Exploration Licence 4954
Finniss River, Northern Territory
Annual Report 1987

Licensee: Corporate Developments Pty. Ltd.
P.O. Box 3528, DARWIN, N.T. 5794.

Operator: Corporate Developments Pty. Ltd.

Period: 5th October 1986 - 4th October 1987

Submitted: December 1987

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Location: Darwin 1:250,000 SD 52-4
Bynoe 1:100,000 5072
SUMMARY

Exploration Licence 4954, comprising 6 blocks, is located 46 kilometers south of Darwin in the Finniss range area. Corporate Developments Pty. Ltd. has been exploring the area for tin/tantalite mineralization in the pegmatites and other prospective zones and envisages recommissioning the existing alluvial plant on adjacent tenements in 1988.

Exploration during the 1986/87 year consisted of mapping and sampling of pegmatites and alluvial/elluvial material from a number of places within EL 4954.

The pegmatites, which have been emplaced in Burrell Creek Formation, are zoned and a small proportion contain visible mineralization.

Microscopic and microbe studies of mineral concentrates has established that the ore mineralogy consists of tantalite-colombite, cassiterite, rutile, ilmenite, magnetite and amboylgonite. Other associated minerals are a wide spectrum of rare earths, gold, muscorite and kaolin.

The distribution of mineralization throughout individual pegmatites is patchy. As exploration proceeds it is planned to utilise the existing alluvial plant on MLN (A) 1052 for bulk testing ore to sample and test material from EL 4954 and adjacent tenements.
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INTRODUCTION

Exploration Licence 4954 comprising 6 blocks of approximately 20 square kilometers was granted to Corporate Developments Pty. Ltd. in July 1986. The area was applied for due to its proximity to the existing alluvial plant at the adjacent Saffums mine.

Corporate Developments Pty. Ltd. which has purchased MLN 814 and MLN 815 and EL 2613 is carrying out exploration on the area. Corporate Developments Pty. Ltd. has lodged an application to apply for a mineral lease over part of EL 2613 (MLN A 1021) adjacent this tenement, and intends to mine tin and tantalite mineralisation within the area of the plant.

The licence area is located in a geological environment thought to contain tin/tantalite mineralisation of significant economic potential. The mineralisation is contained within an extensive suite of discrete granitic pegmatites generally trending northerly with the regional structure.

Previous exploration activity by Corporate has been directed towards the pegmatite bodies and locating mineralisation including columbite-tantalite, cassiterite, amblygonite and rare earth elements. This report outlines the work done and results of exploration carried out by Corporate Developments Pty. Ltd. during 1985/87. Exploration completed to date has comprised identification of pegmatites followed by ground checking and sampling to establish the more important pegmatite occurrences requiring further mineralized assessment by mapping, costeaning, drilling and bulk sampling. Licence holders have been operating a small 10 ton/hour heavy-mineral extraction plant in MLN 1052 since 1981 for bulk sampling purposes to assess the grade and economic potential of pegmatites in the area. This plant (which is now owned by Corporate Developments Pty. Ltd.) has been
replaced in May 1985 by a larger heavy media gravity separation plant 50 ton/hour to test material from pegmatite occurrences in EL 4954.

LOCATION AND ACCESS
The licence is located east of the Finniss Range on the Darwin 1:250,000 sheet approximately 46 kilometres south of Darwin. Access is possible via the Stuart Highway and Mandorah Road thence 17 km along the Mt. Finniss Road towards Wangi. It is conveniently located adjacent other tenements owned by Corporate Developments Pty. Ltd. which contain significant tin/tantalite resources.

The location map (figure 1) shows the tenement situation and access to EL 4954, and the base camp and alluvial plant.

GEOLOGICAL SETTING
EL 4954 is located within a belt of sediments belonging to Burrell Creek formation of lower Proterozoic Age which runs in a general north to noth-north-east direction through the centre of the Bynoe 1:100,000 sheet. The majority of sequence consists of finely laminated siltstone interbedded with more massive beds of sandy greywacke siltstone graphitic shale and minor quartz pebble and lithic conglomerate. West of the licence area and the Finniss Range the Burrell Creek sediments have been intruded by the Two Sisters Granite. The siltstones which have been metamorphosed to muscovite phyllite and quartz mica schist have a well developed slatey cleavage whereas the more competent sandy units display a characteristic refracted sandstone cleavage. This major foliation is regional in extent and is related to the predominant NNE fold direction. In high strain zones a crenulation cleavage has developed as a result of granite intrusion and/or introduction of pegmatite.

The pegmatites are present as discrete steeply dipping intrusives which strike generally in a NNE direction parallel to the regional foliation. An estimated 30 Kilometer of strike length pegmatite has been identified by air photo interpretation and exploration to date. The pegmatites are suspected to be related to the nearby Two Sisters Granite but their origin and relationship to granitic rocks in the area has not been established.
Mapping has shown that the surface representation of the various pegmatites may extend for more than 200 metres.

