WEBBS POUND
CENTRAL MOUNT BLEECHMORE
ALCOOTA 1 : 250 000 Map, Section 70/5

FINAL REPORT to 25th Feb 1995.

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SUMMARY

During the first year an exploration program aimed at testing the geological nature of the Webbs Pound topographic feature was conducted, with particular emphasis on identifying any deep seated ultrabasic intrusive occurrences. This program involved ground magnetic survey and drilling.

During the second year the focus was centered on establishing whether the garnet-rich sand of the Kilmot Creek might have any economic potential. A total of $2 110.00 was spent on the EL during the second anniversary year, (1994/95).
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PROJECT AIMS

The aims of the project were, in the first year, to identify and test intrusive structures of a type which might carry economic mineralisation of, (for example), Diamond, Platinum Group Metals, Gold, Niobium, Rare Earth Elements, or other minerals in economic quantities, such as Apatite, Vermiculite, etc.; and during the second year, to determine whether the garnet-rich sand of the Kilmot Creek, which drains the exploration licence area, might have any economic potential.

LOCALITY

The project area is located in the central part of the Mt Bleechmore hills complex, (ALCOOTA Geological 1 : 250 000 Map, Section 70/5), and it is accessed via station roads from the Plenty Highway. (Map 1.)

EXPLORATION PHILOSOPHY AND TECHNIQUES

The area which comprises EL 7940 was selected to examine the geology of what appears to be an anomalous land feature in the prominent hills of the Mount Bleechmore complex. The feature, a flat-bottomed closed valley with an area of about sixty hectares, was possibly a weathered feature after a younger intrusive pipe, and if so would have some potential for diamond mineralisation.

The exploration target was selected from airphoto and geological map research, and this was followed up with ground reconnaissance to confirm the nature of topography. After inspection it was decided that an informal ground magnetometer survey should be conducted to determine if any substantial difference existed between the magnetic susceptibility of the underlying geology of the pound structure and that of the surrounding rocks of the Mount Bleechmore complex. It was further decided that two percussion holes should be drilled in the floor of the pound to obtain reasonably fresh samples of the underlying unit which appears to have weathered preferentially compared to the refractory rocks of the surrounding hills.
(The rocks of this region are comprised predominantly of the Bleechmore Granulite, a unit of the Strangways Range Metamorphic Complex, and these are described further under the heading Geological Synthesis).

As part of an overall geological strategy for diamond exploration, (in an area which according to conventional wisdom is non-prospective), it was planned to analyse the bulk rock composition of samples from the proposed drill holes so as to to establish the compositional range of the rocks and residual materials in the unit underneath the pound, and to provide data for the interpretation of the mobility of elements during the weathering process. At the same time we felt that the identification of any suspected [relatively] unaltered lamproitic or kimberlitic rocks intersected in the drilling should well become obvious, and easily confirmed, especially if the major element data were to be combined with trace element data.

Our ongoing exploration strategy revolves in part around the fact that any igneous rock now present at or near the surface of the earth, but which originated under depth/pressure conditions within the thermodynamic stability field of diamond, is itself potentially diamondiferous, (especially if the bulk rock composition had a sufficiently high chemical potential of C), or may have picked up diamonds (as xenocrysts) from deep-seated rocks (also within the P/T constraints) through which it passed on its way to the crust.

This model is not nearly so restrictive as the Kimberly- and Argyle-related models, both of which require specific host rocks, but certainly includes them. It does, however, require geochemical signatures and/or mineralogical compositions indicative of the required P/T conditions for diamond stability, such as high Na pyroxenes, high Mg and/or high Na ± Ti garnets, high Mg ilmenites and so on.

With respect to bulk rock analyses, the above apply in terms of separating out the (regional high-grade metamorphic) country rocks from those igneous rocks which have the potential to have been derived from depths exceeding 150km. Carbonatites, kimberlites, lamproites and other ultra-potassic rocks, certain anorthosites, and ultramafic/ultrabasic rocks are all geochemical targets which warrant further mineralogical attention.
WORK COMPLETED

FIRST YEAR

MAGNETIC SURVEY
A magnetic reconnaissance was conducted using a Geometrics G836 Proton Magnetometer giving a reading of local field intensity rounded to the nearest ten. Because of the occurrence of solar fluctuations during the survey, several readings were taken at each station in order to guarantee field stability and thus reasonable accuracy. No correction for diurnal variation was applied.

