Bynoe Joint Venture
1988 Annual and Relinquishment Report
Exploration Licence
3490

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1. INTRODUCTION

This report describes the results of exploration effort undertaken within Exploration Licence 3490 during the period 16th July 1987 - 15th July 1988. It is submitted to the Northern Territory Department of Mines and Energy and comprises an annual report for the previous licence year (Section 34) and a report on the licence area which has been relinquished (Section 32).

The 1987/1988 exploration programme was aimed at further evaluating the tantalite and cassiterite pegmatite potential of EL 3490, particularly in light of the ever increasing price of tantalite over the last 18 months.

2. LOCATION AND LEASING

EL 3490 is located on the Finnis River Station Road approximately 30 km SSW of Darwin (Figure 1). The licence initially covering an area of 42 sq km and 14 graticular blocks was granted on the 16th July 1984. It has subsequently been reduced to an area of 13 sq km and 4 graticular blocks for the 1987/88 field season.

3. TOPOGRAPHY

Gently undulating country makes up the area of EL 3490, and is comprised regionally of low laterite capped peneplains separated by broad mature drainages. Between the drainages and peneplains are gradual slopes.

4. HISTORY

Tin mining commenced in the Finnis River Pegmatite Belt in 1886. The Leviathan Mine, immediately to the west of EL 3490, was discovered in 1886 and finally abandoned in 1909 (Summers, 1956,p.17).
Old Bucks Mine (originally called Fords Claim) located 1.6 km north-east of Leviathan Mine in the north west of EL 3490, was the main producer in the field in 1905 (Summers, 1956, p.22). Leviathan and Old Bucks Mines were mapped by Summers (1956, plates 7 and 11).

In 1984, G. Clynick rediscovered and mapped Old Bucks pegmatite and located Megabucks (formerly Old Bucks west) pegmatite. Project Geologist W. Clayton discovered Bunbury (Prospect 1) and Enterprise (Prospect 2) pegmatites in 1985, and investigated an additional pegmatite exposure (Prospect 3) in a borrow pit east of the Finnis River Station Road in the same year. These prospects are discussed and mapped in previous reports.

Work in the 1986/87 field season found the above previously discovered prospects in EL 3490 to be generally low grade deposits, except for Enterprise pegmatite which graded 0.922 kg/LCM SnO₂ and 0.047 kg/LCM Ta₂O₅. However, the prospect is small and its potential is considered limited.

5. **1987/88 WORK**

A new approach to exploration was attempted during 1987/88, and met with a considerable degree of success. Its aim was to attempt a regional assessment of the five exploration licences comprising the south-western portion of the Bynoe Joint Venture tenement holdings, namely: EL 2088, 2661, 3490, 4082 and 5096. This involved airphoto interpretation and ground reconnaissance, pegmatite discovery and follow-up trenching, sampling and auger drill evaluation. The result was the rediscovery of a total of 18 previously worked pegmatites, the Southern Pegmatite Swarm, 2 of which were within EL 3490, namely: Centaur and Welcome Surprise. All had been long abandoned, and were in various states of collapse when rediscovered.

5.1 **Centaur Pegmatite**

Location:

The prospect is located in EL 3490, approximately 650 m from the old Finnis Station boundary fence and 850 m south east of the junction of the Finnis River Station Road and Leviathan Creek (Figure 2). The Finnis River
LOCATION PLAN

Pegmatites S.E. of Leviathan

Fig. 2
Station Road provides all weather access to the area, but the 850 m to the prospect from this road is on bush track accessible only in the dry season.

Centaur pegmatite is 14.25 km in a direct line from the Observation Hill Project Camp and plantsite.

Topography:

Centaur pegmatite is located in the centre of a low, sloping partly laterite capped rise. To the north and west the partly laterite capped rise continues for some distance before becoming dissected and giving way to extensive alluvial flats. In the south are alluvial flats abutting Leviathan Creek, and in the east elevation increases to a scree covered ridge carrying other pegmatite veins and outcropping shales (see Welcome Surprise).

History:

There is no recorded production from the prospect nor is there any known record of its location. Old workings consisting of one large open pit, 9 m wide by 10 m long and 1.5 m deep, and a number of smaller pits in the north of the prospect, suggest grades must have been good. Laterite caprock obscures the southern extremities of the prospect so little evidence of work is seen in this area.

There is no evidence of mining since the turn of the century, and Mines Department plans do not record the deposit.

