EXPLORATION LICENCE 4845

ANNUAL REPORT FOR FIRST YEAR OF LICENCE
February 28th, 1986 to February 27th, 1987

by

P.M. Nicholson B.Sc(Hons) A.M.Aus.I.M.M.

for
Harlock Pty Ltd

April, 1987

Batchelor 1:100,000
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APPENDIX I ASSAY RESULTS
1 INTRODUCTION

Exploration Licence 4845, which incorporates the Sundance gold mine and Glenluckle prospect, is located 100km south of Darwin and 2km east of Batchelor (figure 1). It is accessible via a number of gravel tracks off the sealed Batchelor road which borders the E.L. to the north, and the Stuart Highway, which is close to the E.L.'s eastern boundary.

The Licence area, which covers the host stratigraphy of the nearby Rum Jungle uranium-base metal deposits, has previously been explored in some detail by C.R.A., B.M.R., Uranerz, Occidental and Pancontinental. However this exploration did not concentrate on gold, which, after the discovery of significant mineralisation at Sundance, is now the major target.

This report describes the first year's exploration programme which has included a literature survey of previous exploration, a detailed geological study of the Sundance gold mine, a literature survey of deposits similar to the Sundance mineralisation and some reconnaissance mapping and sampling.
2 SUMMARY

The first year's programme has included:

(i) A study of the Sundance mineralisation. This work has recognised the mineralisation as karst-related, and thus identified a number of criteria useful for exploration, for example, carbonate host rock, evidence of karstic collapse and presence of quartz-ironstone outcrops.

(ii) Reconnaissance sampling of quartz-ironstone outcrops. A sample from a gossanous outcrop within the Koolpin Formation was found to contain anomalous gold.

(iii) A literature survey to identify criteria relevant to gold exploration which has been recognised in previous exploration.

This work indicates the licence area has excellent potential to contain economic Sundance-type karst-related gold mineralisation and stratiform gold mineralisation similar to that at the Golden Dyke and Cosmopolitan Howley mines.
3 CONCLUSIONS

(i) The mineralisation at the Sundance gold mine is karst related. It is similar to the gold-antimony mineralisation at Bau, West Sarawak, some of the gold mineralisation at Kuranakh, U.S.S.R. and the lead-barite deposits of Arenas, Sardinia.

(ii) The licence area contains extensive outcrops of carbonate, evidence of karstic collapse and outcrops of ironstone and hematite-quartz-breccia. All of these features indicate the area has excellent potential for further discoveries of Sundance-type mineralisation.

(iii) An outcrop of ironstone containing anomalous gold was located in the Glenluckie area. This outcrop appears to be within iron formation - member of the middle Koolpin Formation which contains economic stratiform gold mineralisation at the Golden Dyke and Cosmopolitan Howley mines.
4 RECOMMENDATIONS

(i) The Coomalle Dolomite/Whites Formation and Koolpin Formation should be mapped within the licence area.

(ii) Areas overlying carbonate which contain ironstone–quartz–hematite breccia outcrops, sandstone outcrops and evidence of karstic collapse should be followed up with a program of:-
   a) detailed geologic mapping.
   b) detailed ground radiometry.
   c) costeanning.
   d) percussion drilling.

(iii) Ferruginous outcrops within the Koolpin Formation should be rock chip sampled. Anomalous areas (including the zone located this year) should be followed up by costeanning and drilling.
5 TENURE

Exploration Licence 4845 was granted on 28th February, 1986. The lease covers an area of 12 blocks, or 32 square kilometres.

The licence holders, Mr P. Purich and Mr N. Byrne, have joint ventured the licence to Harlock Pty Ltd, the trustees for the Mt Bonnie Gold Unit Trust.
6 EXPENDITURE

The proposed expenditure for the first year of the licence was $10,000.

Actual expenditure is listed below:

Reconnaissance mapping and sampling around Glenluckie and Sundance

12 days at $200/day $2,400

Rock chip sample analysis

21 samples at $20/sample 420

Literature survey and collation of previous exploration

5 days at $250/day 1,250

Detailed mapping of Sundance gold mine

8 days at $350/day 2,800

Literature study of similar mineralisation

4 days at $350/day 1,400

Purchase of air photographs 85

Reporting 450

8,805

Administration (15%) 1,320

TOTAL $10,996

It is estimated that a minimum of $50,000 will be spent on the Year 2 programme, as outlined in Section 4 of this report.
7 WORK COMPLETED

7.1 Literature Research

The following is an exploration history of the area, with an associated list of organisations, tenements and work completed.


1964 BMR Ground Radiometry
1965 BMR Auger drilling, geochemistry, mapping, radiometry, EM.


This work has accurately mapped carbonate, sandstone and ironstone/hematite-quartz-breccia outcrops. In some places hematite-quartz-breccia (HQB) has also been intersected in drillholes. In addition, several radiometric anomalies located in this work deserve follow up.