In general, the steeply dipping contacts which strike NNE are semi-concordant with the bedding and the regional axial plane foliation.

Mapped field relation suggests that the form of intrusion is controlled by the more competent arenite members of the Burrell Creek Formation and regional fold structures. The pegmatites everywhere associated with quartz mica chiastolite schist. The chiastolote is present as small knotted aggregates or as larger interlocking rods to 10cm in length especially in the contact zones. Other forms of wall rock alteration include development of tourmaline needles, aligned with the long axis parallel to the contact, in areas where pegmatite has intruded grey to black shales.

During emplacement of some pegmatites a secondary crenulation cleavage was developed which has deformed the pre-existing foliation in adjacent schist outward from the contact zone. The deformation appears to be more severe in the vicinity of the lenticular or bulging pegmatite bodies.

3. TEXTURE AND INTERNAL STRUCTURE
The granitic pegmatites generally have a coarse uneven texture with irregular variations in grain size of the component quartz, feldspar, brownish muscovite, occasional tourmaline and garnet.
Some of the outcropping pegmatites show significant heavy mineral content at surface and visible tantalite mineralization, although patchy.

Several North-east trending faults occur in the Burrell Creek Formation in the north-east and north-west regions of the licence area. In addition, north trending anticlinal structures are located in the eastern and western regions of the tenement area.

RESULTS OF PEGMATITE INVESTIGATION

1. WORK COMPLETED

Following regional field assessment and aerial photographic interpretation carried out by G.M. Kater of Greg Kater and Associates Pty. Ltd. the distribution of pegmatite occurrences and potential mineralized alluvial deposits within EL 4954 were postulated as shown on the accompanying 1:50,000 map (figure 2).

Mineralized pegmatites were located in the field and some 200 chip and auger samples were taken, crushed where necessary using a Hilti hammer, and panned to concentrates. Where concentrates indicated possible tin/tantalite presence (10 in all) these concentrates were weighed and their location recorded.

2. PEGMATITE GEOLOGY

Host rock sediments crop out as persistent low undulating ridges with the pegmatites represented especially on the ridge tops as quartz mica aggregates or milky quartz rubble. Recrystallization of the contact rocks has made them more resistant to erosion and as a consequence pegmatite contact zones are readily identifiable.

Trenching has shown that pegmatite bodies are not limited to ridge tips but are also located under the alluvial flats. The pegmatites vary greatly in size but are mainly discrete tabular bodies up to about 10 meters thick which may swell and thin along strike or branch into thin apophyses less than a meter across. More lenticular or bulging types similar to the Saffums No.1 pegmatite thicken to 35 meters at surface.
Many of the pegmatite bodies have zoned internal structure consisting of prominent border zones less distinct wall zones and poorly developed cores.

All of the pegmatites have border zones which are easily identified because of their sharp contacts, regular thickness rarely exceeding 50cm and fine grained greisen or aplitic composition. Not all the pegmatites are symmetrical because they may have only one border zone with the other contact showing some evidence of assimilation of wall rock although no wall rock inclusions have been noted.

Inside the border zone the texture becomes coarser and is characterized by development of book mica and orientation of the elongated quartz/feldspar minerals normal to the contact surface producing a distinctive stellar structure. This wall zone is not always present but quite often when well developed contains large tabular tantalite crystal aggregates. Internal greisenized zones carry similar rich values.

In general, intermediate and core zones are only recognisable in the wider pegmatite bodies. The intermediate zones are usually poorly developed and consist of coarse aggregates of feldspar/quartz or quartz/book mica with occasional greisen zones.

The core zones are characterized by much coarser textures which sometimes consist of massive quartz, giant amblygonite crystals or very coarse crystal masses of amblygonite with quartz.

Commonly the thinner pegmatites have cores of massive quartz especially in areas where the pegmatite swells along strike.

4. MINEROLOGY

Preliminary results from minerological studies of pegmatites in EL 2613 by Prof. G. Friedrich have been included in Volume 2 of the 1983/84 report.

Friedrich (May, 1984) established that theore minerals columbite -rantalieg, cassiterite, rutile and magnerite are present in the
pegmatites and noted the occurrence of amblygonite in the pegmatite at Saffums No.1 deposit.

The minerals of the columbite-tantalite series form an almost continuous series of solid solutions within the range shown in the formula.

\[(\text{Fe}, \text{Mn}) \text{Nb}_2\text{O}_5 - (\text{Fe}, \text{Mn}) \text{Ta}_2\text{O}_5\]

The name columbite is used for minerals in which Nb>Ta and tantalite for those with Ta>Nb.

Friedrich has shown that the minerology at Saffums No. 1 and Sandra Hill contains tantalite-columbite with Ta>Nb. However, microbe data of selected cassiterite grains showed inclusions of columbite-tantalite in the cassiterite.

