COMMONWEALTH OF AUSTRALIA

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**DEPARTMENT OF NATIONAL DEVELOPMENT**

# BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS

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**RECORDS:**

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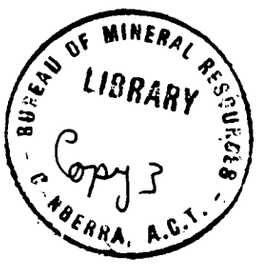
1966/196




SUMMARY OF ACTIVITIES, 1966.
DARWIN URANIUM GROUP - RUM JUNGLE AREA, 1966.

by

J.E.Gardener and D.O. Shatwell



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# SUMMARY OF ACTIVITIES - 1966

## DARWIN URANIUM GROUP - RUM JUNGLE AREA - 1966

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## SUMMARY

During 1966 the Darwin Uranium Group continued to prospect for base metals and uranium in the Rum Jungle District. Compilation of existing data obtained in previous surveys by the Bureau and by Territory Enterprises Pty. Ltd., (T.E.P.) was continued.

Geochemical prospecting by auger drilling was carried out in two areas: (a) Gould and (b) Woodcutters. The work was aimed at extending and covering in detail the geochemical prospecting carried out in 1965. In the Gould area, copper, nickel, cobalt and radiometric anomalies were delineated in the Waterhouse No. 2 area, where uranium mineralisation is known to occur. In the Woodcutters area, detailed geochemical follow-up of lead, zinc, radiometric and copper anomalies was carried out. This is still in progress, and no geochemical results are as yet available.

From the results of the 1965 Gould area survey an area was selected for a detailed geophysical survey in 1966: E.M. Gun work was carried out along all traverses with Turam, I.P. and magnetic work over areas of particular interest. Electro-magnetic anomalies occur over the Waterhouse No. 2 prospect and in shales in the northern part of the area. Some large magnetic anomalies were recorded over amphibolites.

Test surveys were made in the Woodcutters area over geochemical anomalies L5 and L3. Results were disappointing in the L5 area where several geophysical methods were tried. The L3 area, however, was quite responsive to both electromagnetic and induced polarization methods. Several well defined anomalies were located and drilling of the results is recommended.

Test I.P. traverses were read over electromagnetic anomalies in the Huandot North and Coomalie Gap West areas. In the Huandot North area further work, probably detailed geochemical sampling is recommended. Definite I.P. anomalies were obtained on both areas and testing of these by drilling is to be recommended.

The remarks concerning the geophysical results follow from a preliminary assessment only. Analysis of these and further results is still in progress.

The results of diamond drilling are as follows:-

(1) DDH65/2, collared in Golden Dyke Formation. Coomalie Gap West, was completed in February 1966.

(2) DDH66/1, 2 and 3 were completed in the Woodcutters area at anomaly L5. 66/1 and 2 intersected pyrite lodes with low zinc and lead assays respectively; 66/3 intersected 78'8" of silver-lead-zinc mineralization averaging 7.7% Pb 20.6% Zn and 7.8 ozs. Ag.

(3) At present, five diamond drills are operating in the Woodcutters area.

(4) One diamond drill hole has been completed in the Mt. Minza-Gould area. It was designed to test electromagnetic radiometric and copper anomalies. Mineralization of economic grade was not discovered.

After the encouraging intersection in DDH66/3 three additional areas were reserved from occupation under the mining ordinance. These areas are known as Acacia, Celia and Milton and surround the Rum Jungle complex and Waterhouse Granite.

## INTRODUCTION

During 1966 the Darwin Uranium Group assisted by Canberra-based geologists and geophysicists continued to prospect for uranium and associated base metals in the Rum Jungle District. This report summarises the work which consisted of auger drilling, diamond drilling and electromagnetic, I.P., gravity, magnetic, and S.P. geophysical surveys in areas of interest shown up by surveys in 1964 and 1965.

Prospecting was carried out in two areas:

(a) Mt. Minza-Gould Area

Black graphitic slates, hematite quartzite breccia, banded ironstone and minor calcareous rocks, of the Golden Dyke Formation, extend from Mt. Minza in the east to west of the North Australian Railway. Geochemical, radiometric and electromagnetic anomalies had been discovered by previous surveys in this area.

(b) Woodcutters Area

Woodcutters area occurs 3 miles east of the Rum Jungle Complex, and contains lead-zinc anomalies with associated small copper and low-order radiometric anomalies. This prospect was discovered in 1964 and followed up in 1965. It was selected for further auger drilling and diamond drilling in 1966. This work is still in progress.

One geologist, (D.G. Semple) was in charge of the Geochemical Party at Batchelor; two geologists (D.O. Shatwell and Y. Miezitis) were engaged in compilation of data; The Senior Geologist (C.E. Prichard) supervised all diamond drilling. J.E. Gardener, K. Duckworth and B.B. Farrow carried out the geophysical programme.

## GEOLOGY AND GEOCHEMISTRY

To 30/9/66, 37,133 feet were auger drilled in the two areas, (Mt. Minza-Gould and Woodcutters). Holes were drilled on 200' x 400', and on 100' x 200' centres and wherever possible were drilled to identifiable weathered rock. Holes were probed using Harwell type 1368A ratemeters and values were recorded from both soil and weathered rock. A sample from the bottom of each hole was analysed at the Australian Mineral Development Laboratories (AMDEL) in Adelaide by atomic absorption spectrophotometer.

### MT. MINZA-GOULD AREA

Geology -

An outline of the geology of the Mt. Minza area is shown on Plate 2. Detailed geology of the Golden Dyke Formation is not shown; it comprises a sequence of black slates, amphibolite (probably intrusive), sericite schist and altered calcareous siltstone. Prominent beds of hematite quartzite breccia and banded ironstone are exposed in both the Waterhouse No. 2 area, and to the north and west of Mt. Minza. One of the most important facts brought out by the geological mapping is that these two areas may be correlated, and that beds adjacent to the hematite quartzite breccia appear to be potential hosts for mineralization.

Geochemistry -

(a) All geochemical results (copper, cobalt, and nickel) have been received for this area and an initial interpretation of results has been carried out. An outline of the geology, and copper and radiometric anomalies is shown on Plate 2. The areas of interest are summarised as follows:

(i) Associated low order copper and radiometric anomalies occur at 145S, 496E (C1 and R1).

(ii) A group of copper anomalies, some of which were delineated by a previous survey (Shatwell and Duckworth 1966) is associated with amphibolite in the area of anticlinally folded sediments north of Mt. Minza. These anomalies are numbered C2 and are associated with nickel and cobalt anomalies (not shown) in this area, and a radiometric anomaly, R2 which occurs at 169S, 488E.

(iii) A radiometric anomaly of .02 mR/hr (R3) occurs north of a N-E trending fault at 181S, 495E, and is immediately west of a nickel anomaly (not shown).

(iv) A copper anomaly of 475 ppm (C3) occurs at 225S, 408E and appears to be associated with the same N-E trending fault.

(v) A group of copper and radiometric anomalies, with associated nickel and cobalt highs, occurs in the vicinity of Waterhouse No. 2 copper-uranium prospect. The copper anomaly, C4, has three peaks:

251S, 394E, 1500 ppm

253S, 392E, 1000 ppm

247S, 392-393E, 3000 ppm

It is associated with two radiometric anomalies, R4 and R5, which were measured in weathered rock and range up to 0.03 mR/Hr.

Copper anomaly C5 has a 780 ppm peak at 257S, 386E, and copper anomaly C6 has two maxima at 261S, 382E (468 ppm) and at 265S, 388E (430 ppm).

These groups of copper and radiometric anomalies appear to be localised in black shale, close to a bed of hematite quartzite breccia. The northern ends of C4 and R4 are truncated by the N-E trending fault mentioned above; a prominent fracture cleavage, generally vertical, parallels this fault direction in the prospect area.

(vi) A surface radiometric anomaly of .06 mR/hr at 285S, 394E (R6) falls in value to 0.02 mR/hr with depth, and appears to be associated with laterite. However, it is on-strike with the Waterhouse No. 2 anomalies and may yet prove to be significant.

(vii) A group of radiometric anomalies, numbered R7, occur in the Noltenius Formation. These have been investigated in the past and may be caused by radioactive siltstone rubble.

WOODCUTTERS AREA

Detailed auger drilling of geochemical and radiometric anomalies discovered in 1964 and 1965 surveys in the Woodcutters area (Dodson & Shatwell) 1965; (Shatwell 1966) is in progress.

Auger holes are being drilled every 100 feet on lines spaced 200 feet apart. The samples are being analysed for copper, lead, zinc, nickel and cobalt by AMDEL; to date no results have been received.

Plate 3 shows the location of areas being drilled.

## GEOPHYSICAL RESULTS

MT. MINZA-GOULD AREA

The location of all traverses and the geology and principal geophysical results are shown on Plate 2.

E.M. Gun -
All traverses were surveyed with this method. Anomalies in the central northern part of the area occur in black shales and appear to be due to several conducting horizons within the shales.

In the Waterhouse No. 2 area a strong double anomaly extends for 1500 feet with a northerly strike and terminates in the north at a fault line which strikes N-E. In the south, the anomalies continue rather disjointedly and become somewhat less pronounced until passing through the boundary of the survey area.

Of particular interest is the small, but definite anomaly situated between traverses 193S and 173S near the eastern edge of the area. The axis of the indication occurs down dip from an outcrop of hematite quartzite breccia (H.Q.B.) and may be related to it. This anomaly also appears at 514E on traverse 141S, the only traverse which was extended beyond 508E.

Turam -
Traverses were read over the E.M. Gun anomalies in the northern part of the area. Most of the anomalies which were obtained were of large magnitude even with 50 foot staff separation and most indications appeared very abruptly. Because of the large changes in the ratios, accurate readings were difficult to obtain along some portions of the traverses and hence interpretation of the results is somewhat limited. The disturbed nature of the Turam results is most likely due to a highly conducting body lying fairly close to the surface.

Induced Polarization -
Readings were taken with the McPhar HPIP equipment with the dipole-dipole configuration using frequencies of 0.3 c.p.s. and 5.0 c.p.s. and a dipole length of 100 feet.

Two traverses 249S and 253S were surveyed over the Waterhouse No. 2 E.M. Gun anomaly and the results indicate clearly the zone of high conductivity causing the E.M. anomaly. Frequency effects were generally high over the lengths of both I.P. traverses with no marked increase at the zone of high conductivity. Very high frequency effects were associated with the amphibolites.

Two traverses, 173S and 181S were read over the major E.M. Gun anomalies in the northern part of the area. Zones of very high conductivity were located, but the frequency effect anomalies though distinguishable were only slightly higher than background.

One spread was read on traverse 217S over a Slingram anomaly in the Mt. Minza 1965 area. Here the results also confirm a zone of high conductivity with frequency effects increasing with depth over the whole spread. Frequency effects would be affected by very large quantities of graphite in the shales.

In all cases the ground conductivities were so high that readings could not be obtained from depth.

Radiometric -
All traverses were surveyed, but only in the Waterhouse No. 2 area does the surface radioactivity exceed 0.025 mR/Hr. Background in this area is of the order 0.015 mR/Hr.

Comments on other radioactive work have been included in the preceding section, (Geology and Geochemistry).

Magnetic -
All traverses were read with the Sharpe MF-1 vertical component fluxgate magnetometer. Most of the profiles are greatly disturbed due to near surface magnetic sources so that only major variations (above 500 gammas) in the magnetic field can be distinguished clearly as anomalies. It is apparent that most of these anomalies correspond to major outcrops of amphibolite.

Magnetic measurements are currently in progress in the Mt. Minza 1965 area.

