Enterprise Mining Pty Ltd
Suite 1228, 401 Docklands Drive,
Docklands, Melbourne, VIC, 3008
Office: + 61 3 9640 0772
Email: aldob@enterprisemining.com.au

FINAL REPORT, EL29857 LIMBUNYA,
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prepared for
KINGSLAND RESOURCES PTY LTD

by
Reynard Australia Pty Ltd

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1. INTRODUCTION
There was no further work or expenditure on EL29857 in the period from the last annual report on 3 December 2014.

Enterprise Mining hold 6 exploration licenses within the Northern Territory (figure 1) through subsidiaries Kingsland Resources Pty Ltd and Australis Minerals Pty Ltd. These licenses fall along the G2 linear and/or associated linears within target areas identified by Dr Hugh Rutter. Dr Rutter was part of the WMC team that discovered the Olympic Dam deposit in South Australia. The Olympic Dam deposit also falls along the G2 linear.

A review of the known linears within Australia demonstrates a strong correlation between Proterozoic or earlier mineralisation with major NNW trending linears, including the Cloncurry linear (Mount Isa-Cobar-Lake Cargelligo), the Kalgoorlie linear (Norseman-Kalgoorlie-Coolgardie-Menzies-Wiluna-Pilbara) and the G2 linear (Olympic Dam-McDills-Alcoota-Wave Hill-Victoria River-Delamere). Other linear sets trend NW and NE. These can be associated with other major centres of mineralisation including Broken Hill, McArthur River, Pine Creek, Mt Magnet/Meekatharra, Tennant Creek and others. The linears are thought to be deep seated structural features which may form conduits for mineralising fluids. The G2 linear is thought to be around 1600 Ma old.

Dr Rutter considered the G2 linear to be under explored and identified some 11 prospective areas along the G2 linear. Enterprise Mining then examined each of these areas to select sites with suitable geology, geophysics and ground availability. Of the 11 sites, 7 were discounted because of a lack of ground availability. Within the remainder a total of 8 exploration licenses were applied for of which 2 have been relinquished because the available ground did not include the most favorable geological units.

The Enterprise licenses cover targets along the G2 linear that have seen very little recent exploration for metallic minerals and for which there is a distinct lack of existing ground based data. They are based on a combination of prospective geology and anomalous geophysical features. Initial exploration is expected to include more detailed geophysics to generate targets which may warrant further investigation.
2. RELATIONSHIP BETWEEN LINEAMENTS AND MAJOR MINERALISATION

Figure 2 shows the main lineaments within Australia along with the locations of historical mines and the major metalliferous mining centres. This map clearly illustrates a strong correlation between the lineaments and mineralisation, at least in Proterozoic and Paleozoic rock units.

Four main lineament trends are evident;

**NNW TRENDING SET:** These appear to have a very strong influence on mineralisation, and include;

1. The Cloncurry Lineament. This influences the Mount Isa mineralisation, and extends southward through the Cobar district mineralisation, the Lake Cargelligo deposit and onwards.
2. The Kalgoorlie Lineament. This influences the Major Norseman, Kalgoorlie, Coolgardie, Menzies, Wiluna mineralisation in Western Australia and extends Northward through the Pilbara area, including the Telfer, numerous smaller gold mines as well as the major Ta/Sn mine at Wodgina.
3. The G2 Lineament. This extends from near Adelaide in South Australia and extends through to West of Darwin and influences the major Olympic Dam deposit in South Australia, Alcoota and Pine Creek in the NT as well as numerous smaller deposits.
4. The Perth Lineament. This influences the Greenbushes Sn/Ta deposit, the Boddington gold mine as well as numerous smaller deposits.
NE TRENDING SET: These appear to have a moderate to strong influence on mineralisation and include;
3. Boddington - Mt Magnet - Meekatharra - Wiluna
4. Halls Creek - Pine Creek

