FINAL REPORT
TO NORTHERN TERRITORY DEPARTMENT OF MINES
FOR E.L. 2066
(24.01.81 - 24.01.82)

OPEN FILE
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<th>Scale</th>
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<tr>
<td>2066/1</td>
<td>Day Creek Line - Gravity Survey.</td>
<td>1:250,000</td>
</tr>
<tr>
<td></td>
<td>Hiraji Bore Area - Bouger Anomaly and Elevation Profiles.</td>
<td>1:50,000</td>
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1. SUMMARY

E.L. 2066 was granted to AGIP Australia pty. ltd. on 24th of January, 1981. Exploration during this year consisted of a gravity survey to assess the likely structural configuration beneath thick Tertiary overburden. Results from this survey suggest that no sub-basin containing potentially favourable Mt. Eclipse Sandstone occurs and therefore the area does not warrant further exploration.
2. **INTRODUCTION**

E.L. 2066 was granted for a period of twelve months from the 24th of January, 1981 and exploration was carried out to determine if suitable structures might contain lithological units that could possibly host uranium mineralization.

2.1 **Description of Area**

The Area is delineated as follows:

ALL THAT piece or parcel of land in the Northern Territory of Australia containing an area of 103.76 square miles (268.69 sq. km) more or less, the boundary of which is described as follows:

Commencing at the intersection of latitude 22 degrees 36 minutes with longitude 132 degrees 40 minutes thence proceeding to the intersection of latitude 22 degrees 36 minutes with longitude 132 degrees 58 minutes thence proceeding to the intersection of latitude 22 degrees 41 minutes with longitude 132 degrees 58 minutes thence proceeding to the intersection of latitude 22 degrees 41 minutes with longitude 132 degrees 45 minutes thence proceeding to the intersection of latitude 22 degrees 40 minutes with longitude 132 degrees 45 minutes thence proceeding to the intersection of latitude 22 degrees 40 minutes with longitude 132 degrees 40 minutes thence proceeding to the intersection of latitude 22 degrees 36 minutes with longitude 132 degrees 40 minutes, subject to all applications for mining tenements and excluding therefrom all mining tenements granted or registered and all reserves included within the definition of "reserve" in section 7 of the **Mining Act**.
2.2 Location and Access
Hiraji Bore is located on the Napperby 1:250,000 Map Sheet approximately 210 km northwest of Alice Springs. (See Location map E.L. 2066, Figure 1).

Access is via the partly sealed Yuendumu Beef road from Alice Springs to New Well then north along an unimproved earth road. An alternative to this route is via the Napperby Station road.

2.3 Climate and Vegetation
The climate is semi-arid, subtropical and the area lies within the savanna zone of natural vegetation. Rainfall is approximately 300 mm per annum falling mainly in the summer months. Summer maxima exceed 40 degrees C and frost may be expected during the winter months. Vegetation is spinifex (Triodia sp.) and mulga scrub (acacia sp.) with scattered eucalyptus, of various species.
3. GEOLOGY

3.1 Regional Geology
The licence lies at the eastern end of the Ngalia Basin, a "pull-apart" or "rift" basin developed on
the basement of Lower to Middle Proterozoic Arunta Complex.

Sedimentation in the Ngalia Basin commenced with
the deposition of the Upper Proterozoic Vaughan
Springs Quartzite, and marine and continental
sedimentation continued intermittently until the
Upper Devonian to Lower Carboniferous Mt. Eclipse
Sandstone was deposited. The Mt. Eclipse Sandstone
is a thick, synorogenic sequence of non-marine
sandstone and shale, deposited in piedmont and
sub-aerial deltaic fluvialite systems and is host
to all significant uranium deposits known in the
Ngalia Basin.

The Mt. Eclipse occupies several east-west strik-
ing sub-basins separated by "ridges" of older
rocks.

During the Tertiary period, sub-aerial deltaic and
and lacustrine sediments were deposited prior and
subsequent to silcrete development. In places
these sediments are more than 100 metres thick.

3.2 Geology of E.L. 2066
E.L. 2066 is underlain by Vaughan Springs Quartzite.
This basement unit outcrops in the north of the E.L.
and outside the E.L. to the south.

Gravity survey interpretation indicated that no sub-
basin which might be expected to contain Mt. Eclipse
Sandstone has developed on the basement.

A "blanket" of continental Cainozoic deposits possibly up to 200 m thick covers the Vaughan Springs Quartzite.

