EXPLORATION LICENCE 4431

ANNUAL REPORT FOR YEAR ENDING 15th NOVEMBER 1985

by

J.W. SHIELDS GEONORTH

OPEN FILE

for

NORTHERN GOLD N.L.

on behalf of

DESTINY PROSPECTING PTY LTD

NORTHERN TERRITORY GEOLOGICAL SURVEY

CR86/054
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INTRODUCTION

Exploration Licence 4431, consisting of about 16 square kilometres was granted to Destiny Prospecting Pty Ltd on the 16th November 1983. By an agreement dated 22nd November 1983, Northern Gold N.L. acquired the right to 95% of this Exploration Licence. Northern Gold N.L. are also the operators.

During the year ended 15/11/84, Northern Gold carried out costeaming and sampling of quartz veins which had been worked during the early mining history of the Top End of the Northern Territory. Assaying of costean samples gave low gold values; all less than 0.3 grams/tonne, although one grab sample along the vein gave a value of 2.8 grams/tonne, with two others giving 0.8 and 0.9 grams/tonne.

Northern Gold N.L. commissioned J.W. Shields of Geonorth to carry out a programme of exploration on the Licence during 1985 and to report on the results and arrange the necessary reduction in area which came due on the second anniversary of the Licence.

The area was reduced from 5 blocks to 2 blocks, the area retained being shown on figure 4.
SUMMARY

Exploration Licence 4431 is mostly covered in alluvium and eluvium. However, some quartz veins, often ferruginous and sometimes gossanous, crop out in the central and eastern areas. The central veins have been worked or looked at to quite shallow depths, probably for gold.

During 1984, some costean and grab samples were taken and assayed for gold. The costean samples had very low gold values but some of the grab samples had low but interesting values (highest 2.8 grams/tonne gold).

In 1985, loaming and mapping was completed in this area in an effort to determine if there was likely to be any parts of the vein system which might contain higher gold values than those found in 1984. The results of this work suggest that the southern end of the vein system warrants some further work, perhaps costeanning.

Another area containing quartz veins is in the eastern part of the area. The veins form curvilinear shapes and straight veins are present with different orientations. The country rock appears to be mica schist. Such quartz veins and country rock do not fit the generally accepted geological picture of this area. Very low gold values were recorded from the quartz veins.
LOCATION, ACCESS AND TOPOGRAPHY

The Exploration Licence area is situated about 135 kilometres south east of Darwin within the boundaries of the Batchelor and Tipperary 1:100 000 sheet areas, which are themselves within the Pine Creek 1:250 000 sheet area.

Access to the area from Darwin is gained via the Stuart Highway to a graded track which leads to Northern Gold's camp and then through the Exploration Licence area. The track leaves the Stuart Highway about 2 kilometres south of the Bridge Creek crossing.

Access within the Licence area is poor as far as vehicles are concerned as most creeks have steep banks which prevent crossing even by four wheel drive vehicles.

The majority of the area consists of wide alluvial flats. Bridge Creek is the major watercourse in the area. It's bed is about 10 metres below the level of the alluvial plain and has very steep banks. The plain is about 80 metres above Australian Height Datum. Low ridges between the creeks have a maximum elevation of about 120 metres (A.H.D.).

Woodland forest is the dominant vegetation type throughout the area.
REGIONAL GEOLOGY AND GOLD MINERALISATION

The Exploration Licence is situated in the Pine Creek Geosyncline, which contains Proterozoic rocks which have been folded and metamorphosed to low and medium grades. The oldest rocks are Early Proterozoic and have been intruded by granite and dolerite. These rocks are known as hosts for many types of mineralisation.

Gold mineralisation is found in the Early Proterozoic sedimentary rocks, mainly in quartz veins associated with saddle reefs and competent beds which have been faulted and jointed in the crests of anticlines. Examples of this are the Enterprise mine at Pine Creek and the Cosmopolitan Howley Gold Prospect. There are many other such occurrences in the Pine Creek Geosyncline, many of which are being investigated at the present time.

Just to the east of the exploration licence area, one of these anticlines, known as the Howley Anticline, contains gold prospects such as the Cosmopolitan Howley.

Stratiform gold deposits are present also in the Early Proterozoic rocks and these may be the source rocks for the gold mineralisation in the anticline setting.
DETAILED GEOLOGY

Most of the Exploration Licence area is flat lying or gently sloping with alluvium and eluvium cover. Some ridges of weathered slate and greywacke crop out in the north eastern part of the area. In the central and eastern parts, quartz veins are seen on the crest of gently sloping hills (see figures 2 and 3).

The rocks in the north east of the area, which crop out better than any others within the Licence boundaries are probably part of the Mount Bonnie Formation. The rest of the area is most likely underlain by rocks of the Burrell Creek Formation. Rocks in the costeans (see Figure 3) are shales and greywackes, probably belonging to this Formation.

