FINAL REPORT

EL 5688 MT DOREEN

SEPTEMBER 1992

MAREEBA MINING & EXPLORATION PTY LTD

Received 18/9/92
TABLE OF CONTENTS

1. INTRODUCTION 3
2. SUMMARY 4
3. TENURE 5
4. REGIONAL GEOLOGY 6
5. STREAM SEDIMENT GEOCHEMISTRY SURVEY 7
6. ROCK CHIP GEOCHEMISTRY 8
7. ECONOMIC GEOLOGY 8
8. CONCLUSIONS 9
9. RECOMMENDATIONS 9
10. REFERENCES 10

LIST OF FIGURES

Figure 1. Locality Plan
Figure 2. Geology – Mount Doreen Region
1. INTRODUCTION

Exploration Licence 5688 lies on the Mt. Doreen 1:250 000 geological map sheet, approximately 300 kilometres northwest of Alice Springs (see Figures 1 & 2).

The EL was granted to White Industries Ltd on 1 February, 1988 for a period of 6 years. In its third year, the licence was reduced to 118 blocks covering an area of 387 square kilometres.

Following a brief reconnaissance trip to the area in February, 1990 a stream sediment geochemical survey of the area was carried out. A programme had previously been proposed by Dr. Murrell and the stream sediment geochemical programme was based on a similar philosophy. The aim of the programme was to define previously unknown areas of mineralisation particularly in the schistose sediments adjacent to the granitic intrusion.

The programme was helicopter assisted and was completed between 4–8 April, 1990.
2. SUMMARY

A helicopter assisted geochemical stream sediment and rock chip sampling programme was executed over EL 5688 during April, 1990. One moderate and one weak base metal anomaly have been defined within the Pre-Cambrian schist. Three zones of quartz pegmatite veining containing base metal mineralisation were recognised. It is proposed that follow-up work should consist of more rock chip sampling and detailed geological mapping of the quartz-pegmatite zones and mapping/rock chip sampling traverses over the two stream sediment anomalies. This work would be aimed at defining drilling targets, and would require 3–5 field days to complete.

Due to the currently depressed market prices for metals, EL 5688 was relinquished on 23 June 1992.
3. TENURE

Exploration Licence 5688 was granted to White Industries Limited on 1 February, 1988 and comprised 295 blocks covering 968.5 sq km. In its second year of tenure the licence was reduced to 161 blocks. In Year Three, the EL was further reduced to 118 blocks covering an area of 387 sq km.
4. REGIONAL GEOLOGY (from Stidoph, 1989)

EL 5688 is situated in the central part of the Arunta Block (see Figure 1 and 2). As shown in Figure 2, (which is a reproduction of the 1:250 000 geological map produced by the Bureau of Mineral Resources in 1972), the area is underlain by two main rock units:

(a) A folded sequence of schists and gneisses of probable Early Proterozoic age.

(b) A large mass of granitic rocks known informally as the Mount Doreen granite.

The metamorphic rocks consist mainly of mica–quartz schists or gneisses with occasional beds of quartzite. Some schists contain andalusite or garnet. They form low rounded hills and a few small pinnacles and ridges. Also present are rocks described as paragneisses and granulites (Wells, 1972).

Reports indicate that the schists are derived from interbedded siltstones, mudstones and argillaceous sandstones.

The schist/gneiss is host lithology to all known mineralisation in the area. The schistose sediments are tightly folded and faulted and the whole unit has been intruded by 2–15 metre wide granitic veins, probably during intrusion of the granitic batholith.

The Mount Doreen granite is typically a coarse–grained gneissic muscovite–biotite granite with augen–shaped megacrysts of potash feldspar (Brown 1967, Clarke, 1969). A steeply plunging lineation is strongly developed in most outcrops. Reports from Kiek (1940) and
Clarke (1969) indicate that the granite intrudes the metamorphic rocks and that the numerous pegmatites in the area are probably related to a younger, finer grained granite phase.

