ANNUAL REPORT E.L. 3472 -

HOWLEY NORTH

APRIL, 1982 to APRIL, 1983

on behalf of the holders,

Messrs F.E. HENRY, N.J. WALKER, E.J. BAILEY & J.G. WRIGHT

by

P.M. Nicholson B.Sc (Hons)

EUPENE EXPLORATION ENTERPRISES

Darwin, N.T. 1:250 000 Pine Creek
June, 1983 1:100 000 Batchelor
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APPENDIX I  Marking of Exploration Licence by Gutteridge, Haskins & Davey.
FIGURES

1 Location Map 1:250 000

2 Howley North Physiography Access and Tenure

3 Howley North Geological Traverse Mapping

4 Howley North Interpretation Geology
1. INTRODUCTION

1.1 General Introduction

E.L. 3472 was taken up by Messrs Henry, Walker, Bailey and Wright to explore for alluvial gold deposits. However, initial field inspection located extensive hard rock gold showings, encouraging a change of emphasis in subsequent exploration work. This report describes a programme of geological traverse mapping and trenching targeted mainly at quartz vein-hosted gold mineralisation.

1.2 Location, Access

E.L. 3472 is located about 35km SE of Adelaide River (Figure 1). The Stuart Highway passes through the north eastern corner of the E.L. and connects with bulldozed tracks which allow access into most of the area (Figure 2). These tracks are mainly on high ground, becoming impassable only during the rainiest months of the wet season.

1.3 Physiography

A watershed marked by rounded ridges of South Alligator Group metasediments runs through the E.L. in a N.W.-S.E. direction. This higher ground has a relative relief of about 30 to 50 metres above the flat to undulating areas of suboutcropping Finnis River Group metasediments to the S.W. and N.E.

The drainage preferentially runs perpendicular or subparallel to the N.W.-S.E. strike of the metasediments. Rounded to steep gullies usually containing superimposed, incised drainage channels occur in the higher country.
These may contain narrow (less than 20m wide) deposits of alluvium up to 1m in thickness. In the lower areas the creek channels are generally more incised and are surrounded by thicker, wider deposits of alluvium.
2. CONCLUSIONS

1. E.L. 3172 – Howley North contains exposures of the Lower Proterozoic Burrell Creek and Mt. Bonnie Formations which are folded and probably faulted around a major geological structure, the Howley Anticline.

2. Auriferous, ferruginous quartz veins are concentrated within a 200m wide, physically competent greywacke unit occurring along the axis of the Howley Anticline.

3. Small pits and shafts have exploited veins of presumably higher grade within wider zones of ferruginous quartz veining/stockworks.

4. The potential exists for high tonnage (greater than 10 million tonnes), low grade (2 to 5g/t) gold deposits consisting of numerous mineralised, comparatively high grade quartz veins hosted by barren greywacke-rich rocks. If the quartz and host rocks are easily separated by coarse crushing, ore sorting techniques could possibly be used to extract the quartz before final milling and treatment.

Lower tonnage, higher grade deposits consisting of one or several closely spaced veins could also be present.

5. Several creeks draining the favourable greywacke unit have the potential to contain alluvial gold deposits of up to 10 to 60,000 cubic metres.
3. RECOMMENDATIONS

(1) Geologically map in detail all trenches within the E.L. Estimated cost $1,300.

(2) Collect 10kg rock chip samples along the whole length of all trenches at 2 or 4 metre spacings, depending on prospectivity. These should be analysed for gold (fire assay) and arsenic. Estimated cost $6,000.

(3) Undertake stream sediment sampling over the E.L., concentrating on the favourable greywacke-unit. Samples should be sieved in the field retaining the minus 80 mesh fraction for gold (AAS) and arsenic analysis. This work should help identify areas for the more detailed follow up. Estimated cost $1,200.

(4) Cut trenches in the most favourable creeks in exploration for significant alluvial gold deposits. Estimated cost $1,500.

A minimum exploration expenditure from April 1983 to April 1984 is therefore proposed at $10,000. If the above exploration is successful, further detailed costeanning and diamond drilling could follow.
4. **EXPENDITURE**

The proposed expenditure for E.L. 3472 for its first year was $5,000.

The following are details of the actual expenditure:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
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<tr>
<td>Air photographs</td>
<td>125.00</td>
</tr>
<tr>
<td>Contract Surveyors</td>
<td>650.00</td>
</tr>
<tr>
<td>D5 bulldozer hire</td>
<td>1400.00</td>
</tr>
<tr>
<td>O and K backhoe hire</td>
<td>4800.00</td>
</tr>
<tr>
<td>Machinery float hire</td>
<td>2000.00</td>
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<tr>
<td>Trenching Supervision</td>
<td>2550.00</td>
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<tr>
<td>Consulting Geologist</td>
<td>1320.00</td>
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<tr>
<td>Drafting</td>
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<tr>
<td>Typing &amp; Clerical</td>
<td>320.00</td>
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<tr>
<td>Administration</td>
<td>510.00</td>
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<tr>
<td><strong>Overheads</strong></td>
<td><strong>1385.92</strong></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$15245.12</strong></td>
</tr>
</tbody>
</table>

Proposed expenditure for the next year is $10,000.
5. TENURE

E.L. 3472 was initially granted on 19th April, 1982. The E.L. covers an area of 6.5 square kilometres, as shown in figure 1.

