BILLITON AUSTRALIA
THE METALS DIVISION OF THE
SHELL COMPANY OF AUSTRALIA LIMITED

WOLFRAM HILL JOINT VENTURE - E.L. 4730
RELINQUISHMENT REPORT

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DATE: 21 February 1991

REPORT NO: 08.5510
COPY NO: Original

DISTRIBUTION:
Original: NTDME - Darwin
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SUMMARY

The Shell Company of Australia Limited entered into a Joint Venture (J.V.) Agreement with Driffield Mining Ltd over Exploration Licence 4730 on the 28th October 1989.

Billiton Australia, The Metals Division of The Shell Company of Australia Limited are managers and operators of the Joint Venture.

The tenement overlies two historical mining areas, namely the Wolfram Hill and Hidden Valley group of mines which were operated in the early 1900's. Tin, tungsten, and minor copper, lead and silver were mined from these two areas.

The Early Proterozoic Burrell Creek Formation is the dominant rock type in the area and is host to the mineralisation. Early Proterozoic Tollis Formation occurs in the northeastern corner of the licence adjacent to the Wolfram Hill Granite. The granite is also exposed on the eastern boundary of the licence and has caused extensive contact metamorphism to albite-epidote hornfels facies of the adjacent rocks.

A programme of airborne magnetics and radiometrics, stream sediment and rock chip sampling has failed to locate any areas of significant gold mineralisation. Due to the negative results five blocks have been relinquished in accordance with NTDME regulations.
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1.0 INTRODUCTION

Exploration Licence (EL) 4730 was initially granted to Top End Mineral Ventures Pty Ltd on the 15th February 1988 for a period of six years. Immediately after granting, the licence was subsequently transferred to G.B. Scrimgeor on the 18th February, 1988. A second transfer between G.B. Scrimgeor and Driffield Mining Pty Ltd was registered by the Northern Territory Department of Mines on 8th September 1988.

On the 28th October 1989, The Shell Company of Australia Limited entered the Wolfram Hill Joint Venture Agreement with Driffield Mining Pty Ltd with Billiton Australia, The Metals Division of The Shell Company of Australia Limited being managers and operators of the joint venture.

Initially the licence consisted of fourteen graticular blocks. The area was reduced to 10 blocks during compulsory half-term reductions in January 1990.

A further half-reduction was carried out on 15th January 1991 to 5 graticular blocks.

The licence area is located approximately 50kms southeast of Pine Creek and 22 kms northeast of the Batman gold deposit which is operated and managed by Billiton Australia Gold Pty Ltd. Access to the area is via a gravel road which turns off the Stuart Highway 3.5 kms northwest of the Edith River crossing. Access within the area is via bush tracks and off-road driving.

This report contains details of exploration carried out within the relinquished area for the period 15th February 1988 to 14th January 1991.

2.0 GEOLOGY AND MINERALISATION

The geology within EL 4730 consists predominantly of the Early Proterozoic Burrell Creek Formation, overlain in the northeast by the late-Early Proterozoic Tollis Formation. The sequence is intruded along the northeast margin by the Wolfram Granite.
Within the vicinity of the Wolfram Granite ( < 1 km) the Burrell Creek and Tollis Formations have been contact metamorphosed to albite-epidote hornfels facies with minor zones of hornblende hornfels adjacent to the granite. Away from the granite the Burrell Creek Formation consists of interbedded phyllite, siltstone and feldspathic greywacke striking in a north-westerly direction. The Tollis Formation consists of interbedded metasiltstone, slate, greywacke, pale green argillite and various pyroclastic units.

The Wolfram Granite contains grey fine equigranular leucogranite and pink medium to coarse equigranular biotite leucogranite. Both types of granite are extensively altered.

Extensive zones of muscovite-quartz greisen and quartz veins are common, especially in adjacent hornfels where they are associated with tungsten, tin and copper mineralisation.

Regional-scale $F_1$ folding throughout the region, prior to granite emplacement, produced a penetrative and slaty to phyllitic cleavage parallel to fold axes which can easily be identified in siltstone and greywacke units. Folding within the area is typically symmetrical and upright with southward plunging axes.

A second generation of folding ($F_2$), consisting of broad anticlines and synclines which pitch steeply to the southeast has been recognised to the north of the Wolfram Granite.