NW TRENDING SET: (This may be two sets, with one set at about 040° and another at about 060°).
These appear to have a moderate to strong influence on mineralisation and include;
1. Pine Creek - McArthur River - Mt Isa - Crackow
2. Halls Creek - Callie -Rover - Cobar
3. Pilbara - Olympic Dam - Broken Hill - Lake Cargelligo
4. Southern Cross - Norseman

3. OTHER FACTORS AFFECTING THE DISCOVERY OF MINERALISATION
There are a number of factors which will affect whether mineralisation has been discovered. These include;
1. Cover by later sedimentary basins: Figure 3 illustrates the major sedimentary basins in Australia in relation to the lineaments and known metalliferous deposits. Sedimentary basins from the Neoproterozoic and younger effectively mask mineralisation, and the explorer is reliant on geophysical methods in particular to target areas.

For the G2 linear, the Warburton, Amadeus and Wiso Basins have clearly masked mineralisation, with discovered deposits mainly grouped in the areas where basement rocks are exposed between these basins. The Olympic Dam and Rover deposits for example are under thick cover and were discovered by detailed geophysics followed by drilling.
2. **Favorable Geology**: Some rock units on the group or formation level are more highly mineralised than others and this is an important factor in area selection.

3. **Ground Availability**: Ground may already be under license, or may be within various reserves and be generally unavailable.

4. **Remoteness**: Some areas are remote from access and are underexplored for this reason. With the move towards remote sensing techniques for exploration, this factor is becoming less relevant, but may explain a lack of discoveries in the past.

### 4. THE ENTERPRISE MINING GROUND SELECTION STRATEGY

**Australis Minerals and Kingsland Resources**

The ground selection was instigated by Dr Hugh Rutter on the basis that the NNW trending G2 linear was underexplored North of the Olympic Dam deposit. A number of areas were selected on the basis that they were near to the G2 linear and in areas with favorable geology and geophysics. Each of these areas was examined in detail for ground availability and 8 exploration licenses applied for (figure 1 and table 1). Two of these have since been discarded as the available ground did not cover the most favorable rock units.

#### Table 1: Enterprise Tenements

<table>
<thead>
<tr>
<th>Tenement Location</th>
<th>Registered Holder/Applicant</th>
<th>Status</th>
<th>Grant date/Application Date</th>
<th>Area</th>
<th>Licence Number</th>
<th>Minerals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanami Northern Territory</td>
<td><em>KIR</em> Granted</td>
<td>26-Jul-11</td>
<td>1549km²</td>
<td>ELA28908</td>
<td>Gold, Copper, base metals, potash</td>
<td></td>
</tr>
<tr>
<td>Limbunya Northern Territory</td>
<td><em>KIR</em> Granted</td>
<td>4-Dec-13</td>
<td>796km²</td>
<td>ELA29857</td>
<td>Gold, Copper, Base Metals</td>
<td></td>
</tr>
<tr>
<td>Stokes Range Northern Territory</td>
<td><em>AUR</em> Application</td>
<td>19-May-12</td>
<td>717km²</td>
<td>ELA29498</td>
<td>Gold, Copper, Base Metals</td>
<td></td>
</tr>
<tr>
<td>Surprise Creek Northern Territory</td>
<td><em>AUR</em> Granted</td>
<td>20-Feb-13</td>
<td>122km²</td>
<td>ELA29499</td>
<td>Gold, Copper, Base Metals</td>
<td></td>
</tr>
<tr>
<td>Victoria River Northern Territory</td>
<td><em>AUR</em> Granted</td>
<td>10-Apr-13</td>
<td>609km²</td>
<td>ELA29590</td>
<td>Gold, Copper, Base Metals</td>
<td></td>
</tr>
<tr>
<td>Mt Hodgson Northern Territory</td>
<td><em>AUR</em> Granted</td>
<td>22-Jul-13</td>
<td>234km²</td>
<td>ELA29589</td>
<td>Gold, Copper, Base Metals</td>
<td></td>
</tr>
</tbody>
</table>

*KIR=Kingsland Resources Pty Ltd  
(#Limbunya Northern Territory This report)
The Olympic Dam Deposit - Discovery WMC 1970's

In South Australia there was evidence of copper mineralization extending from Moonta in the south, then northwards through Andamooka and onwards to the coast in the Northern territory. Many of these mineral occurrences where old time mines and “diggings”.