## WOODCUTTERS AREA

### (a) ANOMALY L5

Turam -
Eight traverses were read between 200S and 228S using a grounded cable for the source of the primary field. No anomaly was revealed which could be interpreted as due to the sulphide mineralization discovered by drilling.

Self Potential -
Poorly defined negative centres were recorded on some traverses over the known mineralization. However, further work will be carried out later in the year after rain has saturated the ground. With improved ground conditions it is felt that the S.P. method could be useful in locating sulphide mineralization.

Induced Polarization -
Results using this method were disappointing because of the very limited depth penetration. Conductivities of formations were so high a short distance below the surface that voltages set up by the transmitter rapidly became immeasurably small with increasing electrode separation. This situation was aggravated by the very high contact resistances at the surface and these severely limited the current which could be transmitted into the ground. It is felt that depth penetration rarely exceeded 200 feet. There is no doubt that electro-magnetic and normal electrical methods fail because of the lack of contrast in conductivities between mineralization and country rock.

Gravity -
A test gravity survey was started early in September and is now nearing completion. Preliminary results show that there are several gravity anomalies, some of which are of very small amplitude, but occur within the zone of the geochemical lead anomaly. However, there are other anomalies of much greater amplitude than would be expected over mineralization of the type known to exist; most of these anomalies probably are due to structural features, but such a correlation once established may assist in exploration. A formal interpretation of the gravity data has not been started.

Aeromagnetic -
Six test traverses were flown in the L5 Area using Cessna VH-GEO. Tests on the core from DDH 66/3 show that the mineralization is non-magnetic and the small increase in magnetic intensity towards the eastern ends of most traverses could be due to the anticlinal structure associated with the mineralization. The magnetic indication, however, is very weak and it originates from a source very close to the surface. Immediately west of the area of the geochemical anomaly the amplitudes of the magnetic profiles increase considerably. The traverses were flown over outcropping amphibolites and Rum Jungle granite, and it is likely that the magnetic results will assist in the regional geological interpretation of the area.

Borehole Logging -
Resistance, self-potential and radiometric logs were made of drill holes 66/1, 66/2, and 66/3 in the Woodcutters area. The results show that the conductivities of sulphides encountered in the holes is not appreciably different from the surrounding carbonaceous slates. No significant radioactivity was encountered in the radiometric logs.

(b) ANOMALY L3

In contrast to the area of Anomaly L5 geophysical methods gave encouraging results in this area. The principal results (Turam and I.P. methods) are shown on Plates 3 and 4.

Turam -
Twelve traverses were read and a well defined anomaly was mapped in the western half of the area. A smaller anomaly is located in the eastern half of the area. The Turam layout was similar to that used in Anomaly L5.

Induced Polarization -
Two traverses were read using 100 feet dipole lengths. Along traverse 46E which crosses the western Turam anomaly a reasonably well defined I.P. anomaly was located although the frequency effects which were obtained were not particularly large. Along traverse 58E which crosses the lesser Turam indication the I.P. anomaly was not so definite although its magnitude is roughly the same as the anomaly on traverse 46E.

There is thus good correlation between the Turam and I.P. results. The axes of these indications are situated favourably with respect to the Golden Dyke - Coomalie Dolomite boundary and to a surface radiometric anomaly and manganese outcrops in the western portion of the area. Testing of the geophysical results is recommended later in this report.

HUANDOT NORTH

Three Induced Polarization spreads were laid out along two traverses (248S and 252S) in this area. Strong E.M. anomalies had been located along these traverses in 1965. All the I.P. results indicate high conductivities and high frequency effects particularly on traverse 252S where frequency effects up to 30% and resistivities of 1 ohm-meter were observed.

Recommendations are to be made for testing the geophysical results in this area.

COOMALIE GAP WEST

Three Induced Polarization spreads were surveyed along traverse 348S. The results indicate several zones of high I.P. effect along the length of the traverse which also contains several E.M. indications. Recommendations are to be made for testing the geophysical results in this area.

## DIAMOND DRILLING

Ten diamond drill holes, numbered 66/1 to 66/10 were commenced in 1966; five of these are still in progress. In addition, one of the two diamond drill holes commenced in 1965 (No. 65/2) was completed early in 1966.

Initially, three machines, under contract from Aus-drill Pty. Ltd., were used; these were supplemented late in the year by two drills from the Mines Branch, Northern Territory Administration. Of the ~~nine~~ ten holes, one was collared in the Mt. Minza area and the remaining nine in the Woodcutters Area.

Collar positions, depression, azimuth, total depth, target and a stratigraphic summary of the holes are shown in Table 1. Collar positions are also shown on Plates 2 and 5. Geological and assay logs of DDH 66/1 to 66/3 inclusive are shown in Appendix 1.

The results of the drilling are as follows:

DDH 65/2:
This was the second of two holes drilled in the Coomalie Gap West area (Rum Jungle East), south of Coomalie Creek. The primary purpose was to test the stratigraphy of the Golden Dyke Formation, and its contact with the underlying Coomalie Dolomite.

The hole passed through pyritic calcareous graphitic slate, which graded into dolomitic slate at the bottom of the hole. The boundary was transitional, supporting the conclusion of the 1965 auger drilling in this area. No economic mineralisation was intersected.

DDH 66/1 (Fig. 1):
This hole was designed to test a lead anomaly detected by the 1965 geochemical survey in the Woodcutters area (Shatwell 1966). One of the peaks of this anomaly coincides with a north trending cerussite-bearing gossan at 208S, 40E. It was assumed that the gossan, interpreted as a crush zone, dipped vertically. The target was intersected at 300 feet vertical depth indicating a westerly dip of 76° for the crush zone. Strongly pyritic lode formation was intersected from 407 feet to 430 feet, (hole depth) in a calcareous black shale host rock.

Assay results from 425 feet to 437 feet average 0.53% Pb, 8.2% Zn and 0.9 ozs. Ag. The highest zinc results occurred at the bottom of the pyritic lode and below it, in black slate. Microscopic examination of the core in this section revealed finely disseminated sphalerite. An additional 6 feet of core below 440 feet has been sent to AMDEL for assay. Probing revealed no anomalous radioactivity.

DDH 66/2 (Fig. 2):
The hole was collared to the west of a vuggy quartz vein which passes southwards into the gossan tested by 66/1. It was directed east, as 66/1 had indicated that the mineralised zone dips to the west. After passing through calcareous black slate, a strongly pyritic lode containing some galena was intersected from 280 feet to 296 feet (250 feet vertical depth), indicating a westerly dip of almost 80° for the lode. The best lead values occurred at the top of the lode, and a further 12 feet of core has been despatched for analyses from this section. Core was heavily oxidised and deeper drilling is needed to assess the metal content of the lode. Probing revealed 0.2 lbs. e $U_3O_8$ per ton.

DDH 66/3 (Fig. 3):
DDH 66/3 was collared to intersect the more southerly peak of the geochemical anomaly, 1600 feet south of 66/2 and 1200 feet south of 66/1. This southern peak lies some 200 feet further west than the northern peak.

The hole passed through calcareous black slate to 488 feet, where fine grained, light grey dolomite was intersected. From 508'10" to 587'6" the drill intersected a massive pyrite-sphalerite-galena lode. A further 13 feet of grey dolomite was followed by black slate to the end of the hole at 646½ feet.

Assay results are as follows:-

| From | To | Pb% | Zn% | Ag ozs. | Cd % |
|---|---|---|---|---|---|
| 508'10" | 587'6" | 7.7 | 20.9 | 7.7 | 0.15 |

Some features of the lode are:-

(a) 12 feet of arsenopyrite-pyrite near the hanging wall of the lode.

(b) Coarse, brecciated sphalerite and galena towards the footwall.

(c) Black and yellow (high cadmium) sphalerite are present. Cd-Zn ratios are high, averaging about 1:120. Cadmium averages 0.158 per cent.

(d) A high silver content (sections up to 40 oz./ton) which generally occurs in zones of high lead assays.

(e) Low copper values (mostly $\leq$ 0.1%).

(f) No anomalous radioactivity.

DDH 66/4
This hole was designed to test strong Slingram and weak geochemical and radiometric anomalies in black slate overlying hematite quartzite breccia in the Mt. Minza area. It was completed at the time of wiring this report, so that no detailed log is available. However, the following is a summary log:

| | |
|---|---|
| 0-210 ft. | Grey and black slate |
| 210-340 ft. | Black graphitic slate |
| 340-380 ft. | Hematite Quartzite Breccia |
| 380-422 ft. | Grey brecciated slate |

Probing revealed no anomalous radioactivity.

DDH 66/5
This hole was designed to test for possible northerly extensions of mineralisation intersected in 66/1, 2 and 3. Chalcopyrite sphalerite, pyrite dolomite lode was found from 383-420 feet.

DDH 66/6 and 66/7
These holes are collared 400 feet north and south of 66/3 and are still in progress. DDH 66/6 intersected sulphide mineralisation from 518 feet to 538 feet.

DDH 66/8
This hole was collared on a small copper and zinc anomaly on the same line as 66/1, 2 and 3. It is still in progress.

DDH 66/9 and 66/10
These holes are designed to test radiometric and copper, lead and zinc anomalies.

## COMPILATION OF DATA

### GEOLOGICAL, GEOCHEMICAL AND RADIOMETRIC DATA

Two geologists and one draftsman have been engaged during most of 1966 on compilation and synthesis, of geological, geochemical and radiometric data in the Hundred of Goyder. This information is being plotted on sheets at a scale of 1" to 400 feet and in some areas at 1" to 100 feet.

It is estimated that a further 8 months will be required to complete the work.

The detailed progress of compilation on the various sheets is summarised as follows:

Sheets E31-32, E41-42, E51-52

These comprise the Mt. Fitch area, investigated in 1963 by Pritchard and French. All available geological, geochemical and radiometric data from this survey has been compiled. In addition, geological (auger and diamond drilling, surface mapping) information from T.E.P. Ltd., has been plotted, but geochemistry and radioactivity from this source have not yet been plotted.

Some detailed plans at 100 feet = 1 inch have been drawn showing geology and mineralisation at the Mt. Fitch Prospect itself (Tamblyn's Shaft area). There is some suggestion that uranium mineralisation may be controlled by ENE-trending fold axes. Information collected supports our view that there are possibilities for outlining a uranium-base metal deposit at Mt. Fitch.

Sheets E62, E72

Compilation of data on E62 and E72 is about 80% complete. These sheets comprise the Dolerite Ridge-West Finniss Areas (E63), and the "Area 55" region (E72). The sources of data were chiefly BMR auger drilling and TEP diamond drilling. Although no new mineralisation has been brought to light, a detailed study of the significance and distribution of pyrite-pyrrhotite mineralisation is warranted.

Sheets E53, E54, E63 and E73 (The Embayment area)

Because of known economic mineralisation in the Embayment area and the large quantity of information available, compilation of data on these sheets (especially E63) involved much more work than on most of the other sheets. As well as plotting and interpreting existing data, some field investigations have been made in areas where the geology is in doubt.

Two longitudinal projections through the Embayment area (showing geology and mineralisation) have been compiled to facilitate interpretation of the various maps. About one hundred diamond drill sections have been drawn.

Compilation in the Embayment area has confirmed mineralisation in depth between Whites' Open Cut and Brown's Orebody. Sub-ore grade mineralisation is known to exist beneath and west of Whites' Open Cut. Sporadic uranium mineralisation has been encountered in T.E.P. diamond drill holes at the Acacia Gap Tongue - Coomalie Dolomite contact. Evaluation of the Whites area as a uranium-base metal prospect is recommended.

Typing

To date, 592 T.E.P. diamond drill logs, 55 A.M. and S diamond drill logs and 321 drill hole assays have been typed.

