SUMMARY

Exploration Licence 9080 was initially taken out to follow-up anomalous gold-in-stream sediment results obtained by previous workers.

A study of remotely sensed data and a ground reconnaissance traverse revealed that the anomalous streams were sourced from outside the licence and that the gold was probably emanating from the Howley Anticline.

No further targets of any size potential were defined within the area and hence the licence was recommended for relinquishment.
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Figure 1: TENEMENT LOCATION
1.0 INTRODUCTION

This is the final report on all of the exploration undertaken within Exploration Licence 9080, West Cosmo.

The licence is underlain by sediments of the Pine Creek Geosyncline and is therefore considered prospective for hosting structurally controlled, epigenetic lode gold deposits such as those currently being mined at Union Reefs, Brocks Creek and Mt Todd.

2.0 LOCATION AND ACCESS (FIG. 1)

Exploration Licence 9080 is located in the centre of the Pine Creek Geosyncline about 14km west-southwest of Hayes Creek and 3km west of the old Cosmo Howley Mine.

Access to the area is good, as the scenic road between Adelaide River and Hayes Creek passes along the southern boundary of the licence. Access within the licence is provided by numerous old station and exploration trucks.

The terrain is divided between dissected hill topography in the east and west and flat black soil plains in the centre.

3.0 TENURE

Exploration Licence 9080 was granted to Delta Gold Exploration Pty Ltd on the 5th May 1995 for a period of 3 years. An expenditure commitment of $15,000 was proposed for the first year to tenure. The licence occurs on N.T. Portion 2683 which is owned and operated by Tovehead Pty Ltd of N.S.W.

4.0 PREVIOUS WORK DONE

The following is a brief summary of the more recent exploration undertaken over the area underlain by EL9080.

(a) EL4736 - NORTHERN GOLD - 1988/90

A detailed aeromagnetic survey was flown and the data enhanced in an attempt to define target areas for more detailed follow-up. This data was combined with a stream sediment survey which covered the entire area. Some minor anomalism was reported from streams draining the eastern margin of the licence, but the anomalies were not followed up. Metana Minerals assessed the licence for alluvial deposits, but no ground work was reported on.
(b) **EL6319 - BIDDLECOMB - 1988/91**

Rock chip sampling of quartz float and outcrop was undertaken at various locations within the area. A small programme of loaming was completed to follow-up previously reported stream sediment results with minor colours being reported in the pan. The location of this sampling exercise is uncertain.

(c) **EL7355 - DOMINION - 1993/94**

An aeromagnetic survey was conducted and the data enhanced as part of a much larger project in the Cosmo Howley area. A stream sediment sampling programme was also undertaken, but no significant anomalousism was reported.

5.0 **GEOLOGY**

5.1 **Regional**

Exploration Licence 9080 occurs within the Pine Creek Geosyncline which covers approximately 60,000km$^2$ in the Darwin-Katherine region. It contains Archaean and Early Proterozoic rocks and is bounded by younger, largely undeformed sedimentary basins. The geology of the region was described by Needham and De Ross (1990).

The oldest rocks in the region are Archaean granites and metamorphics of the Rum Jungle, Waterhouse and Nanambu Complexes. These acted as a basement for the deposition for an Early Proterozoic sequence of sedimentary rocks in a shallow intracratonic geosyncline. This sedimentary sequence has been divided into four main groups.

(i) **THE NAMOONA GROUP** unconformably overlies the Archaean basement and comprises mainly arkoses, pelites, carbonates and iron formations.

(ii) **THE MT PARTRIDGE GROUP** unconformably overlies the Namoona Group and consists largely of arenaceous sediments interbedded with shale, carbonaceous siltstone, dolomite and minor volcanics.

(iii) **THE SOUTH ALLIGATOR GROUP** contains shallow marine sediments in the form of pyritic black shales and siltstones, chert-banded siltstone, algal carbonate and banded iron formations.

(iv) **THE FINNISS RIVER GROUP** at the top of the sequence exhibits typical flysch-type depositional characteristics. It consists mainly of a monotonous sequence of mudstones interbedded with coarser grained arkose and siltstone.
Sills of Zamu Dolerite were intruded into this sequence prior to greenschist facies metamorphism and a major phase of deformation. This metamorphism is dated at about 1.8 Ga and was immediately followed by widespread granite intrusion at about 1.76 Ga.

