EXPLORATION LICENCE 4915, MARAKAI AREA NORTHERN TERRITORY.

ANNUAL REPORT FOR THE YEAR ENDING 22ND SEPTEMBER 1990.

Prepared for Kakadu Resources Ltd,

by

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Geonorth Pty Ltd,
DARWIN NT.

October 1990.
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FIGURE 1. Location Map.
FIGURE 2. Tenement Map.  1: 50,000.
FIGURE 3. Regional Geology.  1: 100,000.
FIGURE 4. Photogeology.  1: 30,000.

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1. INTRODUCTION.

Exploration Licence 4915 is situated 70 kilometres southeast of Darwin on the Noonamah 1 : 100,000 sheet area. Access is by an unsealed road which leaves the Stuart Highway 70 kilometres south of Darwin and crosses the Adelaide River at Marakai Crossing (Figure 1).

The Licence was originally granted to Mineral Resources Corporation for a six year term commencing 23rd September 1986, and was transferred to Kakadu Resources on 2nd September 1987. The original area of 32 graticular blocks (107 sq. km.) was progressively reduced to 4 blocks (13 sq. km.) by September 1990 as shown in Figures 1 and 2.

During the first three years of the Licence exploration work included drainage geochemical sampling for gold, follow up of anomalous drainages by two phases of geological reconnaissance and rock chip sampling, interpretation of enhanced regional aemagnetics, and trenching and sampling of a gold-anomalous quartz stockwork zone in the extreme southeast of the area. The trenched prospect was later taken up under MON's 3749 & 3750 (Figure 2). During the 1987/88 period the work was undertaken by Freeport Australia Minerals Limited under a joint venture with the titleholders.

The present report describes the results of photogeological studies and geological traversing of anomalous areas which was undertaken to assist in the interpretation and evaluation of the results of previous geochemical exploration work.
2. REGIONAL GEOLOGY.

The main features of the regional geology are illustrated in Figure 3.

The Exploration Licence lies in the northwest part of the Early Proterozoic Pine Creek Geosyncline, on the eastern flank of basement highs formed around the Archaean Rum Jungle and Waterhouse granitoid complexes. The major NE - SW Giants Reef Fault is situated 10km to the northwest, and the NW - SE Noonemah Fault traverses the area. Strata identified in the area are sediments and felsic tuffs belonging to the Mt. Partridge, South Alligator and Finiss River Groups in the middle to upper parts of the Early Proterozoic succession. They include the upper part of the Wildman Siltstone, the Koolpin Formation, Gerowie Tuff and Mt. Bonnie and Burrell Creek Formations. The stratigraphic succession and lithologies are summarised in Table I.

The rocks have been subjected to lower greenschist facies metamorphism, and a weak penetrative foliation is evident in the more pelitic rocks. They are deformed into a series of folds, trending between NWW and NNE, and plunging mainly to the south, but with local reversals producing elongate domal structures.

In terms of its general regional geological context the area can be considered to have potential for gold-quartz vein systems analogous to existing mines of the district such as Goodall, Pine Creek etc.. The most prospective situations would be fracture zones along anticlinal hingelines, particularly where intersecting Koolpin, Mt. Bonnie or Burrell Creek Formations.

