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GEOLOGICAL REPORT

ON THE

OLIVE WOOD PROSPECT

TERRIANT CREEK

BY

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INTRODUCTION

The Olive Wood Prospect is situated about 1½ miles east of Orlando in a geological environment which rather resembles the Orlando setting. Interest is not centred in the old workings on the Olive Wood Prospect itself so much as in the magnetic anomaly which occurs substantially on the adjoining One-O-Three lease and just laps on to the Olive Wood lease on its extreme eastern end. The area and the anomaly were mapped geophysically by the Bureau of Mineral Resources in October 1958 and some geological work which had been done on the area generally has been supplemented by the present detailed stadia survey of the geology in the immediate vicinity of the leases. Sufficient survey data for accurate contouring and determining the relationship of the geophysical grid to the geological surface plan has been collected.
SUMMARY

1. The ironstone body indicated by the anomaly at the Olive Wood is in a favourable geological environment for the occurrence of breccia host rock.

2. The anomaly body could be a mineralised diagenetic breccia carrying gold and copper mineralisation in addition to the indicated magnetite.

3. Like most Tennant Creek ironstones the large ironstone mass outcropping just to the east of the anomaly centre has no particular characteristics which would indicate with certainty that it is a replacement body derived from the mineralisation of a slump breccia. However there are indications of sulphide mineralisation associated with the mass.

4. The occurrence of bladed hematite forming a cellular boxwork structure suggests that it is a tertiary mineral derived from limonite which in turn was derived from sulphides. Bladed hematite is commonly found in association with the ironstones of "Tennant Creek and particular attention will be paid to its possible origin as a tertiary mineral from sulphides in future investigations.

5. The geophysical work at the Olive Wood was completed in the field in October 1958 but the computed results are not yet to hand. There is probably sufficient geophysical information in the hands of our consultant geophysicists to lay out drilling if it is necessary to proceed before the Bureau's results are released.

6. The indicated anomaly body is in a similar geologic setting to Orlando on the footwall side of a broad belt of coarse greywackes in the diagenetically disturbed lutites immediately underneath.
7. The potential of the prospect depends on the extent of mineralisation indicated by the geophysical work.
CONCLUSIONS

The Olive Wood prospect is in a favourable geologic setting for ore occurrence. The assessment of its potential must await the pending geophysical determination but all factors of our understanding of the geology of Tennant Creek to date weigh in favour of the prospect as far as they apply. We can never be sure in advance of drilling a deeply buried body just what type of mineralisation will be encountered as a wide range of differing slump breccias which localise different types of mineralisation are now recognised at Tennant Creek. However with the abundant evidence of slumping and mineralisation at the surface we can conclude that the geology at Olive Wood is as favourable as could be found on this field and that we should definitely drill any indicated potential.
RECOMMENDATIONS

It is recommended that the prospect be tested in the first instance with one drill hole into the heart of the anomaly body.

The hole should be planned when geophysical results are available to indicate the potential size of the mineralisation and the exact position and depth of the magnetite body.

The cost of the hole would depend upon its lay out but the first test should be within £3-4000.
PROPERTIES

The Olive Wood and the associated magnetic anomaly are well covered by a Peke lease and options over the adjoining leases.

The anomaly body falls near the western boundary of the Peke lease (137E called "One-O-Three") and probably about a quarter of it laps on to the "Olive Wood" lease.

The "Olive Wood" (242E) and the "Olive Wood Extended" (323E) are under option to this company from Mrs. M.C. Malinson of Mosquito Creek and her partner R. Cairns. The options expire on 5th August 1960. A sketch of the leases is submitted herewith.
GENERAL GEOLOGY

The "Clive Wood" ironstone body and workings are on an East-West trending shear which may be associated with slumping. Although the mineralisation is auriferous and is the main source of production to date it appears to be limited and was not the primary object of survey during the current work.

Attention was focussed on the south-eastern ironstone outcrop that is the main ironstone outcrop on the "One-O-Three" lease.

The three main rock types in the area in the vicinity of the anomaly which was examined are:

1. The Graywackes.

Coarse and medium grained muddy graywackes extend right along the southern side of the leases as a broad belt with a width of half a mile or so which takes the southern contact well beyond the range of the local mapping. It is apparent that the broad belt of coarse graywackes includes some shales and finer sediments but by far the greater volume of rock is coarse and medium partly recrystallised graywackes.

The degree of rock recrystallisation in the graywackes is comparatively low by general Tennant Creek "porphyry" standards but some development of columnar forms and incipient reorganisation of the relic phyllic fragments is noted.

Many small lenses of coarse graywacke occur in the underlying diagenetically disturbed finer sediments in which the ironstone bodies are found. Although some of these are
mineralised and replaced to various degrees the main beds are comparatively unmineralised. There is little or no mineralisation or shearing on the contact but there is some limited quartz veination in the main graywacke beds presumably on joints and faults.