1987/88 Work:

The prospect was rediscovered in 1987. A total of 315.5 m of trenching was carried out adjacent to the old workings. The open pits and trenches were entered and mapped. A total of 103 samples were taken from trenches and processed. Auger drilling totalling 15 m was undertaken resulting in 7 samples being collected and processed.

Number, Dimensions and Attitude of Pegmatites:

There appears to be one prominent direction of pegmatite intrusion consisting of a single broad unconformable vein striking 035 - 040 degrees with contacts which dip from 70 degrees west to 30 degrees east. This body appears to
diverge into two separate veins in the SW and there is a single off-shooting vein in the north-east. The main exposure of pegmatite is relatively broad from 15 - 34 m and may extend for up to 270 m along strike. Pegmatite is exposed over a minimum width of 6.5 m in the south west part of the prospect.

Centaur pegmatite is large and adjacent pegmatites are located as little as 250 m from this prospect. Dips of contacts are generally of high angle and either subvertical or divergent. In addition, a number of these pegmatites have comparable grades particularly of Ta₂O₅ (North Phoenix, Northern Reward, Welcome Surprise). These factors together tend to suggest a subsurface connection.

General Geology:

Exposures of this pegmatite are confined to old workings and a number of trenches. The pegmatite is kaolinised with kaolin and quartz the dominant minerals, and muscovite mica less-so. A harder quartz muscovite (greisen) zone is preserved on some contacts and makes up the off-shoot vein in the north east (Figure 3).

The pegmatite is partly lateritised so some contacts are obscured, whilst others are relatively sharply defined. Host rocks are mostly lateritised micaceous shales. The main foliation strikes 010 - 015 degrees and dips from 52 degrees west to 82 degrees east. A second north-south foliation parallel to the pegmatite intrusion direction was also apparent.

Cassiterite and Tantalite Mineralisation:

The cassiterite and tantalite grades are uniformly low in this pegmatite apart from a few areas of contact mineralisation (Figure 4 and 5). On the basis of the 103 samples collected the average SnO₂ : Ta₂O₅ ratio was approximately 2.4:1.

Mineralised Reserve Outlined:

The two drill holes on the prospect confirmed the presence of low grade mineralisation at depth in Centaur pegmatite. The one hole to penetrate to depth in the prospect reached 12 m and was still in pegmatite so there is a significant body of pegmatite containing subeconomic mineralisation present.
From within the pegmatite 3 mineralised pods were delineated containing the following estimated reserves and grades to a depth of 10 m:

- 4,390 tonnes containing 0.185 kg/tonne SnO₂ and 0.040 kg/tonne Ta₂O₅
- 2,680 tonnes containing 0.023 kg/tonne SnO₂ and 0.034 kg/tonne Ta₂O₅
- 2,190 tonnes containing 0.469 kg/tonne SnO₂ and 0.031 kg/tonne Ta₂O₅

The estimated ore:waste ratio of each pod assuming a subvertical dip at the contacts is 1:1:1, 1:1:1.14 and 1:1:1 respectively.

Potential Reserves:

A potential exists for a reasonable tonnage of mineralised eluvium associated with this pegmatite. Assuming eluvial grades are concentrated three times over and above pegmatite grades a reserve of 5 - 10,000 tonnes of mineralised eluvium could be expected to be present.

Additional auger drilling to follow up areas of enhanced contact mineralisation is warranted.

5.2 Welcome Surprise Pegmatite

Location:

This prospect is located in EL 3490, approximately 400 m from the old Finniss Station boundary fence, and 1.1 km ESE of the junction between the Finniss River Station Road and Leviathan Creek (Figure 3). The Finniss River Station Road provides all weather access to the area, but the 1.1 km to the prospect is on bush track accessible only in the dry season.

Welcome Surprise Pegmatite is 14.0 km in a direct line from the Project Camp and plantsite.
Topography:

Welcome Surprise Pegmatite is located on the western slope and northern end of a ridge of micaceous shales. To the north are dissected uplands, to the east a drainage area, and to the west a gradually sloping extensive laterite capped rise carrying additional pegmatites. In the south the ridge carrying this pegmatite continues for several hundred metres before giving way to alluvial flats abutting Leviathan Creek. Two additional pegmatites (Mackas Reward, Northern Reward) are exposed along the ridge.

History:

There is no recorded production from the prospect nor is there any known record of its location. The limited number of workings relative to the size of the prospect suggest a low grade, however, a few deeper open pits indicate some higher grade sections. Some extensive eluvial work was also carried out in the centre of the prospect.

There is no evidence of mining since the turn of the century, and Mines Department plans do not record the deposit.

