AFMECO MINING AND EXPLORATION PTY LTD

Exploration Licence 3589

Arnhem Land, Northern Territory

FINAL REPORT

Darwin NT
October 2002

Alligator River
1:250 000 Sheet

J. Fabray
AFMEX Report 2002/18

Verified by:  Authorised by:

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SUMMARY

Exploration Licence 3589 is located in Arnhem Land about 250 kilometres east of Darwin. Exploration has been conducted by a joint venture which consists of AFmeco Mining and EXploration Pty Ltd (operator), SAE Australia Pty Ltd and Macapa Pty Ltd.

This report describes the results of the fifth year of exploration for unconformity-related uranium deposits on the tenements and also summarises the previous work carried out during the term of the tenement.

The comprehensive exploration programs completed over the exploration licence during the last five years have failed to locate any indications of unconformity-related uranium deposits. The tenement was therefore considered to have a low prospectivity for uranium deposits and was relinquished on 26th July 2002.
1. INTRODUCTION

Exploration licence 3589 was explored in joint venture by AFmeco Mining and EXploration Pty Ltd (operator), SAE Australia Pty Ltd and Macapa Pty Ltd.

The tenement is located within the Arnhem Land Aboriginal Reserve and is shown on figure 1.

This report details the work carried out during the term of the licence from 1997 to 2002.

3. LOCATION AND ACCESS

The tenement is located in West Arnhem Land about 250 km east of Darwin in the Northern Territory of Australia.

Access is either by air to the Nabarlek airstrip, or by road via the Arnhem Highway to Jabiru and then via Cahill’s Crossing and unsealed roads within Arnhem Land.

The tenement is mainly located in sandstone escarpment country, which is only accessible by helicopter or on foot.

3. TENURE

Exploration licence (EL) 3589 was granted on 18\textsuperscript{th} November 1997 for a period of six years. The tenement was explored in joint venture by AFmeco Mining and EXploration Pty Ltd – operator (36.75%), S.A.E Australia Pty Ltd (36.75%), Macapa Pty Ltd (24.5%) and Namarrkon Aboriginal Corporation (2%). The exploration licence was relinquished on 26\textsuperscript{th} July 2002.

EL 3589 covers an area of 99 sq km and consists of 30 blocks. The tenement was not reduced during its term.

4. GEOLOGY

4.1. Regional Geology

The regional geology of West Arnhem Land is shown on figure 2 and a stratigraphic chart is shown on figure 3.

The oldest rocks exposed in the region are gneisses belonging to the Mount Howship Gneiss of the Kakadu Group of lower Palaeoproterozoic age. Further to the west in the Alligator Rivers uranium field, similar rocks overlie the Archaean Nanambu complex. The Mt Howship Gneiss is overlain by the Kudjumarndi Quartzite which is one of the main marker horizons in the region.

The psammitic rocks of the Kakadu Group are overlain by the Cahill Formation also of lower Palaeoproterozoic age, which is the host of the main uranium ore bodies in the area. The Lower Cahill Formation consists of a basal calcareous unit which is overlain by a sequence of pelitic schists, meta-arkose and amphibolite. A well
defined amphibolitic unit at the top of the Lower Cahill Formation hosts the Nabarlek uranium deposit. The Upper Cahill Formation and Nourlangie Schist consist of a monotonous sequence of meta-arkose, schist and amphibolite.

East and south of the area of the Palaeoproterozoic sediments lie the granitoid rocks of the Nimbuwah complex. These granitoids were extensively migmatised during the Top End Orogeny which is dated at about 1800my. The relationship between the Cahill Formation and the Nimbuwah Formation is problematical, as the contact zone has not been seen.

Later post-orogenic Proterozoic granites have intruded the meta-sediments in the east of the area.

The upper Palaeoproterozoic Kombolgie Subgroup overlies the older rocks unconformably. This formation consists of sandstones with a prominent basaltic horizon (Nungbalgarri Volcanic Member). The flat-lying sandstones form the Arnhem Land escarpment.

The Oenpelli Dolerite (1700my) intrudes the early Palaeoproterozoic metasediments and the Kombolgie sandstone, and forms large lopolithic bodies. It is the youngest Precambrian rock outcropping in the area.

4.2. Tenement geology

Lower members of the Kombolgie Subgroup underlie the exploration licence. The unconformity at the base of the Kombolgie Subgroup is not seen and lower Palaeoproterozoic metamorphics only outcrop in the northeast corner of the EL.

Drilling has shown that the lower Palaeoproterozoic metamorphics consist of a sequence of generally flat-lying meta-arkoses, mica schists and amphibolites. These rocks have been interpreted as forming part of the lower Arkosic Unit or the Amphibolitic Unit of the lower Cahill Formation (see figure 3) as they contain minor graphitic bands. The Calc-silicate unit was intersected in the lower part of hole NAM04. Drillhole NAM07 intersected a partially migmatised sequence of gneisses and coarse garnet schists which have been interpreted as representing a proximal facies to the Nimbuwah Complex.

