COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.

BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS.

RECORDS.

PRELIMINARY GEOLOGICAL REPORT ON THE TENNYSON NO. I URANIUM PROSPECT, EDITH RIVER AREA, N.T.

by

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DARWIN, N.T.

PRELIMINARY REPORT ON THE TENNYSON NO. I URANIUM PROSPECT EDITH RIVER AREA, NORTHERN TERRITORY.

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C O N T E N T S.

PLANS AND SECTIONS.

Plate No.	Plans.	Scale.
1	Preliminary Geological map, with locality map and reference to Australian 1 mile and 4 mile series.	
2	Radiometric profiles.	

SUMMARY.

At Tennyson's No. 1 Prospect, 4 miles W.S.W. of Edith Siding, Geiger counts ranging from 4 to 10 times background were obtained at nine places in two shear zones in granite. The radioactive material is confined to narrow bands of hematitic lode material in and adjacent to narrow brecciated bands. At all localities a uranium-bearing mineral, probably meta-autunite, was present as a white film, which fluoresced bright green under ultra-violet light, on fracture surfaces. At the northern most locality some flakes of a green micaceous mineral, probably meta-torbernite, were observed.

The lode formation has a total length of approximately 500 feet, is mainly 1½ to 4 inches wide, evidencing to 18 inches over short lengths. The deposits having counts greater than four times background are mostly less than 3 feet long but two are approximately 20 feet in length. Assay samples were taken at the larger deposits. From examination under ultra-violet light it appears that the uranium content of the lode material will increase at a depth of a few inches below the surface.

The deposits at Tennyson's No. 1 Prospect appear to be too small and too low in grade to be profitably worked unless the grade improves considerably at depth.

INTRODUCTION.

Geiger counts exceeding 4 times the aerial background count were obtained late in 1952 by Mr. S. Tennyson at several points in an area, 4 miles W.S.W. of the Edith Siding. The area was inspected by R.S.Matheson early in 1953. It was mapped by plane-table survey by N.O. Jones and S.J. Quain, and samples from the best localities were forwarded for assay. Radiometric profiles were made at one of the deposits by R.J. de Groot, geophysicist.

During the survey a deposit (deposit F) was found to the north of Tennyson's Prospect. It is included in this report, for completeness, although outside Tennyson's leases.

SITUATION AND ACCESS.

The Tennyson No. 1 Prospect is 3½ miles west of the Stuart Highway and 4 miles W.S.W. of the Edith Siding on the Darwin-Birdum Railway. It is reached by travelling 4 miles west along the Florina track from the Stuart Highway. It lies 1½ miles N.N.W. of Tennyson's No. 2 Prospect and 5 miles west of the "Edith River Uranium-bearing Area" (Fisher, 1952).

GENERAL GEOLOGY.

The prospect lies within the southern extension of the Lower Proterozoic Cullen Granite (Noakes, 1949). Half a mile to the west the granite is overlain by arkosic sandstone of Cambrian age. Within the area mapped the country is gently undulating and a large proportion is soil-covered. Outcrops are limited to occasional granite tors and the silicified portions of the shear zones.

The granite adjoining the original find has a coarse grained matrix, essentially of quartz, biotite and felspar and is porphyritic in felspar. It crops out within a circular area approximately 300 yards across. The coarse granite grades, on all sides, into a granite of similar composition but with medium grained matrix and markedly porphyritic appearance. To all sides except the east the porphyritic granite grades into a granite which has a fine to medium grained matrix and contains only scattered phenocrysts of felspar. The 'fine' granite has considerable variation in the proportions of felspar and ferromagnesion minerals from place to place. Near the eastern shear zone there is a small outcrop of greisen. Clots of tourmaline are present in the 'fine' and porphyritic granites at several localities.

The principal structures of the area are two parallel shear zones trending approximately 340 degrees, which lie some 300 yards apart. A third shear zone, 250 yards west of the main shear zone contains no radioactive deposits and was not included in the area of survey. The main shear zone is 30 to 40 feet wide and has a narrow belt of platy fracturing on either side. The plane of shearing dips to the west at 85 degrees. Numerous quartz stringers and lenses are present throughout the shear zone.