1987 Work:

The prospect was rediscovered in 1987. A total of 340 m of backhoe trenching was carried out adjacent to old workings. The open pits and shafts were entered and sampled. A total of 40 samples were taken from old workings and trenches and processed.

Number, Dimensions and Attitude of Pegmatite:

There appears to be one main pegmatite vein, with a few smaller offshootings veins in evidence on its eastern side. The vein strikes 030 degrees for most of its length, but then changes to a north-south strike before again changing to a strike of 350 degrees at the northern end of the prospect. This vein is unconformable in the south, but becomes conformable in the north of the prospect where the strike direction parallels that of the host rocks. Contacts dip from 50 degrees west to 20 degrees east, and the vein varies in width from 1.25 - 9 m. Overall strikelength is 300 m.

Welcome Surprise along with Mackas Reward and Northern Reward prospects are arranged en echelon along the ridge.
General Geology:

Exposures of this pegmatite are restricted to the open pits and trenches cut along its length. The pegmatite is kaolinised and in parts of the prospect is segregated to a quartz core or an interval up to 4 m wide in which quartz is the predominant mineral (Figure 6).

Pegmatite contacts are sharp. Host rocks are laminated micaceous shales, which are weathered to a red-buff colouration. The main foliation strikes north-south or nearly-so, but varies from 350 degrees to 010 degrees. A second foliation, parallel to the pegmatite intrusion direction is evident in some places.

Cassiterite and Tantalite Mineralisation:

Although the cassiterite in this prospect is of low grade the tantalite is of relatively high grade (Figure 7). On the basis of the 40 samples collected the average SnO₂: Ta₂O₅ ratio was approximately 1:2.03. The Ta₂O₅:Nb₂O₅ ratio was approximately 1.03:1.

Mineralised Reserve Outlined:

There may be some access problems in drilling this prospect because of slope and outcropping shales. However, with the generally consistent levels of tantalite of relatively high grade some assessment of the prospects potential is warranted.

To a depth of 10 m the estimated reserves are 39,470 tonnes at 0.021 kg/tonne SnO₂ and 0.049 kg/tonne Ta₂O₅. [This includes a high grade reserve of 31,650 tonnes at 0.025 kg/tonne SnO₂ and 0.056 kg/tonne Ta₂O₅ and a low grade reserve of 7820 tonnes at 0.003 kg/tonne SnO₂ and 0.016 kg/tonne Ta₂O₅].

The estimated ore:waste ratio is 1.08:1 [or 1.04:1 and 1.25:1, respectively].

Potential Reserves:

With the elevated location of the pegmatite and the relatively high tantalite grades there is a likelihood of between 2 - 3,000 tonnes of mineralised eluvium associated with this deposit.
Having relatively high tantalite grades in common with adjacent pegmatites (Mackas Reward, Northern Reward) an assessment of whether this mineralisation continues to a significant depth is warranted. The potential of these prospects as apices of a larger underground body containing a very large mineral reserve makes this deposit worthy of further investigation.

### 6. ESTIMATED EXPENDITURE 1987/88

The Bynoe Joint Venture has spent in excess of $4.5 million on its exploration licences on Cox Peninsula and in the Reynolds River area since 1984. In the last 12 months expenditure has been over $A400,000. Estimated expenditure on EL 3490 is as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
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<tbody>
<tr>
<td><strong>MOBILE FLEET</strong></td>
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<td>Toyota - repairs &amp; maintenance</td>
<td>$1,700</td>
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<td>- hire vehicles</td>
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<tr>
<td>J.D. Backhoe</td>
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<tr>
<td>International 530 FEL for line clearing and road construction</td>
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<tr>
<td>Fuel, Oil and Tyres</td>
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<td><strong>CAMP CANTEEN</strong></td>
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<tr>
<td>Food and Accommodation</td>
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<tr>
<td>Power and Water</td>
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<td><strong>WORKSHOP</strong></td>
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<td>Tech Materials</td>
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<td>Office Overhead</td>
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EXPLORATION SURVEYING
Surveying - grid establishment  1,250
General (salaries & wages  3,670
backhoe trenching)  200
Auger Drilling  1,060
Cone Prep.  2,000
Geological  1,000
Drafting and Reports

ESTIMATED EXPENDITURE  $24,330

7. EXPLORATION PROGRAMME 1988/89

Exploration during 1988/89 will involve the further evaluation of Centaur and Welcome Surprise pegmatites by auger drilling. The search will continue for additional pegmatite targets for exploration.

8. REFERENCES


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