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DYSON'S FIND (1951)

Rum Jungle, N.T.

by

N.J. Mackay

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Records 1953/26.

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CONTENTS

PLANS

PLATE NO.		SCALE.
1	(Geological Plan and Section, Dyson's Deposit)	20 ft. to 1 inch

INTRODUCTION

Dyson's Find is situated 1000 yards east-north-east of White's workings. A radiometric anomaly was discovered here in 1950 by geophysicist D.F. Dyson while traversing the sedimentary rocks between Giant's Reef to the south and the edge of the Rum Jungle granite to the north. No uranium minerals were visible on the surface but costeaning revealed four lines of strong secondary uranium mineralisation.

In 1950 the area was mapped by H.J. Ward on a scale of 50 feet to one inch. A prospecting shaft (No.1 Shaft) was sunk to a depth of 54 feet on one of the uraniferous lodes and some costeaning carried out. In 1951 further mapping on a scale of 20 feet to one inch was done by the writer. Diamond drilling was carried out and a new shaft (No.2) was sunk to 84 feet.

A plan showing the surface geology and workings and a section along coordinate N170 accompanies this report.(Plate I)

GEOLOGY

The rocks of the area consist of carbonaceous slate, hematitic slate, talcose schist, limestone, pyritic quartzite and quartzite breccia. These beds have been dragged around in an anticlinal fold by Giant's Reef fault (Matheson, 1953). The radiometric anomaly is situated close to the nose of this fold on a scree-covered slope.

The trend of the strata is N10°E and the beds dip at 30° to the east. They are closely interbedded, the predominant types being carbonaceous slates and quartzites. In No.2 Shaft these rocks are strongly pyritic below the 60 feet level. Both positive and negative pyrite crystals are present in the quartzites at the surface.

Limestone has so far only been encountered in the bottom of No.1 Shaft and at the end of drillhole D.D.E. No outcrops occur at the surface but the above information places the limestone stratigraphically between the quartzite breccia and the slates in the western section of the area shown on the accompanying plan (Plate I).

STRUCTURE.

In costean C there is evidence that the beds have been displaced by a fault which trends N85°W. Movement of the northern side of the fault has been to the west and the radiometric contours swing around abruptly adjacent to this fault.

In No.2 Shaft the pyritic carbonaceous slates and quartzites have been dragged and overturned either by movement along the N85°W fault, or due to other faults, the presence of which has not been established.

MINERALIZATION

Only secondary uranium mineralisation has so far been revealed at Dyson's Find. A pale yellowish-green crystalline mineral and yellow ochres are present, and they have been identified as autunite or a mineral closely resembling autunite, or both. In the costean where No.1 Shaft was sunk the autunite flakes are heavily stained by limonite and are difficult to distinguish megascopically. No torbenite has been discovered and copper minerals are not prevalent as at other deposits in the Rum Jungle area. Only one occurrence of copper-mineralisation is known; this is in a small mineralised quartz vein at the 50 foot level in No.1 Shaft which contains scattered particles of pyrite and chalcopyrite.

Uranium mineralisation follows the east-dipping stratification of the rocks; it is found in the carbonaceous slates and extending into the adjacent quartzitic beds. No primary mineralisation has so far been encountered.

In No.2,Shaft pyrite is prominent in the carbonaceous slates and quartzites below the water table level. A grab sample of pyrite concentrates taken from between the 60 and 65 foot levels showed on assay a gold content of 20 grains to the ton.

Four autunite-bearing lodes have been revealed by costeaning and shaft-sinking; they range in width from one to six feet and are of variable lengths. The most continuous lode extends over a length of 120 feet at the surface and the mineralisation has been proved by diamond drilling to persist for 160 feet down the dip of the beds.

WORKINGS

(a) Costeans. In the 1950 field season three uraniferous lodes were exposed by a costean 42 feet long. Costean A revealed one wide mineralised zone, costean C exposed the continuation of the three lodes in the first costean, and costean B showed no mineralisation to the north of the radiometric anomaly.

