COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORD No. 1963/93

FERGUSON RIVER RADIOMETRIC INVESTIGATIONS, NT 1950

by

D.F. Dyson

RECORD No. 1963/93

FERGUSON RIVER RADIOMETRIC INVESTIGATIONS, N.T. 1950

by

D.F. Dyson

CONTENTS

ILLUSTRATIONS

SUMMARY

A radiometric survey was made in 1950 of a uranium prospect situated near the crossing of the Stuart Highway over the Ferguson River about 40 miles north-west of Katherine, NT. Attention had been directed to the prospect by the discovery of secondary uranium minerals in a shallow pit put down many years previously to test for copper.

Radiometric readings made with Geiger ratemeters showed radioactivity up to 10 times background in the pit, but only twice background over a very small area in the immediate neighbourhood of the pit. A shaft, which was subsequently sunk from the existing pit to test the prospect, was investigated. The radioactivity on the walls of the shaft was strongest in the upper part and decreased steadily towards the bottom, owing to the pinching out of the mineralized fissure.

Regional investigations, which included examination of old workings and testing of contact zones of granite and country rock and fault or shear zones near the granite, failed to show any other indications of radioactivity worthy of further investigation.

1. INTRODUCTION

Ferguson River railway siding is about 21 miles south-east of Pine Creek and about 40 miles north-west of Katherine. An area between Katherine and Pine Creek has long been known as a mineralized district; gold, copper, tin, wolfram, and silver/lead have been produced on a small scale. In the immediate neighbourhood of Ferguson River, the only visible workings were the Woolngi gold workings, where a considerable amount of work was done in the early days, although no records of production are available, and a few shallow copper and wolfram workings, from which production was insignificant.

Attention was directed to the area by the discovery in 1950 of secondary uranium minerals in an old copper working close to the crossing of the Stuart Highway over the Ferguson River. Subsequent to the discovery, a shallow shaft was sunk with Commonwealth assistance to test the prospect. This Record describes radiometric investigations made by the author in connexion with the testing.

The geology of the area has been described by Carter (1952), who also discussed the significance of the radioactive results in general terms. Plate 1 shows the location of the prospect, and the geology of the area (after Carter).

2. TECHNICAL DETAILS

The radiometric work was done in three stages:

(a) investigation of the prospect before the shaft was sunk,

(b) investigation of the shaft, and

(c) regional investigations in the neighbourhood of the prospect.

The instruments used in the investigation were Geiger ratemeters types 1011 and PRM200. The ratemeter type 1011 has a separate probe about a foot long, mounted on a long handle. The ratemeter type PRM200 is a compact instrument, with the Geiger tube inside the instrument case. All readings quoted are in multiples of normal background count. The readings of the two instruments are therefore comparable.

The results obtained in the three stages are discussed separately.

3. RESULTS

Testing of prospect

The prospect was examined before the sinking of the shaft. It is located on a small quartz-filled fissure in metamorphic rocks, close to the edge of the granite. The quartz contained secondary copper and uranium minerals. A shallow pit had been dug, presumably to test for copper. The highest readings were obtained on the dump and in the

pit, but no reading higher than 10 timesbackground was observed. Away from the pit, radioactivity was weak. It was estimated that readings above twice background were confined to an area about 33 ft long, and not more than 3 ft wide, surrounding the dump.

An area of a few feet square, situated along the shear 54 ft north of the northern corner of the pit, give readings of six times background. No mineralization was observed, but it appears likely that some might be disclosed by sinking.

The following readings were characteristic of rock types in the neighbourhood of the prospect:

granite (about 60 yards to the east)	1.4 times background
small shears near the granite contact	1.5 times background
metamorphic rocks	up to 1.4 times background
sandy creek beds	up to 1.3 times background

Samples from the pit were assayed radiometrically with the following results:

specimen with visible uranium mineralization	1.5 percent equivalent U_3O_8
sample across face of fissure, 1 ft wide	0.15 percent equivalent U_3O_8

Investigation of the shaft

The shaft was sunk from the existing pit to a depth of a little more than 18 ft. At the time of the inspection, it contained water, and the walls could only be inspected to a depth of 15 ft.