2. The Finer Grained Graywackes and Shales.

These beds underly the main graywacke series but are very disturbed. Rolling, contortion, shearing and abundant diagenetic disturbances occur throughout the area mapped but the zones near the main ironstone outcrop and also near the anomaly centre are especially disturbed.

The dips are steep and very irregular due to the disturbances but in general they incline steeply south. There are many small lenses of coarse graywacke interdigitating with the shales and lutites and several small lenses of slump breccia have also been mapped.

There is no doubt that the outcropping mass of ironstone occurs conformable with the sediments in the environment of diagenetic slumping and that mineralisation of a slump breccia could be the origin of this mass.

It is not at all clear that the outcrop extends to depth such that it is connected with the anomaly body but there is no evidence on the surface which would contradict this possibility. However if the outcrop is continuous with the anomaly body it must have a fairly flat (about 40-50°) pitch to the west. More probably the outcrop and the anomaly body are separate
entities, both could be bodies of slump breccia in the fine lutites.

3. The Ironstone Outcrops.

There are three large and several small ironstone outcrops in the area but the ironstone at the Olive Wood workings was examined only briefly. It is one of the larger outcrops and is very quartzose. It contains a little wolfram together with massive and bladed hematite. This outcrop appears to be on a shear but there could well have been previous diagenetic disturbance.

The main outcrop is part of the anomaly centre on the "One-O-Three" lease. It is 320' long and 55' wide at the widest part. For the most part it is a typical Tennant Creek ironstone outcrop containing a little quartz veination but the mineralisation is so complete that its origin with regard to replacement of a parent rock can not be discerned. It is probably the replacement of a slump breccia as some parts of the main outcrop contain vague earthy or slaty fragments and it is associated in the fine grained diagenetically disturbed sediments in which it occurs, with many small lenses of slump breccia.

One point of interest was noted in that hematite forms a cellular boxworks in some places on the outcrop. This hematite is fine granular and bladed but it is arranged in quite distinct boxworks of the limonite type. It is clear that this hematite forms a
the oxidation of sulphides. In this particular outcrop there are two sources of hematite, from limonite after sulphides and from magnetite by martisation. The martite is massive dense and fine grained but the hematite from limonite, in this instance at least, is the fine bladed platy micaceous variety.

Bladed hematite has long been recognised as secondary and it is found associated with most Tennant Creek outcrops often impregnating surrounding and underlying shales and frequently in the matrixes of slump breccias.

Its significance as a tertiary mineral the product of the oxidation sequence sulphides - limonite - bladed hematite may not have been fully appreciated to date but this point will receive close attention in future.

There is further small ironstone outcrop to the south east of the main lens. It is the same slumped shale environment as the main ironstone but is rather more siliceous and veined with quartz. This body is also thought to be a mineralised diagenetic slump but it has apparently been reworked by later tectonic movements and veined with quartz in a similar manner to the slits just further to the south east which are heavily injected with quartz veins.
GEOPHYSICS

The Olive Wood was surveyed as part of a large section of the Orlando area by the Bureau of Mineral Resources team in October 1958. Two major anomalies called "One-O-Too" (69-78) and "One-O-Three" (63-76) were included in this work which also developed one or two minor anomalies of apparently little importance to the north east of the Olive Wood and "One-O-Three".

As has already been pointed out the "One-O-Three" anomaly is the focus of attention at Olive Wood and it laps on to the eastern side of this property. It is the most intense anomaly revealed by the Bureau's work and reaches a build up of over 900 gammas on traverse 2400 E which passes fairly close to the centre of the anomaly at about 2335 E 480 S.

The Bureau have also done some horizontal force magnetic profiles and the depth calculation relating to the 24 E traverse gave a preliminary estimate of the depth of the body assuming a spherical shape as being 1200 feet.

The Bureau are still compiling the results but it is probable that sufficient of the Bureau's recordings were collected by Mr. Serton to enable the sighting of a drill hole by our own geophysicists if this can be done without transgressing the ethics between the geophysicists.
Geochemistry is not very applicable to the development of this prospect and as was anticipated a copper assay of the hematite boxworks yielded nil copper i.e. less than 500 parts per million which is the limit of detection by assaying. However the copper normal for Tennant Creek seems to be about 70-100 p.p.m. and a colorimetric method could perhaps still determine values in the range 100 - 500 p.p.m. which would constitute an anomaly.

It is intended to collect examples of a few more of the rock types outcropping at the Olive Wood for trace copper analysis but if the results are negative the test is inconclusive as the obvious complete leaching would account for the non-occurrence of copper.

Positive traces of copper however would indicate that chalcopyrite or some copper minerals occur in the primary zone.

TENANT CREEK.
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