Gold Mining Leases 358 and 359B held by Talmina Holdings occur within the northern part of the E.L.
6. GEOLOGY

6.1 Geological Traverse Mapping

Several across strike geological mapping traverses were completed (see Figure 3) using the recently flown 1:15 000 scale Lands Department colour photography for position fixing. The 1:10 000 scale base maps were produced from these photographs. They have not been corrected for photographic distortion.

6.2 Costeanning

Approximately 800 metres of trenching was completed during the year (see Figure 3). A D5 bulldozer was used to clear lines prior to trenching by an O and K backhoe. Trenches were cut down to bedrock to an average depth of 1.5 metres. Detailed geological mapping and chip sampling of these trenches and about 250 metres of trenching completed by a previous E.L. holder have been recommended to be mapped and sampled next year.

6.3 Stratigraphy

Metasediments and metadolerites of the Lower Proterozoic, Pine Creek Geosyncline (Needham et al, 1980) crop out in the E.L. area. The stratigraphic subdivisions of these rocks are shown in Table 1 and are described in order of increasing age:-

a) Mount Bonnie Formation - Lower Member

The Mount Bonnie Formation, previously known as the Kapalga Formation, is here informally subdivided into two members. A 200m wide belt of the lower unit, representing an unknown true stratigraphic thickness, runs through the E.L. in a NW-SE
<table>
<thead>
<tr>
<th>GROUP</th>
<th>FORMATION</th>
<th>MEMBER</th>
<th>LITHOLOGY</th>
<th>THICKNESS (metres)</th>
</tr>
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<tbody>
<tr>
<td>Zamu Dolerite</td>
<td>Actinolite-chlorite</td>
<td></td>
<td>Intrusive ?sills</td>
<td>up to 20m thick</td>
</tr>
<tr>
<td></td>
<td>feldspar-quartz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>metadolerite</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finnis River</td>
<td>Burrell Creek</td>
<td>Greywacke, siltstone phyllite</td>
<td></td>
<td>&gt; 500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>upper</td>
<td>Phyllite, tuffaceous chert, banded iron-formation</td>
<td>300-500</td>
</tr>
<tr>
<td>South Alligator (Kapalga)</td>
<td>Mount Bonnie</td>
<td>lower</td>
<td>Greywacke, phyllite, tuffaceous chert.</td>
<td>7200</td>
</tr>
</tbody>
</table>
direction (Figure 4). The unit is dominated by interbedded graded greywacke beds 0.05 to 2m thick and metamudstone beds up to 5m thick. An interlayed lense or band of interbedded tuffaceous chert and mudstone occurs in the north of the E.L. The lower member as described here probably correlates with the two greywacke-units and interlayed metamudstone/chert unit described by Goulevitch (1980) at Mt. Bonnie, some 25km to the east.

b) Mount Bonnie Formation - Upper Member.
This unit is exposed either side of the lower member and appears to be 300 to 500 metres thick. It is composed of dominantly metamudstone-phyllite, some of which is slightly carbonaceous, and lesser interbeds of tuffaceous chert and banded iron formation.

The tuffaceous chert beds are 0.1 to 1.5m thick and are composed of varying proportions of silt-sized quartz and feldspar tuffaceous material and microcrystalline quartz, albite and biotite. The beds are usually massive textured to weakly laminated.

Scree fragments of sugary quartz containing laminae of hematite and secondary iron minerals pseudomorphing pyrite have presumably shed from thin beds of banded iron formation.

c) Burrell Creek Formation
This formation outcrops poorly through most of the E.L. It is comprised of varying proportions of interbedded metamudstone-phyllite and greywacke. Rare beds of sugary chert and banded iron formation occur in places.

d) Zamu Dolerite
Sills of the Zamu Dolerite commonly occur within South Alligator Group sediments, although mainly
in its lower sections. These sills were intruded before regional metamorphism and deformation (Needham and Stuart-Smith, 1980). Only one occurrence has been observed to date in the E.L.; i.e. in the northern most exploration trench. This intersection is about 10 metres thick and is composed of chloritic metadolerite.

6.4 Structure

A major phase of regional deformation and greenschist metamorphism, followed by a second phase of open cross folding probably accompanying later granite intrusion, have been observed in nearby areas (Nicholson, 1980).