The Wolfram Hill region has historically been a major centre for metal production, in particular tungsten, tin and copper with minor lead and silver. Historically gold has not been mined economically in the area, but anomalous results have been recorded from a number of prospects.

Tungsten mineralisation at Wolfram Hill Mine is mainly constrained to two lines of lode:

1) the Main Lode; and
2) the Western Line (Irwins).
The lodes are in quartz-biotite feldspar pegmatite filled shear zones parallel to bedding in hornfelsed greywacke and siltstone of the Burrell Creek Formation.

Tin mining has been confined to the area south of the Wolfram Granite, namely the Stores, Vulcan, Bluff and Bells workings. Tin occurs as fine disseminated cassiterite in kaolinitic and limonitic fault breccias of hornfelsed greywacke of the Burrell Creek Formation.

3.0 WORK COMPLETED AND RESULTS

3.1 Aeromagnetics

The Wolfram Hill licence area was covered by a detailed aeromagnetic survey flown during the reporting period. Survey specifications are as follows:-

- flight line spacing 300 metres 
- Survey Height 80 metres 
- Flight line directions E-W, NE-SW 
- Spectrometer 33.6 litres 
- Flown Austirex 1990

Image processing of the data was carried out by GeoImage, Brisbane and in-house at Billiton, Melbourne. An interpretation of the aeromagnetics is shown in Figure 2.

Prominent northeasterly trends have been recognised by BAUS personnel within the Pine Creek region as significant locations for gold mineralisation. These trends have been recognised in the Wolfram Hill J.V. area but occur beyond the boundaries of the areas being relinquished. No discreet anomalies were recognised within the relinquished area.

3.2 Stream Sediments

A total of 24 BLEG stream sediment samples have been collected from prominent drainages within and surrounding the licence area. Samples weighing approximately 5kg were collected and sieved to -8# for analysis
for gold by the BLEG method. Sample locations and results are presented in Figure 3.

Sample No. 240696 and 240700 recorded highly anomalous values of 6215 ppb Au and 23.9 ppb Au respectively. Repeat sampling of the location of sample No. 240696 returned an anomaly below background level (<2 ppb). Sample No. 240700 has not been repeated, as results of several tests and checks carried out by Billiton suggest the highly anomalous values are due to laboratory error. As sample No. 240700 drains an adjoining Exploration Licence it was considered unnecessary to repeat the sample.

Sample No. 220598 returned a value of 12.9 ppb Au, with a repeat value of 2.7 ppb Au. Follow-up rock chip sampling was carried out upstream of this anomaly and is discussed below.

3.3 Rock Chip Sampling
Seventeen rock chip samples were collected as follow-up work to the stream sediment programme, and as part of a regional sampling programme.

Sample No. 229666 (1.05 ppm Au) was taken as follow-up to the 12.9 ppb Au stream sediment anomaly from sample No. 220598. Sample 229666 was collected from a narrow discontinuous quartz vein. Other similar veins sampled within the area analysed a maximum of 0.18 ppm Au. No further potential could be seen in this region.

The remaining rock chip samples contained little or no gold but were significantly anomalous in Cu, Pb, Zn, Sn, W, and As, particularly in the vicinity of the abandoned Wolfram Hill Mine.
**TABLE 1**

WOLFRAM HILL J.V. ROCK CHIP RESULTS

Results in ppm unless otherwise stated

<table>
<thead>
<tr>
<th>Sample No</th>
<th>Au</th>
<th>Cu</th>
<th>Pb</th>
<th>Zn</th>
<th>Bi</th>
<th>Ag</th>
<th>Sn</th>
<th>W</th>
<th>As</th>
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<td>130</td>
<td>173</td>
<td>370</td>
<td>51</td>
<td>86</td>
<td>14</td>
<td>1100</td>
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<tr>
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<td>85</td>
<td>1120</td>
<td>71</td>
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<td>10</td>
<td>1090</td>
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<td>261</td>
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<td>207</td>
<td>16</td>
<td>1000</td>
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<td>108</td>
<td>16</td>
<td>1300</td>
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**4.0 CONCLUSION**

The results from exploration within the relinquished area have been negative, not giving any encouragement for the location of a significant near surface gold ore body.