Structure in the area is difficult to assess. The only direct evidence is seen from the rocks exposed in costeans and from the outcrop patterns made by the quartz veins.

Bedding planes in the costeans are not easy to identify, but the dips are apparently all to the West (between 50° and 60° measured), with strikes varying from north east to north west. Very tight folding with steep plunges is possible but not likely.

The central quartz veins are typical of veins developed along a shear zone, but the eastern veins (Figure 3) are more likely associated with a disturbed zone, as evidenced by their curvilinear shape. Nothing similar to this seems to exist in the surrounding area. Also unusual is the presence of mica schist in the same area as these quartz veins, and both facts seem to indicate that this particular area is different and probably has had an unusual factor connected with it, such as intense tectonic activity, perhaps associated with the Mount Shoobridge Fault.
The only schist described on the Batchelor-Hayes Creek Special 1:100 000 Geological Sheet is part of the Archaean Rum Jungle Complex or the Waterhouse Complex. However, for one thing, the regional Bouger anomaly map shows no low here so this probability is extremely unlikely.
QUARTZ VEINS

Two areas within the Licence area have quartz veins outcropping on them. The quartz veins in each area form completely different patterns.

The central area (figure 2) has near linear quartz veins striking approximately north-south. These are probably sheeted zone deposits, filling a zone of shear faulting. The veins are often ferruginous and gossanous, at other times they contain brecciated country rock. At one location (see figure 2), secondary copper minerals and barytes are present in the vein. Chalcopyrite is common in these veins and probably produced the secondary copper minerals in the weathering process. Barytes is not usually associated with this type of vein (Boyle 1979, page 279).

The eastern area (see figure 3) has both straight and "folded" quartz veins. These are, for the most part, milky white quartz with some grey quartz, often with ferruginous staining. Also, some of the quartz exhibits banding over the entire width of the vein - some 5 metres. Boxworks are seen in rare gossanous patches in the quartz veins.

Neither the pattern of these eastern quartz veins or the host rock which appears to be mica schist, are what one would expect to find in this area. Sedimentary shales and greywackes are shown in this area on nearly all geological maps.
EXPLORATION WORK AND RESULTS

Further exploration was carried out on the long quartz vein system in the central part of the Licence area, although the results of the previous year's exploration were not encouraging. The exploration philosophy behind this work was that there could be some richer portions of the veins which had not been sampled as yet. It was thought that loaming along the veins would be an effective and inexpensive method of achieving this end. At the same time, a map was prepared using a Topofil Chaix and compass (see figure 2).

Some forty loam samples were taken and panned with two positive results at the southern end of the system where the vein does not outcrop. No gold was panned from either side of the quartz vein where two grab samples (BR21 & BR22) assayed 2.8 and 0.9 grams/tonne gold in 1984. One grab sample from the southern end (where the positive loams were found) assayed 0.8 grams/tonne gold.

It would appear unlikely that there are economic quantities of gold in the vein system though some limited work on the southern part of the vein may be warranted.

Quartz veins were discovered in the eastern part of the area and these were mapped and sampled. The pattern these veins make and the host rock are most unusual, but there is no indication of any economic gold mineralisation with the highest assay being 0.08 grams/tonne gold (see figure 3).
CONCLUSIONS

Exploration work carried out on Exploration Licence 4431 during 1985 did not produce any encouraging results.

Some previously unexplored quartz veins with an unusual outcrop pattern in the east of the Licence area were mapped and sampled. The very low assay results obtained do not warrant any further work being carried out in this part of the Exploration Licence, even though the host rocks to the veins are quite unusual. Lack of outcrop other than the quartz veins would make any further geological assessment of the rocks difficult.

Further work on the quartz vein system in the central part of the area did not upgrade this area. It is concluded that the northern part of this system does not contain economic gold mineralisation and that the southern part and its conjectured continuation beneath eluvial and alluvial material is worth some further limited exploration using costeaming and assaying, as some indications of gold mineralisation have been found.
EXPENDITURE

Expenditure incurred during 1985 on this area is as follows:

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The projected expenditure for 1986 is $4000, being to test the southern end of the central quartz veins and to search for further signs of mineralisation throughout the Licence area.
LEGEND

- ALLUVIUM
- QUARTZ SCREE
- QUARTZ OUTCROP

EASTERN QUARTZ VEINS

NORTHERN GOLD N.L.
EXPLORATION LICENCE 4431
MAP TO ACCOMPANY
ANNUAL REPORT FOR 1985
SCALE 1:2 500

Figure 3
EXPLORATION LICENCE 4431
NORTHERN GOLD N.L.
SHOWING AREA TO BE
RETAINED FOR THIRD YEAR

FIGURE 4
# Analysis Report for GEONORTH

**CODE:** PC 0737  
**DATE:** 18/12/1985

**Client Reference:**

Copies to: J.W. Shields

**SAMPLES:** received 14/12/1985

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**Principal Chemist:** Jorge Ugarte
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*Data in ppm unless otherwise stated.*