

1954/70
A

1954/70
Chief Geophysicist

COMMONWEALTH OF AUSTRALIA.

FILE REF - 84N7/5

DATE REF - 4 JAN 1955

NOT TO BE REMOVED
FROM LIBRARY ROOM

DEPARTMENT OF NATIONAL DEVELOPMENT.

BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS.

RECORDS.

1954/70

BUREAU OF MINERAL RESOURCES

GEOPHYSICAL LIBRARY

Ref. A

DIAMOND DRILLING IN THE EDITH RIVER URANIUM-BEARING

AREA. N.T.

by

J. B. FIRMAN.



NOT TO BE REMOVED
FROM LIBRARY ROOM

1954/70

DIAMOND DRILLING IN THE EDITH RIVER URANIUM - BEARING

AREA. N.T.

by

J. B. Firman.

BUREAU OF MINERAL RESOURCES

GEOPHYSICAL LIBRARY

Ref.....

RECORDS

	<u>CONTENTS</u>	<u>PAGE</u>
SUMMARY		1
INTRODUCTION		1
	Situation and access Previous investigations Acknowledgements	
GENERAL GEOLOGY		1
DRILLING RESULTS		2
	Deposit A Deposit F	
CONCLUSIONS		3
REFERENCES		3
APPENDIX 1.	DRILL DATA	
APPENDIX 2.	SUMMARY GEOLOGICAL LOGS.	

Illustrations.

- Plate 1. Locality map of the Edith river Area showing deposits A and F. Scale 2.11 ins. = 1 mile.
- Plate 2. Plan of Deposit A showing drill sites A1 and A2. Scale 1 in. = 40 ft.
- Plate 3. Plan of Deposit F showing drill sites F1 and F2. Scale 1 in. = 40 ft.
- Plate 4. Section through Diamond Drill Hole A1. Scale 1 in. = 10 ft.
- Plate 5. Section through Diamond Drill Hole A2. Scale 1 in. = 10 ft.
- Plate 6. Section through Diamond Drill Hole F1. Scale 1 in. = 10 ft.
- Plate 7. Section through Diamond Drill Hole F2. Scale 1 in. = 10 ft.

SUMMARY

In January, 1954, the Bureau of Mineral Resources began diamond drilling in the Edith River Area, N.T., to test the grade and extent of uranium mineralisation in two uranium-bearing deposits.

The uranium mineral, meta-autunite, occurs in narrow siliceous reef formations. Surface and drill core samples all returned less than 0.1% U_3O_8 . Radiometric logging of the holes showed no significant increase of radioactivity with depth. Shaft sinking proved the deposits to be small and lenticular.

INTRODUCTION

Situation and access

The deposits that have been drilled in the Edith River area are situated in a major shear zone which runs north for six miles through the uranium-bearing area shown on Plate 1. The north end of the major shear zone lies about one mile due east of Edith River Siding on the North Australian Railway. The deposits can be reached either by a track which runs east from the Stuart Highway about thirty two miles north of Katherine, or by a track from the Stuart Highway about twenty seven miles north of Katherine.

Previous investigations.

Radioactive minerals were found by the Y.M.C.A. Syndicate in 1952. Geologists of the Bureau of Mineral Resources surveyed the area in the same year and prospected the surrounding district in 1953. Diamond drilling began in January, 1954, and was completed in October, 1954.

Acknowledgments.

The drilling of the deposits was supervised in the early stages by geologist J.D. Wyatt, who prepared some of the maps and drilling logs. Geophysicists J.B. Misz and G.F. Clarke prepared the geophysical data shown on Plates 4, 5, 6, and 7.

GENERAL GEOLOGY.

This part of the report is based on an original report by Fisher (1952).

The deposits occur in the Cullen Granite in a north trending shear zone which is 300 to 400 feet wide. Numerous narrow siliceous reefs and shear zones, which strike north-north-west and dip about 80 degrees west, are arranged on echelon within the main shear zone. Some of the siliceous reefs change in strike from north-north-west at their northern ends to north-north-east at their southern ends. A set of cross reefs have strikes ranging from 026 to 075 degrees.

Radioactivity is high where reefs trending north-north-west are cut by cross fractures trending north-north-east. Some of the reefs are brecciated in part and have some reddish hematitic material associated with them. The hematitic material is associated in some places with the secondary uranium mineral meta-autunite.