Much of EL 5688 is covered by superficial Quaternary soils which mask the geology of the underlying rocks. Silcrete and ferricrete are developed on the metamorphics in several places.
5. STREAM SEDIMENT GEOCHEMISTRY SURVEY

All assay results and analytical data were reported in April 1990 and the reader is referred to that report for further data.

The sampling programme was designed such that all first, second and third order streams over the Pre–Cambrian schist were sampled with a maximum sample interval of 1 kilometre. Over the granite only first order streams were sampled with a sample interval of approximately 3 kilometres.

At each site a sample weighing several kilograms was collected across the width of the stream channel. Care was taken to ensure that the most recent sediments were sampled. The material was then sieved to ~50 mesh yielding a final sample of 500–800 grams.

Each sample was split, half retained by Eupene Exploration Enterprises Pty Ltd and half sent to Classic Comlabs Laboratory, Darwin. Here the samples were prepared and the following analytical techniques used:

- Bulk leach extractable : Au
- Acid digest/AAS finish : Ag, Cu, Pb, Zn
- X–ray fluorescence : As, Sn, Ta, W, Pb

A statistical analysis has been carried out for the elements Au, Cu, Zn as these elements have the best geochemical responses. Results of the analyses were presented in the April 1990 report. Two Cu populations were found to exist in the data set, corresponding to granite and schist. Zinc is more uniform in its distribution between the different lithologies, however there is a well defined positive skew. This skew appears to be related to anomalous base
metal mineralisation, suggesting that Zn is a sensitive indicator of base metal mineralisation. As can be seen from the gold histogram, most samples were below detection level.

AAS analysis of Pb show all samples assayed below detection when an acid digest was used. A selected group of 68 samples was re-assayed for Pb by X-ray fluorescence. All samples returned values greater than 5 ppm Pb.

X-ray fluorescence measures "total" Pb rather than only that component readily digestible. It would therefore seem that Pb reported by the XRF technique was held in minerals other than ore minerals, probably silicates. A statistical analysis of the XRF data reveals that the Pb population approximates a normal distribution and therefore no anomaly exists.

Classic Comlabs have suggested that the original acid digest/AAs finish Pb results may have been too low due to a "blank problem" resulting in over correction.

Those areas of know base metal mineralisation displayed subdued anomalies with slightly elevated Cu, As, and Zn values.

The most notably elevated base metal values lie immediately southwest of Mt. Hardy. Four samples collected in this area averaged values of 20ppm Cu and 20ppm Zn. These values are approximately two times the arithmetic mean for those elements over the schist, and interestingly are higher than any sample assayed from around the know areas of mineralisation. This area is adjacent to a quartzite unit exposed within the schist. Due to a lack of whole rock geochemical data, it is impossible to say whether these elevated values are due to local schist-hosted mineralisation or to whole rock geochemical variation between rock units. At this stage the area must be considered an anomaly worthy of further follow-up work.
Sample 40823 returned anomalous Cu (17 ppm) and Zn (26 ppm). Two adjacent samples, numbers 40822 and 40814, both showed anomalous arsenic. These samples defined a subdued anomaly over an area where no mineralisation has previously been noted.

Samples 40889, 40890, 40891 and 40893 all showed elevated Au values of 0.48, 0.51, 0.27 and 1.56 ppb respectively. Although they are one to two orders of magnitude greater than the arithmetic mean, the values are still considered too low to reflect derivation from a source of economic mineralisation. The elevated values are more probably due to higher background values in rocks from that part of the EL.
6. **ROCK CHIP GEOCHEMISTRY**

A total of 19 rock chip samples were collected from quartz-pegmatite veins across the EL and 3 rock chip samples from linear granitic intrusions in schist. These samples were collected during the 1990 stream geochemical survey.

In all 14 samples were taken from three zones of known copper mineralisation in the eastern part of the EL within 5 kilometres of the Mt. Hardy Copper Mine. Assays ranged from 600 ppm – 20.5% Cu, <100 ppm – 17.8% Pb, 22 ppm – 1.52% Zn, 0.02 – 2.66 ppm Au, 1–170 ppm Ag, <100 – 350 ppm As, 10–720 ppm Sn, <20 – 98 ppm W and 806 ppm Li. No significant Ta was assayed.