The eastern "shear zone" is 300 feet wide and consists for the most part of a series of silicified bands of platy fracturing, 1 to 2 feet wide, trending 340 degrees. These are separated by massive granite. Towards the eastern edge of the shear zone these fractures are displaced by a later fault trending 005 degrees. A 20 feet wide band of sheared granite lies on the eastern side of this fault parallel to it.

Numerous fractures are present, trending 270 degrees, with which are associated minor displacements of the shear zones, and many of these contain quartz veins, 1 to 12 inches in width. Within the main shear zone numerous narrow quartz stringers are present, generally parallel to the strike of the shearing for most of their length but swinging to about 030 degrees at their southern end. They have a lower angle of dip than the shearing. Also present in this shear are several lenticular veins of quartz up to 3 feet in width which are slightly vuggy carrying a small amount of hematite, and showing traces of green fluorescence under the ultra-violet light. The quartz vein in the eastern shear zone are similar in appearance to those in the east-west fractures.

At the northern end of the main shear zone and at the eastern side of the eastern shear zone veins of quartz-fluorite-carbonate are present. At the same localities there are also small lenses of an acidic dyke-rock.

Slightly east of the centre of the main shear zone a narrow band of hematite breccia is present. It is probably almost continuous, except where broken by cross-fracturing, although a considerable proportion is soil-covered. It is mainly 1½ to 4 inches wide but in several places short lenses are up to 18 inches in width, and there are several short branches from the main band. The breccia conforms fairly closely to the dip of the shearing, having a vertical or very high angle westerly dip. In the eastern shear zone a similar hematite breccia is present, as lenses less than 20 feet long, one having a maximum width of 30 inches, but all others being less than 12 inches. The relationship of the hematite breccia to the lenticular quartz veins has not been observed but it is later than the acidic dykes, and appears to be later than the quartz-fluorite-carbonate veins, both of which are post shearing.

OCCURRENCE OF URANIUM.

At all deposits the uraniferous minerals occur in a hematitic lode material, which has a very close relationship to the hematite breccia, usually being co-extensive with it but occasionally it is related ? to hematised portions of the granite adjoining the breccia. The lode formation has a total exposed length of approximately 500 feet, is mainly 1½ to 4 inches wide, widening to 18 inches over short lengths. The counts in the lode formation never exceed 300 per minute unless the lode is at least 4 inches wide, when the mass effect is greater.

A uraniferous mineral, probably meta-autunite, is present as a white film or fracture surfaces at all deposits. It fluoresces a bright yellow-green colour under ultra-violet light. In some cases with fractures on which it occurs also have thin coatings of quartz or hematite. At the north end of deposit C, and at deposit F, it also occurs in narrow veins through the breccia which contain largely fluorite with smaller amounts of a black crystalline mineral and a white radiating fibrous mineral which have not been determined.

A micaceous mineral, light green in colour, which does not fluoresce under ultra-violet light was observed at deposit F. It is probably meta-torbernite, and is present only on fracture suffaces. Also at this deposit casts of pyrite and (?) carbonate were observed in the altered rock adjoining the lode material.

The individual deposits are described below:-

DEPOSIT A.

This deposit lies in a section of the main shear zone which is displaced in several places by small fractures. The lode material comprises a highly silicified and hematised breccia and some narrow bands of hematised sheared granite which lie between branches of the breccia. The lode formation exposed totals 30 feet giving 400 to 700 counts per minute, including a continuous length of 20 feet, and 40 feet giving 200 to 400 counts per minute. The average width is about 12 inches for the lengths with higher counts, and 6 inches for the lower counts. An assay sample, No. A5949, contained .058 % U_3O_8.

DEPOSIT B.

Deposit B is small and very variable in width being often 2 to 3 inches wide although one lens (giving 500 counts per minute) is 18 inches wide over a length of 3 feet. A major cross-fracture passes south of this deposit and towards this the breccia has a quartzose rather than hematitic matrix. The lode formation exposed is 40 feet in length, averages 3 inches in width, with mainly 200 to 300 counts per minute. No assay sample was taken.

DEPOSIT C.

