EXPLORATION LICENCE 5664 ANNIE CREEK NEAR BYNOE HARBOUR NT

REPORT FOR THE YEAR ENDING MAY 1990

Prepared for Kakadu Resources Limited,

by

G R Orridge,
GEONORTH PTY LTD,
Darwin NT.

June 1990.

CR90/436
CONTENTS

1. INTRODUCTION.
2. GEOLOGY AND MINERALISATION.
3. EXPLORATION WORK CARRIED OUT.
4. CONCLUSIONS AND RECOMMENDATIONS.
5. REFERENCES.

FIGURE 1. Locality Map.
FIGURE 2. Topographic Map 1 : 50,000.
FIGURE 3. Regional Geology 1 : 100,000.
FIGURE 4. Geological Map 1 : 10,000 approx.
1. INTRODUCTION.

Exploration Licence 5664 is situated about 40 kilometres south-southwest of Darwin in the Bynoe 1:100,000 sheet area (Figure 1). It consists of a low lying laterite covered surface occupied by savannah woodlands, with mangrove swamps, tidal mudflats, beaches and cheniers fringing the tidal estuaries of the Annie and Charlotte Rivers (Figure 2). Access is obtained by bushtracks leading north from the Finniss River road at a point 16 kilometres from its junction with the Cox Penninsular road.

Originally the Exploration Licence included six one minute square blocks which were granted to Kakadu Resources Limited for a three year term commencing 12th May 1988. The area was to be explored under a joint venture agreement with Union Oil Development Corporation; however they withdrew shortly afterwards. Subsequently Compass Resources NL took up a 20% interest in the Licence.

In 1989 the area of the Licence was reduced to a single one minute square block (about 3.2 square kilometres) which was believed to contain the best potential for tin/tantalum bearing pegmatites which were the main target for exploration of the area.

This report describes the results of geological mapping and preliminary prospecting of the area carried out by GEONORTH in May 1990.
2. GEOLOGY AND MINERALISATION.

The geology of the region surrounding the Licence area is shown on the Bynoe 1:100,000 Geological Series map (NTGS 1986) and the geology is described in the accompanying Explanatory notes. A relevant portion of this map is reproduced in Figure 3.

The area lies on the northwestern margin of the Early Proterozoic Pine Creek Geosyncline, at the northern end of a belt of relatively high grade metamorphic rocks and granitoids known as the Litchfield Block. It also lies at the western edge of a near north-south belt of cassiterite-tantalite bearing pegmatites, which were historically worked on a small scale, and in which recent exploration (mainly by Greenbushes Ltd) has demonstrated a significant tantalum resource in weathered pegmatite and eluvium.

The nearest known mineralisation is at the Lost Chinaman Prospect, situated some four kilometres southeast of EL5664, where an extensive complex of pegmatite dykes is believed to have rare earth, tin and tantalum potential (Giacomo 1989). The published geology also shows the area to lie roughly along strike to the north of tin occurrences near Leviathan Creek some four to six kilometres south.

Exposures of basement rocks in the Licence area are non-existent. However small exposures on the mangrove edges to the east and west (Figure 4) show coarse-grained quartz-muscovite schists and gneisses with small pegmatite segregations in lenses and patches; these are assigned to the Welltree Metamorphics, and similar rocks are presumed to underlie all of the Exploration Licence.

Also exposed on the foreshore to the west are dykes of coarse-grained pegmatite consisting of quartz, muscovite, minor feldspar and in places very abundant tourmaline. Float and sub-outcrop of similar material is seen in the southwest corner of the EL, and at one spot on the eastern side.
All of the non-tidal portions of the Licence area are covered by a thin (1 to 3 metres thick) layer of lateritic ferricrete which forms low cliffs and breakaways around the margins of the mangroves. The ferricrete is spongy and pisolithic in structure, and contains a great abundance of quartz fragments (sometimes somewhat rounded), and disintegrated mica schist detritus, sometimes giving the appearance of a breccia or conglomerate. These are probably in the main secondary or detrital laterites formed by erosion and re-deposition of an original early Tertiary full lateritic profile.

Over most of the area the ferricrete layer is cocealed by extensive thin quartz-laterite gravels formed by disintegration of the ferricrete. This results in an almost ubiquitous spread of quartz and mica surface float so that the presence of such material cannot be used as an indicator of underlying pegmatite dykes as is the case further to the east where the country rocks are relatively unmetamorphosed and mica free.
3. EXPLORATION WORK CARRIED OUT.

Enlarged aerial photographs at a scale of about 1:6,000 were acquired covering the area of interest, and these were used to prepare a photogeological base map, and for location during traversing in the field (Figure 4). Geological traversing was carried out along all the laterite breakways along the edge of the mangroves since this is the best situation to find outcrop in this type of terrain. Additionally northeast to southwest traverses were run across the laterite surfaces at intervals of about 200 metres. As indicated in the previous section no true outcrops of bedrock were discovered in the area of the Licence.

At five locations, where float and/or sub-outcrop of pegmatite dykes or quartz vein were seen, two kilogram samples of fine colluvial gravel were collected and panned. The pan concentrates were examined with a binocular microscope; the heavy minerals identified included tourmaline, zircon and minor magnetite, but gold, cassiterite and tantalite were not found.

Expenditures made in completing this work were as follows:-

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contracting geologist</td>
<td>2,450</td>
</tr>
<tr>
<td>Transport</td>
<td>320</td>
</tr>
<tr>
<td>Fuel</td>
<td>62</td>
</tr>
<tr>
<td>Air photographs</td>
<td>83</td>
</tr>
<tr>
<td>Overheads at 10%</td>
<td>290</td>
</tr>
</tbody>
</table>

TOTAL $3,205
4. CONCLUSIONS AND RECOMMENDATIONS.

On the basis of comparisons with nearby areas Exploration Licence 5664 can be regarded as having potential for tin, tantalum and rare-earths mineralisation associated with pegmatite dykes. However fairly detailed geological mapping and prospection failed to produce evidence of mineralisation.

It has to be accepted that this result is inconclusive since bedrock is virtually totally obscured by laterite and superficial gravels. It is certainly possible, or even probable, that large pegmatites are present beneath the laterite but show no visible manifestations.

Exploration work to discover concealed pegmatites would involve systematic close-spaced drillholes to sample bedrock on a series of NE - SW traverses across the laterite areas. A percussion drill (such as an Airtrak) would be needed because of the hard ferricrete. Such a program would be quite expensive, and would cost of the order of $10,000 for preliminary traversing with 10m spaced holes on 500m spaced traverses.

There is not sufficient encouragement to warrant such a program under the present circumstances. It would only be justified by a substantial improvement in demand and prices for the relevant commodities, and by the proving up of significant resources at the Lost Chinaman. It appears highly unlikely that such such a situation will eventuate before the expiry of the Licence in May 1991. Accordingly it is recommended that the area be relinquished.
5. REFERENCES.


LOCALITY MAP
Fig. 1
QUATERNARY
Qca  Intertidal marine alluvium.
Qct  Beach sands and cheniers.

CAINozoic
Czs  Soil.
Czl  Laterite and ferricrete.

MESOzoic
Kld  Bathurst Island Formation.

PROTEROZOIC
Pghts  Two Sisters Granite.
Pwt  Welitree Metamorphics.

REGIONAL GEOLOGY
1:100,000

FIGURE 3.