Samples 40902 to 40912 were re-assayed for Pb by X-ray fluorescence due to problems with the AAs reading. The AAS results should be ignored.

The linear granitic intrusions showed the following average values:

34 ppm Cu, 17 ppm Pb, 17 ppm Zn, 001 ppm Au, <5 ppm Ag, <2 ppm As, 26 ppm Sn, 10 ppm Ta, 15 ppm W and 12 ppm Li.

Samples taken around the Wolfram Hill prospect range from 189 ppm – 1.13% Cu, 50 – 157 ppm Zn, 0.021 – 0.083 ppm Au, <20 – 109 ppm Sn and 45 – 309 ppm Li. Sample VS6 assayed 25 ppm Ag and 6040 ppm W. No other samples taken at this prospect assayed above detection level for Ag or W.
7. **ECONOMIC GEOLOGY**

Mineralisation in the area is associated with quartz and pegmatite/aplite veins within the Lower Proterozoic schist. Significant copper mineralisation may also be contained within gneisses adjacent to these veins. Most of the outcropping mineralised zones are made up of narrow 0.3 – 2 metre wide veins, plus associated mineralised gneissose pods up to 7 metres wide (No. 2 pit Mt. Hardy Copper Mine). Previous drilling results show secondary enrichment has occurred.

Metals of economic significance in these zones are Cu, Pb, Zn, Ag, Sn, and possibly Au and W. The style of mineralisation indicates that small to medium tonnage, moderate grade deposits may exist within these zones. To date, only one such zone has been tested by drilling, i.e. the Mt Hardy Copper Mine, where indicated reserves are too small to warrant large scale extraction.

It is suggested that a deposit of 300–500 000 tonnes of 4–6% copper equivalent is required for the prospect to be considered attractive to a mining company. Although all work on known mineralisation prior to the current exploration programme has failed to find a deposit of this scale, it is quite clear that tall the potential zones have not been adequately tested.
8. CONCLUSIONS

* Broad, albeit subdued, base metal anomalies were defined around areas of known copper mineralisation.

* A well defined zone of elevated Cu, Zn and As values lies immediately southwest of Mt Hardy. This anomaly may be due to either base metal mineralisation or to whole rock geochemical variation between rock types.

* A low level base metal anomaly is defined by sample number 40823 (17 ppm Cu, 26 ppm Zn) and supported by arsenic values of 4 ppm (sample number 40814) and 3 ppm (sample number 40822).

* No Sn, Ta or W anomalies were defined, however the detection limit of analytical techniques used may have been too high.

* Elevated Au values up to 1.56 ppb over the northwest corner of the EL are one to two orders of magnitude greater than the arithmetic mean. These values are however considered too low to have been derived from a source of economic mineralisation. It is suggested that whole rock geochemical differences account for higher values in this area.

* Quartz-pegmatite veins, 0.3 – 2 metre wide, and associated mineralised gneissose pods up to 7 metres wide contain significant mineralisation with rock chip samples assaying up to 20.5% Cu, 17.8% Pb, 1.52% Zn, 2.66 ppm Au, 170 ppm Ag, 720 ppm Sn, and 98 ppm W.
Wolfram Hill is not considered worthy of further follow-up as only one sample returned significant W, (sample number VS6, 6040 ppm W), and because of depressed world tungsten prices.
9. RECOMMENDATIONS

* Follow-up those two base metal anomalies defined, with thorough rock chip and mapping traverses.

* Carry out detailed mapping and rock chip sampling over those three zones of base metal mineralisation with a view to defining drilling targets.

It is envisaged that this programme would take 3 -5 days to complete and would be essential before any drilling commenced.

* Carry out a 2000-3000 metre reverse circulation drilling programme over the zones defined upon completion of the above work.
10. REFERENCES


MINING DISTRICT: NORTHERN TERRITORY SOUTH
ATPA. ELA: EL 5688
ATP, EL: -
MLA: -
ML: -
MAP REFERENCE: SF 52-12 MOUNT DOREEN