In the Howley North E.L., the major Howley Anticline trends across the area in a NW-SW direction (figure 4). This is a first deformation structure and its axial plane is paralleled by a slaty cleavage in micaceous rocks. The anticline appears to be tight and is only slightly crossfolded.

In detail the structure of the Howley Anticline is almost certainly more complex than it at first appears. The thickness of the upper Mt. Bonnie Formation is asymmetrical across the axis of the anticline, no structural repetition of the tuffaceous chert/metamudstone unit appears to occur within the band of lower Mt. Bonnie Formation, and all graded beds observed to date indicate that stratigraphic youngings within the band of lower Mt. Bonnie Formation consistently young towards the west. These features indicate that some axial plane shearing probably occurred within the axis zone of the anticline.

6.5 Mineralisation

The Howley Anticline is a structure noted for its past gold production. At least 50 small pits and shafts exploiting auriferous quartz veins occur scattered along the axial trace of the anticline, hosted by the greywacke-
rich Lower Mt. Bonnie Formation (figure 4). In addition, many of the creeks draining this zone contain shallow alluvial workings.

The quartz veins range in thickness from 1mm to 2m and have a predominant orientation subparallel to the slaty cleavage, i.e. NW-SE striking and steeply dipping. Some other vein orientations parallel bedding and others are flatterly dipping. The veins contain up to 5 or 10 percent ferruginous secondary minerals pseudomorphing pyrite and arsenopyrite.

Initial inspection of the costeaming reveals that ferruginous quartz veining sometimes forms stockworks and extends over zones much larger than those exploited by the small pits.
The northern boundary of the E.L. was accurately surveyed by Gutteridge, Haskins and Davey (see Appendix I) for the holders due to the recent exploration activity immediately to the north of the E.L.
8. REFERENCES


Gutteridge, Haskins & Davey
Consulting Engineers
Civil, Structural, Mechanical and Electrical Engineering
Project Management, Planning, Surveying and Photogrammetry
Incorporating the Practices of D.J. Dwyer & Associates Pty. Ltd.
and Planner West Pty. Ltd.

Gutteridge, Haskins & Davey Pty. Ltd.
Beagle House, Mitchell Street.
Darwin, 5790.
G.P.O. Box 251, Darwin, N.T. 5794.
Telephone: 81 5922
Telex: "Haskey" 85107

13 May 1983

Eupene Exploration Enterprises
111 Smith Street
DARWIN NT 5794

ATTENTION PETER NICHOLSON

Dear Sir

MARKING OF EXPLORATION LICENCE AT LATITUDE 13° 28' SOUTH - JOB NO 431-5289.

Pegs were placed on 10 May 1983 indicating where latitude 13° 28' south crosses the Stuart Highway. Two (2) pegs and two (2) blaze marks on trees were established as illustrated below.

**Diagram Illustration**

NOT TO SCALE

Offices Adelaide Brisbane Cairns Canberra Darwin Hobart Launceston Melbourne Perth Sydney Townsville

PRINCIPALS
H Adcock ME MICE MIAust
K M Oenway BSc BE MIAust
D F Friend BSc MIAust
R T Lloyd BSc MIAust
J E McCann BSc FIAust
T Miller BSc LS HIAust FIAust MASCE
D A Poult BE MIAust
J E Ryan MIAust
D N Stroud BSc MIAust MAHRA

ASSOCIATES
J C Callinan DipCE MIAust
D J Dryer ASTC MIAust
G Hambleton BE MIAust
A G Longstaff BSc MIAust
N Macken BS BE MIEng FIAust
J T Phillips BE MIEng FIAust MASCE
C W Ruck BSc Eng BE MIAust MASCE MIAust
J L Sheean ASTC BE MIAust
R A Smith BSc MIEng FIAust MASCE
R J H Travers JS BSc MIAust FIAust MASCE
E M West ASTC MIAust

A R D Cameron DipCE MIAust
B N Fink BSc FIE Aust MASCE
T R Hardware BE MIAust
R E Macintosh BE MIEng FIAust MIRHOI IE
N H Manger BE MIEng FIAust MASCE
J H Planier BE MinYastic FIAust
R V Rose BSc MIAust
D E Stillingworth BSc DipCE FIAust MASCE
R N Smith BE FIAust MIEng
R Vas ES ASTC BE MIAust
J W Wyles BE MinYastic FIAust

S Catuliano BE MIAust
R G Harrow BE MIAust
W F Yann BSc MIAust MASHRAE

(OLQ & NT) D R Michael LS MIAust
When driving south on the Stuart Highway latitude 13°28' south is crossed 3.6 km beyond Bridge Creek, when driving north it is crossed 10.9 km beyond the Fountain Head turnoff.

We trust that the above marks satisfy your requirements.

Yours faithfully

[Signature]

GUTTERIDGE HASKINS & DAVEY PTY LTD