No uranium mineralisation was found in the basement rocks.

The Mamadawerre sandstone was found to be about 300 metres thick in the drillholes completed on the tenement. The overlying Nungbalgarri Volcanic Member is represented by lateritic outcrops and clays. The lowermost 25 to 70 metres of the sandstone were generally coarse and pebbly.

The Oenpelli Dolerite intrudes the older rocks and forms sills, dykes and lopolithic bodies. It does not outcrop but its presence can be inferred from magnetic data.
5. PREVIOUS WORK

The ground covered by the tenements had not previously been explored prior to the EL being granted in 1997.

A summary of the work completed by the joint venture during the period of tenure of the EL is given below. Further details may be found in the annual reports submitted to the Mines Division.

An airborne geophysical survey was flown in 1996 prior to the grant of the tenement with the permission of the NLC and NT Department of Mines and Energy.

5.1. Work completed in 1997-98

Five helicopter supported diamond drillholes totalling 1503.5 metres were completed in 1998. The drillhole positions are shown on figure 4 and the summary geological logs are presented in table 1.

A stream sediment survey was carried out with 69 samples being collected.

Initial ground reconnaissance of the airborne radiometric anomalies defined by the 1996 survey was carried out.

5.2. Work completed in 1998-99

Seven helicopter supported diamond drillholes totalling 2241.3 metres were completed in 1999. The drillhole positions are shown on figure 4 and the summary geological logs are presented in table 1.

Ground geophysical surveys, including NanoTEM and IP, were carried out over a number of lines.

Surface sandstone sampling was done on a 500X500m grid. The samples were analysed using a PIMA instrument.

Surface geological mapping was completed over part of the exploration licence.

A regional east-west gravity traverse was done across the EL. The average station spacing was 500m.

5.3. Work completed in 1999-2000

Six proposed drillhole sites were located and pegged in EL 3589 during March 2000 using a helicopter (see figure 4). These proposed drillhole sites were cleared for exploration work by the NLC in May 2000. Subsequent to these activities a reappraisal of the exploration budget led to the postponement of the drilling program.
5.4. Work completed in 2000-2001

A detailed low-level radiometric/magnetic airborne survey was flown over the western portion of the EL, see figure 5. An electromagnetic (TEMPEST) airborne geophysical survey was completed over the remainder of the tenement. Due to a number of delays the data for the radiometric/magnetic survey had not been received at the end of the reporting period.

6. WORK COMPLETED DURING 2001-2002

Work completed in the fifth year of tenure has included interpretation of the airborne surveys competed in 2001 and a general reassessment of the prospectivity of the EL.

Universal Tracking Systems (UTS) were contracted to acquire high resolution magnetic and radiometric data over the western portion of EL3589. This survey was part of a wider focus on an interpreted NW trending structural corridor, considered prospective for hosting unconformity related uranium deposits. The purpose of the survey was to highlight structures within this corridor.

Specifications of this survey are listed below.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey Name</td>
<td>Myra Falls</td>
</tr>
<tr>
<td>Survey Type</td>
<td>Magnetic/Radiometric/DTM</td>
</tr>
<tr>
<td>Survey Location</td>
<td>Alligator River 1:250,000 map sheet</td>
</tr>
<tr>
<td>Contractor</td>
<td>UTS Geophysics</td>
</tr>
<tr>
<td>Aircraft</td>
<td>Fletcher FU24-954, VH-HVP</td>
</tr>
<tr>
<td>Navigation</td>
<td>Real Time Differential</td>
</tr>
<tr>
<td>Sensor Height</td>
<td>30m</td>
</tr>
<tr>
<td>Flight Line Spacing</td>
<td>50m</td>
</tr>
<tr>
<td>Flight Line Direction</td>
<td>AMG 060-240</td>
</tr>
<tr>
<td>Tie Line Spacing</td>
<td>500m</td>
</tr>
<tr>
<td>Tie Line Direction</td>
<td>AMG 150-330</td>
</tr>
<tr>
<td>Magnetometer</td>
<td>Scintrex CS-2</td>
</tr>
<tr>
<td>Sample Interval</td>
<td>0.1 second</td>
</tr>
<tr>
<td>Gamma-Ray Spectrometer</td>
<td>Exploranium GR 820</td>
</tr>
<tr>
<td>Crystal Volume</td>
<td>48 litres</td>
</tr>
<tr>
<td>Sample Interval</td>
<td>1 second</td>
</tr>
</tbody>
</table>

Data for the radiometric/magnetic survey completed in 2000-2001 are appended herewith.

Magnetic data indicate a predominantly near surface volcanic response, in agreement with elevated thorium counts observed in radiometric data. Magnetic data have failed to highlight any significant structures due in part to a lack of magnetic susceptibility contrast. No new radioactive anomalism was observed in the airborne survey.