Plate 2 shows contours of the radioactive level on the walls of the shaft, in multiples of background count. The radioactivity was strongest in the upper part of the shaft, and decreased steadily towards the bottom. The decrease in radioactive intensity was not due to a change in the degree of mineralization of the radioactive material, but to the narrowing and pinching out of the mineralized fissure.

Regional investigations

Regional investigations consisted of examining old workings in the neighbourhood of the prospect, and of systematic testing of areas considered favourable, such as contact zones of granite and country rock, and fault or shear zones near the granite. The workings tested and the geological features examined are shown on Plate 1.

The levels of radioactivity detected in this work were very low. The workings inspected were shallow shafts sunk on quartz-filled fissures showing evidence of mineralization. In general, such fissures showed a little radioactivity, readings ranging up to 1.5 times background. In the actual workings, readings up to 1.8 times background were observed. Away from the fissures, the country rock showed no detectable radioactivity. Therefore it appears that the radioactivity observed is probably associated with the mineralization.

In the regional investigation, the radioactivity observed was also very low. Near the granite contact, readings up to 1.4 times background were observed. Away from the granite, some of the fault and shear zones showed no detectable radioactivity. Others showed slight radioactivity. The highest activity observed was along the fault zone north of the Ferguson River, where readings up to twice background were obtained at several points over a distance of about half a mile.

