EXPLORATION LICENCE 2661
COX PENINSULA
ANNUAL AND PARTIAL RELINQUISHMENT REPORT
MARCH 1989

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CONTENTS

1. INTRODUCTION
2. LOCATION, CLIMATE AND TOPOGRAPHY
3. LICENCE DETAILS
4. REGIONAL EXPLORATION CONTEXT
5. EXPLORATION COMPLETED WITHIN RL 2661
   5.1 Summary of Previous Exploration (1984 - 85)
   5.2 Work Completed 1985 - 86
       5.2.1 Auger Drilling
       5.2.2 Decrepitometry
   5.3 Work Completed 1986 - 87
       5.3.1 Auger Drilling
       5.3.2 Costeanning
   5.4 Work Completed 1987 - 88
       5.4.1 Airphoto Interpretation
       5.4.2 Ground Reconnaissance
   5.5 Work Completed 1988 - 89
   5.6 Exploration Expenditure
6. 1989 EXPLORATION PROGRAMME

FIGURES

1. FINNISS RIVER PEGMATITE BELT
2. RL 2661 - LOCALITY MAP
3. DRILL CROSS SECTION - LITHOLOGY UNCONSOLIDATED ALLUVIAL SEDIMENTS
4. LOCATION PLAN SHOWING LINES 10500N AND 11000N AND SAMPLE LOCATIONS

APPENDICES

1. DECRIPITATION RESULTS
1. INTRODUCTION

This report documents the work carried out on Exploration Licence 2661 during the period 12th March 1988 to 12th March 1989. It also reports on the licence area which has been relinquished. The report is submitted to the Northern Territory Department of Mines and Energy to document exploration activities and in support of a renewal of the exploration licence.

The exploration programme was carried out by Greenex the exploration division of Greenbushes Ltd on behalf of Greenbushes Ltd and its joint venture partner Barbara Mining Corporation, a subsidiary of Bayer A.G. of Leverkusen, West Germany. The joint venture is known as Bynoe Joint Venture.

2. LOCATION, CLIMATE AND TOPOGRAPHY

The tin-tantalum and niobium resources of the Cox Peninsula south west of Darwin (Figure 1) covers an area 55 km x 9 km. The EL 2661 is part of a larger area being investigated by the Joint Venture partners.

The area’s climate is tropical, monsoonal with 2 seasons, the wet extending from October to April and the dry May to September. Annual rainfall is 1,600 mm with approximately 97% falling in the wet season. The humidity varies from 50 – 80% in the wet and 45 – 70% in the dry.

The land system comprises 3 main land forms :-

2.1 the upland plains consist of gently undulating plains with gravel ridges often associated with quartz veining, or ironstone lateritic crust.

2.2 the alluvial flats are 200 to 300 m wide and several kilometres long. The accumulation of organic material in the drainage means they are commonly known as black soil plains.

2.3 the lower slopes separate the upland plains from the alluvial flats. In most cases the slopes are scree covered and outcrop is poor.
3. LICENCE DETAILS

Exploration Licence 2661 was approved by the Secretary on the 12th March 1984 and the application for renewal was granted on the 13th April 1988.

The licence area is approximately 6 sq km in area and is covered by the graticular blocks :-

24/61
25/61

Figure 2 shows the location of the EL.

Greenbushes Ltd undertook an exploration expenditure of $10,000 for the fifth year of this programme.

4. REGIONAL EXPLORATION CONTEXT

Exploration Licence 2661 is one of a number of licences held by the Joint Venture partners in the Finnis River Pegmatite Belt. The exploration plan has been to prove ore reserves for a number of pegmatites and associated alluvial deposits centred on an area suitable for a central plant site and water storage. The satellite mining operations would supply ore to the central plant, which on completion of mining in one area would be moved progressively to other locations.

In May, 1984 the Joint Venture established an exploration camp near Observation Hill in the EL 4183. The camp included sample processing facilities. To date the Joint Venture has spent approximately $4,900,00 on exploration in the Finnis River Pegmatite Belt, much of it within MLN 16.
5. **EXPLORATION COMPLETED WITHIN EL 2661**

5.1 **Summary of Previous Exploration (1984-85)**

The initial evaluation of the area involved:-

* Preparation of geological and topographic base maps from airphotos.

* Photogeological studies outlining potential pegmatite and alluvial targets.

* Helicopter inspection of the licence area and potential targets by Greenbushes Ltd and Bayer A.G. geological staff.

* Follow up ground reconnaissance.

These procedures identified a number of outcropping quartz/quartz-muscovite veins as being prospective for Sn-Ta mineralisation and a site was selected on the main drainage in the eastern portion of the licence area, to test for possible alluvial deposits.