The granite of the shear zone gave a local background count of about 100 counts per minute. Readings above background

were obtained on 14 of the reef formations. A reading of 10 times background was obtained in one locality and readings of 6 to 8 times background were obtained in several other localities. Radiometric assay results of all samples taken from the surface were less than 0.1 per cent ϵ U₃₀₈.

The sequence of geological events, as interpreted from surface geology and drill cores at the drilled deposits, is as follows: -

1. Intrusion of the coarse-grained Cullen Granite.
2. Intrusion of fine-grained granite into the coarse grained granite.
3. Formation of a main north trending zone of shearing in which smaller shears strike north-north-west.
4. Introduction of quartz and the formation of narrow quartzose reefs along the smaller shear zones.
5. Movement causing brecciation and mylonisation in places in the reef formations and irregular fracturing elsewhere in the main shear zone.
6. Introduction of fluorite, apatite, quartz and primary radioactive minerals.

DRILLING RESULTS.

Deposit A

This deposit is situated in a zone of strong shearing which is up to 60 feet wide and extends for 1,000 feet on a bearing of 338 degrees. A lode formation containing abundant quartz veins trends parallel to the north end of the shear zone and dips about 80 degrees west. Quartzose reefs trending 030 degrees intersect the shear zone.

Two holes, 355 feet apart at the surface, were drilled in this locality (Plate 2).

Diamond drill hole A1, which was put down to test for uranium mineralisation in the oxidized zone, was directed at the intersection of a quartz vein trending parallel to the lode formation and a quartzose reef trending north-east. Geiger counter readings up to 10 times background were obtained on the intersection at the surface. A drill intersection was made at a vertical depth of 157 feet below the surface outcrop.

In the A1 hole the highest counts were obtained in sheared coarse-grained granite containing hematite. The readings were as follows: 400 counts per minute between 61 and 63 feet, 550 counts per minute between 132 and 136 feet, and 1100 counts per minute between 201 and 206 feet (Plate 4). A radiometric assay of the core from 201 to 206 feet gave 0.099 per cent ϵ U₃₀₈.

Diamond drill hole A2, which was put down to test for primary mineralisation, was directed at a lode formation which gave Geiger counter readings from 2 to 5 times background at the surface. An intersection was made at a vertical depth of 261 feet below the surface outcrop.

The highest counts obtained in the A2 hole were as follows: 480 counts per minute between 243 and 250 feet in coarse-grained

granite containing thin intercalated bands of aplitic granite, and 700 counts per minute between 253 and 264 feet in sheared and brecciated reddish-brown granite (Plate 5).

Deposit F

This is a quartzose reef formation which forms a discontinuous outcrop at the surface. The northern part trends north-north-west for approximately 400 feet and the southern part trends north-east for approximately 300 feet. The reef dips steeply west. Geiger counter readings up to 8 times background were obtained along the reef. Near its southern end the reef is a hematitic quartz breccia formation. A lens of hematitic lode, up to 5 feet wide, crops out south of the quartz breccia formation. Geiger counter readings above background were made over a length of 50 feet along the lens. A shaft was put down near the centre of the lens and samples from depths of 5 feet 6 inches and 7 feet 6 inches gave 0.12 per cent U_3O_8 .

Two drill holes were put down 50 feet apart to intersect the quartzose reef formation (hematitic lode); both were directed at right angles to the strike of the reef (Plate 3).

Diamond drill hole F1 was put down to test the mineralisation in the oxidized zone. An intersection was made at 135 feet vertically below the surface outcrop of the reef (Plate 6). No uranium minerals were found in the core. Radiometric logging gave uniformly low results with a maximum of 250 counts per minute in fine-grained granite at a drill depth between 73 and 75 feet.

Diamond drill hole F2 was put down to test for primary mineralisation at depth. An intersection with the quartzose reef formation was made at a vertical depth of 233 feet below the surface outcrop of the reef. No uranium minerals were found in the core. Radiometric logging gave readings ranging from 100 to 400 counts per minute, with a maximum of 1200 counts per minute in coarse-grained granite at a drill depth between 216 and 219 feet. Probing could not be continued beyond 250 feet because the hole collapsed at this depth. However, the core from 250 feet to the end of the hole was checked with a Geiger counter (P.R.M. 200) and no significant increase in radioactivity was detected.