DRILLING PROGRAM
Two holes of 24 meters each were drilled into the floor of the pound, comprising a total of 48 meters. These holes were designated POU 1, and POU 2. (Map 2 & Fig 1.)

DRILLING EQUIPMENT
The drilling rig used was an Ingersol-Rand ECM 350 air track machine, mounted along with an I-R 900cfm compressor on a semi-trailer. It has a boom mounted air hammer and is probably best described as a percussion RAB drill.

DRILL SAMPLES
A bulk sample was taken from each hole, and after reduction a portion of the material from POU 1 was sent to Analabs, Brisbane, for analysis. (Table 2.)

SECOND YEAR

SAMPLING PROGRAM
Two sites in the creek were were sampled, comprising four samples from each section, (Map 2.), which returned about 6-8kg per section. For this program it was only necessary to obtain representative samples of the Kilmot Creek sand to determine the values of the contained garnet.
SAMPLING EQUIPMENT

A hand sampling device was developed to produce a sample of sand that had a high integrity in terms of consistent volume to depth ratio. It is in the form of a 55mm diameter light gauge steel tube which is turned into the sand via a removable bar. A close fitting pipe of similar construction is then inserted into the first tube in order to load and remove the sample material. (This can only be achieved by compacting the sand, after the addition of a small amount of water to bind the grains.) In this way the first tube acts as a casing, isolating the dry sand outside the tube, and ensuring that the sample collected represents a true vertical section through the sand.

SAMPLES

The samples so collected were then transported to Baikal Homestead where they were dried and quartered, and a 1kg parcel of each was forwarded to the project geologist, (Dr S K Dobos), for assessment. Some of the remainder was used for hand separation tests to establish a reasonable estimate of the percentages of garnet contained in the samples. (Table 1.)

As well, about 40kg of sample was collected to establish the suitability of a Reichert spiral for concentrating the garnet fraction of bulk samples. A single spiral unit was set up at Baikal Homestead, and while this functioned as it should, it was found to lack the sharp accuracy required to establish reliable data, at least on a test scale.

TEST COMMENTS

The hand separated garnet concentrate from the test samples (tabled below) were virtually free of any other heavy minerals. All size fractions above 75 microns had a few iron-rich fragments of lateritic residue, and below 300 microns there were small amounts of magnetite. In the minus 75 micron fraction a trace of a dense white (colourless) mineral was observed, which was possibly zircon. Very little hornblende was seen in the concentrates, which simply reflects the limited amount available to the stream from the rocks weathering into the catchment.

As regards both the sand and the garnet, the predominant grain size was in the range between 500 microns and 1600microns, this fraction accounting for slightly more than 50% of the mass of each of the samples. The largest garnet fragments observed were about 3mm to 4mm in size, but above 1.6mm the garnet values were only a few
percent. Not surprisingly, the tailings fraction was essentially quartz, with a lesser amount of feldspar and a trace of mica and other light minerals.

The amount of 'tramp' material in the samples, (stones and gravel fragments larger than 5mm, and containing no garnet), was about 12% at both sample locations, though this was difficult to calculate accurately due to the presence of occasional stones which were too large to enter the sampling tube. This precluded the tramp material from being sampled representatively which will have biased the sample to some degree in favour of the finer fraction.

EXPLORATION RESULTS AND CONCLUSIONS

It is most likely that the percussion drill samples from Webb's Pound represent quartz and residual materials which have been derived principally from the breakdown of the feldspar and biotite constituents of a quartz rich schist, all of which are common phases in the Mount Bleechmore Complex. Any opaques and garnet in this situation would have tended to resist the weathering process better, and in an area of high or moderate relief would generally be transported away when exposed to the conditions at or near the surface.

The trace element data must be interpreted carefully, insofar as the majority of materials analysed are partly or completely altered. The chemical data therefore reflect a range of values, of which some are relatively "mobile" (Sr), through to "immobile" (Zr). Our interpretation of the data accounts for the possibility of selective removal/enrichment of the elements.

It is clear that the samples from drill holes POU 1 and POU 2 simply represent the Bleechmore country rock, for they show no evidence that would suggest they belong to any of the deeply sourced igneous rock groups mentioned earlier.