(b) Shafts. No. 1 Shaft, inclined at 70 to the east, was sunk to a depth of 54 feet in 1950. This shaft was put down on one of the lodes exposed by the fist costean. It passed through this lode and encountered the underground extension of the "western" lode at 30 to 35 feet.

No. 2 Shaft was commenced in June, 1951 as the first step in underground exploration of the lode channels down the dip of the beds. It is intended that the shaft be sunk to 110 feet and cross-cutting and driving be done at the 100 foot level. The depth of the shaft is at present 84 feet and no radioactivity has yet been encountered. Water was first struck in the shaft at the 55 foot level.

DIAMOND DRILLING

A total of 400 feet of diamond drilling was done in 1951 by an E100 Mindrill. The sites of the four drillholes are shown on the surface plan. The drillholes intersected, at vertical depths ranging from 45 to 90 feet, the extension of the lode channels to the east down the dip of the beds. Autunite is present in all sludge samples showing high assay results. Core recovery was very poor but showed that the rock types intersected were mainly carbonaceous slates, talcose schists and pyritic quartzites.

Lode intersections by the drillholes and their sludge assay results are shown below:

Drillhole D.D.A.

Coordinates: N166 Bearing: 275°M. Length of drillhole: 100 ft.
E240 Depression: 45°W

Bore Depth	Sludge Assay
10' - 15'	0.15% U_3O_8
55' - 60'	0.07% U_3O_8
65' - 80'	0.22% U_3O_8

Drillhole D.D.B.

Coordinates: N166 Bearing: 275°M. Length of Drillhole: 100 ft
E242.5 Depression: 80°W.

Bore Depth	Sludge Assay
5' - 10'	0.23% U_3O_8
60' - 90'	0.09% U_3O_8

Drillhole D.D.C.

Coordinates: N151 Bearing: 248°M. Length of drillhole: 110 ft.
E238.5 Depression: 45°W

Bore Depth	Sludge Assay
80' - 90'	0.51% U_3O_8

Drillhole D.D.E.

Coordinates: N191 Bearing: 298°M Length of drillhole: 90 ft.
E229 Depression: 80°W

Bore Depth	Sludge Assay
45' - 60'	0.44% U_3O_8

The sludge assay figures given are probably low due to loss of a certain amount of the light, secondary uranium minerals during the sludging process.

ESTIMATE OF ORE RESERVES

Not enough development has been carried out to enable an accurate estimation of the ore reserves to be made. However, a very conservative estimate of the oxidised ore found to date can be given by assuming an average width of four feet and a length of 120 feet for a distance of 160 feet down the dip of the lode system to the drillhole intersections. Using a factor of 12½ cubic ft. per long ton this block is estimated to yield 6000 tons of oxidised ore.

It is impossible at this stage in the development of the deposit to venture a grade for the ore but it should average 0.1% U_3O_8. Listed below are the assay results of channel and sludge samples from the lodes.

Costean Channel Samples

Costean	Width	Assay (% U_3O_8)	
A	27"	0.45	One lode of width 6'6"
A	36"	1.45	
A	15"	0.27	
A	30"	1.71	
C	16"	1.36	
C	9"	1.49	

Shaft Channel Samples

Shaft	Depth in Shaft	Width	Assay (% U_3O_8)
No. 1	6 ft.	56"	0.83
No. 1	35 ft.	57"	0.71

Drillhole sludge samples

Drillhole	Lode intersection	Assay (% U_3O_8)
D.D.A.	5 ft.	0.07
D.D.A.	15 ft.	0.22
D.D.B.	30 ft.	0.09
D.D.C.	10 ft.	0.51
D.D.E.	15 ft.	0.44

PROSPECTING RECOMMENDATIONS

No. 2 Shaft is to be continued to a depth of 110 feet. If no lode is struck in the shaft cross-cutting is to be done to the west at the 100 foot level in order to intersect the extension of the lode system already located by drilling. Driving both north and south will then be done to determine the lateral extension of the lode.