The results of this work proved disappointing; trenching across the drainage did not penetrate the base of the alluvial horizon and failed to locate significant mineralisation. Inspection of the quartz occurrence located one quartz-muscovite pegmatite (Prospect 8, Figure 4) which yielded sub-economic Sn-Ta grades. The presence of muscovite within quartz suggested other prospects may have pegmatite affinities.
5.2 Work Completed 1985 - 1986

5.2.1 Auger Drilling

Auger drilling was employed to further test the thickness of alluvial deposits in the vicinity of earlier trenching (Figure 3). 102 holes were drilled for a total meterage of 446.5 m. The drill intersected an alluvial sequence of black organic clay, sandy clay/clayey sands and clayey gravels overlying micaceous clays which represent weathered bedrock.

The basal gravel horizon is generally poorly developed, implying that mineralisation will be of low grade. Analyses have not yet been received and therefore grades are unknown.

Sampling and processing techniques were identical to those used in previous years.

5.2.2 Decrepitometry

In an effort to determine the efficiency of fluid inclusion decrepitometry as an exploration technique in the Finniss River Pegmatite Belt, several samples were collected from outcropping quartz and quartz-muscovite veins within the licence area.

Fluid inclusion decrepitometry has been used with some success to distinguish between auriferous and barren veins in gold deposits of various origins.

Decrepitometric analyses were performed by K Burlinson of Burlinson Geochemical Services Pty Ltd, Darwin.

Decrepitation results are shown in Appendix 1.
An initial orientation survey included samples obtained from mineralised pegmatites and apparently barren veins east of the Observation Hill leases. Four samples of the mineralised Hang Gong pegmatite (sample no's 327701 - 1/4, see Table 1) showed a range of decrepitation temperatures with maxima occurring at 420 degrees, 430 degrees ?, 450 degrees ? and 460 degrees (? indicates poorly defined or skewed peaks). Two of these samples showed low temperature maxima due to the presence of CO2 - rich inclusions. The three samples collected from Lee's pegmatite (sample no's 327600 - 1/3) gave peaks of 440, 440 and 450 degrees C. CO2 - rich inclusions were present in the two 440 degrees C samples. As expected these results confirm the zoned nature of the mineralised orebodies.

Most of the barren quartz veins analysed produced peaks which largely fall within the range of the pegmatites, between 440 ? and 480 degrees C (sample no's 32702 - 1/3 and 32703 - 1/3). Some quartz veins contained traces of muscovite which may indicate affiliation with pegmatite-forming solutions and one sample with a peak of 440 degrees C contained CO2 - rich inclusions (327703-2).

A total of 11 quartz samples were collected from quartz outcrops located within EL 2561 (sample no's 7918-7928). These fall into three groups based on decrepitation results.

Group A - These veins represent the most prospective targets as they correlate with a sample obtained from Bilato's pegmatite to the north of the licence area. Group A samples (7920, 7921, 7926, 7927 and 7929) are characterised by:

i) the presence of CO2 - rich inclusions or

ii) peak maxima at 430 degrees C.

Both characteristics are exhibited by sample 7929 (Bilatos pegmatite) and the Hang Gong samples. Samples 7920, 7921 and 7923 contain CO2 - rich inclusions, whilst samples 7926, 7927 (Locations 6 and 8, Figure 4 quartz-muscovite pegmatite) show peak maxima at 430 degrees C.

It is interesting to note that samples obtained from location 2 (Figure 4) which is 1 km south along strike from Wigg's and Bilato's pegmatites, falls outside this group.
Figure 4
Bynoe Joint Venture
EL 2661 Location Plan

Showing Drill Lines 10,000N and 10,500N and Sample Locations
TABLE 1:

SUMMARY OF DECRIPITATION RESULTS

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>SAMPLE N°</th>
<th>TEMPERATURE (PEAK MAXIMA)</th>
<th>CO² PRESENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lees pegmatite</td>
<td>327600-1</td>
<td>450</td>
<td>No</td>
</tr>
<tr>
<td>&quot;</td>
<td>327600-2</td>
<td>440</td>
<td>Yes</td>
</tr>
<tr>
<td>&quot;</td>
<td>327600-3</td>
<td>440</td>
<td>Yes</td>
</tr>
<tr>
<td>Hang Gong</td>
<td>327701-1</td>
<td>420</td>
<td>No</td>
</tr>
<tr>
<td>&quot;</td>
<td>327701-2</td>
<td>460</td>
<td>Yes</td>
</tr>
<tr>
<td>&quot;</td>
<td>327701-3</td>
<td>450?</td>
<td>No</td>
</tr>
<tr>
<td>&quot;</td>
<td>327701-4</td>
<td>430?</td>
<td>Yes</td>
</tr>
<tr>
<td>Qtz vein, Mandorah Rd</td>
<td>327702-1</td>
<td>460-500?</td>
<td>No</td>
</tr>
<tr>
<td>1km towards Berry Springs</td>
<td>327702-2</td>
<td>440?</td>
<td>No</td>
</tr>
<tr>
<td>&quot;</td>
<td>327702-3</td>
<td>480?</td>
<td>No</td>
</tr>
<tr>
<td>Qtz vein, Mandorah Rd</td>
<td>327703-1</td>
<td>450?</td>
<td>No</td>
</tr>
<tr>
<td>1.5km towards Berry Springs</td>
<td>327703-2</td>
<td>440</td>
<td>Yes</td>
</tr>
<tr>
<td>&quot;</td>
<td>327703-3</td>
<td>450</td>
<td>No</td>
</tr>
<tr>
<td>EL 2661</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qtz vein location 1 (south)</td>
<td>7920</td>
<td>450?</td>
<td>Yes</td>
</tr>
<tr>
<td>Qtz vein location 1 (north)</td>
<td>7921</td>
<td>450?</td>
<td>Yes</td>
</tr>
<tr>
<td>Qtz Location 6</td>
<td>7926</td>
<td>430</td>
<td>No</td>
</tr>
<tr>
<td>Qtz-Mu pegmatite</td>
<td>7927</td>
<td>430</td>
<td>No</td>
</tr>
<tr>
<td>Location 8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qtz vein location 2</td>
<td>7918</td>
<td>460</td>
<td>No</td>
</tr>
<tr>
<td>Qtz vein location 2</td>
<td>7919</td>
<td>460</td>
<td>No</td>
</tr>
<tr>
<td>Qtz vein location 9</td>
<td>7922</td>
<td>460</td>
<td>No</td>
</tr>
<tr>
<td>Qtz vein location 5</td>
<td>7923</td>
<td>450?</td>
<td>No?</td>
</tr>
<tr>
<td>Qtz vein location 5</td>
<td>7924</td>
<td>460</td>
<td>No</td>
</tr>
<tr>
<td>Qtz vein location 4</td>
<td>7925</td>
<td>450?</td>
<td>No</td>
</tr>
<tr>
<td>Qtz vein location 7</td>
<td>7928</td>
<td>460</td>
<td>No</td>
</tr>
<tr>
<td>Bilato's pegmatite</td>
<td>7929</td>
<td>430?</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Group B - Group B samples (7918, 7919, 7922) are characterised by relatively low - B quartz inversion peaks and peak maxima at 460 degrees C. Sample 7919 (Location 2) gives a similar decipitation analysis to sample 327600-1 (Lees Pegmatite).

Group C - Group C is comprised of the remaining samples (7923, 7924, 7925 and 7928) having peak maxima between 450 - 460 degrees C.

From the small number of samples analysed to date it has been possible to broadly define the features of mineralised pegmatites as follows :-

i) evidence of temperature zonation (420 - 460 degrees C)

ii) CO2 - rich inclusions present

As only single, or occasionally duplicate samples were obtained from the veins within EL 2661, temperature zonations are not obvious. The duplicate samples obtained from locations 1,2 and 5 (Figure 4) serve to show good reproduction ability for the technique.

5.3 Work Completed 1986 - 1987

5.3.1 Auger Drilling

A line was drilled across the drainage (11000N), 500 m north of the previous seasons drilling. A total of 160.5 m was drilled and 34 samples were collected from the interval immediately above basement. All grades were low and sub-economic.

5.3.2 Costeasing

The Komatsu excavator was used to dig a costean across the drainage on line 10500N which had been drilled during the 1985 season. The costean was expected to confirm the low grades recovered from drill samples and eliminated the possibility of undervalued grades.
Costeaining totalled 125 m and 27 channel samples were collected and processed. Grades were very low throughout and confirmed the earlier work which indicated that the alluvial potential is limited.

In addition to costeaining of the drainage a backhoe was used to expose a minor pegmatite. A total of 35 m of trenching was completed, intersecting a narrow (1.5 m) pegmatite which returned an assay of 0.011 kg/tonne SnO2 and 0.010 kg/tonne Ta2O5 (1.5 tonne/LCM).

5.4 Work Completed 1987 - 1988

During the 1987 - 88 field season exploration efforts were concentrated in the dissected uplands in the northern part of the exploration licence in conjunction with similar work being carried out in adjacent exploration licences. The results of this work would be a guide to future exploration trenching and drilling. Airphoto interpretation, ground reconnaissance and the development of access roads were all part of the 1987 programme.