3.2.1 Definition of Units
The following units are recognised in the Ngalia Basin but they do not necessarily occur within E.L. 2066.

Rock Stratigraphic Units of the Quarternary and Tertiary

The stratigraphic nomenclature adopted for description of the Cainozoic deposits in the area is as follows:-

QR Red brown and limey, sandy soils
Tc Calcrite.
Tgsc Plastic clay, green-grey, sandy frequently gypsiferous with traces of charcoal. Usually interbedded with Tch.
Tch Yellow to Olive-grey and light-brown, coarse to pebbly feldspathic sand.
Tbsc Olive-grey and light brown to red sandy clay to clayey sand.
Trfs Red-brown sand; friable with minor red clay matrix.
Tlss Deep red-brown lateritic sandstone, with occasionally abundant "worm tubes".
Tga/Tcl Massive to crystalline gypsum; usually associated with grey clay (Tcl); which is often carbonaceous.
Ta   Yellow limonitic kaolinitic clay.
Cs   Silcrete - developed on a variety of
     Underlying formations.

Rock Units of Unknown "Pre Silcrete" Age
This is a sequence of carbonaceous, and limonitic
or pyritic sands and shales lying under the
silcrete in the central eastern part of the
Basin.

Pending further information on the age of this
sequence which may be :

1. Lower Tertiary
2. Mesozoic or Permian
3. An un lithified platform cover facies of
   the Mt. Eclipse Sandstone.

No designation has been adopted.

Rock Units of Pre-Mt. Eclipse Age
On available information, "basement" rocks under-
lying the Tertiary units are as follows:

Puv  Adelaidean Vaughan Springs Quartzite; divided
     into the Quartzite Member (Puv), comprised of
     tough, clean quartzite, and the Truer Member
     (Puv₁), comprised of grey siltstone and
     cherty shale.

PCg  Granite of the Lower Proterozoic Arunta
     Complex.

PCM  Biotite schist of the Lower Proterozoic Arunta
     Complex.
4. PREVIOUS WORK

Prior to acquisition of the area by Agip Australia pty. ltd. the area was geologically mapped by the Bureau of Mineral Resources as part of the Napperby 1:250,000 map sheet.

In addition, the area of the licence covers part of a regional airborne magnetic and radiometric (spectrometric) survey carried out by the Bureau of Mineral Resources in 1976 and is included in maps of Bouger anomaly, and seismic structure and reflection time contours of the Ngalia Basin produced by the Bureau in 1980.
5. **EXPLORATION ACTIVITIES**

Exploration during the twelve months from 24th January, 1981, consisted of survey levelling by Agip personnel of 24 line-km north from Patty Well to Malcolm's Bore and a subsequent gravity survey, with a station spacing of 250 m, by contractors Wongela Geophysical pty. ltd.

The gravity survey produced a Bouger anomaly profile consistent with the steep regional gradient in this area and a pronounced anomaly at the northern end of the line which is inferred to be a "basement" high along strike from outcropping Vaughan Springs Quartzite. There is no suggestion of a possible sub-basin structure in the centre part of the survey line.
6. CONCLUSIONS

There is little prospect of uranium mineralization on this E.L. as there is no evidence of a sub-basin which could contain Mt. Eclipse Sandstone beneath the Tertiary Units.
7. **EXPENDITURE**

Expenditure on E.L. 2066 in the 10 months from 24.01.81 to 24.11.81 was as follows:-

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Labour</td>
<td>$3,879.33</td>
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<tr>
<td>Purchases</td>
<td>100.29</td>
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<tr>
<td><strong>Services:</strong></td>
<td></td>
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<tr>
<td>Geophysics</td>
<td>1,680.85</td>
</tr>
<tr>
<td>Aerial Photography</td>
<td>597.22</td>
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<tr>
<td>Other</td>
<td>371.97</td>
</tr>
<tr>
<td>Miscellaneous Costs</td>
<td>243.77</td>
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<tr>
<td>Alice Springs Office Costs</td>
<td>2,528.43</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td>$9,401.86</td>
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APPENDIX I

Gravity Survey - Operational Report
**OPERATIONAL REPORT**

1981 NGALIA BASIN GRAVITY SURVEYS  
NORTHERN TERRITORY

Summary.