The relevant maps in the above reports are currently being collated and redrafted to produce a set of maps of the same scale showing geology, geochemistry, magnetics and radiometrics.
7.2 Sundance Mine Research

The Sundance mineralisation was initially discovered during a ground radiometric survey conducted by Pancontinental in the late 1970's. Follow up chip sampling and costeaming produced disappointing uranium grades accompanied by some high gold grades. Detailed exploration was then carried out by Mt Bonnie Mines immediately prior to mining in late 1986.

The licence area surrounds MLN 542 and MLN 543, which covers the Sundance gold mine. The workings at Sundance were mapped in detail during mining in an attempt to elucidate the controls to mineralisation and thereby maximise the efficiency of exploration in the surrounding area.

Mining at Sundance mainly occurred within two pits (figure 3). Both pits were underlain by a carbonate karst surface (that is, the upper surface of bedrock is extremely irregular in shape due to solution and collapse processes).

In the eastern pit the overall orientation of the karst surface is horizontal, although the depth to the top ranges from 0.5 to 10 metres (figure 3). The carbonate is overlain by pockets of yellow clay, which are in turn overlain by ironstone and euhehedral quartz. The ironstone, which contains ore grade concentrations of gold, is generally dense and massive textured. It occurs as subrounded masses 0.05 to 5m in diameter. Clay material between the ironstone masses contains grey, zoned euhehedral quartz crystals up to 10cm in length. The ironstone-quartz is covered by recent soil.

In the western pit the karst surface forms an irregular basin 60m wide (east-west) by 100m long (north-south) by up to 50m deep. The basin is mainly filled by yellow-white clay and sand. This material contains fragments of quartz, ironstone and sandstone which range from 10cm to 5m in diameter. The
HUNDANCE MINE
SURFACE GEOLOGY

Open Pit
hae dolomite
has mudstone
bks sandstone
□ mining area
□ possible ore
□500 tonnes 12 production in g/t Au

SECTION 5990 N

interception in g/t Au

SECTION 6100 N

GUNDANCE AREA FIG 3
sand/clay is bedded. The bedding is defined by bands of sand and silt and is irregularly folded and faulted. Within the basin of clay/sand are two smaller basins of massive textured sandstone (figure 3). The boundaries of these basins are sharp.

The ironstone fragments (or boulders) in the western pit tend to occur in clusters. The ironstone fragments generally have a breccia texture comprised of ironstone and quartz fragments averaging 1cm in diameter, cemented by an ironstone matrix. Some ironstone fragments are not brecciated. They have massive or banded textures.

The geology of the Sundance deposits have many similar features to the Karst hosted mineral deposits described by Zuffardi (1976), Laznicka (1985) and Wolfenden (1965).

In these deposits, it is postulated that the solutions which form the karst also physically deposit detritus and chemically deposit the base metals, uranium, gold etc with iron and quartz. Continued solution after mineralisation can cause further collapse and brecciation of the mineralisation, and detrital accumulates (as occurs in the western pit).

Important exploration criteria are therefore carbonate suboutcrop, ironstone outcrop and evidence of karstic collapse. The latter may be evidenced by dolines or sandstone outcrops, which appear to be preferentially preserved in areas of collapse.
7.3 Sampling and Reconnaissance

The area immediately adjacent to the Sundance leases was searched for the presence of more ironstone outcrops. However, the presence of long grass prevented effective work.

In the Glenluckie area (figure 2) an ironstone outcrop was sampled and assayed for Au, Ag, Cu, Pb, Zn, Ni, Mo and Pt (Appendix I). Anomalous gold was found in one sample, which was repeat assayed (SD22, SD30).
REFERENCES

Wolfenden, E.B., 1965, Bau Mining District, West Sarawak, Malaysia, Geol. Surv., Borneo Region, Malaysia.
APPENDIX I
### ANALYSIS

<table>
<thead>
<tr>
<th>SAMPLE MARK</th>
<th>Cu ppm</th>
<th>Pb ppm</th>
<th>Zn ppm</th>
<th>Ag ppm</th>
<th>Mo ppm</th>
<th>Ni ppm</th>
<th>Au ppm</th>
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<td>58</td>
<td>1640</td>
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<td>345</td>
<td>&lt;0.01</td>
<td>&lt;0.02</td>
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<td>1190</td>
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**Det'n Limit**: (2) (5) (2) (2) (1) (5) (0.01) (0.02)

**METHOD**: A1/1, A1/1, A1/1, A1/2, A1/2, A1/2, A2/3, A7/3
## ANALYSIS

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**METHODS:** A2/3; A1/2
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METHODS: A2/3; A1/2
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<td>1750</td>
<td>95</td>
<td>120</td>
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<td>x</td>
<td>x</td>
<td>500</td>
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Results in ppm unless otherwise specified
T = element present but concentration too low to measure
X = element concentration is below detection limit
--- = element not determined