ANNUAL REPORT FOR
EXPLORATION LICENCES 5072 AND 5133
WHITE HILL PROJECT

AND

FINAL REPORT FOR
EXPLORATION LICENCE 5072
WHITE HILL PROJECT

PREPARED BY : J W J DAVENPORT
CHIEF GEOLOGIST
POSEIDON GOLD LIMITED
PO BOX 294
TENNANT CREEK NT 0861

SUBMITTED TO : NORTHERN TERRITORY
DEPARTMENT OF MINES AND ENERGY
GPO BOX 2901
DARWIN NT 0801

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FIGURE 1 LOCATION OF EL's 5072 AND 5133

WHITE HILL PROJECT AREA, TENNANT CREEK
SUMMARY

The White Hill project area originally encompassed three EL's granted to Australian Development Limited (now Poseidon Gold Limited) and which formed part of a joint venture with Newmont Australia Limited.

Two of the licences (EL 5067 and 5072) were granted on 29th January, 1987 whilst EL 5133 was granted on 24th March, 1987. In January, 1988 the NTDME approved the consolidation of the licences into one project area (White Hill) for purposes of reporting.

EL 5067 was surrendered as part of the second year relinquishments and a Final Report was submitted (Pearson, 1989). EL 5072 is now due for relinquishment (28th January, 1991) and this document includes the Final Report (due 28th February, 1991) for this licence.

EL 5133 is due to expire on 23rd March, 1993 and this report includes the Annual Report for this licence. The Reduction Report for EL 5133 (due 23rd February, 1991) will be submitted under a separate cover. Future reporting will therefore only concern EL 5133 and reporting dates should revert to the original anniversaries for the licence.

During the year under review Newmont Australia Limited as operators and managers of the joint venture undertook detailed reassessments of the previous exploration results. No physical exploration field work was undertaken. In August 1990, Newmont returned responsibility for the two licences (EL's 5072 and 5133) to Poseidon Gold Limited. Since that time PGL have reviewed the Newmont data and programmed future exploration work to be undertaken on the remaining area of EL 5133.
1. INTRODUCTION

1.2 Location and Access

The White Hill project area occupies parts of Tennant Creek and Phillip Creek stations as well as areas of Crown Land, presently subject to the Warramunga Aboriginal Land Claim. The Stuart and Barkly Highways traverse the tenements which lie between 10km and 40km north of township of Tennant Creek (refer Fig.1). Local access is via station fence lines and exploration tracks that are only passable in dry weather.

1.2 Regional Geology

The White Hill project area covers parts of the central section of the early Proterozoic Warramunga Group sediments. Dodson and Gardener (1987) provide the most recent formal stratigraphic subdivision for this group. These authors subdivide the uppermost formation, previously known as the Carraman Formation, into six numbered greywacke units and two units of acid volcanics known as the Gecko Volcanics and the Warrego Volcanics. This sequence is underlain by acid volcanics and shaley sediments of the Bernborough Formation and the Whippet Sandstone which are in turn underlain by greywackes of the unit 1 greywackes of Dodson and Gardener or the Monument Beds of previous authors.

Williams (1987) has suggested that the Whippet sandstone is the lower most unit of the Warramunga Group and that it unconformably overlies a sequence of greywacke, shale, BIF, chert and acid volcanics which he considers are the equivalent of Division 1 of the Arunta inlier in Central Australia. The Warramunga Group is viewed as the equivalent of Division 2 of the Arunta Complex by Stuart et.al. (1984).

Williams (1987) has further proposed an informal subdivision of the Carraman Formation by recognizing lower, middle and upper units. The middle unit named the Black Eyed Member (thickness up to 3000m) has been delineated on the basis of its magnetic response and includes a sequence of haematite shales, quartz porphyries and greywackes with up to 20wt% magnetite. This unit also encloses all known massive magnetite ironstones on the field, some of which are hosts to the major ore bodies including Nobles Nob, Juno and Warrego.
Structure is reasonably complex with three main deformations resulting in moderate to steep open folds oriented ESE-WNW with numerous plunges reversals. Two main periods of defaulting are recognized including an earlier development of steep shear zones subparallel to fold axes and a later set of NW-SE faults with major sinistral strike displacements. Folding is thought to have commenced early in the basin's history while some sediments were still only partially consolidated.

The Warramunga Group has been metamorphosed to the greenschist facies and shows evidence of local contact metamorphism against granite contacts, however, the numerous porphyry intrusives have produced minimal contact metamorphic effects.

Two ages of granites occur on the field, the earliest known as the Tennant Creek Granite occurs mainly on the eastern side of the field and is foliated. The Warrego Granite which occupies the central and western parts of the field post-dates the folding events but carries numerous quartz veins related to the later faulting event. Other intrusives include dolerite, syenite and lamprophyre dykes.

Several sets of large quartz veins cut through the field with a north to north-westerly trend and are considered to be low temperature fillings of late stage fractures.

1.3 Local Geology

The central part of the tenement is occupied by the main mass of the Tennant Creek Granite which intrudes both the pre Warramunga-Arunta Division 1 equivalents (Williams 1987) and the lower-most members of the Warramunga Group.

On the western side of the project area the boundary between the acid volcanics of the Bernborough Formation and greywackes of the lower Carraman Formation is truncated by the intrusive granite contact. Adjacent to the granite contact is up to 500m of hornfels is developed and locally tourmalinisation of sediments has been observed. Folds in the sediments have wave-lengths of 500m to 1km and plunge shallowly to the SE. Axial plane shears are common.