All handwritten T.E.P. and A.M. and S. logs have been typed, leaving 209 typed logs to be zeroned later on.

About 40% of T.E.P. and A.M. and S. diamond drill assays have been typed. About 327 churn drill logs remain to be typed.

The following table shows the progress of compilation on the various sheets:-

| Sheet No. | Geology | Geochemistry | Radiometric |
|---|---|---|---|
| E31 | 80% | 60% | 60% |
| E32 | 80% | 60% | 60% |
| E41 | 80% | 60% | 60% |
| E42 | 80% | 60% | 80% |
| E51 | 80% | 60% | 60% |
| E52 | 80% | 60% | 60% |
| E62 | 80% | 80% | 80% |
| E63 | 90% | 80% | 80% |
| E63 - 3 | 80% | -- | -- |
| 4 | 80% | -- | -- |
| 5 | 80% | -- | -- |
| 6 | 80% | -- | -- |
| 7 | 80% | -- | -- |
| 8 | 80% | -- | -- |
| 9 | 80% | -- | -- |
| 10 | 80% | -- | -- |
| E53 | 70% | 90% | 90% |
| E54 | 70% | 90% | 90% |
| E72 | 90% | 100% | 100% |
| E73 | 30% | 90% | 90% |
| E81 | 10% | 10% | 10% |
| E82 | 15% | 15% | 15% |
| E83 | 50% | 100% | 100% |
| E93 | 20% | 20% | -- |
| E94 | 20% | 50% | -- |

Comment:- It is significant that Whites and Rum Jungle Creek South uranium-bearing deposits are found close to phosphate hematite quartzite breccia (H.Q.B.). At Waterhouse No. 2, radioactive mineral anomalies occur in carbonaceous shales close to H.Q.B. which can be traced south to phosphate rich rich H.Q.B. at Stapleton. Three observations of interest are made:-

Prospecting -

(a) Uranium and base metal mineralization could occur between Waterhouse No. 2 prospect and Milton Springs.

(b) Base metal mineral deposits could occur between Rum Jungle Creek South and Castlemaine Hill.

(c) An H.Q.B. lens immediately west of the Waterhouse Granite is also of interest.

GEOPHYSICAL

It is planned to prepare transparent overlays showing the results in contour form for each of the geophysical methods used over each sheet area. Thus a sheet area could have up to 9 such overlays although the average figure will be 5-6 overlays per sheet.

Lists of data for work appearing on each sheet are prepared in Darwin and these together with base map transparencies are forwarded to Canberra when the base map is copied and the original returned to Darwin. A large proportion of the geophysical material in its original form is sent to Melbourne for photographic reduction to correct scale. Some material has to be redrawn (as for example if the original plate should contain data which is not required in the final transparency). Only a small proportion of the original material is in suitable form for addition to the base map.

The geophysical material now all in the form of transparencies and at correct scale, is dissected and results from each method in turn are added to the particular base and 2 transparencies of the composite sheet are made. One copy of each such compilation is forwarded to Darwin.

To date, compilation on sheets E93 and E83 has been completed; sheets E72 and E82 are each 60% completed; sheets E63 and E73 are 30% and 20% completed respectively. In addition the following sheets have had base maps prepared and are awaiting reduction and/or redrafting of data: E31, E32, E41, E42, E51, E52, E53, E54, E61, E62, E63, E71, E73, E81, E92, E94.

The compilation was held up in its early stages because of a shortage of drafting staff and delays in the delivery of double clear film from England. However, it is expected that compilation of all data in the Hundred of Goyder will be completed by mid-1967. No formal assessment has been made of the compilation to date.

## RECOMMENDATIONS FOR 1967 PROGRAMME

### 1. AUGER DRILLING/GEOCHEMICAL SAMPLING

Untested reconnaissance geochemical anomalies discovered by the 1964 geochemical survey should be geochemically sampled by auger drilling. These include:-

(a) Lead anomalies on the Coomalie Dolomite-Golden Dyke Formation boundary and copper-lead anomalies in the Crater Formation should be covered by a grid extending between 168S and 264S (Rum Jungle East Grid). Area 44, investigated by P.W. Pritchard in 1963, lies within this area.

(b) Electromagnetic anomalies in the Coomalie Gap West area, north of the Batchelor road, should be auger drilled.

(c) Follow-up of base metal and radiometric anomalies in Coomalie Gap West between 408S and 480S should be carried out.

(d) Turam anomalies north of Huandot Farm, in the southern part of the Woodcutters area, should be auger drilled.

It is estimated that about 30,000 feet of auger drilling and 350,000 feet of traverse pegging will be required.

### 2. GEOPHYSICAL

It is proposed that approximately 120,000 feet of traverse be surveyed by Turam and I.P. methods in the area between anomalies L3 and L5. Existing survey lines will be used. At this stage it is probable that all traverses will be covered by Turam and that I.P. would be limited to every second traverse. In Area 44, Turam and I.P. could be undertaken on approximately 80,000 feet of the traverses which will be surveyed for geochemical purposes.

However, details of the geophysical programme at Woodcutters depend on the geochemical and diamond drilling results and all proposals depend upon the overall commitment by the Bureau for exploration in these and other areas in the Rum Jungle District.

## 3. DIAMOND DRILLING - WOODCUTTERS AREA

Diamond drilling of known geochemical and radiometric targets at Woodcutters Area should be continued. The proposed programme totals 14,000 feet of diamond drilling, 7000 feet by Mines Branch drills and 7000 feet by Aus-drill Pty. Ltd.

Anomaly L5
Step-out holes to test the continuation of known mineralization along the strike and in depth:-

| | | |
|---|---|---|
| Traverse | 196S | 600 feet |
| | 200S | 600 feet |
| | 205S | 800 feet |
| | 212S | 600 feet |
| | 214S | 1000 feet |
| | 218S | 1000 feet |
| | 248S | 800 feet |
| | 234S | 500 feet |
| | 252S | 500 feet |
| | 180S | 600 feet |

| Mines Branch Diamond Drills | |
|---|---|
| Total | 7000 |

Copper Anomaly at 168S
To test copper-zinc anomaly 400 feet south of drill hole 66/8.

| | | |
|---|---|---|
| Traverse | 172S | 500 feet |

Anomaly R2-R3-L6
To test copper-lead-radiometric anomaly.

| | | |
|---|---|---|
| Traverse | 156S | 550 feet |
| | 150S | 550 feet |
| | 140S | 550 feet |
| | 132S | 550 feet |

Anomaly L1
To test lead-zinc-radiometric anomaly.

| | | |
|---|---|---|
| Traverse | 118S | 600 feet |
| | 112S | 600 feet |

+ 4 holes to follow-up any intersections.

Anomaly L2
To test lead-zinc anomaly (Low priority).

| | | |
|---|---|---|
| Traverse | 80S | 550 feet |
| | 88S | 550 feet |

Anomaly L3
To test radiometric, lead-copper, I.P., and Turam anomalies:- 2000 feet of diamond drilling is proposed. Three holes are planned as follows:-

| Hole | Collar Position | Direction | Depression | Length | Target Portion | Target Depth |
|---|---|---|---|---|---|---|
| DDH 1 | 4600E, 4750N | Grid North | 60° | 450 ft. or to contact (Coomalie Dol.) | 4600E, 4920N | 300 ft. |
| DDH 2 | 4600E, 4320N | Grid North | 60° | 450 ft. | 4600E, 4500N | 300 ft. |
| DDH 3 | 5800E, 4650N | Grid North | 45° | 550 ft. | 5800E, 4950N | 300 ft. |

The holes are in order of priority. DDH 3 may be re-sited on the results from DDH 2.

## 4. ROTARY PERCUSSION DRILLING

Twelve 250 foot holes at Waterhouse No. 2 Prospect to test radiometric anomalies are planned.

## 5. GEOBOTANICAL STUDIES

Arrangements are being made for Mr. W. Ridley of the Geological Survey of Queensland to carry out geobotanical studies at Woodcutters Area. The investigation will commence on L5 anomaly and if time permits will be extended to L6. Firstly a plant distribution census will be made followed by bark and leaf sampling to determine the usefulness of vegetation as a guide to ore, i.e. to find out if trees and plants reflect anomalous metal values in the soil, if any species selectively absorb metals and if vegetation species differ over different rock types.

## 6. COMPILATION

Compilation of data at present being carried out in mineralised areas of the Hundred of Goyder will be completed.

## ACACIA, CELIA AND MILTON AREAS. (Plate 6)

Auger drilling/geochemical sampling and detailed geological mapping of the three areas involve at least two additional geologists and will require setting up of two camps, one at Celia Creek and one at Milton Springs.

Two additional auger drills would be required for reconnaissance and follow-up drilling.

| | | |
|---|---|---|
| Acacia | 17,000 feet | Reconnaissance only. |
| Celia | 14,000 feet | " " |
| Milton | 21,500 feet | " " |

Approximately 300 miles of surveying is needed and about 20,000 survey pegs.

The Geological Branch does not have sufficient staff to mount such a survey and geologists currently engaged in exploration will be fully occupied with diamond drilling and follow up work in the Rum Jungle East area.

It is recommended that private companies should be invited to tender for the areas.

PROPOSED STAFF FOR 1967 PROGRAMME

| | |
|---|---|
| C.E. Prichard | Darwin Uranium Group |
| J. Gardener | " " " |
| K. Duckworth | " " " |
| Willist | " " " |
| Y. Mizeitis | Canberra. |
| D.G. Semple | " |
| L. Kerek (Draftsman) | " |

## REFERENCES


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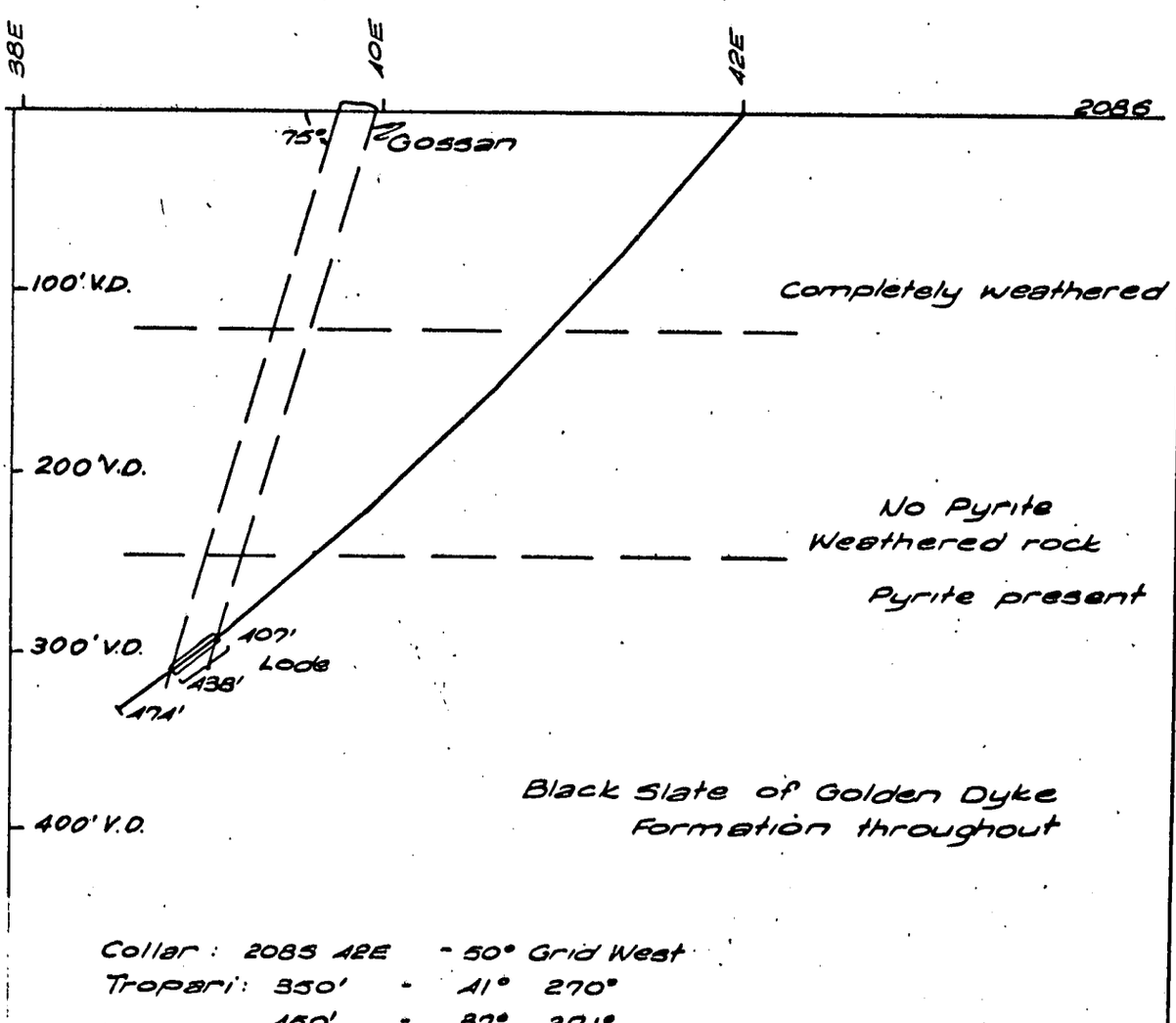
TABLE 1