Dr Hugh Rutter compiled the regional geophysics of South Australia, particularly the gravity and magnetic data, and analysed this for buried rock type and structure. An extensive linear feature was recognized, which is now known as the G2 Linear. It extends from the Moonta area of South Australia to the northern coast of Australia, west of Darwin (Figure 2).

A detailed interpretation of the geophysical data, integrated with any geological and mineral information led to the recognition of a prospective area on the Roxby Downs pastoral station. There was no evidence of mineralization on the surface. Detailed magnetic and gravity data suggested a target at between 300m and 400m. A detailed seismic survey which confirmed a target depth of 335m.

Dr Rutter located a site for the first drill hole RD1 which intersected a brecciated granitic rock at 335m, which contained 3.5% copper plus uranium. Olympic Dam had been discovered. Western Mining concentrated on this area and other explorers investigated the surrounding areas.

The fact that the major G2 linear feature extended northwards to the west of Darwin was forgotten.

Area Selection Criteria

Within each of the prospective locations selected by Dr Rutter exploration licenses were applied for utilising geophysical and geological information available from the NT Department of Resources. The data available included;

- Topographic maps composite
- Geological maps composite
- Gravity image
- Total magnetic intensity image
- Ternary radiometrics image
- Magnetic worms image
- Landsat 741 image
- Landsat 742 image.
- Mineral deposit, rock chip, whole rock, soil sampling and drill information.
- Ground availability.

Of the 11 sites selected by Dr Rutter, 7 were discarded due to a lack of ground availability either because of existing exploration licenses or State/Territory/National reserves of some type. Licenses were taken up at the Green Swamp Well, Delamere, Victoria River Downs and Limbunya sites.

5. EXPLORATION LICENCES

Four licenses are located in the Northern Territory South of Timber Creek (EL29498, EL29499, EL29589 and EL29590). These licenses cover magnetic and gravity features within the Birrundudu Group and are thought to be prospective for sediment hosted base metal mineralisation. These licenses fall close to the intersection of the G2 linear with a NE trending and NW trending linears. The NE trending linear also passes through the highly
mineralised Pine Creek Geosyncline.

EL29857 at Limbunya also falls on the same NE trending linear that extends from Arnhem Land through Pine Creek, Timber Creek and on to the Lamboo area of Western Australia. It covers the contact between the Finnis River Group and the Wattie and Bullita Group.

![Map showing geological features and license areas]

**Figure 4. Relationship between EL29498, EL29499, EL29589, EL29590 and EL29857, the G2 linear and NE trending and NW trending linears in the NW of the Northern Territory.**

**Limbunya: (ELA 29859)**

- The license covers a 20 mgl gravity anomaly west of the G2 linear
- coincident magnetic anomalies
- complex north-west to south-east structures
- located on the junction of the Victoria River Basin, Ord Basin and Birrundudu Basin.

The ground prospective for disseminated strata bound copper and barium mineralisation within rocks of the Ord Basin.

Copper mineralisation forms on the contact between top basaltic flows and the underlying Headleys Limestone of the Negri group. The license covers a 20 mgl gravity anomaly west of the G2 linear with coincident magnetic anomalies and complex north-west to south-east structures and is located on the junction of the Victoria River Basin, Ord Basin and Birrundudu Basin.

The licenses are in areas which have seen little exploration and the emphasis should be on generating drill targets using a combination of modern remote sensing techniques with the expectation of finding significant mineralisation of one or more of the license areas. Several prominent structural features are evident on the aeromagnetic image and these may be associated with mineralisation (Figure 12).
The Inverway barium mine within the application area has a quoted resource of 38000 t of 99% BaSO4 (Mendum 1972), with 6 veins to 1.5 m width exposed in open cuts.

Mineralised manganiferous black limestone possibly of fumarolic origin forms a circular feature about 50 m diameter at the Caves Mine to the west of the EL29587.