Chemically, the average values in weight % indicate high Ta$_2$O$_5$ between 65 and 80%.
WORK DONE

Following regional field assessment and aerial photographic interpretation carried out by G.M. Kater of Greg Kater & Associates Pty. Ltd., the distribution of pegmatite occurrences and potential mineralized alluvial deposits within EL 4954 were postulated as shown on the accompanying 1:50,000 map (figure 2).

Mineralized pegmatites were located in the field and some 200 chip and auger samples were taken, crushed where necessary using a Hilti hammer, and panned to concentrates. Where concentrates indicated possible tin/tantalite presence (10 in all) these concentrates were weighed and their location recorded.

The on-going poor market situation for tin/tantalite has been a negative influence in the commitment of extensive funding for this property. However, as the market for these commodities appears to be strengthening, Centennial Gold proposes to commit substantial funds, to the tenements to fully examine the feasibility of recommissioning the operation.

After takeover, and after assessment of the large volume of documentation, samples were taken over a number of areas of interest, including existing costeans and excavation, and fault and anticlinal structure which had apparently not previously been tested by Talmina.

Sampling was carried out by Corporate's full time field assistance, who was employed on this prospect and adjacent tenements for the year.

(a) Tin/Tantalite

Approximately 200 samples were taken from alluvial, eluvial, and hardrock areas of existing pegmatites within the area covered by the licence EL 4954. Samples were sieved, oversize crushed (using a Hilti Hammer drill and dough pot) and samples panned in an effort to determine which pegmatites were mineralized. Some samples were also split assayed as a
Difficulty was experienced assessing the head grade of the samples visually, particularly as the separation between tin and tantalite in the samples was indistinct.

The conclusion reached following this work is that a full comprehensive sampling programme needs to be undertaken on a retrievable and systematic basis over the whole area, and samples assayed to show the boundaries of mineable material.

(b) **GOLD**

Investigation has revealed reports of previous gold mineralisation in the area. In addition, the discovery of a substantial gold deposit at Goodall by Western Mining Corporation has renewed interest in the Burrell Creek Formation as host rocks for gold mineralisation.

It is apparent no work has previously been done by Talmina (or other recent licence holders) for precious metals outside the area of tin/tantalite.

Mineralisation (although sampling of the contact zone of pegmatites has shown interesting gold values). Samples were taken (see attached map) along anti0clinal and shear structures. Again, a number of samples were collected and crushed with hammer drill and dolly pot, and panned. Samples were also submitted for assay, and anomalous gold, arsenic and platinum values obtained in a number of areas.

The conclusion reached from this sampling is that a further substantial systematic sampling programme over a large area must be undertaken to establish a basis for assessment of the mineral potential for precious metals in the area.

In addition during the year, our Consultant Geologist, Mr. R. Bluck, visited Darwin as part of a review of the Company's tenements and exploration) and detailed programmes for future exploration and maps are currently being formulated.
CONCLUSION

Exploration Licence 4954 contains an extensive suite of granitic pegmatite bodies intruded into sediments of the lower Proterozoic Burrell Creek Formation.

A strike length in excess of 3 Kilometers of pegmatite has been estimated from photogeological interpretation but only a small proportion has so far been explored by costeasting and mapping.

Individual pegmatite bodies are mainly tabular in shape but the more important bulging types are zoned and preliminary work has shown that the mineralization is associated with certain zones.

As the Ta₂O₅ content is in excess of Nb₂O₅, tantalite mineralization predominates.

The distribution of tantalite, lesser cassiterite and amblygonite mineralization in individual pegmatites is patchy so that sampling and grade estimation may be a problem.

The tenement also contains fault and anticlinal structures which may contain economic mineralization. A systematic programme of auger sampling is proposed over potential eluvial zones in an effort to prove up mineable zones of economic mineralization containing gold, tin, tantalite, rare earths and other industrial minerals.
An Agreement has been entered into between Corporate Developments Pty. Ltd. and Centennial Gold N.L. for the transfer of this tenement to Centennial.

Centennial is currently raising $3m for the purpose of exploring a number of tenements. A principal object of the Company's plan is to commence production at the earliest possible time from the Company's (proposed) tenements. The Finniss River prospect is one area where, providing results continue to warrant the exploration expenditure, the Company intends to pursue the establishment of an operating mine.

Due in part to difficulties with Talmina's previous mining of the (hardrock) pegmatites, Centennial intends to concentrate on eluvial material containing tin and tantalite in order to commence mining.

In addition, exploration (again using the rapid method of auger sampling) will proceed on areas believed to be prospective for gold and platinum.

Work of exploration of EL 4954 will be a minimum of $5,000 during the forthcoming year of the licence. (year 3.)
## STATEMENT OF EXPENDITURE

Expenditure for the year ending October, 1987 was:

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23rd September, 1987

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Page 1

DATE RECEIVED: 1st September, 1987

Alan Ciplys
Manager
AMDEL Limited (N.T.)
### ANALYSIS

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**METHOD:** PM4/2, X3