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

FINAL REPORT FOR EXPLORATION ON
E.L. 6222  McKINLAY RIVER NORTH

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SUMMARY

Exploration Licence (E.L.) 6222, McKinlay River North, is located approximately 25 km north of Pine Creek.

The licence area has been the subject of the McKinlay Joint venture Agreement between Coronation Hill Gold Mines NL, and The Shell Company of Australia Limited, which commenced on the 1st July, 1988. Coronation Hill Gold Mines and The Shell Company of Australia Limited are tenants in common, with The Shell Company of Australia Limited as Manager and operator of the joint venture. Shell withdrew from the McKinlay Joint Venture effective 14th September, 1990.

The geology within the licence area consists predominantly of interbedded siltstones, shales and greywackes of the early Proterozoic Burrell Creek Formation of the Finnis River Group. Within the eastern-most sub-block of E.L. 6222 the Burrell Creek Formation overlies shales, siltstones, greywackes, tuffs and minor cherts of the Mt Bonnie Formation and Gerowie Tuff of the Early Proterozoic South Alligator Group. These sedimentary sequences are wedged between intrusions of the Upper Early Proterozoic Cullen Batholith which occur to the northwest and southwest.

Regional metamorphism to greenschist facies occur associated with at least two phases of deformation, an upright north-northwest folding, and gentle north-northeast warping.

This report contains a summary of all previous work carried out on E.L. 6222, with respect to the joint venture, and details work carried out.
during the current tenement year. Recent work has consisted of gridding, ground magnetics, soil sampling, rock chip sampling and mapping. Results from this recent work have not been encouraging and no further work is planned.
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1.0 INTRODUCTION

Exploration Licence 6222, McKinlay River North, was granted to Coronation Hill Gold Mines NL and The Shell Company of Australia Limited on the 30th September 1988 for a period of four years.

On being granted, EL 6222 was added to the McKinlay Joint Venture, between Coronation Hill Gold Mines NL and The Shell Company of Australia Limited, which commenced on the 1st July, 1988. Shell is manager and operator of the joint venture.

This report details the work complete and results gained by Billiton Australia, The Metals Division of The Shell Company of Australia Limited, on behalf of the McKinlay Joint Venture, during the current reporting period.

Exploration within the licence area has focused on locating near surface bulk tonnage gold mineralisation.

2.0 TENEMENT STATUS

Exploration Licence 6222 was granted on the 30th September, 1988 and will expire on the 29th September, 1990 following a decision by the joint venture partners not to renew the tenement for a third year.
3.0 GEOLGY

The geology within Exploration Licence 6222 comprises of four (4) different Early Proterozoic rock units, namely:-

1. Gerowie Tuff
2. Mt Bonnie Formation
3. Burrell Creek Formation
4. McKinlay Granite (See Figure 1)

The Gerowie Tuff of the South Alligator group is the oldest unit exposed in the licence area and is found in the southeast corner of its eastern most sub-block. The unit is comprised of a sequence of interbedded siltstone, phyllite, tuff and minor chert. Siltstone beds sometimes contain chert nodules.

The Gerowie Tuff is conformably overlain by the Mt Bonnie Formation, again of the South Alligator Group. The Mt Bonnie Formation covers most of the eastern sub-block. Lithologies within the unit consist of interbedded shale, mudstone, phyllite, siltstone, feldspathic greywacke, minor chert and rare banded iron formation.

Unconformably overlying the Mt Bonnie Formation is the Burrell Creek Formation of the Finnis River Group. The Burrell Creek consists of interbedded shale, slate, phyllite, siltstone and greywacke. Rocks within the unit are well cleaved and tightly folded about north-northwest-trending sub-horizontal fold axes. Fold hinges are commonly outlined by low strike ridges, particularly where the fold axes are steep. Rocks of the Burrell Creek Formation are the dominant unit represented in Exploration Licence 6222 and cover the majority of the three western most sub-blocks. In most
of this area the Burrell Creek forms topographic lows and are covered by alluvium.

Granite of the McKinlay Granite can be found in the far northern western corner of EL 6222. This granite forms an oval-shaped exposure about 22 km² in size and 9 km long. The granite is commonly of a medium to coarse, slightly porphyritic hornblende-biotite variety. The granite is the youngest rock type in the vicinity, intruding the Gerowie Tuff, Mt Bonnie Formation and Burrell Creek Formation. Hornfelsing of the intruded sediments, produced by contact metamorphic effects of the McKinlay Granite is relatively common in the area close to the granite and up to hundreds of metres from the granite.

Regional metamorphism to greenschist facies occurs associated with at least two phases of deformation, an upright north-northwest folding and gentle north-northwest warping.

