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BUREAU OF MINERAL RESOURCES
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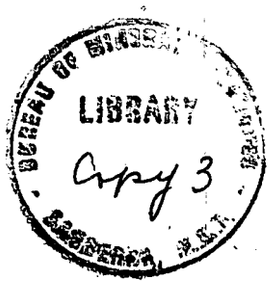
URANIUM PROSPECTS, WATERHOUSE AREA, NORTHERN TERRITORY.



(Preliminary Report and Plans)

by C. J. Sullivan

URANIUM PROSPECTS, WATERHOUSE AREA, NORTHERN TERRITORY.

SUMMARY:

The area described in this report extends for 6.5 miles south of the southern boundary of the Hundred of Goyder, and for approximately 8.5 miles west of the Stuart Highway. The North Australian Railway runs approximately through the centre of the area.

No uranium-bearing minerals have yet been discovered in the Waterhouse Area, but copper mineralization, associated with some radioactivity, is known to occur. A slate formation, which is partly graphitic, carries the main signs of copper and uranium mineralization noted to date, and is underlain by a quartzite breccia. Those beds are similar to, and are possibly identical with, those carrying the uranium and copper ore at Rum Jungle, where surface showings were not impressive. The mineralized slate at Waterhouse warrants prospecting and at least one known deposit warrants drilling. Other parts of the area, in which radiometric anomalies have been found by the airborne scintillometer, need further ground investigation.

GENERAL GEOLOGY:

Geological investigations of the area is still proceeding but available information is shown on plan NT61-1. A group of sedimentary and volcanic rocks consisting of limestone, quartzite, quartzite breccia, grits, slate, shale, tuffs, rhyolites and basalts occur, and have been folded into northerly trending folds, which generally pitch south. Easterly trending faults are of common occurrence, and there is also evidence that strike faulting has taken place.

A body of granite, known as the Batchelor Granite, intrudes the above group of rocks and its position is shown on the western portion of Plate NT61-1.

The most important result obtained so far from the regional mapping is the discovery that a line of radioactive anomalies, with associated copper mineralization, occurs along a

bed of slate, which is in part graphitic and which is stratigraphically immediately above the Minza quartzite breccia. The anomalies were discovered mainly by air-borne surveys. The slate bed and underlying quartzite breccia are similar to those associated with most of the ore at Rum Jungle and may be the same beds repeated by folding.

Gold-bearing quartz reefs occur in the Stapleton volcanics, immediately north of Stapleton Siding, and some radioactivity was also detected in these rocks by airborne survey. However, preliminary ground investigation did not suggest the presence of important uranium deposits.

A northerly trending line of scintillometer anomalies was recorded during the 1952 airborne surveys, about 2 miles west of the Stuart Highway. These are numbers 13, 24, 50, 27, 11, and 30. They appear to correspond with the axis of a south-pitching anticlinal fold. However, investigations by jeep-mounted geiger counters failed to reveal any significant activity in this region.

URANIUM PROSPECTS:

To-date during the examination of this area, most attention has been paid to two prospects, named Nos. 1 and 2, which both occur in the same formation. Owing to lack of survey marks, exact location on the ground with respect to the boundaries of the Hundreds is difficult, and although it was thought at first that No. 1 Prospect was within the Hundred of Waterhouse, it now appears likely that it is within the Hundred of Goyder. However, partly for the sake of giving an understanding of the Waterhouse type of mineralization, a description of both No. 1 and No. 2 Prospects is given below.

No. 1 Prospect:

This area corresponded to the position of a first-order anomaly found by airborne scintillometer. The results of geological, geophysical and geochemical examinations are shown on plan NT61-2.

A ridge, rising to a height of about 100 feet above creek level, is capped by a rock, mapped in the field as "quartzite", but which may be a silicified crushed slate. The siliceous rock is underlain to the west by siltstone and is overlain to the east

by shale or slate.

Within the siltstone, some spots show radioactivity up to 12 times background by geiger counter, and areas up to about 200 square feet exhibit activity of about 8 times background. The area of maximum radioactivity corresponds to a rock containing disseminated limonitic casts after a sulphide, probably pyrite. The small area and moderate intensity of this limonitic staining suggests that any primary mineralization is weak and of small extent.

Within the slates, weak copper mineralization has been proved by geochemical means, to extend over a length of 600 feet. Near the junction of the two creeks shown in plate NT61-2 there is an outcrop of silicified slate, containing stains of malachite. This outcrops over a length of 20 feet and a maximum width of 10 feet. No signs of radioactivity were detected in the copper-stained material.

Apparently on the southern continuation of the strike of the copper-stained outcrop, limonitic casts after sulphide were found intermittently over a length of 700 feet. Very weak radioactivity, amounting to about twice background, is associated in places with the limonite-stained slate.