The goldmines at Tom's Gully and Goodall lie 35km to the east and southeast (respectively) of the EL, and the Rum Jungle/Woodcutters basemetal and uranium field is 25km to the southwest.
<table>
<thead>
<tr>
<th>GROUP</th>
<th>Formation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINNISS RIVER GROUP</td>
<td>Burrell Creek Formation</td>
<td>Siltstone, shale, greywacke quartz pebble conglomerate.</td>
</tr>
<tr>
<td>SOUTH ALLIGATOR GROUP</td>
<td>Mount Bonnie Formation</td>
<td>Red - brown siltstone, greywacke, banded iron form'n.</td>
</tr>
<tr>
<td></td>
<td>Gerowie Tuff.</td>
<td>Tuffaceous shale, chert and siltstone, minor thin banded iron formation.</td>
</tr>
<tr>
<td></td>
<td>Koolpin Formation</td>
<td>Carbonaceous shale and siltstone.</td>
</tr>
<tr>
<td></td>
<td>Ella Creek Member</td>
<td>Ferruginous and siliceous breccias, banded iron form'n and conglomerate.</td>
</tr>
<tr>
<td>MOUNT PARTRIDGE GROUP</td>
<td>Wildman Siltstone</td>
<td>Grey to buff coloured shale and siltstone.</td>
</tr>
<tr>
<td></td>
<td>Acacia Gap Quartzite</td>
<td>Orthoquartzite, sandstone, minor interbedded shale.</td>
</tr>
<tr>
<td></td>
<td>Member</td>
<td></td>
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</table>
3. PREVIOUS EXPLORATION WORK.

3.1 DRAINAGE GEOCHEMISTRY.

Stream sediment sampling was carried out by Freeport over the whole of the original EL area at a density of about 2.5 samples per square kilometre. Samples were analysed for gold by cyanide leach. The suite of samples showed a relatively high background and variance, with values ranging from 0.44ppb to 9.08ppb and an estimated threshold of about 5ppb; the high background is probably due to the presence of ironstones and carbonaceous shales in the South Alligator Group sediments. Possibly anomalous values exceeding 5ppb occur in three drainage catchments as illustrated in Figure 4.

3.2. ROCK CHIP SAMPLING.

Rock chip sampling was undertaken in two phases. Initially Freeport collected 218 samples of vein quartz, ironstone and iron formation in a routine traversing of the entire area. Subsequently Kakadu Resources collected a further 33 samples concentrated in the anomalous catchments indicated by the drainage survey.

The Freeport work reported 20 gold - anomalous rock chips, most of which were in Burrell Creek Formation, notably in the extreme southeast of the area where values of 5.95ppm and 2.29ppm occur associated with a quartz stockwork system lying roughly on the line of the major NW - SE fault.. This area was opened up by excavating four shallow bulldozer trenches which exposed a NW trending zone of quartz stringers in greywackes and siltstones, of about 12m width and at least 400 metres in length. Chip sampling over 2m widths in the trenches gave relatively low values, the best result being 0.15ppm Au, 1200ppm As.

The sampling by Kakadu Resources of anomalous drainage source areas gave negative results, the highest value being 0.3ppm Au.
4. PROSPECT GEOLOGY.

The area covered by the Exploration Licence consists of gently undulating country, with small rocky ridges and local alluvial plains. Outcrop of bedrock is sparse and virtually restricted to the ridges. However the undulating country is covered by very thin skeletal soils and rock rubble, with bedrock at shallow depth. Secondary low level laterites occur along some of the drainage, but the original high level laterite capping has been totally eroded. Drainage channels are well defined.

Under these topographic conditions stream sediment sampling would have been very effective in identifying areas of mineralisation. Conversely rock chip outcrop sampling may have been inconclusive since exposure is virtually restricted to resistant silicious and ferruginous rock types, particularly banded iron formations in the Mt. Bonnie Formation, superficial breccia cappings over Koolpin Formation, and silicified zones in the Burrell Creek Formation, which are not necessarily the most prospective rock types.

The Wildman Siltstone formation occurs only in the northwest of the southern portion of the retained area (Area 1), where it occupies the core of a complex SSW - plunging anticline. Lithologies include pale buff coloured siltstone, with outcropping bars of fine grained quartz sandstone or quartzite. The latter are commonly traversed by a dense network of quartz - filled tension gashes, presumably related to relatively brittle failure of the competent beds during folding. The results of drainage and rock chip sampling indicate that this quartz is not associated with mineralisation.

Koolpin Formation is present in the northwest of Area 1. Its presence is indicated by bouldery outcrops of siliceous and ferruginous breccias which probably are superficial expression of pyritic sediments (black shales, cherts, limestones) in the sub-outcrop. Sampling by Homestake recorded four rock samples from the Koolpin with anomalous gold values in the range 0.12 to
0.64 ppm Au. However the drainage sampling do not indicate significant mineralisation in this formation.