This is the northerly continuation of deposit A and is separated from it by a cross-fault offsetting the northern side 25 feet to the east. The lode formation is almost continuously exposed over a length of 200 feet with counts ranging from 200 to 700 per minute. The width of the lode is mainly 2 to 4 inches with lenses up to 18 inches. There are several small branches of the hematite breccia the largest being 30 feet long, up to 3 inches wide, with a maximum of 300 counts per minute. Counts greater than 400 per minute are obtained at three places, over lengths of 3 to 6 feet. The largest of the veins of vuggy quartz is 15 to 30 feet west of the central portion of this deposit. Three assay samples, numbers A5946,A5950 and A5951 contained .076,.063 and .126 % respectively.

DEPOSIT F.

For 800 feet north of deposit C only small isolated patches of lode material crop out, never more than 6 inches in width and with a maximum of 300 counts per minute. North of the leases held by S.B. Tennyson, where the main shear crosses a small gully, the lode formation reaches a maximum width of 20 inches and maintains an average width of 10 inches over a probable length of 70 feet although partly concealed by soil cover. Further to the north the lode is completely covered by a deep wash soil. A maximum of 550 counts per minute was obtained at the surface and at least 300 counts per minute wherever the lode is exposed. The removal of 9 inches of rubbly material from the surface of the lode increased the maximum count to 700 per minute, and further increase is likely at depth as the lode formation is here much softer and apparently more highly leached than at the other deposits. Two assay samples, Nos. A5947 and A5948 contained .066 % and .064 % U_3O_8 respectively.

DEPOSIT M.

This is the only place in the eastern shear zone where a significant development of lode material has been found. It occurs at the junction of two short bands of breccia, one nearly vertical, the other a 45 degree easterly dip. The deposit has a maximum width of 30 inches and counts greater than 200 per minute are obtained over a length of 15 feet. It would probably become narrower at depth, below the junction of the two bands. The highest count obtained was 1,000 counts per minute and 400 counts per minute were obtained over an area of 6 by 2 feet. An assay sample No. 5958 contained .071 % U_3O_8.

SAMPLING.

The samples were taken as shown in the table below:-

Deposit.	Sample No.	Width.	Depth Below Surface.	Average C.P.M. in sample Channel.	Radiometric Assay % U_3O_8.
A	A5949	12"	0-1"	700	.058
C North	A5950	6"	½" - 2"	500	.063
Centre	A5946	8"	2" - 3"	700	.076
South	A5951	5"	½" - 2"	500	.126
F North	A5947	Grab	3" - 5" (in rubble)	700	.066
South	A5948	Grab	1" - 2"	500	.064
M	A5958	30"	1" - 5"	800	.071

The background count on the granite of the area mapped is 100 counts per minute which is approximately twice the background count in the sediments.

The counts obtained from the sample channels were generally slightly higher than those obtained from the undisturbed surface prior to sampling. From examination under ultra-violet light it appears that the uranium content of the lode material may increase at a depth of a few inches below the surface. Because of this no calculations of the grade of the ore present can be made until information is available of the nature of the ore at depth.

RADIOMETRIC INVESTIGATIONS.

Radiometric testing in the vicinity of the prospect by R.J. deGroot, geophysicist, showed that the anomalies were of such small extent that the plotting of isorad contours was impracticable.

The granite in the area generally gave a reading of twice the background reading of the sediments of the region. Some granite exposures gave a slightly higher reading. Test traverses across the shears in the area showed no appreciable variation from the normal radioactivity of the granite unless (by choice or coincidence) the traverse passed over one of the known anomalies.

At deposit C a profile was made along the line of lode for about 200 feet with short cross traverses taken at the three main points of radioactivity. These profiles (Plate 2.) serve to show the small extent of the radioactive anomalies and are typical of the deposits in the area.

CONCLUSIONS AND RECOMMENDATIONS.

The deposits at Tennyson's No. 1 prospect appear to be too small and too low in grade to be profitably worked unless the grade improves considerably at depth. A similar prospect has been found 1¼ miles east-south-east of Tennyson's No. 1 Prospect within the area covered by the airborne scintillometer survey of 1952. It will be recommended that this prospect be drilled and the results obtained will be applicable to Tennyson's No. 1 Prospect.

REFERENCES.