SUMMARY OF DIAMOND DRILLING DATA

| Hole No. | Collar | Direction | Depression | Area | Grid | Depth | Target | Summary |
|---|---|---|---|---|---|---|---|---|
| 65/2 | 412S 16E | Grid W | -50° | Coomalie Gap West | Rum Jungle East | 424 ft. | Coomalie Dolomite | 0-198' Golden Dyke Formation 198'-324' Transition 324'-424' Coomalie Dolomite |
| 66/1 | 208S 42E | Grid W | -50° | Woodcutters | Rum Jungle East | 474 ft. | Gossan at 208S, 40E | Golden Dyke Formation throughout; lode 404'-440'; From 422'-437' lode averages 0.22% Pb 7.9% Zn 0.9 Ozs Ag. |
| 66/2 | 204S 38E | Grid E | -60° | Woodcutters | Rum Jungle East | 352' | Quartz vein at 204S, 40E | Golden Dyke Formation throughout; pyritic lode 280'-299'; weathered; 277'-283', 5.15% Pb and 0.77% Zn. |
| 66/3 | 220S 33E | Grid E | -60° | Woodcutters | Rum Jungle East | 646½' | Geochemical peak at 220S, 38E | Golden Dyke Formation throughout; Ag-Pb-Zn-pyrite lode 508'10" - 587'6" averages over 78'8" - 7.7% Pb 20.9% Zn 7.7 ozs. Ag. |
| 66/4 | 237S 460E | Grid E | -60° | Mt. Minza | T.E.P. Mine | 422' | Slingram anomaly at 237S, 462E | Golden Dyke Formation throughout. Radiometrically probed, but no anomalous radioactivity. |
| 66/5 | 192S 37E | Grid E | -60° | Woodcutters | Rum Jungle East | 478' | Northern extension of lead anomaly | 383-420 feet chalcopyrite-sphalerite-pyrite dolomite. |
| 66/6 | 216S 35E | Grid E | -60° | Woodcutters | Rum Jungle East | In progress | Northern extension of mineralization intersected by 66/3 | To be drilled to 600 feet. Mineralization from 518-538 feet Pb-Zn. |
| 66/7 | 220S 33E | Grid E | -60° | Woodcutters | Rum Jungle East | In progress | Southern extension of mineralization intersected by 66/3 | To be drilled to 700 feet. |
| 66/8 | 168S 35E | Grid E | -60° | Woodcutters | Rum Jungle East | In progress | Copper anomaly at 168S 38E | To be drilled to 550 feet. |
| 66/9 | 120S 32E | Grid E | -60° | Woodcutters | Rum Jungle East | In progress | Radiometric anomaly, lead, and zinc anomaly. | |
| 66/10 | 156S 35E | Grid E | -60° | Woodcutters | Rum Jungle East | Setting up | Radiometric anomaly, copper, lead, zinc anomaly. | |

FIG 1

# WOODCUTTERS AREA N.T.




Collar : 2085 42E - 50° Grid West
Tropari: 350' - 41° 270°
450' - 37° 271°

DDH 66-1
SECTION ALONG 2085

Scale: 100' = 1"

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

# GEOLOGICAL LOG OF DRILL HOLE

PROJECT. RUM JUNGLE AREA 1965 : 66 ..... REMARKS .....

HOLE No. B.M.R. 66/1 ..... CO-ORDINATES 2085. A2E. Rum Jungle East Gr. GROUND Depth 474 feet

LOCATION Woodcutters Area ..... ANGLE FROM HORIZONTAL 30° ..... DIRECTION W.

| DESCRIPTION OF CORE | R.L. / CASING | DEPTH / SIZE OF CORE | LOG | LIFT & CORE RECOVERY % | SAMPLES | REMARKS | ASSAYS | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Cu % | Pb % | Zn % | Ag oz/ton |
| Black slate, irregularly weathered, Py rare | | | 404' | | | | | | |
| 404'6" Black slate, Pyrite, Py ranges from 5% to 60% | | | 407' | | 66/25001 | 0.014 | 0.26 | 0.98 | 0.5 |
| 407' Massive Pyrite with black slate matrix Py averages over 80% | | | 410' | | 66/25002 | 0.019 | 0.18 | 0.26 | 0.6 |
| | | | 413' | | 66/25003 | 0.010 | 0.19 | 0.90 | 0.2 |
| 415'6" Galena visible on joint | | | 416' | | 66/25004 | 0.010 | 0.18 (0.77) | 0.44 0.40 | 0.3 |
| | | | 419' | | 66/25005 | 0.007 | 0.16 | 0.48 | 0.3 |
| 420' / 421'6" Weathered porous mostly Py. ?Cerussite | | | 422' | | 66/25006 | 0.045 | 0.18 | 2.3 | 0.5 |
| | | | 425' | | 66/25007 | 0.028 | 0.27 | 4.9 | 1.1 |
| 425' / 427' Weathered - ?cerussite Galena forms matrix to Py. | | | 428' | | 66/25008 | 0.014 | 0.32 | 6.2 | 2.6 |
| 429'6" Black slate, broken irregularly weathered Py 1% to 30% av. c. 5% 430' & 433'6" veins ½" ?cerussite | | | 431' | | 66/25009 | 0.048 (0.01) | 0.21 (1.79) | 12.9 (6.5) | 0.7 |
| | | | 434' | | 66/25011 | 0.005 | 0.28 | 8.75 | 0.10 |
| 434' Black slate, fresh Py + $CO_3$ in blebs < 1% | | | 437' | | 66/25012 | 0.005 | 0.03 | 6.75 | 0.10 |
| 437' 438' Black slate, weathered broken ?cerussite 1" vein | | | 440' | | 66/25013 | 0.005 | 0.02 | 2.25 | 0.10 |
| Black slate, fresh Py $CO_3$ in blebs < 1% | | | 443' | | 66/25096 | | | | |
| | | | 446' | | 66/25097 | | | | |

DRILL NO. A1000 ..... TYPE. Mindrill .....

DRILLER J. Jansen ..... COMMENCED ..... COMPLETED 2:5:66 ...

CASING IN HOLE DURING DRILLING

EXPLANATION: 5 ft. to an inch

REFERENCES: ( ) . Py · Pyrite Qtz · Quartz.

HEAD OFFICE

LOGGED BY C.E.P.

DRAWN BY .....

CHECKED BY .....

SHEET 4 OF 4

DRAWING NO. .....

GD130 ..... B.M.R. Check Assay Results: ..... EJ

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

# GEOLOGICAL LOG OF DRILL HOLE

PROJECT. RUM JUNGLE. AREA. 1965-66. REMARKS.

HOLE No. B.M.R. 66:1 CO-ORDINATES 208S. 42E. Rum Jungle East Grid R.L. GROUND Depth. 474 feet.

LOCATION Woodcutters. Area ANGLE FROM HORIZONTAL 50° DIRECTION W.

| DESCRIPTION OF CORE | R.L. CASING | DEPTH SIZE OF CORE | LOG | LIFT & CORE RECOVERY % | SAMPLES | REMARKS | ASSAYS |
|---|---|---|---|---|---|---|---|
| 0' | | | | | | | |
| Soil and completely weathered rock, chiefly clay. Colour ranges through brown, yellow, purple | | | | No Core | | | |
| 60' | | | | | | | |
| Weathered rock, mostly soft clay, yellow, grey, pink. Bedding not recognisable | | | | 97 | | | |
| 100' | | | | | | | |
| 160' | | | | | | | |
| Similar but getting slightly harder. Some dark grey (carbonaceous) porous weathered rock. Bedding occasionally recognisable. | | | 20° 35° | 98 | | | |
| 200' | | | | | | | |

DRILL NO. A1000
TYPE Mindrill
DRILLER J. Jensen
COMMENCED
COMPLETED 2-5-66

CASING IN HOLE DURING DRILLING

EXPLANATION 20 ft. to an inch

REFERENCES
Py - Pyrite
Qtz. - Quartz

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LOGGED BY C.E.P.
DRAWN BY
CHECKED BY
SHEET 1 OF 4
DRAWING NO.

GD130

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

# GEOLOGICAL LOG OF DRILL HOLE

PROJECT RUM JUNGLE AREA 1965-66 ..... REMARKS .....

HOLE No B.M.R. 66-1 ..... CO-ORDINATES 2089 42E Rum Jungle East Grid ~~GROUND~~ Depth 474 feet ....

LOCATION Woodcutters Area ..... ANGLE FROM HORIZONTAL 50° ..... DIRECTION W .....

| DESCRIPTION OF CORE | R.L. CASING | DEPTH SIZE OF CORE | LOG | LIFT & CORE RECOVERY % | SAMPLES | REMARKS | ASSAYS |
|---|---|---|---|---|---|---|---|
| 200' | | | | | | | |
| 205' | | | 20° | | | | |
| Weathered porous black rock (ex black slate) | | WX | 30° | | | | |
| | | | | 92 | | | |
| 229' } cavity<br>234' } | | BX | | | | | |
| Vuggy limonite, trace Py. | | | | | | | |
| 240' Gradation | | | 65° | | | | |
| Black slate weathered Py < 1% | | | | | | | |
| 251' } Qtg. veins ½"<br>258' } | | | 60° | | | | |
| 268' limonite, trace Py. 1" | | | | | | | |
| | | | 60° (55°) | 98 | | | |
| 300 | | | | | | | |
| | | | 60° | | | | |
| 340' | | | | | | | |
| Black slate slightly calcareous Py < 1% | | | | | | Tropari 350' -41° at 271° | |
| 352' Qtg. vein ¼" Py 5% | | | | 100 | | | |
| 374'6" Qtg. vein ½", Py 10%, Galena 10% | | | 55° | | | | |
| 375' | | | | | | | |
| Black slate not calcareous, weathered | | | | 98 | | | |
| 378'? Cerussite | | | | | | | |
| 396'6"? sheared galena on joint. | | | | | | | |
| 100' | | | | | | | |

DRILL NO A1000 .....
TYPE Mindrill .....

CASING IN HOLE DURING DRILLING

EXPLANATION
20 ft. to an inch

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DRAWN BY .....
CHECKED BY .....