With regard to the economic potential of the garnet contained in the sand of the Kilmot Creek, the hand separation tests certainly demonstrated the presence of adequate garnet percentages, in a sand-mix notably free of hornblende or other minerals that might complicate any separation process. It would however be thoroughly impractical to mount any such operation in this section of the creek, because for the most part it is not in the form of an open sandy channel, instead being completely overgrown with titree scrub, which apart from being an inconvenience, reduces the sand content of the channel to almost zero. Where it is open the sand is quite shallow, with little in the way of reserves. We are satisfied then that as far as our exploration on EL 7940 is concerned the matter is closed.
GEOLOGICAL SYNTHESIS

The following synthesis is derived from a broad investigation of data from EL 7940 and the other contiguous exploration licences in the Mount Blechmore locality. More specifically, it is derived from a number of field traverses over the greater area of these licences; from fresh surface samples collected during these traverses, and selected thin-sections cut from these samples; and from visual and microscopic examinations of the various diamond drill cores from the program on EL 7696, and petrographic analyses of thin-sections cut from these. It also encompasses geochemical data from the weathering products of this rock suite (as listed in previous reports).

From the available data, there are three principal rock types in the Mount Blechmore area, namely, the rock suite comprising the Blechmore granulite, various small leucocratic quartz and feldspar dominated "intrusives", and the rocks comprising the carbonatitic suite, genetically and temporally related to the Mud Tank Carbonatite.

THE BLEECHMORE GRANULITE

The Blechmore granulite is a heterogeneous suite of pelitic metasediments and intercalated mafic granulites. The dominant lithological type is a heterogeneous, garnetiferous 2-feldspar-quartz-biotite±hornblende+magnetite granulite. This rock type exhibits a wide range of modal compositions and textures, reflecting inherited protolithic compositions and grainsizes; some variants are garnet-free, and others may be mono-, bi- or tri-mineralic assemblages of the above mineral suite, such as garnet-quartz-plagioclase, biotite-quartz-garnet, garnet-biotite, and just biotite. These compositional variants may range from fine bands or lenses of several centimetres thickness, to more massive and continuous layers or lenses exceeding 12 metres in thickness.

The protolithic suite which gave rise to these rocks comprised differing ratios of quartz chlorite and/or montmorillonites, illite and/or kaolinite and/or detrital feldspars, as well as minor calcite, and the usual array of heavy detrital trace minerals such as zircon, monazite, allanite and tourmaline. As a suite, these protoliths were significantly more mafic than normal pelitic sequences.

In common with a number of pelitic rock suites throughout the Arunta Block, the Blechmore Granulite includes lenses and layers of mafic granulite on a variety of scales up to 40m in thickness. These rocks comprise the assemblages plagioclase +clino- and/or orthopyroxene±hornblende + magnetite, and some of these may contain
garnet and/or quartz as their compositions vary towards more silica saturated types; some lower-grade diopside-amphibolites may be observed locally.

Again in common with rocks of similar compositions throughout the Arunta Block, the Bleechmore Granulite may contain variants that are notably rich in magnetite, and we infer that small “blows” of magnetite, up to say 30m in length, may also exist, probably in close proximity to the lithological contact between pelitic granulites and thick mafic lenses. We have not actually observed such blows at the surface in the areas encompassed in the ELs, but these may be responsible for some of the localised magnetic "highs" that have been recorded, as for example in the rocks immediately north of the small dam in Webbs Pound, (Table 3.)

LEUCOCRATIC “INTRUSIVES”

For the most part, these are quartz- or quartz and feldspar-dominated thin cross-cutting veinlets, veins and dykes, evident both at the surface and in the drill cores. Their most probable source is the anatetic melting of selected compositions of the high grade pelitic granulites, (similar to the occurrences in Migma Creek near the Harts Range Police Station), hence their source is localised. Though possible, it is unlikely that these veins and dykes emanated from late-stage post-tectonic granitoid intrusives underlying the Bleechmore granulite, and we have seen no evidence of such granitoids. Geochemically, these leucocratic intrusives are quite ‘barren’, and are of no economic significance.

CARBONATITIC INTRUSIVES

Part of the area adjacent to EL 7959, (SEL(A) 8493), is intruded by a small? carbonatitic unit, whose exposed and deeply weathered outcrops are identical in appearance to some of those at Mud Tank, and we believe that the two units are genetically related, and thus coeval. We have not intercepted any fresh carbonatites in our cores, though a number of them show signs of local metasomatism by the carbonatite, in the form of zones of bleaching and strong apatite enrichment from late-stage differentiated fluids. (SEL(A) 8493 Second report - Core log, PDD 4: 142.6m, and 144m.)

