TOTAL Mining Australia Pty. Limited

E.L. 4870 FISH RIVER

TOLMER PROJECT

ANNUAL REPORT

1987

R/87-18-U

P. MELVILLE
MARCH, 1987

Not to be reproduced without written permission from TOTAL Mining Australia Pty. Limited.
TABLE OF CONTENTS

I. INTRODUCTION
   1.1 GENERAL
   1.2 DESCRIPTION OF AREA
   1.3 LOGISTICS

II. GEOLOGY
   2.1 REGIONAL SETTING AND STRATIGRAPHY
   2.2 STRUCTURE
   2.3 LOCAL GEOLOGY AND STRUCTURE

III. FIELD ACTIVITIES
   3.1 GEOPHYSICS - INPUT SURVEY
      3.1.1 Timetable
      3.1.2 Procedure - General Comments
      3.1.3 Results
      3.1.4 Conclusions

LIST OF FIGURES

Figure 1 Tolmer Project Location (1:2,000,000)
Figure 2 Tolmer Project Tenement Situation.

LIST OF PLATES

<table>
<thead>
<tr>
<th>Plate</th>
<th>Description</th>
<th>Scale</th>
<th>Drg. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate 1</td>
<td>Tolmer Project Synthesis Map</td>
<td>1:100,000</td>
<td></td>
</tr>
<tr>
<td>Plate 2</td>
<td>Tolmer Project Selected Input Conductor Map. Sheet 5</td>
<td>1:25,000</td>
<td>547-098</td>
</tr>
<tr>
<td>Plate 3</td>
<td>Tolmer Project Selected Input Conductor Map. Sheet 6.</td>
<td>1:25,000</td>
<td>547-099</td>
</tr>
<tr>
<td>Plate 4</td>
<td>Tolmer Project Selected Input Conductor Map. Sheet 8.</td>
<td>1:25,000</td>
<td>547-101</td>
</tr>
</tbody>
</table>
I. INTRODUCTION

1.1 GENERAL

This report encompasses the exploration activities carried out on E.L. 4870 during the 1987 field period. The tenement is being explored by a joint venture agreement between TOTAL Mining Australia Pty. Ltd. (T.M.A.) and the Power Nuclear Corporation of Japan (PNC).

The geological similarities of the region to that of the Alligator Rivers Uranium Field prompted T.M.A. to mount an exploration programme based on that model.

1.2 DESCRIPTION OF AREA

The Exploration Licence is located in the Daly River region approximately 35 km southeast of the mission settlement and 130 km south of Darwin. All land within the tenement is covered by the Fish River Pastoral Lease, a part of Tipperary Station. The E.L. is bounded by latitudes 13°55'S, 14°10'S and longitude 130°51', 131°02' and comprises 133 sub-blocks.

1.3 LOGISTICS

Access is gained via station tracks from either Tipperary or Claravale homesteads. In both cases the Daly River has to be negotiated. This watercourse remains impassable for 6 months. Much of the country is of low relief with woodland-type vegetation.
TOLMER PROJECT
TENEMENT SITUATION

FIGURE 2
II. GEOLOGY

2.1 REGIONAL SETTING AND STRATIGRAPHY

The Joint Venture Licences are located on the western edge of the Pine Creek Geosyncline. The main rock types are sediments ranging in age from Lower Proterozoic to Adelaidean; Carpentarian granites intrude these sediments. The Litchfield complex of ?Archaean to Lower Proterozoic age occurs to the northwest. The Cambrian Daly River Group obscures much of the Lower Proterozoic-Adelaidean rocks both west and east of the tenement area.

The stratigraphy is as follows (from N.T.G.S., 1983):

ARCHAEOAN–EARLY PROTEROZOIC: Litchfield Complex comprising high grade metamorphics which appear to include sediments, basic to intermediate rocks and anatetic granites.

EARLY PROTEROZOIC: Burrell Creek Formation comprising variably metamorphosed sandstones and siltstones. Includes pebble and conglomeratic facies, graphitic shales/schists and some carbonate rocks (Pfb).

LATE PROTEROZOIC:

(i) Carpentarian syn-orogenic to post-orogenic granites. Represented by the Mt. Litchfield, Allia Creek and Jammine granites and the Soldiers Creek granite at Collia (Pxgl, Pxga, Pxgi and Pgs).