Tempest data was collected during July 2001 in what was considered less than ideal conditions due to excessive wind turbulence and high sferic noise. Final data was
received approximately 8 weeks after acquisition. In field processing and quality control indicated sferic noise was having little impact on data quality. Wind turbulence mainly affected aircraft acquisition rates, limiting flights to around one per day.

Data from the Tempest survey is appended herewith.

It was hoped that conductivity information acquired with the Tempest platform would resolve alteration around the sandstone-basement unconformity. Similar surveys flown elsewhere had shown this was certainly possible.

Tempest digital time domain electromagnetic system characteristics are detailed below. The processing report for this work is included as Appendix 1.

<table>
<thead>
<tr>
<th>Survey Name</th>
<th>EL3589</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey Type</td>
<td>Tempest EM</td>
</tr>
<tr>
<td>Line Spacing</td>
<td>200m</td>
</tr>
<tr>
<td>Line Direction</td>
<td>AMG 090-270</td>
</tr>
<tr>
<td>Base frequency</td>
<td>25Hz</td>
</tr>
<tr>
<td>Transmitter Area</td>
<td>186 m²</td>
</tr>
<tr>
<td>Transmitter Turns</td>
<td>1</td>
</tr>
<tr>
<td>Waveform</td>
<td>Square</td>
</tr>
<tr>
<td>Duty Cycle</td>
<td>50% (equal on and off times)</td>
</tr>
<tr>
<td>Transmitter Pulse Width</td>
<td>10ms</td>
</tr>
<tr>
<td>Transmitter off-time</td>
<td>10ms</td>
</tr>
<tr>
<td>Peak Current</td>
<td>300A</td>
</tr>
<tr>
<td>Peak Moment</td>
<td>55,800 Am²</td>
</tr>
<tr>
<td>Average Moment</td>
<td>27,900 Am²</td>
</tr>
<tr>
<td>Receiver Sample Rate</td>
<td>75kHz on X and Z</td>
</tr>
<tr>
<td>Receiver Sample Interval</td>
<td>13 microseconds</td>
</tr>
<tr>
<td>Receiver Samples per half-cycle</td>
<td>1500</td>
</tr>
<tr>
<td>System Bandwidth</td>
<td>25Hz to 37.5kHz</td>
</tr>
<tr>
<td>Flying height</td>
<td>130 - 150m</td>
</tr>
<tr>
<td>EM sensor</td>
<td>Towed bird with 3 perpendicular dB/dt coils</td>
</tr>
<tr>
<td>Transmitter-Receiver horizontal separation</td>
<td>121m (nominal, actual measured)</td>
</tr>
<tr>
<td>Transmitter-Receiver vertical separation</td>
<td>39m (nominal, actual measured)</td>
</tr>
<tr>
<td>Stacked data output interval</td>
<td>200ms (~12m along line)</td>
</tr>
<tr>
<td>Number of output windows</td>
<td>15</td>
</tr>
<tr>
<td>Window centre times</td>
<td>From 13 microseconds to 16.2 ms</td>
</tr>
<tr>
<td>Magnetometer</td>
<td>Stinger-mounted caesium vapour</td>
</tr>
<tr>
<td>Compensation</td>
<td>Fully digital</td>
</tr>
<tr>
<td>Magnetometer Resolution</td>
<td>0.001nT</td>
</tr>
<tr>
<td>GPS cycle rate</td>
<td>1 second</td>
</tr>
</tbody>
</table>

Tempest data quality was initially questioned because of poor correlation with drilling data within the Exploration License.

Two elements were enigmatic;

1. Strong alteration intersected in previous drilling was not manifest in the corresponding CDI’s.
2. The agreement between X and Z component CDI sections was considered to be especially poor.
An example of this is shown below in CDI sections for X and Z component data for Line 30410. Weak conductivity contrasts are observed at depth in both sections but there is little confidence in associating this with a possible unconformable horizon, largely because of poor lateral consistency and continuity.

![X component conductivity section for line 30410](image1)

![Z component conductivity section for line 30410](image2)

Figure 6 – Discrepancies in the x and z component CDI sections

In order to compute the expected Tempest response over existing drill holes, Fugro completed forward modelling using conductivity information provided by AFMEX. Results are reproduced in Appendix 2 and included because they affect the interpretation of Tempest data within EL3589.

In summary, Fugro were unable to give a reason for the “minor” differences between X and Z component CDI’s. They did conclude that conductivity contrasts between altered and unaltered rocks might not be sufficient in this area.

No significant conductors are identified in the data, either at or below the unconformity. As mentioned above, depth of unconformity is not certain despite an apparent horizontal conductor in the CDI’s.

7. CONCLUSIONS

The comprehensive exploration programs completed over the exploration licence during the last five years have failed to locate any indications of unconformity-related uranium deposits. The tenement was therefore considered to have a low prospectivity for uranium deposits and was relinquished.