Fisher N.H. 1952: The Edith River Uranium Bearing Area. Bur. Min. Res. Records. 1952/69.

Noakes L.C. 1949: A geological Reconnaissance of the Katherine-Darwin Region, Northern Territory. Com. Bur. Min. Res. Geol and Geophys. Bulletin 16.

PLATE 1

TENNYSON'S Nº1 URANIUM PROSPECT

EDITH RIVER

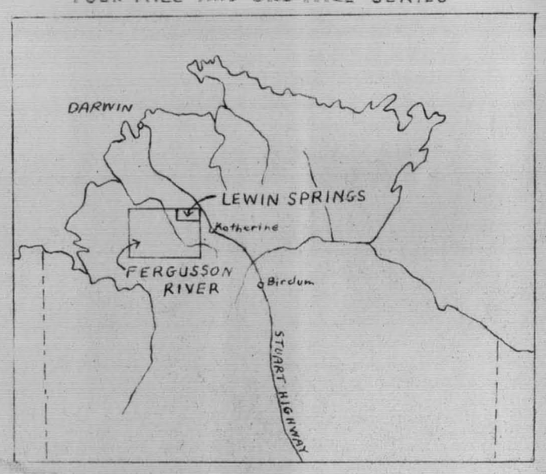
NORTHERN TERRITORY

PRELIMINARY GEOLOGICAL MAP

SCALE

400 0 400 800 1200 FEET

POSITION OF AREA DEALT WITH IN REPORT AND REFERENCE TO AUSTRALIAN FOUR MILE AND ONE MILE SERIES



LOCALITY MAP

(Traced from photo mosaic)