DRILLER J. Jansen ..
COMMENCED .....
COMPLETED 2.5.66 ....

REFERENCES
Py. - Pyrite
Qtg. - Quartz.

SHEET 2 OF 4
DRAWING NO .....

GD130

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# GEOLOGICAL LOG OF DRILL HOLE

PROJECT RUM JUNGLE AREA 1965-66 REMARKS

HOLE No B.M.R. 66-1 CO-ORDINATES 2088 42E Rum Jungle East GL ~~GROUND~~ Depth 474 feet

LOCATION Woodcutters Area ANGLE FROM HORIZONTAL 50° DIRECTION W

| DESCRIPTION OF CORE | R.L. CASING | DEPTH SIZE OF CORE | LOG | LIFT & CORE RECOVERY % | SAMPLES | REMARKS | ASSAYS |
|---|---|---|---|---|---|---|---|
| 400' | | | | | | | |
| 404' Black slate Py 40% | | | | 98 | | | |
| 407' Fine grained Py with black slate matrix (40%) Galena present 425'-427' | | | | 98 | | 400' - 450' see sheet A | |
| 429'6" Black slate weathered in part, Py irregular but decreasing | | | | 98 | | | |
| 438' Black slate slightly calcareous disseminated blebs of Py + $CO_3$ | | BX | 45° (55°) | 100 | | Tropari 450' -37° at 271° | |
| 474' Total Depth | | | | | | | |
| Golden Dyke Formation throughout. Pyrite Lode 407' to 429'6" Bedding and schistocity in opposite directions (along core) | | | | | | | |

DRILL NO A1000 TYPE Mindrill

CASING IN HOLE DURING DRILLING

EXPLANATION 20ft. to an inch

HEAD OFFICE

DRILLER J. Jansen

COMMENCED

COMPLETED 2.5.66

REFERENCES

Py. - Pyrite

Qtz. - Quartz

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SHEET 3 OF 4

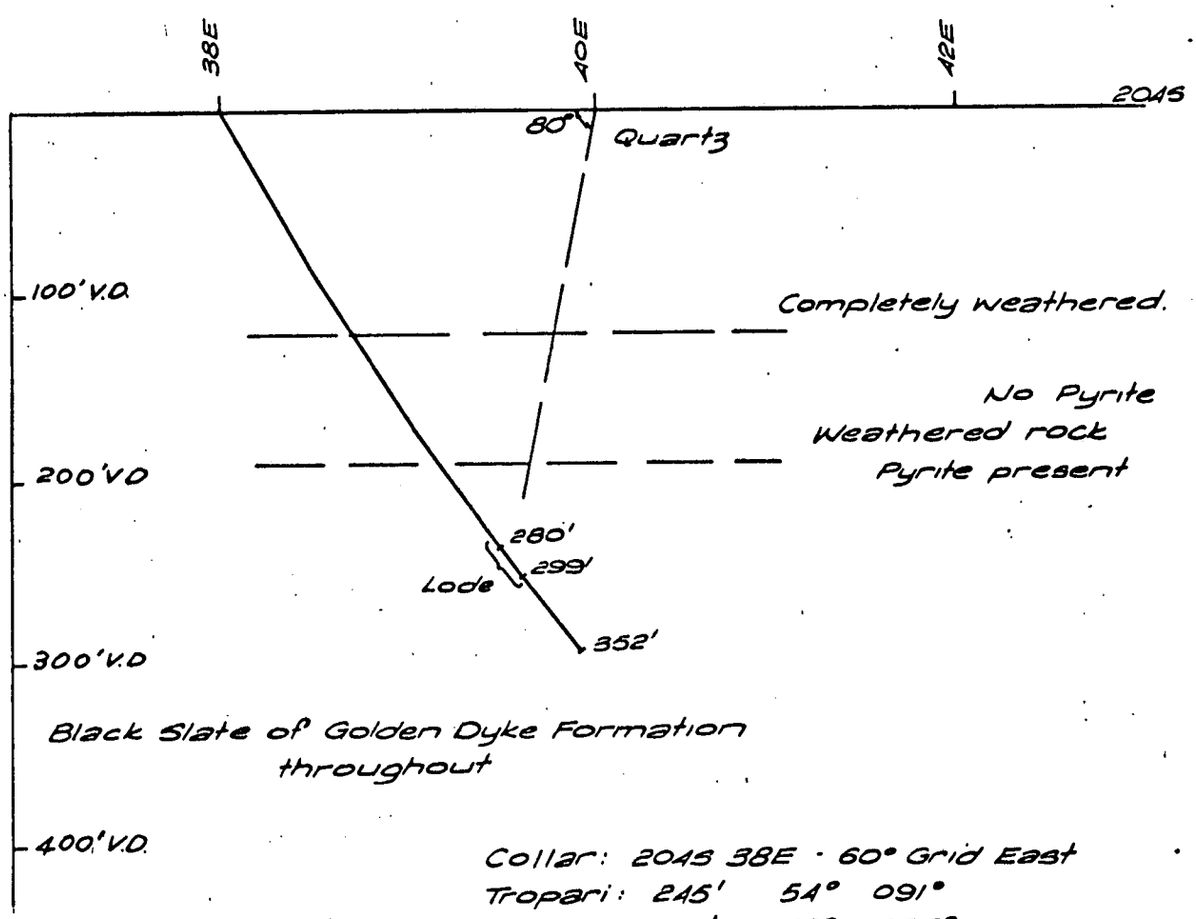
DRAWING NO

GD130

EJ

FIG 21

# WOODCUTTERS AREA N.T.




Collar: 2045 38E · 60° Grid East
Tropari: 245' 54° 091°
325' 52° 095°

D.D.H. 66·2
SECTION ALONG 2045

Scale: 100'=1"

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

# GEOLOGICAL LOG OF DRILL HOLE

PROJECT: RUM JUNGLE AREA 1966 ..... REMARKS .....

HOLE No.: B.M.R. 66-2 ..... CO-ORDINATES: 204S 38E Rum Jungle East Grid ~~GROUND~~ Depth: 352'

LOCATION: Woodcutters Area ..... ANGLE FROM HORIZONTAL: 60° ..... DIRECTION: East

| DESCRIPTION OF CORE | R.L. CASING | DEPTH SIZE OF CORE | LOG | LIFT & CORE RECOVERY % | SAMPLES | REMARKS Cu % | REMARKS Pb % | ASSAYS Zn % | ASSAYS Ag oz/ton |
|---|---|---|---|---|---|---|---|---|---|
| 279' | | | 277' | | | | | | |
| Weathered porous carbonaceous slate | | | | | 66125014 | -0.005 (0.04) | 2.40 (1.91) | 2.45 (2.21) | -0.1 |
| 279'11" Weathered Py lode largely Fe oxides | | | 280' | | | | | | |
| 281' Pyritic lode with carbonaceous matrix galena as matrix to pyrite 284'-285' | | | | | 66125015 | 0.080 (<0.01) | 5.15 (5.27) | 0.77 (0.77) | 1.3 |
| | | | 283' | | | | | | |
| 285 | | | | | 66125016 | 0.010 (<0.01) | 2.90 (3.28) | 0.22 (0.22) | 0.2 |
| 285'10" Weathered Pyritic lode Py + Fe oxides | | | BX 286 | | | | | | |
| 286'8" Weathered black slate, minor graphite Fe oxide stained. | | | | | 66125017 | -0.005 | 1.20 | 0.50 | -0.1 |
| 288'6" Weathered black slate, Fe oxide impregnated 10-15% Py | | | 289' | | | | | | |
| 290 | | | | | 66125018 | -0.005 | 0.88 | 0.54 | -0.1 |
| 290'6" Weathered black slate, closely fractured | | | 292' | | | | | | |
| 293'6" Weathered black slate, Fe oxide impregnated. | | | | | 66125019 | -0.005 | 0.90 | 0.40 | 0.1 |
| 296' | | | 296' | | | | | | |
| 296'0" Weathered black slate. | | | | | 66125020 | -0.005 | 0.51 | 0.60 | 0.1 |
| 299' 299'0" | | | 299' | | | | | | |

DRILL NO. A1000 ..... TYPE: Mindrill .....

DRILLER: J. Jansen

COMMENCED .....

COMPLETED: 10.6.66.

EXPLANATION

CASING IN HOLE DURING DRILLING

REFERENCES

1" = 2'0"

(:) Check Surveys

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SHEET 3 OF 3

DRAWING NO .....

GD130

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# GEOLOGICAL LOG OF DRILL HOLE

PROJECT. RUM. JUNGLE. AREA. 1966. REMARKS.

HOLE No. B.M.R. 66:2. CO-ORDINATES 20AS. 38E. Rum. Jungle. East. Grid. ~~L. ground~~ Depth. 352'

LOCATION. Woodcutters. Area. ANGLE FROM HORIZONTAL. 60°. DIRECTION East.

| DESCRIPTION OF CORE | R.L. CASING | DEPTH SIZE OF CORE | LOG | LIFT & CORE RECOVERY % | SAMPLES | REMARKS | ASSAYS |
|---|---|---|---|---|---|---|---|
| 0 | | | | | | | |
| No Core | | | | Nil | | | |
| 30' | | | | | | | |
| Completely weathered material. Red, pink, yellow and brown, some pale grey c. 105' | | NX | | 93% | | | |
| 100' | | | | | | | |
| 140' | | | | | | | |
| Pale to dark grey well weathered rock. Core fragmentary and parts along closely spaced ?bedding planes | | BX | | 90% | | | |
| 179' | | | | | | | |
| Dark grey to black carbonaceous slate partly weathered. 196'6" - 3" Quartz, no mineralization | | | | 92% | | | |
| 200' | | | | | | | |

DRILL NO A1000

TYPE

DRILLER J. Jansen

COMMENCED

COMPLETED 10.6.66

CASING IN HOLE DURING DRILLING

1" = 20'0"

EXPLANATION

REFERENCES

HEAD OFFICE

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CHECKED BY

SHEET 1 OF 3

DRAWING NO

GD130

EJ

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

# GEOLOGICAL LOG OF DRILL HOLE

PROJECT. RUM. JUNGLE. AREA. 1966. REMARKS.

HOLE No. B.M.R. 66:2 CO-ORDINATES 2045. 38E Rum. Jungle. East. Grid ~~GROUND~~ Depth. 352'

LOCATION Woodcutters. Area. ANGLE FROM HORIZONTAL. 60° DIRECTION East.

| DESCRIPTION OF CORE | R.L. CASING | DEPTH SIZE OF CORE | LOG | LIFT & CORE RECOVERY % | SAMPLES | REMARKS | ASSAYS |
|---|---|---|---|---|---|---|---|
| 200' | | | | | | | |
| 220' Carbonaceous slate not weathered, calcareous, scattered small (¼ 1/20") Py + $CO_3$ blebs | | | | | | | |
| 221' & 249' 3" cherty silicia + 10% Py. Few Py veins to 1/10" | | BX | | 98 | | | |
| 276'6" Weathered porous carbonaceous slate 279'11" | | | | 90 | | | |
| Lode | | | | 87 | | | |
| See Sheet 3 | | | | | | | |
| 300' 299' Carbonaceous slate fresh minor Py. | | | | | | | |
| 309'-312' Silicified brecciated in parts | | | | | | | |
| 322'3"-322'9" silicified micro breccia | | | | 98 | | | |
| Few Py veins to 1/10" | | | | | | | |
| 352' | | | | | | | |
| Golden Dyke Formation throughout. Azimuth Depression | | | | | | | |
| Collar: 90° 60° | | | | | | | |
| 245' : 91° 54° | | | | | | | |
| 325' : 95° 52° | | | | | | | |

DRILL NO A1000

TYPE Mindrill

DRILLER J. Jansen

COMMENCED

COMPLETED 10.6.66

CASING IN HOLE DURING DRILLING

1" = 20'0"

EXPLANATION

REFERENCES

HEAD OFFICE

LOGGED BY C.E.P.