Figure 5: EL29857 Aeromagnetic image.

EL29857 of 796 sq km located in the near to the WA border covering ground prospective for disseminated stratabound copper and barium mineralisation within rocks of the Ord Basin. Copper mineralisation forms on the contact between top basaltic flows and the underlying Headleys Limestone of the Negri group. The license covers a 20 mgl gravity anomaly west of the G2 linear with coincident magnetic anomalies and complex north-west to south-east structures and is located on the junction of the Victoria River Basin, Ord Basin and Birrindudu Basin.

The licenses at Tanami and Limbunya were selected on the basis of their relationship with the G2 linear as well as co-incident magnetic and gravity features in prospective rock units.

The licenses are in areas which have seen little exploration and the emphasis should be on generating drill targets using a combination of modern remote sensing techniques with the expectation of finding significant mineralisation of one or more of the license areas.

EL29857 lies within the Birrindudu Basin of the Victoria River Region. Steeply dipping Palaeoproterozoic dolomitic and carbonaceous metasediments of the Inverway Metamorphics are unconformably overlain by Mid to Upper Proterozoic marginally deformed and metamorphosed shallow-marine basin sediments of the Inverway Group which is described as a 1250m thick unit of
carbonate and siliciclastic rocks correlated with the McArthur Basin. The Cambrian Antrim Plateau Volcanics overlie the Inverway Group. Most rock types are observed at surface and are partially covered by Cainozoic sediments. (Rawlins & Sullivan 2012)

Sedimentary rocks of the Neoproterozoic Limbunya Group are the most extensively exposed rock types particularly in the northern and central parts of the EL.

Formations within the Limbunya group exposed within the area are as follows:
- Cambell Springs Dolomite (grey massive dolomite, minor dolarenite, abundant stromatolites)
- Blue Hole Formation (Pink, grey and purplish silty dolomite, siltstone and dolomite, stromatolitic in places)
- Farquarson Sandstone (Fine and medium quartz sandstone, minor siltstone)
- Mallabah Dolomite (Grey and buff dolomite)
- Pear Tree Dolomite (Dolomite and dolarenite)
- Margery Formation (Siltstone and claystone, minor dolomite, chert at top and base) and Stirling Sandstone (White and brown quartz sandstone, basal grit and minor conglomerate).

Also in the northern and central parts of the EL, the Neoproterozoic lithologies are in part overlain by the Lower Cambrian Antrim Plateau Volcanics that are described as massive and porphyritic basalt flows averaging 30m thick. Sediments and volcanics within EL 22305 are only gently folded, with bed dips rarely exceeding 10 degrees, except where adjacent to faults.

Exploration rationale

Basic exploration model is focused on the interactions of the Antrim plateau volcanics and underlying Limbunya sediment groups in numerous ways:

- Direct interaction due to contact metamorphism and hydrothermal fluid alteration leading to the formation of base metal sulphides/oxides within the sediments when encountering sulphur/oxygen.
- Depletion of the volcanics by sulphur sinks within the sediments such as shales which
concentrate base metals precipitation

- Indurated brines formed by compressional forces with the Limbunya sediments, containing mobile base metals leached from country rock, rising and travelling via structures and precipitating in porous and permeable layers of the volcanic flows

The models being used which follow these forms are:

- Michigan-style Copper Deposits within the Antrim Plateau Volcanics
- Magmatic Sulphide-Rich Nickel-Copper Deposits within the Antrim Plateau Volcanic
- Stratiform Zinc-Lead-Silver Deposits within the Birrindudu and Limbunya Groups

(Finnigan 2013)