It is evident that copper mineralization with some uranium, is present in this deposit and it is possible that surface leaching has been sufficiently intensive to remove most of the metal present in the primary zone. Drilling is the only way in which the nature of the primary zone can be definitely determined. However, the information available cannot be regarded as highly encouraging.

No. 2. 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.

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 Plate NT61-1), in which a shear zone may coincide with the outcrop of the breccia.

The prospect bears certain 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.

As is the case with Whites, the deposit is close to present creek level and has had a similar erosional history. It is only 5 to 10 feet above creek level, and it is expected that the primary mineralization would lie at only 20 to 30 feet below the surface. Testing would thus be comparatively cheap.

As shown on Plate NT61-4, three costeans have been bulldozed through the deposit, but radioactivity did not improve with depth. In No. 1 Costean, a small area of radioactivity up to 7 times background was found and in No. 2 Costean, two patches of radioactive material were exposed.

As shown on Plate NT61-4, radioactivity amounting to twice background extends over a length of approximately 750 feet and the geochemical work shown on Plate NT61-3 indicates that copper mineralization also occurs over that length. The copper mineralization consists, generally, of light malachite staining on the bedding and cleavage planes of the slates.

No uranium-bearing minerals have yet been found in the prospect, the surface radioactivity is slightly weaker than that

found at Whites Deposit, Rum Jungle, and the results of costeaning tend to indicate a rather sporadic mineralization.

Nevertheless, in view of the widespread surface leaching of both copper and uranium which is known to occur in this region, the deposit should be tested by two diamond drill holes. These should be drilled from east to west, should be designed to test the radioactive copper-bearing slates below water table, and should be extended sufficiently far to intersect the quartzite breccia lying beneath the slate. There is some evidence that the best mineralization is within crushed slate lying immediately above the quartzite breccia.

OTHER POSSIBILITIES.

After four years investigation at Rum Jungle, discoveries are still being made near the surface. This shows that a good deal of careful investigation is necessary to exhaust the possibilities of an area. The most important type of investigation is systematic prospecting with geiger counters, combined with trenching to remove the abundant soil, laterite or other materials which commonly obscure bedrock.

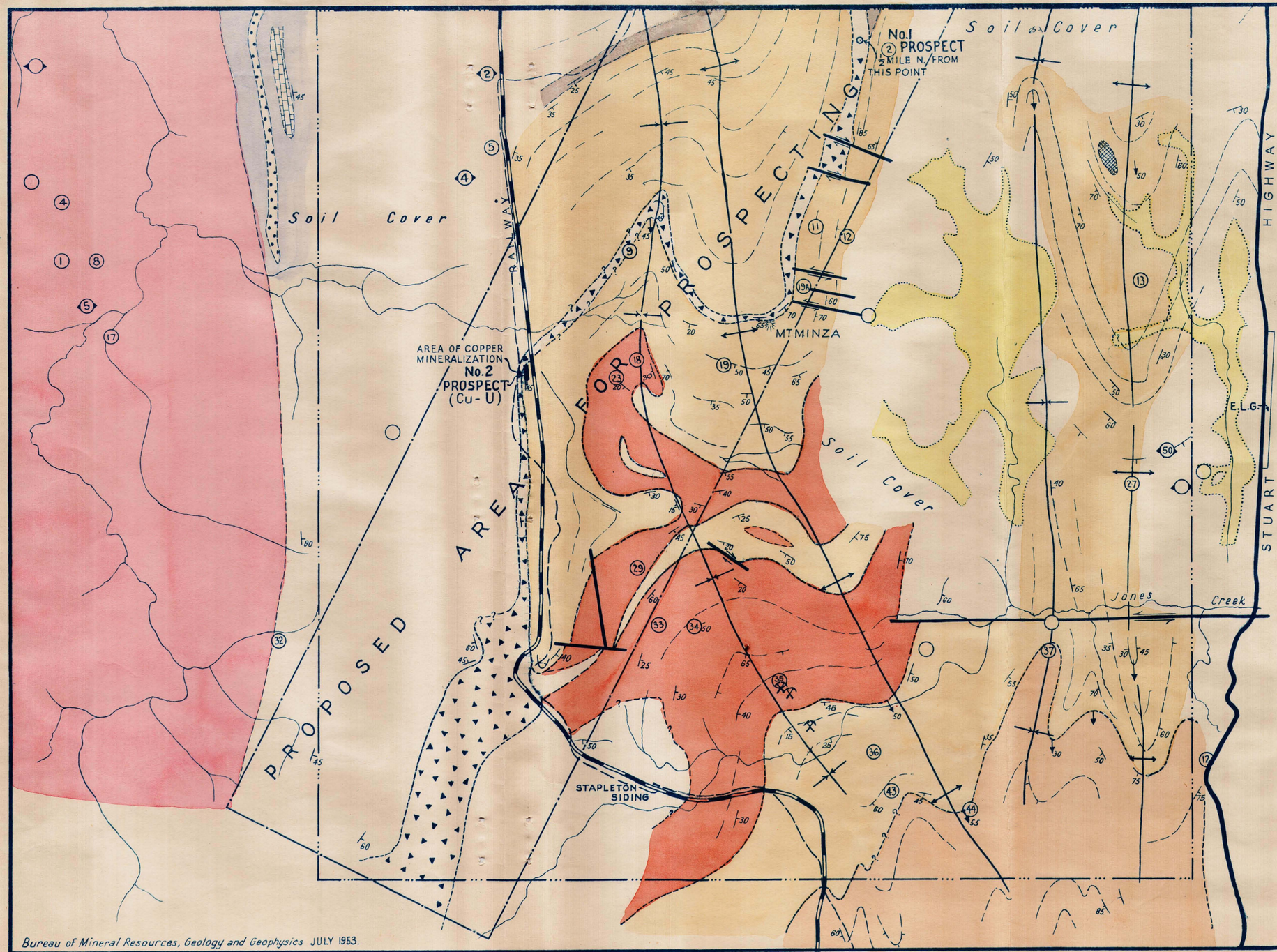
The amount of work carried out to-date in the Waterhouse area is small, and apart from the testing of prospects suggested above, further investigation recommended is as follows:-

