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THE WATERHOUSE AREA, NORTHERN TERRITORY

(Preliminary Report & Maps)

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NOTES ON THE WATERHOUSE URANIUM PROSPECTING AREA, N.T.

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The Hundred of Waterhouse, the north-eastern portion of which has been mapped, extends southward from the Hundred of Goyder. Mapping was carried out on air photos at a scale of 4"= 1 mile, and the information was transferred to a mosaic at a scale of 2" = 1 mile (see accompanying map).

In the following notes are discussed the general geology of the area, the relationship between the formations mapped and the ore-bearing formations at Rum Jungle, the structural geology of the area, and a uranium prospect which was discovered in the course of the regional mapping. Some recommendations for future geological mapping and prospecting are appended.

General Geology

The Rum Jungle Granite and the Batchelor Granite intrude and granitise ill-defined limestone and quartzite beds which are overlain by a persistent marker bed of hematised breccia conglomerate (Matheson, 1953). This marker bed underlies a succession of siliceous, argillaceous and calcareous sediments, the most prominent of which is a quartzite breccia, defined by Matheson (1953) as a "sedimentary talus breccia". The quartzite breccia underlies shales and slates, some of which are graphitic and dolomitic, and contain the Rum Jungle uranium and copper deposits.

The shale and slate formation is overlain by quartzite and by limestone which outcrops south of the Batchelor Road (see accompanying map). The limestone is coarsely crystalline, and underlies a great thickness of graphitic, limonitic, and siliceous shales and slates. The Waterhouse "A" anomaly is in a bed of brown shale close to the contact between the shale and slate formation and the overlying Minza quartzite breccia.

The Minza quartzite breccia closely resembles the breccia which underlies the copper and uranium-bearing shales and slates at Rum Jungle, but is very inconstant lithologically along its strike. North of the cross-faults which displace it to the east at a distance of one mile north of Mt. Minza, the breccia is very intensely sheared, and grades into hematised quartzite, silicified slate, and shale. In the writer's opinion, the brecciated nature of this competent bed is only partly of sedimentary origin; later shearing, silicification and brecciation have probably contributed greatly to its present character.

The Minza quartzite breccia is overlain by shales and slates which include graphitic, limonitic, and probably tuffaceous beds. The newly discovered uranium prospect is close to the contact between this sequence and the top of the Minza quartzite breccia. These shales and slates resemble the ore-bearing formation in the Rum Jungle area; they are overlain by a locally developed volcanic formation, here named the "Stapleton Volcanics" after the excellent outcrops in the vicinity of Stapleton Siding.

The Stapleton Volcanics include tuffs, tuffaceous shales, quartz grits, and lavas which range in composition from rhyolite to basalt. The rocks of this formation are generally competent, and contain abundant introduced quartz; many quartz reefs are gold-bearing but this type of mineralization is not considered to be favourable for the occurrence of uranium.

The volcanic beds and flows lens out laterally, and are overlain by shales and slates which in the Stapleton area contain gold-bearing quartz reefs.

The youngest beds mapped until now are interbedded quartz grits and micaceous shales which outcrop in the south-eastern portion of the area.

Structure

(a) Folding:- The beds described have been folded between the Rum Jungle and Batchelor granite domes into persistent anticlines and synclines which plunge south-south-east, Two major anticlinal and two major synclinal axes, which trend through the area more or less meridionally, have been mapped. These folds are well expressed in the outcrop of the Minza quartzite breccia. Their plunge varies from 20° to 65°, and is generally of the order of 45° to 50°. Where folding about the axis is sharp, such as in the eastern anticline, lines of airborne scintillometer anomalies appear to follow the fold axes.

Overturning of folds and isoclinal folding on a regional scale appear to be generally rare, but some overturned fold limbs were observed in the eastern and south eastern portions of the area, and practically isoclinal folding of shale and slate beds in detail is common throughout the area. Axial plane shears are commonly associated with these structures.

(b) Faulting:- Shearing in a direction sub-parallel to the strike has almost certainly occurred along a considerable portion of the outcrop of the Minza quartzite breccia. This bed has also been cross-faulted in many places.

A second set of transverse faults trends east, for example, the fault which trends east from the Waterhouse "A" anomaly, and the fault which coincides with Jone's Creek.

A prominent quartz-filled fault which strikes north-north-west truncates the Minza quartzite breccia at one mile north-north-west of Stapleton Siding.

The Uranium Prospect:-

Graphitic copper-bearing slates and leached shales in which ratemeter counts of over 1,200 counts per minute were recorded were discovered on June 15th 5½ miles south of Batchelor Railway Siding. The prospect is on the western side of the track which parallels the railway line at a distance of approximately 200 yards west of the railway line. A branch of Stapleton Creek flows east at a distance of 100' north of the prospect.

The prospect is not on the site of an airborne scintillometer anomaly. The nearest such anomaly is ¾ mile distant in an east-north-easterly direction.

The shales and slates which give the high ratemeter counts are underlain by the Minza quartzite breccia. The strike of these beds is north, but changes to north-east at a short distance north of the prospect. The beds dip east at an average angle of 45°, but local variations in strike and dip are associated with minor flatly-plunging cross-folds.

The regular southerly strike of the quartzite breccia south of the prospect is not entirely in harmony with the regional structure of this area (see accompanying map), in which a shear zone map coincide with the outcrop of the breccia.

As pointed out by C.J. Sullivan (personal communication) the prospect bears certain structural and lithological similarities

to White's Deposit at Rum Jungle. In both cases the high radiometric readings are associated with copper-bearing graphitic shales which are underlain by quartzite breccia. Although the suggestion has been made that repetition by isoclinal folding may be involved, rhythmic sedimentation may account for the similarities equally well.

Recommendations:-

1. It is suggested that the upper and lower contacts of the Minza quartzite breccia be examined closely in the vicinity of any marked changes of strike, and that the possible north-easterly extension of this bed be explored in the area east of the Stuart Highway.

2. The slate and shale formations which overlie and underlie the Minza quartzite breccia contain limonitic, pyritic and graphitic beds which should be

(a) mapped in detail on enlarged air photographs; and

(b) thoroughly tested by closely spaced Geiger Counter and geochemical traverses. (Most of the uranium ore discovered until now in the Rum Jungle area is associated with copper mineralization, which is readily detected in trace amount by geochemical methods).

Some of these beds have already been mapped in the course of the regional work, but further work of this nature could not be conveniently fitted into the programme of the regional party as determined at present. The detailed party could be more suitably employed on this project.

3. Four prominent fold axes are mapped on the work sheet which accompanies the monthly report for June. Detailed geological observations and Geiger traverses should be carried out to cover these structural features. Enlarged air photographs could in this case too be used as base maps.

(Some evidence has already been adduced showing that "lines" of scintillometer anomalies tend to follow fold axes in the Waterhouse area).

Reference:-

Matheson, R.S., 1953 : Rum Jungle Investigations 1951 and 1952 Progress Report. C'wealth of Australia. Bureau of Mineral Res; Records 1953/24.