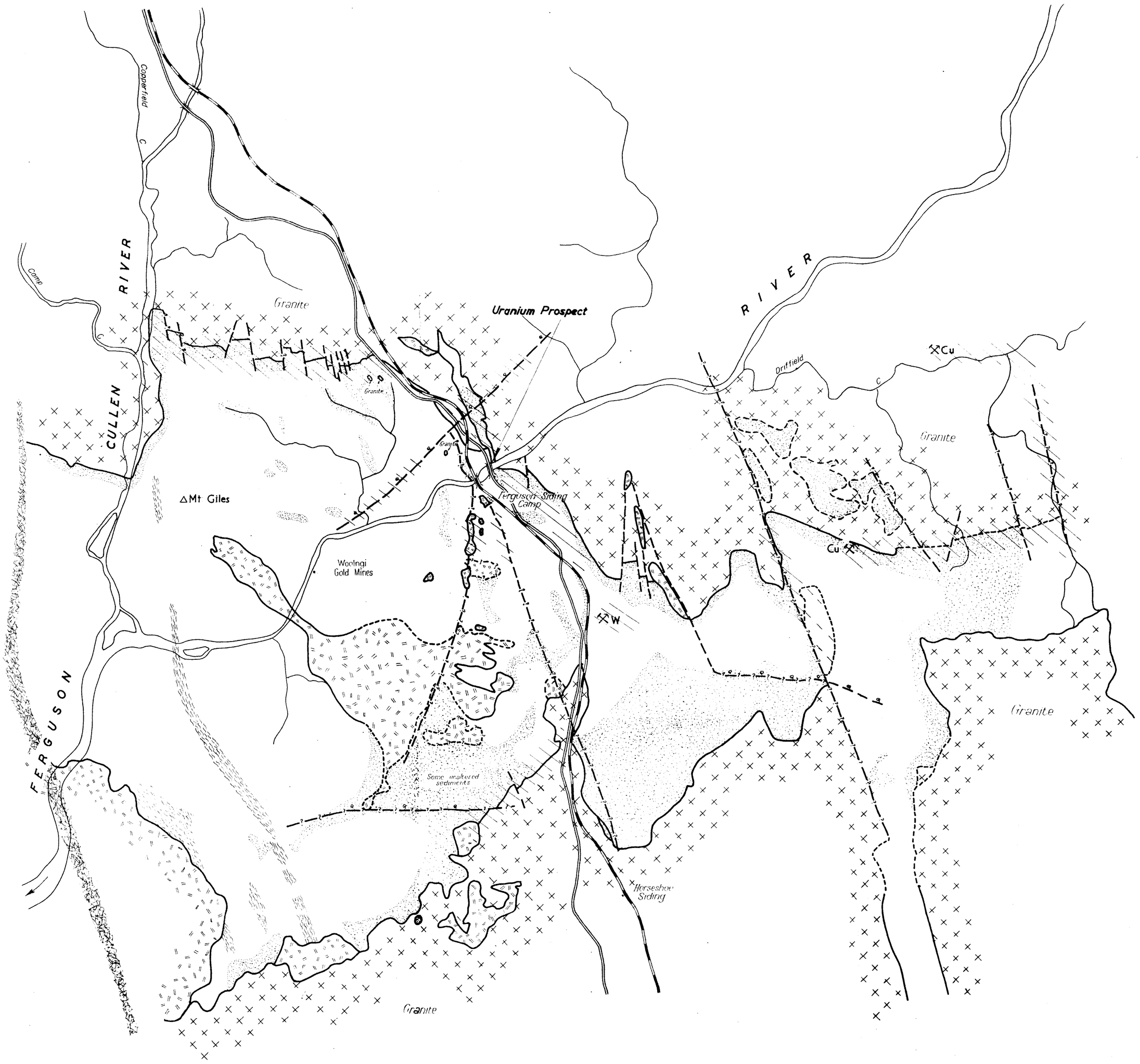
4. CONCLUSIONS

The only evidence of the presence of radioactive minerals in any quantity was in the immediate neighbourhood of the prospect. However, the investigation showed that this is of no economic importance. None of the other indications of radioactivity observed are worthy of further investigation.

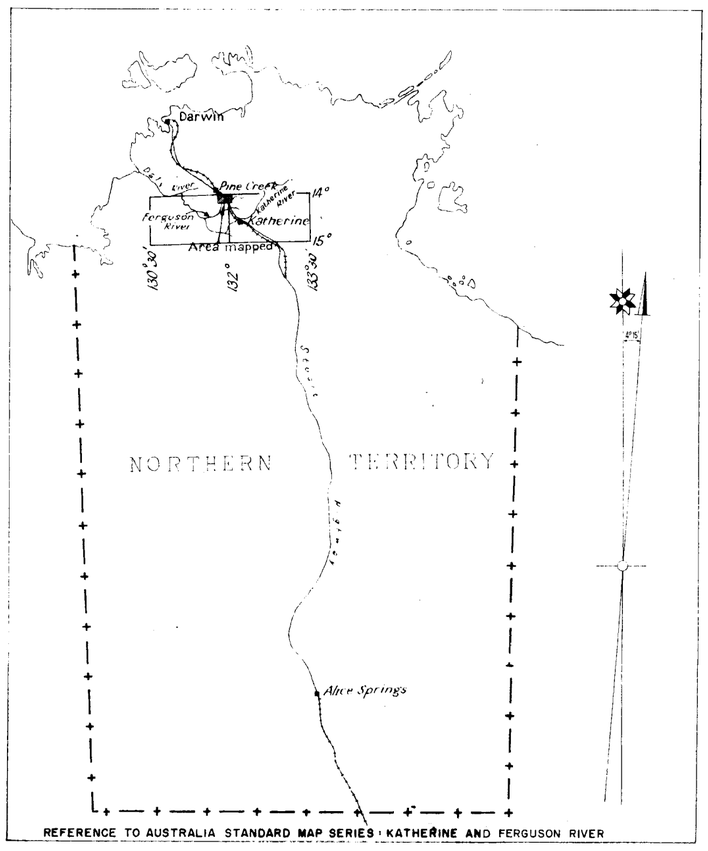
5. REFERENCE

CARTER, E.K. 1952 The geology of an area surrounding the Ferguson Railway Siding, NT Bur. Min. Resour. Aust. Rec. 1952/68 (unpubl.)