DRAWN BY

CHECKED BY

SHEET 2 OF 3

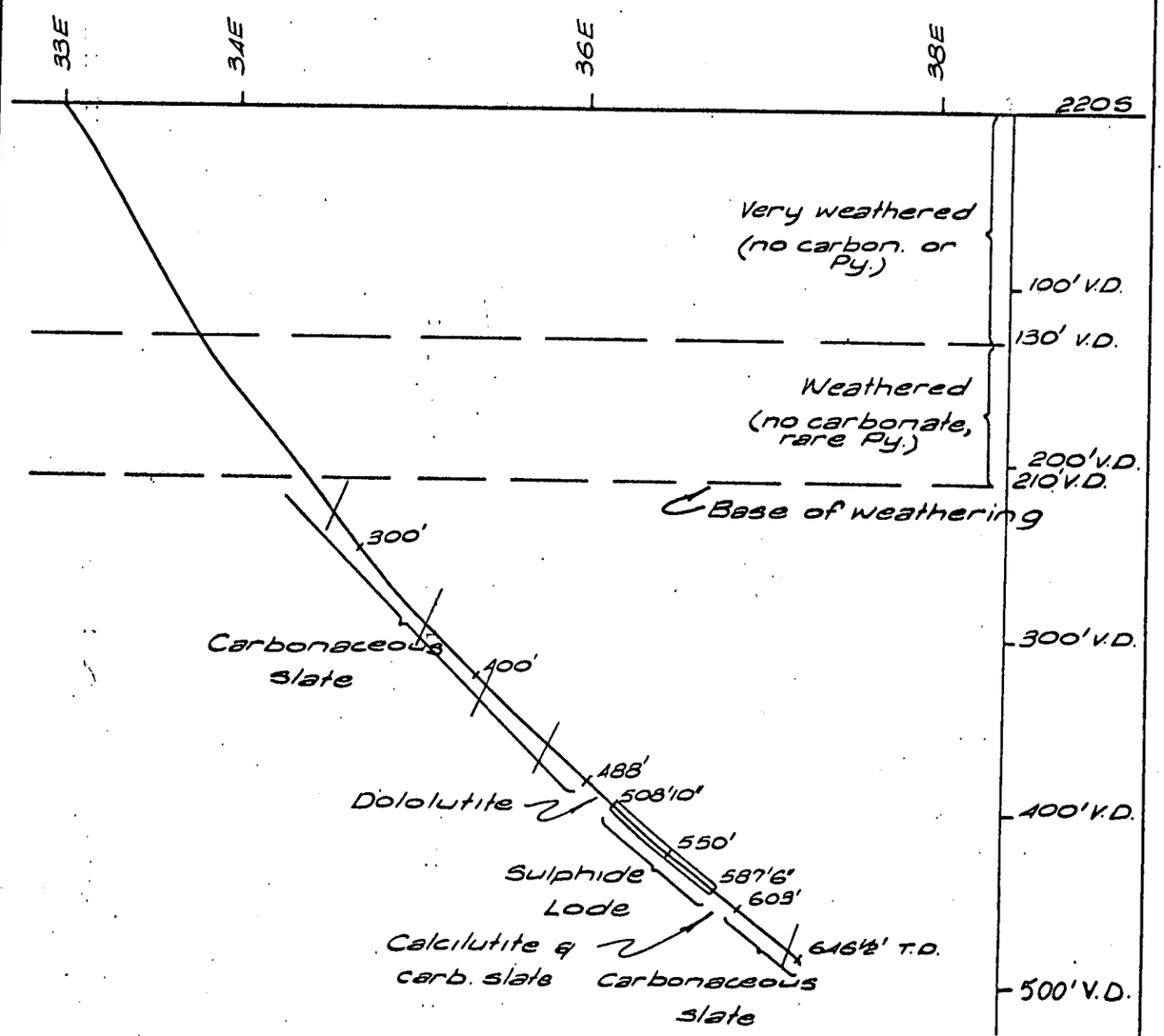
DRAWING NO

GD130

EJ

FIG 3.

# WOODCUTTERS AREA N.T.




Golden Dyke Formation throughout

Tropari

| | | |
|---|---|---|
| Collar | - 60° | Grid North |
| 250' | - 52° | - |
| 450' | - 42° | 085° |
| 620' | - 37° | 091° |

D.D.H. 66-3
SECTION ALONG 2205

Scale: 100' = 1"

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

# GEOLOGICAL LOG OF DRILL HOLE

PROJECT Rum Jungle Area 1966 ..... REMARKS .....

HOLE No B.M.R. 66:3 ..... CO-ORDINATES 2205 33E. Rum Jungle East Grid ..... Depth 646.5 ft.

LOCATION Woodcutters Area ..... ANGLE FROM HORIZONTAL 60° ..... DIRECTION E (grid)

| DESCRIPTION OF CORE | R.L. / CASING | DEPTH / SIZE OF CORE | LOG | LIFT & CORE RECOVERY % | SAMPLES | REMARKS | | ASSAYS | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Cu % | Pb % | Zn % | Ag oz/ton |
| 480 | | | BX | | | | | | |
| Carbonaceous slate calcareous. Py general but irregular and <5% except last few feet. Bleb of Gal. at 487'9" | | | 482'6" | | | | | | |
| | | | | 99 | 66125037 | -0.005 | 0.05 | 0.02 | 0.8 |
| 488'10" | | | 487'6" | | | | | | |
| Dololutite, carbonaceous at top. Py irregular but abundant (to 30%) Vuggy near base ?cerrusite in vugs. | | | | 99 | 38 | 0.045 | 1.15 | 2.50 | -0.01 |
| 490 | | | 492'8" | | | | | | |
| | | | | 99 | 39 | 0.005 | 0.05 | -0.01 | 0.1 |
| 496' | | | | | | | | | |
| Cavity | | | | NIL | | | | | |
| 500 | | | | | | | | | |
| 502' | | | | | | | | | |
| Dololutite, carbonaceous and calcareous Py variable. | | | 503'10" | 98 | (39) | | | | |
| | | | | | 66125040 | 0.010 | 0.10 | 0.06 | 0.1 |
| 508'10" | | | 508'10" | | | | | | |
| Massive Py minor disseminated Gal (5%) some calcite | | | | | 41 | 0.060 | 1.30 | 0.20 | 4.8 |
| 514'10" | | | 514'10" | | | | | | |
| Largely Py. Calcite and Gal. variable minor Sph. | | | | | 42 | -0.050 | 2.65 | 4.38 | 0.6 |
| 520 520'1" | | | 520'1" | | | | | | |
| Py, Gal, Sph, up to 20% Gal. 5% Sph. | | | | | 43 | 0.115 (0.14) | 8.65 (8.86) | 19.2 (19.3) | 2.4 |
| 523'1" | | | 523'1" | | | | | | |
| | | | | | 44 | 0.200 (0.21) | 13.3 (16.3) | 24.2 (25.5) | 6.0 |
| 527'3" | | | 526'1" | | | | | | |
| carbonaceous slate and calcite, Py, Gal, Sph, | | | | | | 0.060 | 8.05 | 34.6 | 1.2 |
| 528'3" | | | 528'1" | | | | | | |
| 530 | | | | | | | | | |

DRILL NO A1000 ..... TYPE Mindrill .....

DRILLER J. Jansen .....

COMMENCED 18.6.66 .....

COMPLETED 19.8.66 .....

CASING IN HOLE DURING DRILLING

EXPLANATION 1" = 5'

REFERENCES

( ) Check assays.

HEAD OFFICE

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CHECKED BY .....

SHEET 5 .... OF 7 ....

DRAWING NO .....

GD130

EJ

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

# GEOLOGICAL LOG OF DRILL HOLE

PROJECT Rum Jungle Area 1966 ..... REMARKS .....

HOLE No. B.M.R. 66:3 ..... CO-ORDINATES 2205 33E Rum Jungle East Grid ~~GROUND~~ Depth 646.5 ft.

LOCATION Woodcutters Area ..... ANGLE FROM HORIZONTAL ... 60° ..... DIRECTION E (grid)

| DESCRIPTION OF CORE | R.L. / CASING | DEPTH / SIZE OF CORE | LOG | LIFT & CORE RECOVERY % | SAMPLES | REMARKS | | ASSAYS | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Cu % | Pb % | Zn % | Ag oz/ton |
| 530' | | | BX | | | | | | |
| Py, slate gangue with calcite. Gal. throughout Sph. in places | | | 533'3" | | 66128047 | | | | |
| 535'9" | | | | | | 0·190 | 5·00 | 23·3 | 1·5 |
| Py and Gal. Carbonate gangue White ? Pb. mineral on joints | | | 538'3" | | 48 | | | | |
| 540 | | | | | | 0·010 (<·01) | 2·10 (2·12) | 4·1 (4·67) | 1·1 |
| | | | 543'3" | | 49 | | | | |
| | | | | | | 0·040 | 6·15 | 16·1 | 4·3 |
| 548'3" | | | 548'3" | | 50 | | | | |
| Py, Gal, Sph, variable calcareous gangue minor carbonaceous slate very minor chalcopyrite 549'-550' | | | | | | 0·100 (0·11) | 5·00 (4·19) | 39·4 (36·7) | 5·8 |
| 554'6" | | | 553'3" | | 61 | | | | |
| Carbonaceous slate Py throughout Calcite variable Gal. and Sph. variable ? slump breccia 561½' - 562½' | | | | | | 0·030 | 6·50 | 15·4 | 1·3 |
| 560 | | | 558'6" | | 62 | | | | |
| | | | | | | 0·005 | 3·15 | 14·7 | 3·0 |
| | | | 561'6" | | 63 | | | | |
| 564' | | | 564'0" | | | 0·120 (0·11) | 51·5 (48·8) | 11·0 (10·7) | 49·4 |
| Fine grainee Py and Gal. calcareous gangue Some Sph. and trace ? Bornite | | | | | 64 | | | | |
| | | | | | | 0·020 | 10·0 | 31·2 | 6·6 |
| 570 shaley at base | | | 569'6" | | 65 | | | | |
| 571'6" | | | | | | 0·030 | 4·45 | 35·2 | 4·5 |
| Sph. and Gal. in calcareous matrix Py variable Slumping and slump breccia about 572' | | | 574'6" | | 66 | | | | |
| | | | | | | 0·030 (0·03) | 16·0 (14·2) | 32·4 (32·8) | 28·5 |
| 580 | | | 579'6" | | 67 | | | | |

DRILL NO A1000 ..... TYPE Mindrill .....

DRILLER J. Jansen

COMMENCED 18.6.66

COMPLETED 19.8.66

CASING IN HOLE DURING DRILLING

EXPLANATION 1" = 5'

REFERENCES

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# GEOLOGICAL LOG OF DRILL HOLE

PROJECT. Rum Jungle Area 1966 ..... REMARKS .....

HOLE No. B.M.R. 66.3 ..... CO-ORDINATES 2205 33E. Rum Jungle East Grid Depth 646.5 ft.