4.0 PREVIOUS WORK

The previous work outlined below is with respect to the McKinlay Joint Venture only.

4.1 Geological Mapping and Rock Chip Sampling

Limited regional mapping and rock chip sampling within EL 6222 has been concentrated within the eastern most sub-block. Results to date have been poor with low base metals and a maximum gold value of 1.29 g/t from some limited quartz veining within the Mt Bonnie Formation near the
eastern boundary of the licence area. Details of the mapping and sampling results have been given in previous Annual Reports and therefore will not be repeated here.

4.2 **Stream Sediment Sampling**

A total of 35 composite 5kg, -8# and 200g, -80# stream sediment samples have been collected within the licence area. Gold analyses were completed using the bulk cyanide leach method with silver, lead, zinc, copper and arsenic AAS determinations completed on the -80# fraction. BCL Au results were very low and discouraging (best value of 0.4 ppb Au). Elevated Pb and Zn values were obtained in several catchment areas, with the highest values recorded being 220 ppb Pb and 315 ppb Zn. These anomalous samples were collected from the most easterly block of the E.L. and are interpreted to be associated with the iron formations of Koolpin Formation which have high base metal background values as indicated by rock chip sample results.

4.3 **Aeromagnetics**

Detailed airborne magnetic and radiometric data was acquired from Aerodata Holdings, as part of a major multi-client survey over the Pine Creek Geosyncline. This survey was completed using a 200m flight line spacing, 5000m tie line spacing and 70m mean sensor height. Image processing was completed by GeoImage of Brisbane.

Two discrete magnetic highs have been recognised in the northwest corner of the licence area. One anomaly is associated with the eastern margin of the McKinlay Granite. The second anomaly is possibly associated with a shallowly buried granite 1km to the south-southeast (See previous Annual Report for details).
5.0 WORK COMPLETED

5.1 Ground Magnetics

A total of 25.6 line kms of grid based ground magnetics, on a 200m spaced grid with a 10m sampling interval, has been carried out on a grid constructed over two discrete magnetic anomalies detected during earlier work on regional aeromagnetic data. The ground magnetics confirmed the aeromagnetic data with two distinct anomalies of 300-400 nanoteslas located in the northwest and southeast of the grid (Figures 2 & 3).

A field examination of the two aeromagnetic and ground magnetic anomalies was carried out. The south eastern anomaly corresponds to an outcropping sequence of magnetic, fine grained sandstone with narrow (<10cm) veins of quartz-magnetite-haematite. Image processing of the detailed aeromagnetic data suggests the southern portion of EL 6222 is underlain by a shallow level granite intrusion. The magnetic anomaly is interpreted to be the result of the formation of pyrrhotite during contact metamorphism from the buried granite and related quartz magnetite veining.

The second magnetic anomaly, in the northwest portion of the grid, corresponds to strongly hornfelsed sediments adjacent to the southeast margin of the McKinlay Granite, indicating a similar source to that identified for the magnetic anomaly occurring in the southeast portion of the grid and investigated in more detail.
5.2 Geology

Detailed mapping at 1:5,000 scale was carried out over 1.6 km strike length of the grid, concentrating on the southeastern magnetic anomaly. The geology consisted of a north-northeast striking sequences of shales, fine grained sandstone and minor pebbly sandstones (Figure 4). Numerous massive glassy-milky quartz veins, oriented north-northeast occur within the central portion of the grid. Very minor Fe poor sheeted veining and brecciation occurs. The major structural feature is a northeast plunging syncline, however structural information is sparse, particularly in the north of the grid.

Rock chip samples collected from several quartz veins within the grid returned disappointing results, with a best value of 0.18 ppm (Figure 3).

5.3 Soil Sampling

A BCL Au soil sampling programme was carried out on the grid emplaced over the southeastern magnetic anomaly (1.6km x 0.9km). A total of seventy five, -8#, 2kg residual soil BCL samples were collected at 20m intervals, and composited into 100m samples. A 50g, -80# sediment was also collected and assayed for Cu, Pb, Zn and Ag. Results were disappointing with values at background (1-2 ppb Au) levels (Figure 5), with one weakly anomalous sample in Pb and Zn (60 ppm and 160 ppm respectively), being recorded (Figure 6). Further followup work was not regarded as warranted.
6.0 CONCLUSION

The current exploration programme has failed to locate significant near surface bulk tonnage gold mineralisation. Due to negative exploration results, no further exploration is proposed for the licence area.
## EXPENDITURE STATEMENT

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<td><strong>TOTAL</strong></td>
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NOTES:
100m - 80g composite soil samples
Cu/Pb/Zn/Ag results in ppm