1. As shown in the general geological plan (Plate NT61-1), the most promising indications of ore found to-date are in the slate formation, immediately above the Minza quartzite breccia. This stratigraphic position has been found to be favourable for ore at Rum Jungle, and these beds should be carefully prospected for the presence of radioactivity, copper-staining and limonite after sulphides, especially where the slates are sharply folded or faulted.

2. Scintillometer anomalies Nos. 2, 3, 4 and 5 occurring to the west of the railway line require further investigation, and others in the area, including those in the granite, should probably be checked.

REFERENCE:-

Matheson, R.S., 1953 : Rum Jungle Investigations 1951 and 1952 Progress Report.
Bur. Min. Resourc. Aust., Records 1953/24.



GENERAL GEOLOGICAL MAP OF HUNDRED OF WATERHOUSE

NORTHERN TERRITORY

SCALE

1 ¾ ½ 0 1 MILE

Reference

- Quartz
- Granite or Granitised Sediments
- Quartzite and Quartzite Breccia
- Hematised Breccia Conglomerate
- Limestone
- Silicified Slate
- Slate, Shale and Silts
- Minza Quartzite Breccia
- Stapleton Volcanics
- Grit and Micaceous Shale
- First order Scintillometer Anomalies
- Second order Scintillometer Anomalies
- Alluvium boundaries
- Established geological boundaries - position approximate
- Inferred boundaries
- Strike and dip of strata
- Observed strike line
- Direction and plunge of lineation
- Established anticlinal crest
- Established synclinal trough
- Plunge or pitch of minor anticline
- Plunge or pitch of minor syncline
- Established fault
- Mine working or prospect

Boundary of area proposed to be made available to companies

True N. Magnetic N.

LOCALITY MAP

Geology by G. F. JOKLIK & J. FIRMAN.

Bureau of Mineral Resources, Geology and Geophysics JULY 1953.

NT 61-1

WATERHOUSE URANIUM PROSPECT No.1

N.T.

Plan showing geology, radiometric and magnetic contours, & copper distribution.

Scale

100' 0 100 200 Feet

True 4°30' Magnetic

Reference

Quaternary — *Alluvium*

Pre-Cambrian — Bracks Ck. Group

- *Shale*
- *Quartzite (silicified slate?)*
- *Siltstone*

Limonite pseudomorphs after pyrites

Geological boundaries, position approx.