5.4.1 Airphoto Interpretation

A detailed study was made of aerial photography of the area south east of Leviathan Mine and numerous potential exploration targets were identified. Many of these exploration targets were examined, and it is planned to examine the remainder during the 1988 - 89 field season.

5.4.2 Ground Reconnaissance

Ground reconnaissance of the area south east of Leviathan Mine, encompassing EL 2661 was begun with a single major traverse across the country between the Wangi Road and the Finniss River Station Road in conjunction with the development of an access road. Whilst one party was engaged in the continuation of the road to its destination, a further party was engaged in ground reconnaissance in the adjacent country and relocated targets identified from aerial photography. These exploration targets were examined in detail, and those
that looked prospective for tin-tantalum mineralisation were appropriately marked for later trenching, sampling and follow-up drilling. Access roads were developed to these prospects.

Many of the exploration targets identified from aerial photography were found to be comprised of scattered quartz scree associated with massive milky quartz outcrop, some of which contained traces of muscovite. In total, 18 of the prospects examined to date were found to be comprised of pegmatite, mostly as veins but in a few instances as flat lying bodies more akin to sills or as complex vein/sill structures. All of these bodies upon closer examination showed evidence of mining activity ranging from simple open pits to complexes of shafts and drives and open cut workings, but appear not to have been worked since last century.

Trenching, sampling and follow-up auger drilling of these prospects has begun and is detailed in reports on adjacent exploration licences. Much additional work of a similar nature is planned.

5.5 Work Completed 1988 - 1989

During the 1988 field season detailed ground reconnaissance was carried out in the two remaining blocks of EL 2661 to find the southern extensions of the Leviathan Creek (Southern) Pegmatite Swarm, discovered in 1987. This work resulted in the discovery of 5 separate exploration targets within EL 2661, and two further pegmatites (Sarahs and Hatcher's) in EL 5096. All exploration targets were located in the western block of EL 2661 so this block (No. 24/61) has been nominated to be retained for exploration in 1989.

The eastern graticular block (No. 25/61) of this licence was of a different character to that evident in the major part of the Finniss River Pegmatite Belt. Elevation is greater in this eastern block and the country significantly more rugged in general terms. It is considered that this factor is significant in the lack of success in pegmatite exploration in this area. In the Finniss River Pegmatite Belt low relief is a general character and most pegmatites are exposed in the slope regions between upland plateaus and the adjacent creeks. The eastern graticular block of EL 2661 with its rugged character and the unmetamorphosed nature of its sediments has prevented similar erosional downcutting. Thus pegmatites which may be present in
subsurface have not been exposed by erosion. Pegmatites do occur to the north, south, east and west of the area in question so there presence is likely at depth. However, the capital expenditure required to locate such "hidden" bodies is not supported by projected market conditions so this block has been relinquished in favour of the western block.

5.6 Exploration Expenditure

The following table presents an estimate of expenditure on EL 2661 during 1988. To-date the Bynoe Joint Venture has spent in excess of $4.9m in the region in the evaluation of tin/tantalum deposits.

<table>
<thead>
<tr>
<th>Item</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles</td>
<td>2,000</td>
</tr>
<tr>
<td>Fuel, Oil and Tyres</td>
<td>400</td>
</tr>
<tr>
<td>Maintenance and Spare Parts</td>
<td>500</td>
</tr>
<tr>
<td>Accommodation and Messing</td>
<td>800</td>
</tr>
<tr>
<td>Geological</td>
<td>1,000</td>
</tr>
<tr>
<td>Field Assistants</td>
<td>800</td>
</tr>
<tr>
<td>ADMINISTRATION</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>150</td>
</tr>
<tr>
<td>Travel (Perth - Darwin)</td>
<td>1,000</td>
</tr>
<tr>
<td>Technical Materials</td>
<td>550</td>
</tr>
<tr>
<td>Tenement Charges &amp; Administration</td>
<td>450</td>
</tr>
<tr>
<td>Wages - Project Geologist &amp; Manager</td>
<td>1,430</td>
</tr>
<tr>
<td>Drafting Materials</td>
<td>150</td>
</tr>
<tr>
<td>Clerical and Secretarial</td>
<td>500</td>
</tr>
<tr>
<td>Office Overheads (Perth)</td>
<td>1,400</td>
</tr>
</tbody>
</table>

$ 11,130

6. 1989 EXPLORATION PROGRAMME

During 1989 the five exploration targets identified during the previous field season will be investigated to determine whether they have pegmatite affinities. All targets consist of quartz dykes of various size and it is expected that at least one will be the quartz core of an otherwise "hidden" pegmatite. Sampling of the quartz will take place for possible testing, and backhoe trenching is also envisaged. Auger drilling will follow-up encouraging results from the backhoe programme.