LOCATION Woodcutters Area ..... ANGLE FROM HORIZONTAL ... 60° ..... DIRECTION E (grid)

| DESCRIPTION OF CORE | R.L. CASING | DEPTH SIZE OF CORE | LOG | LIFT & CORE RECOVERY % | SAMPLES | REMARKS | | ASSAYS | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Cu % 0.04 (0.04) | Pb % 40.9 (41.0) | Zn % 23.7 (25.0) | Ag oz/ton 34.0 |
| 580 | | BX | | | | | | | |
| 583'0" White and pale grey calcilutite and dark grey carb. slate. 3" Sph + Gal. at 587' silicified at base | | | 583'0" | 66 | 25058 | 0.010 | 4.30 | 4.1 | -0.01 |
| 587'6" | | | 587'6" | | 59 | | | | |
| 590 Alternating dark grey carbonaceous slate and pale calcilutite slumped and partly slumped. Thin calcite veins. Py irregular ∠ 5% | | | 592'6" | | | -0.005 | 0.03 | 0.03 | -0.01 |
| 600 | | | | | | | | | |

DRILL NO A1000 ..... TYPE Mindrill .....

CASING IN HOLE DURING DRILLING

EXPLANATION 1" = 5'

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SHEET 7 OF 7

DRAWING NO .....

DRILLER J. Jansen

COMMENCED 18.6.66

COMPLETED 19.8.66

REFERENCES

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# GEOLOGICAL LOG OF DRILL HOLE

PROJECT Rum Jungle Area 1966 REMARKS

HOLE No B.M.R. 66:3 CO-ORDINATES 2205.33E Rum Jungle East Grid GROUND Depth 646.5 ft.

LOCATION Woodcutters Area ANGLE FROM HORIZONTAL 60° DIRECTION E (grid)

| DESCRIPTION OF CORE | R.L. CASING | DEPTH SIZE OF CORE | LOG | LIFT & CORE RECOVERY % | SAMPLES | REMARKS | ASSAYS |
|---|---|---|---|---|---|---|---|
| 0 | | | | | | | |
| Core not requested<br>Completely weathered residual rock mostly yellow and pink | | | | No Core | | | |
| 100 100' | | | | | | | |
| Very well weathered residual rock.<br>Yellow and salmon with a little being pale dirty grey. | | NX | | 86 | | | |
| 154' | | | | | | | |
| Carbonaceous slate. Weathering varies.<br>Grey - dark grey - black<br>Light and porous in part. Py. mostly weathered. | | BX | | 93 | | | |
| 200 | | | | | | | |

DRILL NO A1000

TYPE Mindrill

DRILLER J. Jansen

COMMENCED 18.6.66

COMPLETED 19.8.66

CASING IN HOLE DURING DRILLING

EXPLANATION 1" = 20'

REFERENCES

Py - Pyrite

Gal - Galena

Sph. - Sphalerite

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SHEET 1 OF 7

DRAWING NO

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# GEOLOGICAL LOG OF DRILL HOLE

PROJECT Rum Jungle Area 1966 ..... REMARKS .....

HOLE No. B.M.R. 66:3 ..... CO-ORDINATES 220S 33E Rum Jungle East Grid ..... Depth 646.5 ft.

LOCATION Woodcutters Area ..... ANGLE FROM HORIZONTAL ... 60° ... DIRECTION E (grid)

| DESCRIPTION OF CORE | R.L. CASING | DEPTH SIZE OF CORE | LOG | LIFT & CORE RECOVERY % | SAMPLES | REMARKS | ASSAYS |
|---|---|---|---|---|---|---|---|
| becoming less weathered | | BX | | | | | |
| 245½' Qtz. vein, vuggy, barren 6" | | | | | | | |
| 250' Fresh black carbonaceous slate pyritic, calcareous | | | 30° | 98 | | | |
| 399'-401' abundant calcareous lenticles | | | 30° | | | | |

DRILL NO A.1000 ....
TYPE Mindrill .....

CASING IN HOLE DURING DRILLING

EXPLANATION 1" = 20'

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COMMENCED 18.6.66 ...
COMPLETED 19.8.66 ...

REFERENCES

30° angle between bedding and normal to core axis.

SHEET 2 ... OF 7 ...
DRAWING NO .....

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# GEOLOGICAL LOG OF DRILL HOLE

PROJECT Rum Jungle Area 1966 REMARKS

HOLE No B.M.R. 66-3 CO-ORDINATES 2205 33E Rum Jungle East Grid RL No Depth 646.5 ft.

LOCATION Woodcutters Area ANGLE FROM HORIZONTAL 60° DIRECTION E (grid)

| DESCRIPTION OF CORE | R.L. CASING | DEPTH SIZE OF CORE | LOG | LIFT & CORE RECOVERY % | SAMPLES | REMARKS | ASSAYS |
|---|---|---|---|---|---|---|---|
| 400 | | | | | | | |
| Carbonaceous slate | | BX | | | | | |
| 411'6" Calcite 3" | | | 20° | | | | |
| Graphite on many joints | | | | | | | |
| | | | 15° | | | | |
| 457' | | | 15° | | | | |
| Carbonaceous slate with pale calcareous bands (1"3") becoming more numerous. Py increasing and forming aggregates, bleb of Galena 477½' | | | | 99 | | | |
| | | | 15° | | | | |
| 488' | | | | | | | |
| Dololutite carbonaceous at top Py irregular but abundant vuggy (? cerrusite) at base | | | | No Core | | | |
| 496' | | | | | | | |
| 500 Cavity | | | | 97 | | | |
| 502' | | | | | | | |
| Dololutite, carbonaceous & calcareous, Py variable | | | | | | | |
| 508'10" | | | | | | | |
| Pyrite - Galena - Sphalerite lode mostly gangue | | | 45° | | | | |
| See detailed log sheets 5 to 7 | | | 65° | | | | |
| | | | 50° | 99 | | | |
| 583' | | | | | | | |
| Interbedded calcilutite, carbonaceous calcilutite, and calcareous carbonaceous slate, slumped in places, Sphalerite, Galena & Py 7" at 587' | | | | 97 | | | |
| 600 | | | | | | | |

DRILL NO A1000

TYPE Mindrill

CASING IN HOLE DURING DRILLING

EXPLANATION 1" = 20'

DRILLER J. Jansen

COMMENCED 18:6:66

COMPLETED 19:8:66

REFERENCES

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SHEET 3 OF 7

DRAWING NO

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# GEOLOGICAL LOG OF DRILL HOLE

PROJECT. Rum Jungle Area 1966 REMARKS.....

HOLE No. B.M.R. 66:3 ..... CO-ORDINATES 220S 33E. Rum Jungle East Grid ~~MAGNETIC~~ Depth 646.5 ft.

LOCATION Woodcutters Area ..... ANGLE FROM HORIZONTAL 60° ..... DIRECTION E (grid)

| DESCRIPTION OF CORE | R.L. CASING | DEPTH SIZE OF CORE | LOG | LIFT & CORE RECOVERY % | SAMPLES | REMARKS | ASSAYS |
|---|---|---|---|---|---|---|---|
| 600 | | | | | | | |
| 603' Py variable<br>Carbonaceous slate<br>minor very thin<br>calcilutite bands<br>Py minor | | BX | 30°-40° | 97 | | | |
| | | | 25° | | | | |
| 646½ Total Depth 646.5 ft.<br><br>Golden Dyke Formation throughout<br><br>Tropari Survey<br>250' - 52° 074°<br>450' - 42° 085°<br>620' - 37° 091°<br>(N.B. 074° at 250' disregarded)<br><br>Electric Logs run from 50' to total depth<br>Radiometric Log run from 270' to total depth | | | | | | | |

DRILL NO A1000 .....
TYPE Mindrill .....

CASING IN HOLE DURING DRILLING

EXPLANATION

1" = 20'

DRILLER J. Jansen ..
COMMENCED 18.6.66 ..
COMPLETED 19.8.66 ..

REFERENCES

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PLATE 1

0000E
10000E
20000E
30000E
40000E
50000E
60000E

60000N
50000N
40000N
30000N
20000N
10000N
0
10000S
20000S
30000S

13°00'

North Australian Railway

Rum Jungle Granite

Giants Reef Fault

BASE LINE

Area 44

90° East - West

Woodcutters

Stuart Highway

40E

IP test traverse, Huandot North, 1966.

IP test traverse, Coomalie Gap West, 1966.

Coomalie Gap West

Creek

Coomalie

Batchelor

Emmas Line

Gould

42OE

Mt Minza - Waterhouse Area N.T.

Waterhouse Granite

32°
12°
Darwin
13°
Pine Creek
14°
Reference to Australian Standard 1m Map Series

# LOCALITY MAP

## GEOPHYSICAL & GEOCHEMICAL SURVEYS 1966

## RUM JUNGLE AREA N.T.

Geochemical Surveys 1966

Geophysical Surveys 1966

Areas Surveyed prior to 1966

Scale: 1 mile to an inch

1 0 2 miles

Bureau of Mineral Resources Geology & Geophysics Darwin 1966

Grid: TEP Mine Grid

PLATE 2

360E 380E 400E 420E 440E 460E 480E 500E

141S 655 395 2135 2375 2615 2855

Pld Pln Plo

C1 R1 Cu 400 ppm

C2 R2 Cu 400 ppm

R3 C2 Cu 400 ppm Cu 400 ppm Cu 400 ppm Cu 400 ppm

C2 Cu 806 ppm Cu 782 ppm Cu 496 ppm

C3 Cu 475 ppm

R4 Cu 3000 ppm RA·03 mR/hr C4 Cu 1500 ppm Cu 1030 ppm C5 WATERHOUSE No. 2 PROSPECT

C6 Cu 468 ppm Cu 430 ppm

R5 R6 R7 R7 R7

MT. MINZA

D.D. 64/4

360E 382E 410E 420E 430E 440E 450E 460E 480E 500E

Grid: Gould Grid 1965
Grid North 359°58' True
Co-ordinates TEP Mine Grid

Reference

Pegged 1966
Pegged 1965

## Lower Proterozoic REFERENCE

- Pln — Noltenius Formation (Greywacke & siltstone)
- Pld — Golden Dyke Formation (Carbonaceous & sericitic slate; calcareous slate; amphibolite)
- Plo — Coomalie Dolomite (Dolomite)

Hematite quartzite breccia & banded ironstone in Pld

Formation boundary - definite

Ditto, inferred

Fault

Fold axes: (a) Synclinal (b) Anticlinal

# OUTLINE GEOLOGY & MAJOR GEOCHEMICAL & GEOPHYSICAL ANOMALIES

## 1966 GEOCHEMICAL SURVEY

## MT. MINZA AREA

## RUM JUNGLE DISTRICT

Scale: 1000 feet to an inch

1000 0 1000 2000 feet

Copper anomaly in weathered rock with peaks indicated — dashed line indicates 200 p.p.m. contour around all anomalies with peaks >400ppm.