bedding / cleavage / joints Strike and dip

Radiometric contours

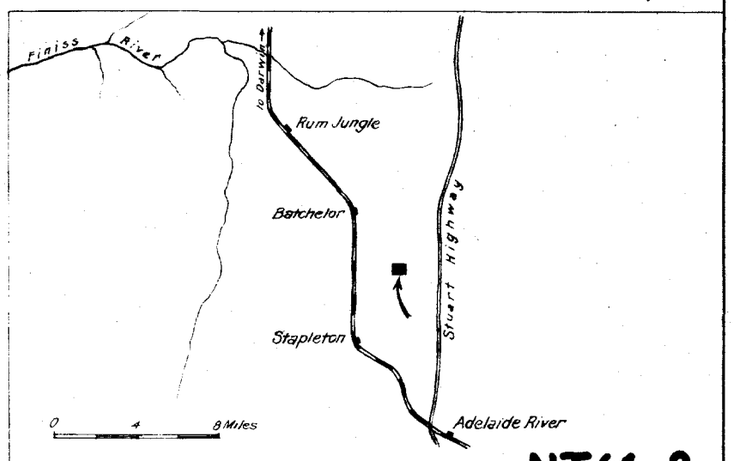
Magnetic contours

Low / Medium / High / Very high } Copper results

Geochemical contours showing copper distribution

Contours at 10 feet intervals

Drainage



NT61-2

GEOCHEMICAL PLAN
WATERHOUSE URANIUM
PROSPECT Nº 2

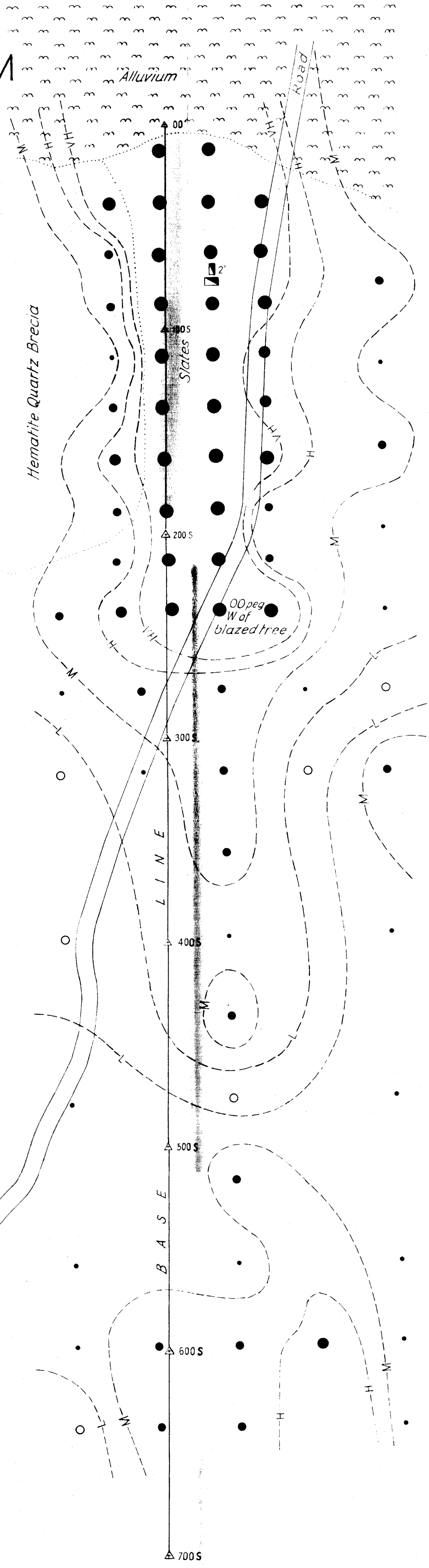
SCALE

40 20 0 40 80 120 FEET

REFERENCE

○	0	*Negative*
•	L	*Low*
●	M	*Medium*
●	H	*High*
●	VH	*Very High*

True
14°30' Mag.



NT 61-3

GEOLOGICAL & RADIOLOGICAL MAP
RUM JUNGLE AREA
WATERHOUSE
URANIUM PROSPECT N°2

NORTHERN TERRITORY

Plane table and telescopic alidade survey and geology by J.D. Wyatt and P.B. Rosenhain June-July 1953.

SCALE

40 20 0 40 80 120 feet

Reference

QUATERNARY

- Alluvium

PRE-CAMBRIAN

BROCK CK GP.

- Shales
- Hematized Quartzite breccia
- Hematized silicified Quartzite (Non brecciated)
- Siltstone ?

INTRUSIVE

- Quartz

- Geological boundaries (approximately)
- 260 — Contours
- Tracks
- 45° — Strike and dip
- F—F — Fault
- Plunge of minor anticline
- 4× — Radiometric contours

COSTEAN N°1

COSTEAN N°2

COSTEAN N°3

Black slates

Slates

Copper stained

Hematized Quartzite breccia

Hematized and silicified quartzite

Hematized Quartzite breccia

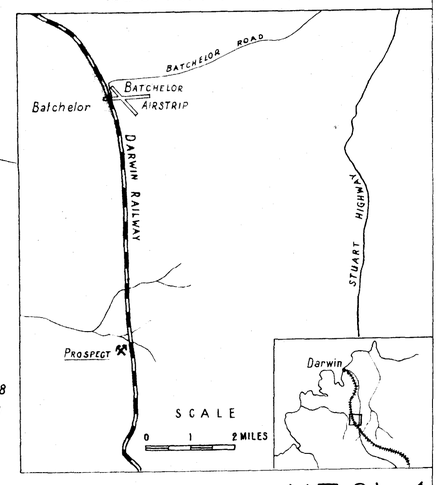
Slate breccia silicified

Well bedded siltstone

True North

Magnetic North 4°30'

LOCALITY MAP



NT 61-4

Bureau of Mineral Resources, Geology & Geophysics, August 1953.