(ii) ?Early Adelaidean Tolmer Group. Comprises four formations:
   + Depot Creek Sandstone: thickly bedded medium to coarse quartz arenite (450 m) (Ptd).
   + Stray Creek Sandstone: flaggy micaceous, ripple marked quartz arenite (300 m) (Pts).
   + Hinde Dolomite: dolomite, dolomitic shales and arenites, quartz arenites (+ 314 m) (Pth).
   + Waterbag Creek Formation: red mudstone with thin arenite layers (non-outcropping) (+ 134 m) (Ptw).

(iii) Late Adelaidean Uniya Tillite (0 – 30 m) (Put).

PALAEOZOIC: Cambrian Daly River Group. Basal conglomerates, Antrim Plateau Volcanics (basalts) and the Tindall Limestone (Ela).
2.2 STRUCTURE

The principal structural feature of the region is the Giants Reef Fault which has caused obvious displacement to the various rock units it traverses. The zone extends some 30 km NE of Rum Jungle where it loses its identity under alluvial cover; southwards it extends well outside the Company's area of interest. The Giants Reef Fault is considered to be the northern extension of the Hall's Creek Mobile Zone. Parallel structures, the largest being the Stapleton and Rock Candy Range Faults and many minor ones traverse both the Burrell Creek Formation and Tolmer Group rocks.

Folding is present both on a small and large scale. The Burrell Creek sediments are tightly folded with fold axis striking generally N-S. The overlying Tolmer Group dips gently eastwards forming the extensive Daly River Basin. Folding occurs in the Tolmer adjacent to the Rock Candy Fault forming an elongated domal structure thought to be underlain by Carpentarian granite. The Cambrian sediments are nearly flat lying.

Regional dips are moderate to steep westerly for the Burrell Creek Formation and gently eastwards for the Tolmer Group. Strikes are N-S to NW-SE.

2.3 LOCAL GEOLoGY AND STRUCTURE

The tenement area is wholly within the Tolmer Group sediments with the exception of localized outcrops of Cambrian rocks. There is a general north to northeast strike, however gentle folding and faulting vary this trend locally. A faulted domal structure occurs in the central eastern part of the tenement and a large synclinal structure is apparent to the north with subsidiary folds along its western limb.

The major facies of the Tolmer Group which outcrop include:

- the Stray Creek Sandstone,
- Hinde Dolomite,
- Waterbag Creek Formation.

The basal Depot Creek Sandstone has not been observed in outcrop despite the folded nature of the sequence. Cambrian rocks include the basal Witch Wai Conglomerate and basalts of the Antrim Plateau Volcanics. Much of the area is covered by sand, gravels and laterite.
III. FIELD ACTIVITIES

3.1 GEOPHYSICS - INPUT SURVEY

3.1.1 Timetable

The INPUT survey over Tolmer area, commissioned to Geoterrex in April, 1987, was carried out during the first two weeks of July.

Approximately 69 flight lines for 968 line-kms were flown, followed by infill lines for about 80 km.

3.1.2 Procedure - General Comments

After each flight, the tracking camera films were developed and the analog charts were sorted and annotated. As the charts are on thermal paper, which tends to fade with time, it is recommended to take a more permanent photocopy as soon as the recordings become available. After locating the charts in relation to the navigation photo strips, anomalies were selected and marked on flight-line overlays at 1:25,000 scale.

The data quality has been excellent throughout the survey; efficient work from the ground crew allowed the revision of the complete survey and the selection of infill areas one day after the end of the last flight.

During the survey, the manager of Tipperary Station was kept informed of the whereabouts and purpose of the aircraft.

3.1.3 Results

The preliminary results are based on the field evaluation of the anomalies. The plots on the 1:25,000 maps are approximate only; more accurate are the anomaly locations on the colour photographs set.

Three models were followed during the field interpretation: two indicating horizontal surface conductors (thin sheet and half-space) and one indicating a sub-vertical conductor. Only the "vertical" anomalies were plotted on colour photographs.

The symbols used on the photo set to indicate the anomalies are:

- Response in channels 11 or 12: type A
- Response in channels 9 or 10: type B
- Response in channels 7 or 8: type C
- Response in channels 1 to 6: type D

Minor anomalies.