PLATE I



LOCATION DIAGRAM



SCALE

5000 2500 0 5000 10000 FEET

RADIOMETRIC INVESTIGATIONS FERGUSON RIVER AREA

SHOWING PRINCIPAL CONTACTS AND FAULTS ALONG WHICH REGIONAL RADIOMETRIC TRAVERSING WAS CONDUCTED

GEOLOGICAL FORMATION AFTER CARTER (1952)

LEGEND

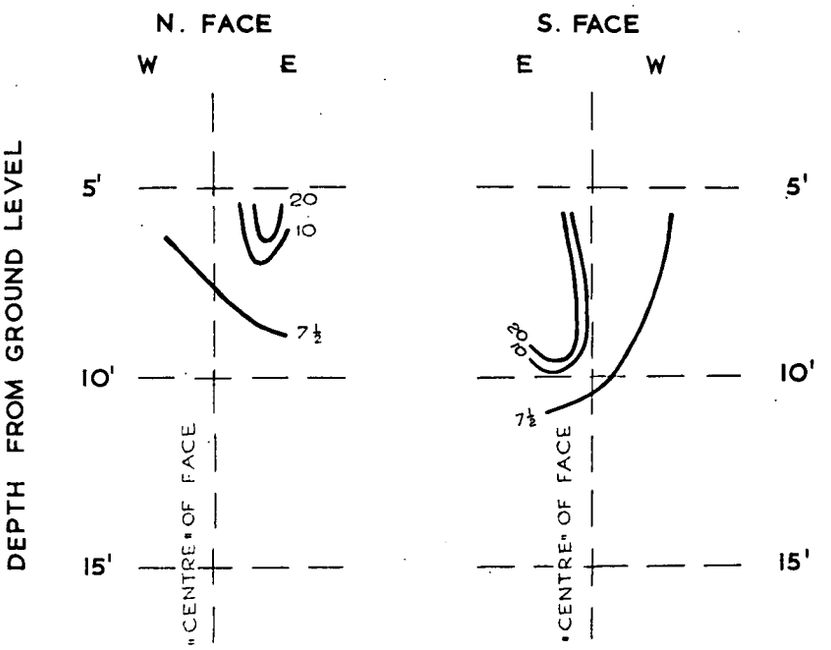
- REGIONAL RADIOMETRIC TRAVERSING
- BROCKS CREEK GROUP SEDIMENTS — SANDSTONE, GREYWACKE, CLAYSTONE & SHALE
- HORNFELS — BOUNDARY VERY APPROXIMATE
- FERGUSON TOSCANITE — TOSCANITE WITH SOME ASSOCIATED INTRUSIVE PORPHYRY
- CULLEN GRANITE
- FAULT ZONE
- SHEAR ZONE
- DEFINITE GEOLOGICAL BOUNDARY POSITION ACCURATE
- DEFINITE GEOLOGICAL BOUNDARY POSITION APPROXIMATE
- UNCERTAIN GEOLOGICAL BOUNDARY
- ESTABLISHED FAULT LINE
- PROBABLE OR POSSIBLE FAULT LINE
- MINE WORKINGS OR PROSPECTING PITS WITH METAL WORKED
- RAILWAY
- HIGHWAY

TO ACCOMPANY RECORD No. 1963/93

Geophysical Branch: Bureau of Mineral Resources, Geology and Geophysics.

D52/B4-1

PLATE 2



CONTOURS AS "TIMES NORMAL BACKGROUND COUNT"

SCALE

5 0 5 10 FEET

RADIOMETRIC INVESTIGATIONS AT FERGUSON RIVER PROSPECT

SHAFT CONTOURS

AS DRAWN FROM READINGS RECORDED 29.11.50.

Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics.
TO ACCOMPANY RECORD No. 1963/93
D52/B4-2