Scale

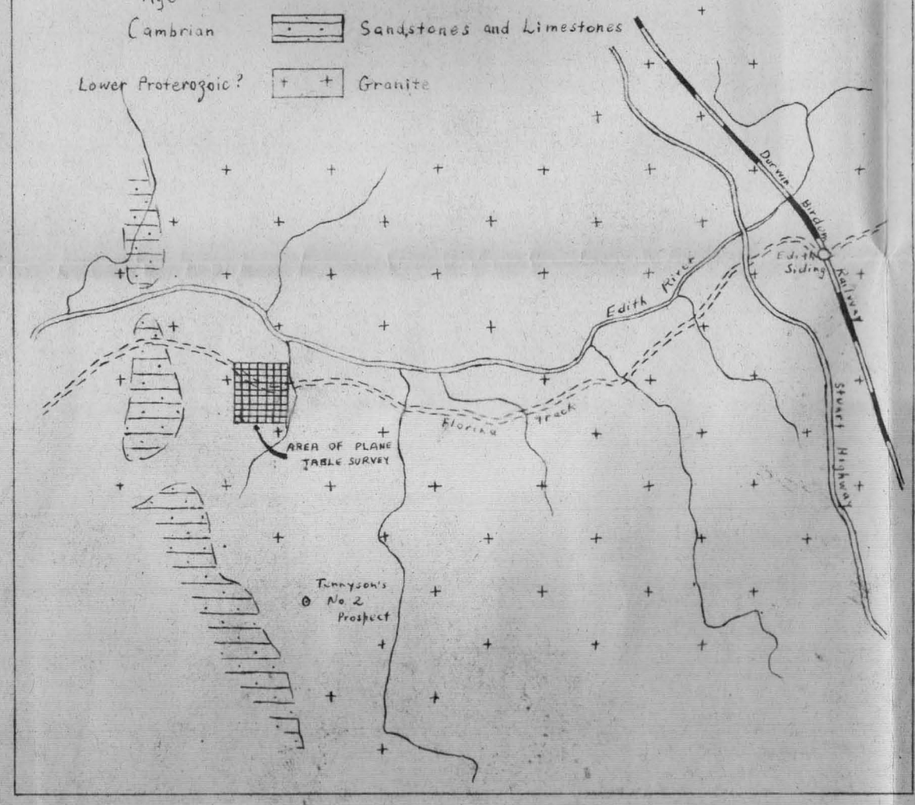
2 1 0 1 2

Reference

Age

Cambrian — Sandstones and Limestones

Lower Proterozoic? — Granite



Reference

?Pl — Fine granite

Porphyritic granite

Coarse granite

Acidic dyke

Quartz-fluorite-carbonate vein

Quartz vein

Lode formation

Shear zone

300N — Baseline and pegs for radiometric survey

Geiger readings more than 4 times background

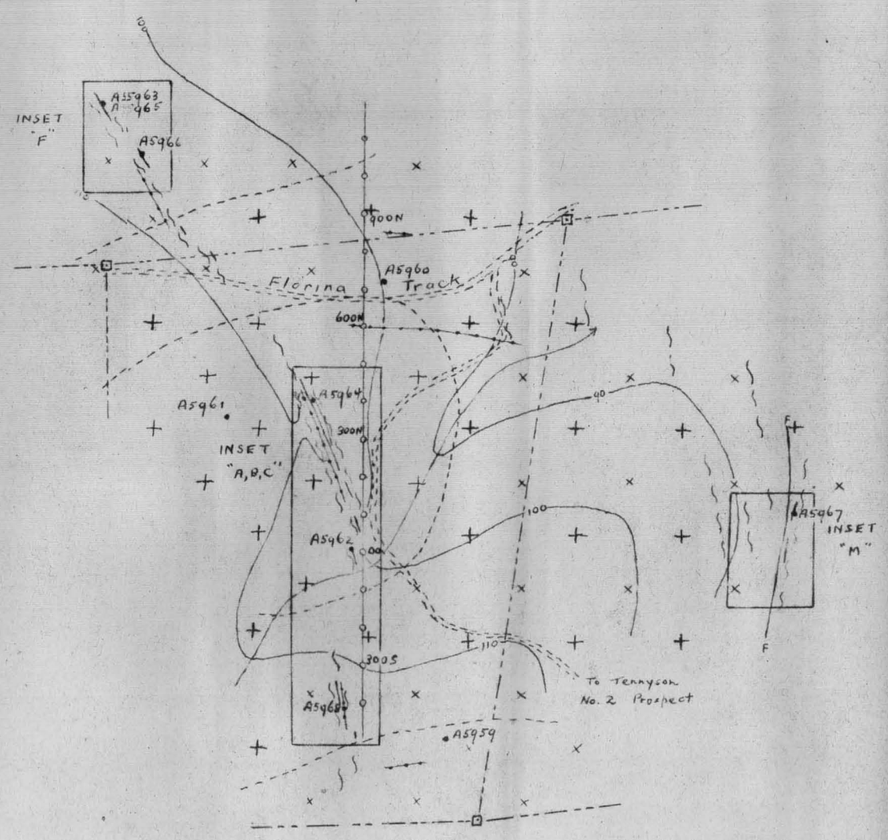
A5946 — Specimen nos, on main map only

A5951 5" — Assay sample nos (width sampled or grab), on insets only

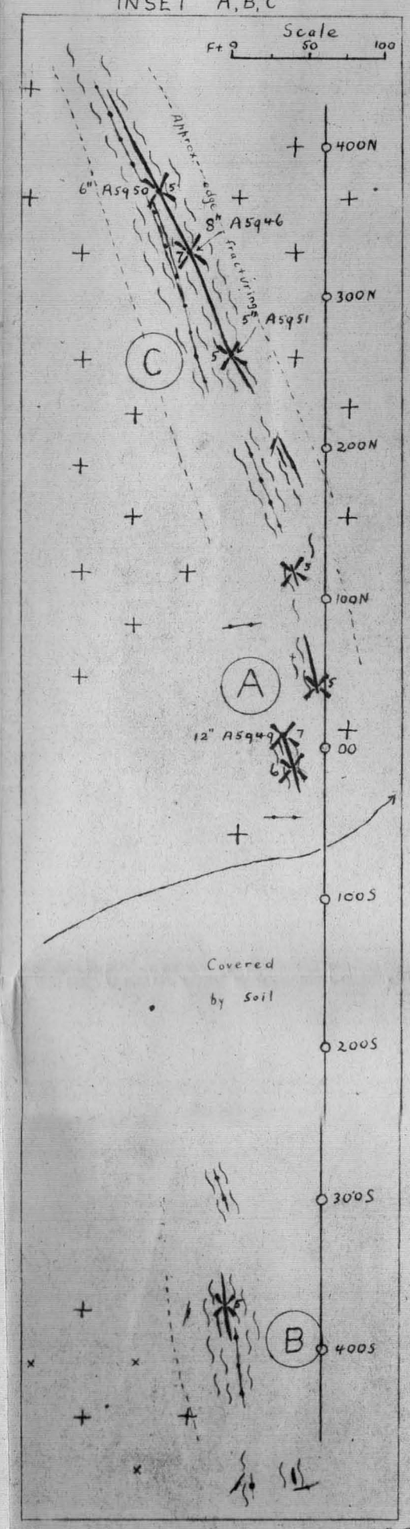
Contours (assumed datum 100 ft at peg 00)

