THE SHELL COMPANY OF AUSTRALIA LIMITED

UNION REEFS PROJECT

RELINQUISHMENT REPORT FOR EXPLORATION ON

EL 6895 EMERALD SPRINGS

FOR THE PERIOD ENDING 13 MAY 1993

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SUMMARY

Exploration Licence 6895 (Emerald Springs) comprising 4 blocks was granted to The Shell Company Of Australia Limited on 22 June 1990 for a period of four (4) years. Two blocks in the western portion of the licence were relinquished on 1 June 1992. A further block was relinquished on 13 May 1993.

This report details all work completed and results gained by Billiton Australia, The Metals Division of The Shell Company of Australia Limited, in the recently relinquished block.

The licence is located approximately 29 kms north northwest of the township of Pine Creek.

The Lower Proterozoic geology of the licence area comprises: phyllite and chert of the Koolpin Formation; siltstone, phyllite, argillite and tuff of the Gerowie Tuff; shale, siltstone and greywacke of the Mt Bonnie Formation; and Zamu dolerite intrusive bodies.

Little is known about mineralisation within the licence area or old workings.

Work completed within the relinquished block in Exploration Licence 6895 has consisted of the purchase and interpretation of aeromagnetic data, a stream sediment sampling programme and follow up reconnaissance and rock chip sampling.

The results of this work have been negative, not giving any encouragement for the location of a significant near surface gold ore body.
1.0 INTRODUCTION

Exploration Licence 6895 (Emerald Springs) comprising 4 blocks was granted to The Shell Company of Australia Limited on 22 June 1990 for a period of four (4) years.

Two blocks in the western portion of the licence area were relinquished on 1 June 1992 (Figure 1).

A further block, the eastern most in the licence area, was relinquished on 13 May 1993.

This report details the work completed and results gained within the recently relinquished block.

2.0 LOCATION AND ACCESS

The licence area is located approximately 28 kms north northwest of the township of Pine Creek. Access is best taken from the Stuart Highway on the well formed, culverted, gravel Spring Hill Road. The Spring Hill Road is followed for 9.5 kms and then on the left hand side of the road a track is selected which when followed passes just to the south of the tenement area.

3.0 REGIONAL SETTING

Exploration Licence 6895 lies in the central portion of the Pine Creek Geosyncline. The geosyncline contains Early Proterozoic metasedimentary rocks resting on a gneissic and granitic Archean basement. The metasediments represent a preserved basinal sequence up to 14 kms thick (Needham et al., 1980), comprising of a possible original thickness of up to 20 km (Ferguson, 1980), which at 1870-1899 Ma was folded and metamorphosed mostly to greenschist facies, and in places to amphibolite facies. The geosynclinal sequence is intruded by transitional ingeous rocks; including pre-tectonic dolerite lopoliths and dykes (Stuart-Smith et al, 1987).
Largely undeformed platform cover of Middle Proterozoic, Late Proterozoic, Cambro-Ordovician and Mesozoic strata (mainly sandstone and minor volcanics and carbonate rocks) rest on these with marked unconformity (Stuart-Smith et al., 1987).

4.0 TENEMENT GEOLOGY

The Lower Proterozoic geology within Exploration Licence 6895 comprises; the Mt Bonnie Formation, Gerowie Tuff, and Koolpin Formation all belonging to South Alligator Group; and the Zamu Dolerite. The Koolpin Formation is the oldest unit exposed in the licence area, covering most of the northwest portion. The unit is comprised dominantly of ferruginous and carbonaceous phyllite with rare chert bands.

Conformably overlying the Koolpin Formation the Gerowie Tuff is found throughout most of the tenement and comprises a sequence of interbedded siltstone, phyllite, argillite, tuff and minor chert.

The Gerowie Tuff is conformably overlain by the Mt Bonnie Formation (the upper-most member of the South Alligator Group). The Mt Bonnie Formation is exposed only in the far northeast and southwest corners of the tenement area. Lithologies within the unit consist mainly of highly interbedded shales, siltstones and greywackes with some minor tuffaceous chert.

Zamu dolerite in the form of long, stratigraphically controlled dykes, is found intruding all other units in the licence area. These dykes and sills are concentrated in the central portion of the area within the Gerowie Tuff.

Two major phases of folding can be recognised in the Early Proterozoic sediments of the region, both pre-dating granitoid intrusions.
Of these phases, the older (F¹ folds) are well represented in the tenement area. These folds are tight to isoclinal, and have north to northwest trending axes. The folds seem to plunge at varying degrees to the south.

The second phase and younger (F² folds) in the region are widely spaced open types. They are not obvious in outcrop owing to their openness and spacing of several kilometres. They trend east and may be associated with poorly developed mesoscopic similar-trending kink or crenulation cleavages (Stuart-Smith et al., 1987).

5.0 MINERALISATION

Little is known about mineralisation within EL 6895. No old workings are known within the tenement area. The old Spring Hill Mine hosted in a large anticlinal structure lies 2 km to the east of the licence area. Two similar large anticlinal structures can be found within the Emerald Springs licence area.

The Pine Creek Shear Zone, a structure which passes some 4 km to the east of the licence area can be traced for a considerable distance to the north-west and south-east, and hosts major gold mineralisation at Pine Creek, Union Reefs, Woolwonga and Goodall.

6.0 WORK COMPLETED

6.1 Detailed Aeromagnetic Interpretation

Data from a multi-client detailed aeromagnetic survey by Aerodata was purchased by Billiton Australia during late 1989. A total of approximately 6,000 flight line kms were surveyed, the coverage of which includes the Emerald Springs licence area.
The survey was flown for the purpose of identifying regional structures and more specifically significant magnetic anomalies that may represent bulk tonnage gold mineralisation (e.g. pyrrhotite bearing veining at Mt Todd).

Detailed processing of the aeromagnetic data was conducted by GeoImage of Brisbane.

Interpretation of both the raw and filtered magnetic data over EL 6895 highlighted several magnetic features in the area, including:

- a major SW-NE fault crossing the top NW corner of the EL.
- A number of small dislocations of magnetic units throughout the tenement area.
- A series of folded magnetic units which are interpreted to be caused by BIF's in the Koolpin Formation.
- No discreet aeromagnetic anomalies that could be interpreted to represent bulk tonnage gold mineralisation as at Mt Todd (Figure 3).

6.2 Stream Sediment Sampling

Active stream sediment samples were collected from 9 locations in the relinquished block of EL 6895 in August 1991 (Figure 2). From each site a 5kg sample of material sieved to -10 mesh and a 200gm sample sieved to -80 mesh were collected.

Assay results are shown on Figure 2. Three subanomalous results (i.e. 4.6, 6.3 7.3ppb) were obtained in streams draining the south-west corner of the relinquished block, the SE corner of the retained block and a NW trending ridge which extends south into SEL 7707. Other Au results in the relinquished block were not anomalous.
6.3 Rock Chip Sampling

Subanomalous stream sediment samples were followed up by reconnaissance and rock chip sampling concentrated in the SW corner of the recently relinquished block. Rock chip sample locations and results are shown on Figure 3. The results were either very low or below detection.

7.0 CONCLUSIONS

The results from exploration within the relinquished block of EL 6895 have been negative, not giving any encouragement for the location of a significant near surface gold ore body.
8.0 REFERENCES


International Atomic Energy Agency, Vienna, 91-100.


EMERALD SPRINGS - EL 6895

Rock Chip Results and Locations
(50 = below detection)
Results in Au ppm

LOCATION PLAN

DARWIN
Katherine
Tenant Creek
Alice Springs