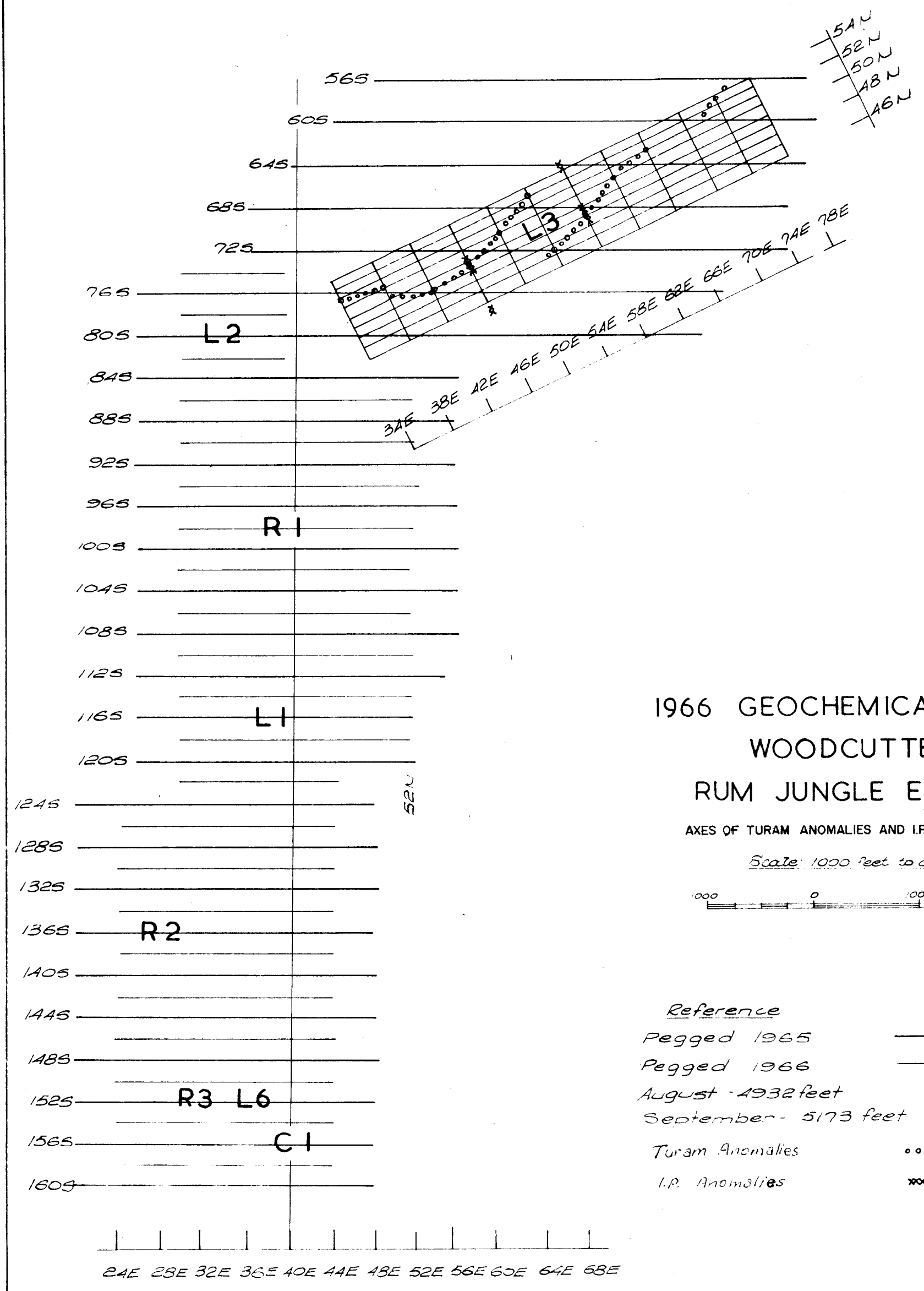
Radiometric anomaly in weathered rock — >·02 mR/hr.

Numbers on anomalies refer to text.

Axis of Slingram anomaly

Bureau of Mineral Resources, Geology & Geophysics, Darwin.

PLATE 3




# 1966 GEOCHEMICAL SURVEY
# WOODCUTTERS
# RUM JUNGLE EAST, N.T.

AXES OF TURAM ANOMALIES AND I.P. INDICATORS SHOWN.

Scale: 1000 feet to an inch

1000 0 1000 2000

Reference

Pegged 1965 ——

Pegged 1966 ——

August - 4932 feet

September - 5173 feet

Turam Anomalies ○○○○○

I.P. Anomalies ××××

PLATE 4

WOODCUTTERS 23 AREA

TURAM RATIO CONTOURS AND I.P. INDICATIONS

1 inch = 200 ft.

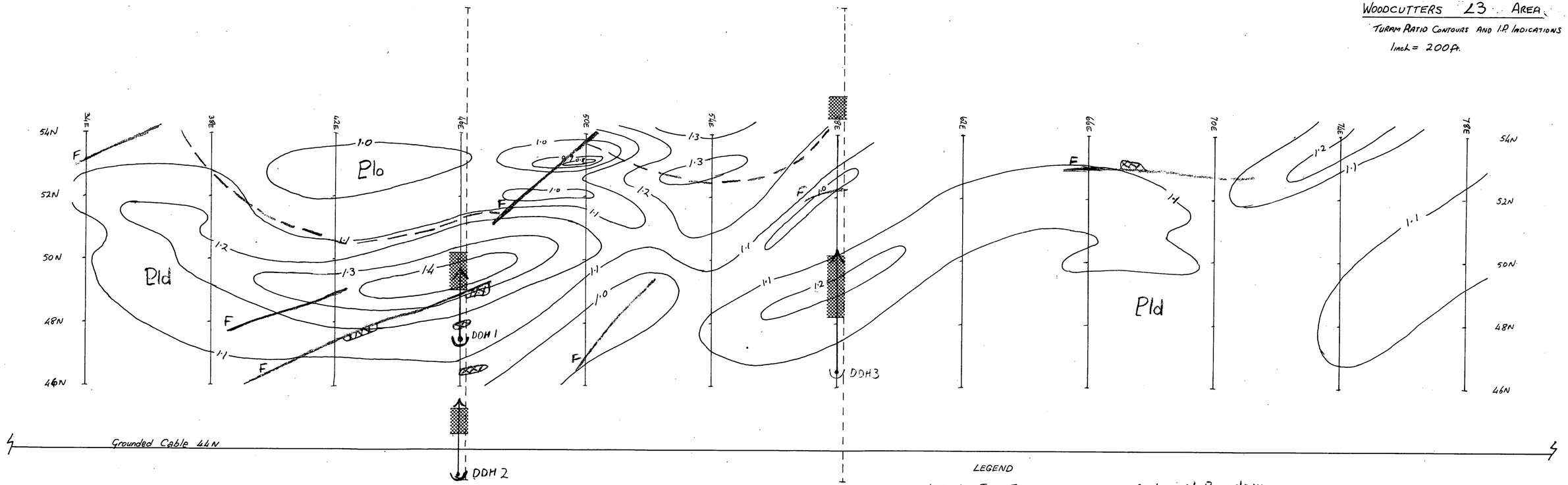


PLATE 5

# WOODCUTTERS PROSPECT

GEOLOGY, ELECTROMAGNETIC AXES, GEOCHEMICAL ANOMALIES AND RADIOMETRIC CONTOURS

## Reference

LOWER PROTEROZOIC

Golden Dyke Formation — Pld

- Black shale
- Sericitic schist
- Amphibolite and chloritic schist
- Pyritic quartzitic sandstone
- Quartzite and chert
- Siltstone

Coomalie Dolomite — Plo — Dolomite

- Formation boundary, position approximate
- Lithological boundary
- Outcrop boundary
- Fault, full line position accurate, broken line position approximate, queries inferred
- Gossan
- Dip and strike of bedding
- Costean
- Vehicle track
- Slingram anomaly axis
- Zone of manganese mineralisation
- Lead contours at 100, 200, 400 ppm } Auger samples
- Copper contours at 150, 300 ppm. } Auger samples
- Radiometric contours at 025, 030 mR/hr. (Maximum values in auger holes)
- Diamond drill hole proposed
- " " in progress
- " " completed

| RESULTS | | |
|---|---|---|
| DDH | Footage | Mineralization |
| 66/1 | 474 | 407'–438' |
| 66/2 | 352 | 280'–299' |
| 66/3 | 646'6" | 508'10"–587'6" |
| 66/5 | 478' | 383'–420' |
| 66/6 | in progress | 518'–538' |
| 66/7 | " | |
| 66/8 | " | |
| 66/9 | " | |
| 66/10 | " | |

SCALE 400 0 400 800 1200 FEET

Port Hundal North Grid 1964

PLATE 6

# RESERVATIONS-RUM JUNGLE AREA

ACACIA AREA

CELIA AREA

MILTON AREA

BMR August, 1966

BMR August, 1966

Reference

AEC

BMR

Geology to 1957 by E. J. Malone, B. P. Walpole, O. N. Warin, S. Hasan, H. Davies with some data by Territory Enterprises Pty Ltd., P. H. Dodd, F. J. Frankovitch, J. Firman, R. Bryan

Drawn by P. R. Browne.

CAINOZOIC

QUATERNARY

- Qa — Soil and alluvium
- Qf — Ferruginous cemented detritus

UPPER PROTEROZOIC

Tolmer Group

Buldiva Sandstone

Depot Creek Sandstone Member

- Puo — Pink quartz sandstone, ripple-marked in places, with lenses of hematite-rich calcarenite breccia and lenses of quartz pebble conglomerate

LOWER PROTEROZOIC

AGICONDIAN SYSTEM

Rum Jungle Granite

- Pgr — Biotite granite

Waterhouse Granite

- Pgt — Porphyritic granite and adamellite,

- Pdo — Basic intrusives

Finniss River Group

Noltenius Formation

- Pfn — Quartz greywacke, greywacke, quartz pebble conglomerate, siltstone
- Pfn — Quartz pebble conglomerate.

Burrell Creek Formation

- Pfb — Siltstone, greywacke siltstone, greywacke, quartz greywacke

Goodparla Group

Golden Dyke Formation

- Pfd — Quartz siltstone and carbonaceous siltstone, in places pyritic, thin-bedded siltstone, marl and dolomite, limonite-rich greywacke
- Pfd — Silicified dolomitic slump breccia
- Pfd — Pyritic, carbonaceous, dolomitic marl, in places slumped and brecciated, and containing chert lenses and nodules

Masson Formation

Acacia Gap Tongue

- Pfa — Quartz greywacke, quartz sandstone, pyritic and silicified in places; pyritic, carbonaceous siltstone, siltstone

Batchelor Group

Coomalie Dolomite

- Pco — Silicified and metamorphosed dolomite, in places containing algal bicherms, calculutite, siltstone, tremolite schist

Crater Formation

- Pcr — Quartz greywacke, greywacke, arkose, fine and pebble conglomerate, siltstone
- Pcr — Pyritic, carbonaceous, dolomitic marl, in places slumped and brecciated, and containing chert nodules and lenses
- Pcr — Quartz pebble conglomerate

Celia Dolomite

- Pcl — Algal dolomite, in places silicified and metamorphosed, silicified dolomitic breccia, tremolite schist
- Pcl — Silicified dolomitic breccia

Beestons Formation

- Pfe — Arkose, greywacke, siltstone, conglomerate, arkosic conglomerate, white friable quartz sandstone

Geological boundaries

- Established boundary, position approximate.

Strike and dip of strata

- Inclined
- Inclined showing prevailing dip
- Trend lines
- Vertical

Folds

- Established synclinal trough-position accurate
- Established anticlinal crest - position approximate
- Established synclinal trough - concealed
- Established anticlinal crest - concealed
- Plunge of syncline
- Plunge of anticline
- Overturned syncline

Faults, etc.

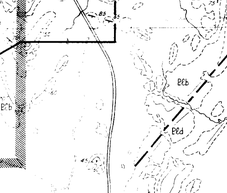
- Established fault, position accurate
- Established fault, position approximate
- Established fault - concealed
- Probable fault - concealed
- Quartz vein
- HS — Homestead
- Railway
- Highway
- Vehicle track
- Fence
- Quarry
- Mine or prospect
- Cu — Copper
- Co — Cobalt
- Pb — Lead
- Th — Thorium
- U — Uranium
- Zn — Zinc
- Ag — Silver
- @ — Fossil locality

Approximate outline of Hundred of Goyder

SCALE

1 Mile to 1 Inch

1 MILE AND 4 MILE SERIES




Showing Magnetic Declination

ANNUAL CHANGE 0.5 E

GEOLOGICAL RELIABILITY DIAGRAM

A Detailed surface and subsurface mapping

A1 Cutcrop mapping at photo scale, approximately 4 inches to 1 mile

B Numerous traverses