Zr. It ranged from 55 ppm to 120 ppm with an average of 94 ppm.

Other activities included reconnaissance visits, report writing and tenement administration. This program costed $71910.00 and details are given in expenditure report (Appendix 3).

7.0 Proposed Exploration Activity

New high resolution geophysical cover of the project area has provided new insights about the bed-rock geology, and will generate targets for drilling. This
will lead to Air core/RC drilling program which should penetrate deep into bed rock geology. Samples retrieved during drilling will be petrographically examined, and assayed for a suite of elements, which should help to identify bed-rock geology and its mineral potential. A minimum budget of $40000.00 has been set-aside for this program.

8.0 References