Corner pegs and boundaries of leases held by S.B. Tennyson

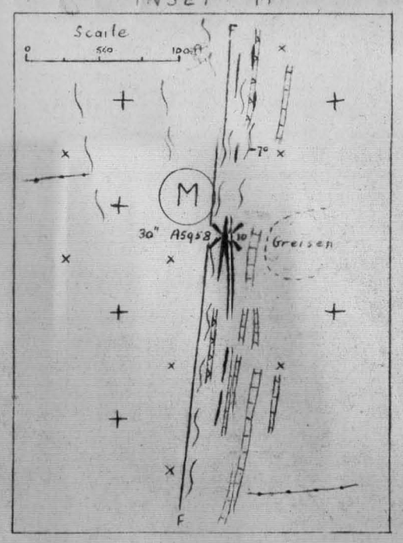
T.N. M.N.



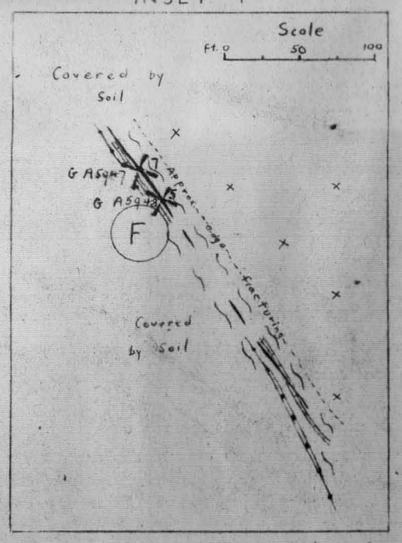
INSET "A,B,C"



INSET "M"



INSET "F"



Plane table and telescopic alidade survey by N.O. Jones and S.J. Quain.

Geology by N.O. Jones — June, 1953

PLATE 2.

TENNYSON'S Nº 1. URANIUM - PROSPECT

EDITH RIVER, NORTHERN TERRITORY

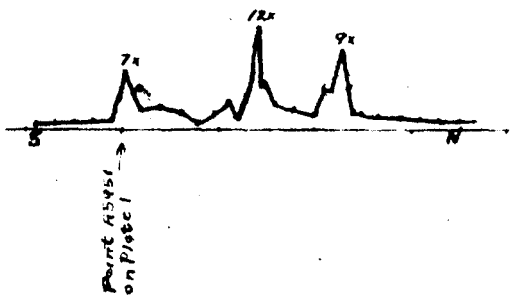
RADIOMETRIC PROFILES

DEPOSIT C

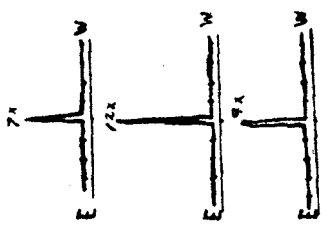
Scale 1" = 100'

0 50' 100'

PROFILE ALONG LINE OF LOAD



PROFILES ACROSS LINE OF LOAD



Vertical Scale: 1/10" = 2 TIMES BACKGROUND COUNTS (APPROX)

BACKGROUND TAKEN AS READING ON THE SEDIMENTS EQUALS 6 MICROAMPS ON "C" SCALE OF CINTEL PORTABLE GEIGER MULLER RATEMETER TYPE 1011C USING TYPE G24H G.M. TUBES.

AREAL BACKGROUND OF THE GRANITE EQUALS APPROX. TWICE THIS VALUE.

R de Grood
GEOPHYSICIST
10-7-53