- Production commenced: 22nd September, 1981
- Production completed: 26th September, 1981
- Days worked in field: 5
- Calculations: 1
- Travel days: 2
- Total days: 8
- Total stations observed: 324 (spacing 100 m to 500 m)
- Total kilometres of control: 101.8

**Traverse details.**

<table>
<thead>
<tr>
<th>Line</th>
<th>From S</th>
<th>To N</th>
<th>Stns.</th>
<th>Kms.</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>Emu Cave</td>
<td>22</td>
<td>16</td>
<td>11</td>
<td>2.0</td>
<td>Spacing 200 m</td>
</tr>
<tr>
<td>Camel Flat</td>
<td>11</td>
<td>5</td>
<td>11</td>
<td>2.0</td>
<td>Spacing 200 m</td>
</tr>
<tr>
<td>Hiraji Bore</td>
<td>100</td>
<td>22</td>
<td>78</td>
<td>19.5</td>
<td>Spacing 250 m</td>
</tr>
<tr>
<td>81-1</td>
<td>67</td>
<td>14A</td>
<td>59</td>
<td>22.3</td>
<td>Spacing 250, 500 m</td>
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<tr>
<td>81-2</td>
<td>41</td>
<td>1</td>
<td>41</td>
<td>20.0</td>
<td>Spacing 500 m</td>
</tr>
<tr>
<td>81-3</td>
<td>34</td>
<td>1</td>
<td>34</td>
<td>16.5</td>
<td>Spacing 500 m</td>
</tr>
<tr>
<td>81-4</td>
<td>20</td>
<td>1</td>
<td>20</td>
<td>1.9</td>
<td>Spacing 100 m</td>
</tr>
<tr>
<td>81-5</td>
<td>48</td>
<td>1</td>
<td>48</td>
<td>15.5</td>
<td>Spacing 48-41 500 m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>41-21 100 m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>21-1 500 m</td>
</tr>
<tr>
<td>81-6</td>
<td>22</td>
<td>1</td>
<td>22</td>
<td>2.1</td>
<td>Totals</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>324 101.8</td>
</tr>
</tbody>
</table>

Totals: 324 101.8
2.

**Personnel**
- B.S. Riddler  Gravity observer
- R. Gorter  Geologist/assistant

**Equipment**
- LaCoste Romberg Gravity Meter G80
- Toyota Landcruiser

**Operational Procedure.**

The traverses had been previously pegged and levelled by Agip personnel. Stations were observed in closed loops of control either from a base at the Yungarra camp or from sub-bases on traverses tied to the Yungarra camp base.

**Reduction of Results.**

**Gravity.**

All gravity readings were reduced in the field and observed gravity differences were calculated relative to the Yungarra camp base. Final observed gravity values used are relative to the BMR station at Central Mount Wedge, assigned a value of 0.00 milligals.

The gravity value of the Yungarra camp base was established relative to Central Mount Wedge in 1980.

Mount Wedge $\rightarrow$ Yungarra = -43.62 milligals

**Elevation.**

Elevations provided by Agip for all lines except those at Emu Cave and Camel Flat are in metres relative to a datum of 0.00 metres at the Central Mount Wedge base which has an elevation of 558.70 metres above AHD. An arbitrary elevation datum has been used for each of the Emu Cave and Camel Flat lines.

The reduction density used is 2.25 gm/cm³ and the elevation correction factor is 0.2144 mg/metre.
Reduction of Results contd.

Station locations and Latitude corrections.

The traverse lines were located by Agip personnel. Latitude corrections are based on the 1930 International Ellipsoid, and have been computed by Agip personnel relative to a datum of 0.00 milligals at Central Mount Wedge for the lines 81-1 to 81-6 inc. and Hiraji Bore.

The Mount Wedge latitude is 22° 44' 14" South and the latitude correction is based on a gradient of 0.579 mg/km computed using this latitude value.

An arbitrary datum for the latitude correction has been used for the lines at Emu Cave and Camel Flat.

Presentation of Results.

The survey results are presented as Bouger anomaly and elevation profiles at a horizontal scale of 1:10 000 for Emu Cave, Camel Flat and Lines 81-4, 81-6 and a small portion of 81-5. Hiraji Bore and Lines 81-1, 81-2, 81-3 and 81-5 are presented at a horizontal scale of 1:50 000.

The vertical scales are: 1 milligal = 1 cm
10 metres = 1 cm

Lindsay N. Ingall
Geophysicist.

October 1981.