Exploration Licence 9080 overlies the contact between the Burrell Creek Formation and the Mt Bonnie formation. Lithologies within this area include greywacke, siltstone, sandstone, ferruginous shale and minor felsic volcanics. Lamprophyre dykes trending NW are also common in places. The sediments have experienced several phases of deformation and folding is tight to isoclinal, with axes trending north to north-northwest and plunging to the northeast. Bedding strikes north-northwest and is steeply dipping to subvertical. Regional metamorphism is of lower greenschist facies and localised zones of weak hornfelsing may represent intrusive granites at depth.

5.2 Mineralisation

Three main styles of gold mineralisation occur within the Pine Creek Geosyncline. They have been described by Nicholson and Eupene (1990).

(i) Associated with Alligator River Style uranium mineralisation. These have an association with the Early/Mid Proterozoic unconformity and/or acid volcanism and brecciation coupled with ferromagnesian metasomatic alteration. The deposits are hosted by the Cahill Formation, Whites Formation (Namaona Group) and EL Sherana Group. They include the Jabiluka, Coronation Hill and Ranger deposits.

(ii) Stratiform gold - base metal mineralisation. All significant known deposits occur in the South Alligator Group, although small deposits are known in the upper Mount Partridge Group and the Cahill Formation and equivalents. Gold concentrations are contained within lenses of bedded sulphides hosted by iron formation, carbonaceous mudstone and chert. The Cosmopolitan Howley, Golden Dyke Dome, Iron Blow/Mount Bonnie and Zapopan deposits are included in this style.

(iii) Quartz vein and stockwork gold-base metal mineralisation. These are economically the most important style and occur in the upper South Alligator and Finniss River Groups.

Veining occurs as continuous, often conformable, veins and stockworks. Vein systems are typically located near major anticlinal axes and associated with lamprophyre dykes intruded parallel to cleavage. This style includes Enterprise, Goodall, Tom’s Gully, Mount Todd, Woolwonga, Moline and Union Reefs.
6.0 WORK COMPLETED BY DELTA

(a) A comprehensive review of all previous exploration was undertaken using open file company reports located at the Northern Territory Department of Mines and Energy.

(b) A preliminary airphoto interpretation was completed using standard 1:25000 scale, colour aerial photography obtained from the Northern Territory Government. This interpretation was done primarily to define the major structures thought to be controlling mineralisation in this area.

(c) A preliminary aeromagnetic interpretation was completed using data obtained from open file reports located at the Northern Territory Department of Mines and Energy. Emphasis was again placed on structural information.

(d) Delta initially applied for EL9080 to investigate previous reports of anomalous gold-in-streams draining the eastern margin of the licence. A field reconnaissance trip was undertaken to investigate these anomalous streams.

7.0 RESULTS

The review of all previous exploration indicated that anomalous gold-in-stream sediments had been detected from streams draining the eastern margin of the licence. No follow-up to these results were reported.

A combined review of both the aeromagnetic and airphoto interpretations revealed a prominent magnetic anomaly located beneath black soil plains in the centre of the licence. This anomaly was considered worthy of follow-up, but the actual area protected by EL9080 was not considered of sufficient size to host a significant deposit. A follow-up programme would have been considered had the entire anomaly been held by Delta.

The field reconnaissance undertaken to track down the gold draining into the eastern streams revealed that the streams were sourced from outside the licence and that the gold was probably draining from the Howley Anticline located 1km to the east.

8.0 CONCLUSIONS

The work undertaken by Delta on EL9080 was of a reconnaissance nature in an attempt to follow-up anomalous results achieved by previous workers. This work confirmed that little potential existed within the licence and no further work has been recommended.
9.0 RECOMMENDATIONS

As no targets have been defined by the reconnaissance work undertaken, the licence has been recommended for relinquishment.

10.0 EXPENDITURE

The following is a breakdown of expenditure incurred during the life of the tenement:

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<td><strong>TOTAL</strong></td>
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11.0 BIBLIOGRAPHY

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