Results from the underground development will indicate the targets for deeper drilling. Further work will be determined by the nature and grade of the primary ore when it is encountered.

APPENDICES

C.S.I.R.O. Mineragraphical Report No. 474.

by F.L. Stillwell

Dyson's Prospect. Rum Jungle

Specimen No. 6

Location: Kaolinised zone in costean A.

This specimen of whitish clay contains abundant yellowish-green, tabular crystals of autunite which fluoresce strongly under a mineralight lamp and give a positive test for phosphorus.

Specimen No.7

Location: No. 1 Shaft, 6 ft. level.

This limonitic specimen from a depth of 6 ft. contains small scattered clusters of autunit e. A brown platy mineral is the limonite alteration product of a greenish mineral with a mica-like cleavage which appears to be a hydrous lime silicate. Traces of the unaltered mineral are pleochroic, biaxial and negative with a refractive index about 1.585 and medium double refraction but its identity cannot be established on the available material. A thin section also shows a group of minute colourless crystals with square outlines, one poorly developed cleavage and a low double refraction, a uniaxial and positive character and refractive index approximately that of canada balsam. These crystals are probably apophyllite.

Specimen No.8

Location: No. 1 Shaft, 6 ft. level.

This specimen from a depth of 6 ft. consists of quartz with leached boxwork cavities coated with limonite. Small pale yellowish-green crystals of autunite are abundantly strewn throughout the limonite patches.

Specimen No. 9

Location: No. 1 Shaft, 50 ft. level.

This specimen of a mineralised quartz vein at a depth of 50 ft. in the shaft consists of iron-stained quartz with leached cavities containing limonite. Crystals of fluorescent autunite occur on the limonite. The quartz contains small scattered particles of pyrite and chalcopyrite.

Specimen No. 10

Location: No. 1 Shaft, 45 ft. level

This specimen from an approximate depth of 45 ft. in the shaft consists of weathered rock with films of autunite along joints.

Mineralogical Report

by C.R. Lemesurier, W.A. Govt. Chemical Laboratories.

Specimen No. R17.

Location: Surface lode material, Dyson's Find.

An unidentified pale greenish-yellow mineral occurring on the fracture faces of the rocks as crusts and as clusters of individual rectangular crystals about a half to one millimetre long: individual crystals occurring singly also present. With ultra-violet light the mineral exhibits a brilliant yellowish-green fluorescence but no phosphorescence. Under the microscope individual crystals are observed to consist of large numbers of smaller units, mostly irregular in outline.

The crystals are rectangular with distinct pinacoidal cleavages. H = soft, G = 3.1, F.n.d. Soluble in HNO_3. Individual crystals vary from apparently uniaxial negative in some parts to distinctly biaxial negative in others. The apparently uniaxial character appears to be asssociated with a very intimate intergrowth of two crystals orientated virtually at right angles (or it may be very fine twinning) the one crystal like unto a sponge with the other a single crystal filling the pore space. There are individual units within the crystal which, although oriented the same as one or the other of the intergrown crystals, do not appear to be continuous with either. Areas which are sufficiently large to provide an interference figure from one crystal unit only are clearly biaxial negative with (-) $2V = 7^{\circ}20'$ (the maximum observed - some variation exists). Both L and Y vary between 1,562 (± .001) and 1.565 (± .001) in the same crystal. Birefringence weak, colour pale yellow, not pleochroic.

The mineral appears to be closer to autunite than to torbernite in its optic properties, but has a slightly lower refractive index and a much smaller optic axial angle. It could be an alteration or weathering product pseudomorphous after autunite.

The more strongly coloured but imperfectly crystallised material in the second specimen looks much the same under the microscope with almost identical R.I. and slightly large optic axial angle.

REFERENCES

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DYSON'S FIND - RUM JUNGLE, N.T.
SURFACE GEOLOGY & WORKINGS