The western granite contact is displaced by the major sinistral Quart Hill Fault marked in the field by large outcrops of vein quartz. To the south of this structure the granite contact parallels a NE trending zone of intense shearing in greywackes and jaspers of the Lower Carraman Formation.
In the Grey's Bluff area (SW corner of the project area) the Lower Carraman Formation consists of greywackes, siltstones, sandstones and cherty tuffs with several quartz-feldspar porphyry units. Hornfelsing extends up to 1km from the granite contact and the granite shows considerable evidence of wall rock contamination suggestive of a shallow south dipping contact zone. Several small lamprophyre dykes have been mapped in this area.

To the east and north outcrop becomes scarce and the granites are covered by immature arkosic sediments which give way to aeolian/alluvial sand and lateritic gravel cover.

In the SE corner of the project area the Lower Carraman Formation is overlain by vesicular basalt of the Cambrian Helen Springs volcanics. The basalt outcrops as lateritised low rubble strewn rises. Green glauconite commonly fills the amydales. In places the basalts are overlain by cherts of the Cambrian Gum Ridge Formation.

North of this area soil cover precludes geological mapping and the basement may comprise both Proterozoic and Cambrian rocks.

2. PREVIOUS WORK

Newmont Australia Ltd have pursued a non-model specific exploration strategy with the aim of finding mineralisation in subtle magnetic/non-magnetic settings not explored for by other companies. Initilly, systematic exploration proceeded through phases of data acquisition, soil sampling, geological mapping, interpretation of aeromagnetics and RAB drilling.

First pass soil sampling identified twelve geochemically anomalous areas which were reduced to two after screening involving confirmatory sampling and consideration of their geomorphological, geological and geophysical characteristics. Investigation of the airborne geophysical surveys highlighted three targets which on further analysis were not considered prospective targets. Readers are referred to reports by Pearson (1989) and Preston (1990) for details of the work conducted. A summary of the salient features of the work undertaken on the two geochemical anomalies (C30 and C24) is provided below:
2.1 Anomaly C 30

An initial anomaly of 7.63 ppb Au by BLEG methods identified the area of interest. Follow-up sampling failed to reproduce the results and contamination is considered the likely cause. Outcrops sampling during mapping and geochemical surveys failed to provide any anomalous results and no further work was carried out.

2.2 Anomaly C 24 - Grey's Bluff

A broad geochemical anomaly evident from initial sampling was investigated by extending the 500 x 500m sample coverage to the north and infilling the existing grid on 250m centres. Results produced three anomalous areas of up to 3.25 ppb Au. Two of the areas were RAB drilled (Northern and Southern anomalies). A ground magnetic survey comprising 30 line km of traversing on 80m line spacings and 10m recording intervals was completed. No discrete magnetic features were evident for drill testing.

2.3 Northern Anomaly

Results from the RAB drilling programme (14 holes, 575m total) produced weak Au, Cu and Bi siltstone with minor quartz veining. The dominant lithologies intersected included, granite hornfelsed greywackes, shales, occasional narrow lamprophyres, quartz veins and granitic dykes. It was concluded that the anomalism was due to metasomatic contact effects of the Tennant Creek Granite and enclosing hornfelsic sediments.

2.2.2 Southern Anomaly

The Rab drilling programme (10 holes, 620.5m total) encountered an interbedded sequence of greywackes and shales with minor lamprophyre dykes. Geochemical responses proved very low and minor responses for Au, Bi and particularly Cu were associated with quartz veins and basic dykes.
3. WORK COMPLETED

Due to the lack of prospective targets within EL 5072 no further work was undertaken over this area of the White Hill Project and the remainder of the EL was relinquished on 28th January 1991. Work within EL 5133 was confined to a review of the Newmont Australia Ltd exploration data by Poseidon Gold Limited geologists and geophysicists in an attempt to use accumulated experience to identify areas warranting additional evaluation.

The hand-over of all the exploration data to Poseidon Gold Ltd, accumulated by Newmont has commenced. This data includes soil samples in storage which will be analysed for a range of elements to compliment the exclusive determinations for gold carried out by Newmont.

4. CONCLUSIONS

Past exploration has focussed on two of twelve geochemical targets. Follow-up sampling and RAB drilling of those targets has down-graded their significance. Similarly, three geophysical targets identified were not considered worthy of drill testing.

A complete exploration data review, in the light results achieved to date, suggests that only limited additional exploration work on EL 5133 is warranted.
5. EXPENDITURE SUMMARY

Exploration expenditure over the year ended 29th January, 1990, was incurred by Newmont Australia Ltd (up to 28th August 1990) and by Poseidon Gold Ltd. The respective breakdowns of expenditure (covenant $40,000) are tabulated below:

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An appropriate breakdown of these expenditures over the two EL's comprising the exploration Project Area (White Hill) amounts to:

- EL 5072 $ 4,305 (15%)
- EL 5133 $ 24,395 (85%)

**$ 28,700**
6. WORK PROGRAMME AND PROPOSED EXPLORATION EXPENDITURE  -  EL 5133  1991/92

Since being granted in January 1987, EL 5133 has been subjected to a series of thorough exploration programmes by Newmont Australia Ltd. as part of the Tennant Creek JV with Poseidon Gold Ltd.

Newmont has recently withdrawn from the JV but an ongoing review by Poseidon Gold geologists of the work undertaken by Newmont reveals that only limited additional work is required to complete the exploration programme over the area. This work will involve collation of data, soil geochemical analyses and detailed ground magnetic surveys.

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REFERENCES


Williams, B.T.; 1987: Exploration of the Tennant Creek Mineral Field, Proterozoic gold-copper project, Tennant Creek and Storrna Districts, Volume 1 University of Tasmania pp28-60.