Note that lithological variants of the Mud Tank suite may be locally rich in magnetite, (in octahedra up to 6cm); by inference, this allows another explanation for some of the diffuse magnetic anomalies which occur throughout the general Bleechmore area.
ENVIRONMENTAL CONSIDERATIONS

Webbs Pound is accessed by a major road development constructed by the Pastoral Lease proprietors to open up an area which previously could only be reached by walking across the ridges of the Mt. Bleechmore complex.

The floor of the pound is largely free of trees and scrub, except for some Teatree and River gums growing in the drainage channels. No timber was cleared to gain access to the drill sites and no earthworks were necessary. The holes were backfilled to ground level before vacating the site, and any rubbish was removed (not buried) on departure.

ABORIGINAL AREAS

Shortly after the EL was granted, an excursion through the Mt. Bleechmore area with one of the specific Senior Traditional Owners was conducted, for the express purpose of ensuring that the exploration program in no way conflicted with any sensitive Aboriginal areas. During this trip certain localities in the hills surrounding the pound were declared as being ‘out of bounds’, but no restriction was placed on exploration in the pound area itself.
EXPENDITURE - 1994/95

Expenditure details for the anniversary year are as follows:

**Sample collection**
- Toyota field vehicle, (670km @ $1.00/km),...
  - $670.00
- Samples, self plus one assistant,
  - (4 hours @ $35.00/hour x 2)
  - $280.00

**Sample tests**
- Reichert spiral tests, (share of,)
  - $260.00
- Hand separation tests
  - $480.00

**S K Dobos and Associates**
- Geological consultants, (part costs of project visit)
  - $280.00

Rent, freight, office costs, reporting etc.
- $140.00

**TOTAL...**
- **$2,110.00**

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**TABLE 1**

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**KILMOT CREEK**
- Garnet sand samples.

Hand separated from 1kg of quarted sample.

<table>
<thead>
<tr>
<th>Sample site number</th>
<th>By mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>KCK No. 1</td>
<td>23.0%</td>
</tr>
<tr>
<td>KCK No. 2</td>
<td>25.1%</td>
</tr>
</tbody>
</table>
FULL LATITUDE AND LONGITUDE VALUES ARE SHOWN AT THE SHEET CORNERS, WITH EVERY 15' VALUE BEING LABELLED AROUND THE NEATLINE.
<table>
<thead>
<tr>
<th></th>
<th>Sr</th>
<th>Ce</th>
<th>Nd</th>
<th>Ba/10</th>
<th>La</th>
<th>Sc</th>
<th>Zn</th>
<th>Nb</th>
<th>Cr</th>
<th>Y</th>
<th>Cu</th>
<th>Zr</th>
<th>Ni</th>
</tr>
</thead>
<tbody>
<tr>
<td>POU 1</td>
<td>112</td>
<td>76</td>
<td>27</td>
<td>84</td>
<td>36</td>
<td>4</td>
<td>94</td>
<td>&lt;10</td>
<td>74</td>
<td>7</td>
<td>&lt;5</td>
<td>134</td>
<td>&lt;10</td>
</tr>
<tr>
<td>LEX 2</td>
<td>998</td>
<td>869</td>
<td>397</td>
<td>365</td>
<td>312</td>
<td>257</td>
<td>161</td>
<td>151</td>
<td>93</td>
<td>78</td>
<td>70</td>
<td>68</td>
<td>66</td>
</tr>
</tbody>
</table>

(Sample from Webb's Pound, EL 7940)

(From weathered carbonatite, EL7696)

Comparison between trace element data from Webb's Pound and Lexandra carbonatite.

EL 7940

TABLE 2.
WEBBS POUND
Informal magnetic reconnaissance
Line spacing: 50m
Station spacing: 25m

[No measured baseline or grid control.]

EL 5940
WEBBS POUND
Magnetic line data

INSTRUMENT:
GEOTECHNICS G836 Total field magnetometer

Not to scale.

TABLE 3.
Mount Bleechmore locality, showing Webb's Pound.

From 1988 ALICE SPRINGS REGIONAL air-photo series
RUN 8 - Number 020
**EL 7940**

COMMON SECTION, PERCUSSION HOLES
POU 1 & POU 2.

<table>
<thead>
<tr>
<th>Hole No.</th>
<th>Meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>POU 1</td>
<td>24</td>
</tr>
<tr>
<td>POU 2</td>
<td>24</td>
</tr>
</tbody>
</table>

Sandy soil, 0-1m.

Fine grained Quartz Biotite (Schist?)

1m-24m.

END.

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**EL 7940**

Drill Sections

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**FIGURE 1.**