The Gerowie Tuff occurs as an arcuate belt around a broad south-plunging syncline in the south of Area 1. It is expressed as low ridges covered with rubble of pale grey chert, cherty tuff and siliceous siltstone. Freeport note one sample containing 1.14 ppm Au from a one metre wide quartz vein, but otherwise their are no indications of mineralisation in this unit.

Mount Bonnie Formation forms a series of relatively strong ridges around the synclinal closure in the south of Area 1. Outcrops are mainly of banded ferruginous chert (iron formation), but extensive areas are covered with maroon phyllite rubble, and this lithology is no doubt dominant in the sub-outcrop.

Rock chip sampling by Freeport and Kakadu Resources did not detect any significant values in this formation. However the stream sediment work highlighted anomalous drainage originating in Mt. Bonnie Formation at two locations in Area 1 (Figure 4).

The Burrell Creek Formation is present in the northeastern parts of Area 1, and in Area 2. It consists of interbedded greywackes and siltstones, and is generally poorly exposed except where low ridges are formed by relatively resistant zones of silicification and quartz veining.

In the northeast of Area 2 (Figure 4), a number of north to northwest trending zones of silicification and quartz veining are present. They vary from massive breccias consisting of angular clasts of chloritised country rock in a white quartz matrix, to zones of conformable and disconformable quartz stringers in silicified/chloritised greywacke. The zones are up to ten metres wide and over 100m long. They are slightly ferruginous in places due to weathering of chlorite but there is no evidence of significant sulphide. Freeports drainage survey reported anomalous gold (up to 8.78 ppb) in gullies draining this area, but 15 rock chip samples taken by Kakadu reported maximum values of 0.038 ppm gold.
In the extreme southeast of Area 1 (including MCN's 3749 & 3750), an isolated low ridge is formed by a NNW trending zone of quartz stringers in greywackes and siltstones. The zone is up to twelve metres wide and at least 400m long. A second weaker zone is present some 50m to the west. Quartz is sparse in stringers generally 2-3cm thick (rarely 30cm), following a coordinate system of mainly east and west dipping fractures. Some veinlets have a thick selvage of sulphide boxwork after pyrite. In this respect the veins differ from those observed in the northern area.

Initial rock chip sampling by Freeport detected a number of anomalous values up to 5.95ppm Au, but this was not substantiated by follow up sampling in four trenches.
5. CONCLUSIONS AND RECOMMENDATIONS.

1. Given the prevailing conditions of outcrop and topography the drainage geochemical survey completed by Freeport is considered to have been a very effective method for locating gold mineralisation.

2. The gold anomalies detected were of low magnitude and small areal extent.

3. Extensive rock chip sampling and geological traversing did not reveal any indications of mineralisation of possible economic interest, except in the area now covered by Mineral Claims.

4. Although the source of the drainage anomalies was not totally resolved, the generally discouraging results of the extensive sampling programs indicates that the chances of discovering a commercial gold deposit in EL 4915 are remote.

5. No further exploration work is warranted, and it is recommended that the Licence be relinquished.
6. REFERENCES.


<table>
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<th>Description</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Consultants Fee</td>
<td>$ 1,750.00</td>
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<td>Vehicle - fuel, repairs etc</td>
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<td>Consumables</td>
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<td>Backfulling of Trenches</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$ 8,031.40</strong></td>
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PROPOSED PROGRAMME FOR FORTHCOMING YEAR

Due to the disappointing conclusions reached following the last year of exploration, a limited follow-up programme will be conducted over the four remaining blocks of this Exploration Licence in the forthcoming year of tenure. If the results of this follow-up programme are not encouraging then it is expected that the Exploration Licence will be surrendered.

The proposed programme for the forthcoming year is expected to cost in the vicinity of $2,500.00.