6. MINERALISATION (Cutivinos et al 2002)

6.1. Barite
Pods and veins of barite occur in the Antrim Plateau Volcanics and are commonly associated with quartz and calcite. The biggest deposit (occurrence LIMBUNYA No 006) includes six steeply dipping barite veins in the Kirkimbie Yard area, 32 km to the north-northwest of Inverway homestead. The veins occupy a fracture in the volcanics and are parallel to the major regional lineament that forms the southwestern margin of the Hardman Syncline in western LIMBUNYA (Sweet 1974a). Two were mined during 1970-1972 by South Australian Barites Ltd. The main lode is about 3.3 km long, up to 2 m wide and has a strike of 330º. A bulk sample from this lode had a specific gravity of 4.28 g/cm3 and contained 97.3% BaSO4, 2.05% SrSO4 and 0.33% SiO2 (Willis and Newton 1975). The second, western lode is 60 m long, up to 2 m wide and has a strike of 355º. A bulk sample taken from this lode had a specific gravity of 4.54 g/cm3 and contained 96.9% BaSO4, 2.4% SrSO4 and 0.33% SiO2. Total production form both lodes was 35 000 t, but only the top 4-5 m of lode material was mined. The resource is estimated at 32 800 t per vertical metre (Mendum 1972). Total barite resources are estimated to be 475 000 tonnes to 20 m in depth (Nibar Mining 1986).

6.2. Stratabound copper occurrences
The top of the Antrim Plateau Volcanics succession, near and along the contact with the overlying Headleys Limestone, carries widespread, but thus far economically insignificant copper mineralisation. Some copper is also hosted by the Headleys Limestone close to the contact zone. In LIMBUNYA, an extensive exploration program for copper was conducted during 1968-1970 by a joint venture headed by Metals Exploration NL. The exploration was targeted to locate large, low-grade Lake Michigan-type copper deposits in the Antrim Plateau Volcanics (Erskine et al 1970). In the early 1970s, Amoco Minerals Australia Co carried out an exploration program to test for copper mineralisation in the Antrim Plateau Volcanics/Headleys Limestone contact (Miguel 1974). From these early surveys, four types of copper mineralisation were distinguished (Erskine et al 1970, Burt et al 1970, Miguel 1974):

1. structurally controlled mineralisation in fault and shear zones in the Antrim Plateau Volcanics;
2. mineralisation in the basal three metres of the Headleys Limestone;
3. mineralisation associated with agglomerate, vesicle infills in flow tops, or disseminated in massive basalt in the upper part of the Antrim Plateau Volcanics; and
4. mineralisation linked with black manganiferous limestone blows of possible fumarolic origin.

The biggest copper prospect located during these exploration activities, Caves prospect (526700mE, 8062400mN), contains about 2000 t of ore grading 2-20% Cu (Erskine et al 1970). Visible mineralisation is fault-related and concentrated near the contact between the Antrim Plateau Volcanics and Headleys Limestone. The main ore minerals are malachite and chalcocite. A circular body of fumarolic deposits occurs adjacent to the visible mineralisation.
7. DISCUSSION
Enterprise Mining Pty Ltd through its subsidiaries, Australis Minerals Pty Ltd and Kingsland Resources Pty Ltd has accumulated a total of 6 licenses in the Northern Territory based on the concept that the G2 linear has a strong influence on mineralisation along its length as evidenced by the discovery of the Olympic Dam deposit by Western Mining in the late 1970's. Dr Hugh Rutter was a leading member of the discovery team for Olympic Dam, and has provided considerable advise to Enterprise on target areas, leading to the exploration license applications.

The mineralising concept provided by Dr Rutter appears sound and may lead to a number of significant discoveries within the Enterprise licenses. These target areas recommended by Dr Rutter appear to have been previously ignored or underexplored and warrant the application of modern exploration techniques.

Exploration on all licenses is at the concept stage. Initial exploration will be aimed at identifying and ranking specific targets within the licenses for further exploration. A comprehensive exploration program involving aircraft based geophysics, geological mapping and sampling, ground based geophysics, and eventually RC and diamond drilling is planned.

EL29857 has been relinquished because the available ground did not include the most favorable geological units.

8. REFERENCES


Glass L.M. Ahmat M and Munson T.J. 2013: Geology and Mineral Resources of the Northern Territory, Chapter 30 Kalkarindji Province. NTGS Special Publication 5.


Brandes P.T. 2008: Geology of the Keweenaw Peninsula Michigan.