On the overlays, the ratio between channel 2 and channel 10 amplitudes and the altitude from the ground were also given.
Spatially close anomalies were grouped in "areas", generally reflecting a particular geological environment. A total of 61 areas was thus defined. Unfortunately, none of them indicates the expected occurrences of graphitic schist beneath the sandstone cover. A test flight was carried out over a known graphitic conductor in the Rum Jungle area, in order to compare the amplitude and persistency of the anomalies.

The areas fall broadly into four categories:

. Conductors in exposed Burrell Creek Formation ("basement").
. Conductors along faults.
. Conductors in Tolmer Group.
. Conductors in Cambrian Volcanics and/or Cretaceous.

The anomalies that occur in Cretaceous are generally located near the edge of a cliff; they could indicate the presence of a thin layer of Antrim Plateau Volcanics in the pediment between Cretaceous and Proterozoic Sandstones.

Some anomalies appear to line up or coincide with rivers and billabongs.

The anomalies occurring within E.L. 4870 are listed as follows:

E.L. 4870
44 ) All within the same faulted/folded block of Stray Creek and
45 ) Hinde Dolomite. Area characterized by E-W folding bounded
46 ) by a N-S fault. 44, 46, 48 may be conductor zones along
47 ) the fault. There is no apparent reason for the others.
48 )

Some of the Input conductors have been classified for follow-up ground EM planned for the 1988 field season. These are plotted on Plates 2-5. No ground geophysics was performed in 1987.

3.1.4 Conclusions

Several Input conductor anomalies have been defined which are considered to warrant ground follow-up. No ground radiometrics are planned due to the absence of the unconformity within the licence; no Burrell Creek sediments outcrop within the tenement.
EXPENDITURE STATEMENT
# Expenditure Statement - TOLMER Project

**1/1/87 - 31/12/87**

<table>
<thead>
<tr>
<th>Description</th>
<th>EXPENDITURE RELATING TO ALL TOLMER EL.'S</th>
<th>E.L. 4856</th>
<th>E.L. 4857</th>
<th>E.L. 4858</th>
<th>E.L. 4870</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. OUTSIDE SERVICES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bulldozing</td>
<td>8,458</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8,458</td>
</tr>
<tr>
<td>Laboratory</td>
<td>1,820</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,820</td>
</tr>
<tr>
<td>Ground Geophysics</td>
<td>186,549</td>
<td></td>
<td>13,861</td>
<td>13,861</td>
<td></td>
<td>186,549</td>
</tr>
<tr>
<td>Airborne Geophysics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SUBTOTAL 1</strong></td>
<td>196,827</td>
<td>13,861</td>
<td>13,861</td>
<td></td>
<td></td>
<td>224,549</td>
</tr>
<tr>
<td>2. OPERATING EXPENSES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchases</td>
<td>8,382</td>
<td>2,970</td>
<td>2,030</td>
<td>12,139</td>
<td>6,515</td>
<td>13,382</td>
</tr>
<tr>
<td>Personnel</td>
<td>88,356</td>
<td>46,178</td>
<td>39,048</td>
<td></td>
<td></td>
<td>192,236</td>
</tr>
<tr>
<td>Supplies &amp; Services</td>
<td>2,446</td>
<td>536</td>
<td>122</td>
<td>127</td>
<td></td>
<td>3,104</td>
</tr>
<tr>
<td>Transport &amp; Accommodation</td>
<td>20,343</td>
<td>8,845</td>
<td>5,144</td>
<td>827</td>
<td></td>
<td>35,159</td>
</tr>
<tr>
<td>Administrative Costs</td>
<td>4,386</td>
<td>187</td>
<td>16</td>
<td></td>
<td></td>
<td>4,589</td>
</tr>
<tr>
<td>General Administration</td>
<td>8,141</td>
<td>4,961</td>
<td>4,339</td>
<td>1,142</td>
<td>624</td>
<td>19,207</td>
</tr>
<tr>
<td>Depreciation</td>
<td>4,526</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4,526</td>
</tr>
<tr>
<td><strong>SUBTOTAL 2</strong></td>
<td>136,280</td>
<td>63,677</td>
<td>50,699</td>
<td>14,108</td>
<td>7,139</td>
<td>271,903</td>
</tr>
<tr>
<td><strong>PROJECT TOTAL</strong></td>
<td>333,107</td>
<td>77,538</td>
<td>64,560</td>
<td>14,108</td>
<td>7,139</td>
<td>426,452</td>
</tr>
</tbody>
</table>