CONCLUSIONS

The structures visible in the drill cores are tight and radioactivity is low and limited in extent. There is no indication in the drill cores that leaching of the uranium mineral in the oxidized zone has increased the amount of uranium at depth.

Radiometric logging indicates two zones of relatively high radioactivity in the drill holes; 1,400 counts per minute between 204 and 206 feet in the A1 hole and 1,200 counts per minute between 216 and 219 feet in the F2 hole. Radiometric assay of the core giving 1,400 counts per minute yields only 0.099 per cent U_3O_8 .

The drilling results are substantiated by shaft sinking carried out by the Uranium Development and Prospecting Company, N.L., in the lode formation at Deposit A. The ore deposits proved to be small, lenticular and of low grade.

REFERENCES

- | | | | |
|---------------|------|---|---|
| Fisher, N.H., | 1952 | - | The Edith River uranium-bearing area. Bureau of Mineral Resources, Australia. Records 1952/69. |
| Noakes, L.C. | 1949 | - | A geological reconnaissance of the Katherine-Darwin Region, Northern Territory, Bureau of Mineral Resources, Australia. Bull. 16. |

APPENDIX 1.

DRILL DATA.

DRILLING DATA EDITH RIVER, N.T. 1954. (NDECO DRILLS).

Drill Hole No.	R.L. (Feet)	True Bearing	Depression	Drill Depth (Feet)	Percentage Core Recovery	Footage Drilled per week
A1	86.35	98°30'	45°	215	69.4	43
A2	75.71	106°	69° 30'	270	71	45
F1	91.30	121°	45°	230	75 (after 6/4/54)	32 (after 6/4/54)
F2	88.55	121°	62°	320	74	64

APPENDIX 2.

SUMMARY GEOLOGICAL LOGS.

Diamond Drill Hole A1

Depth in Feet

From To :

0	20	Coarse-grained granite with a large amount of hematite.
20	24	Fine-grained granite
24	30	Coarse-grained granite
30	31	Fine-grained granite
31	210	Coarse-grained granite; shearing at 45 degrees to hole from 31 feet to 149 feet; core contains hematite which is particularly abundant between 205 and 207 feet where radioactivity is high. End of hole.

Diamond Drill Hole A2.

Depth in Feet

From To:

0	10'6"	Medium-grained granite with quartz veinlets and quartz-filled shears.
10'6"	42'	Coarse-grained granite with numerous quartz-filled shears. Hematite between 10'6" and 22'6". Small amounts of fluorite in quartz-filled shears between 32'6" and 33'6".
42'	70'3"	Medium-grained granite with numerous shears 45° to hole; some shears contain quartz. Some irregular fractures are quartz-filled.
70'3"	122'6"	Coarse-grained granite with numerous irregular fractures containing quartz and fluorite. Hematite between 87'9" and 89', 90'6" and 94'9", 114'6" and 122'6".
122'6"	135'6"	Banded rock containing abundant quartz veins and veinlets. Highly contorted and brecciated in part with fluorite in irregular fractures. Banding may have been produced by strong shearing of a coarse-grained granite containing numerous quartz veins. Hematite occurs between 123' and 125' and 127' and 130'.
135'6"	142'6"	Coarse-grained granite with quartz-filled shears; hematite between 135'6" and 142'6".
142'6"	167'	Coarse-grained granite; sheared with dark grey mineral (biotite) in matrix. (Augen granite). Contains small amounts hematite between 142'6" and 146'6". Matrix of lighter colour between 148' and 156'6".
167'	211'6"	Sheared coarse-grained granite; relatively unweathered. Hematite between 174'6" and 186', 190' and 191'3", 194' and 196'.
211'6"	242'3"	Coarse-grained granite; relatively unweathered; not sheared.
242'3"	242'9"	Aplitic granite
242'9"	244'6"	Coarse-grained granite; relatively unweathered; not sheared.
244'6"	245'	Aplitic granite

Diamond Drill Hole A2.

Depth in Feet

From To:

245'	256' Coarse-grained granite; relatively unweathered; not sheared
256'	259'6" Coarse-grained granite; relatively unweathered; not-sheared. Small amount of shearing and brecciation and abundant dark reddish-brown platy mineral.
259'6"	270' Coarse-grained granite; relatively unweathered. Quartz-filled shears at 265'7".

Diamond Drill Hole F1.

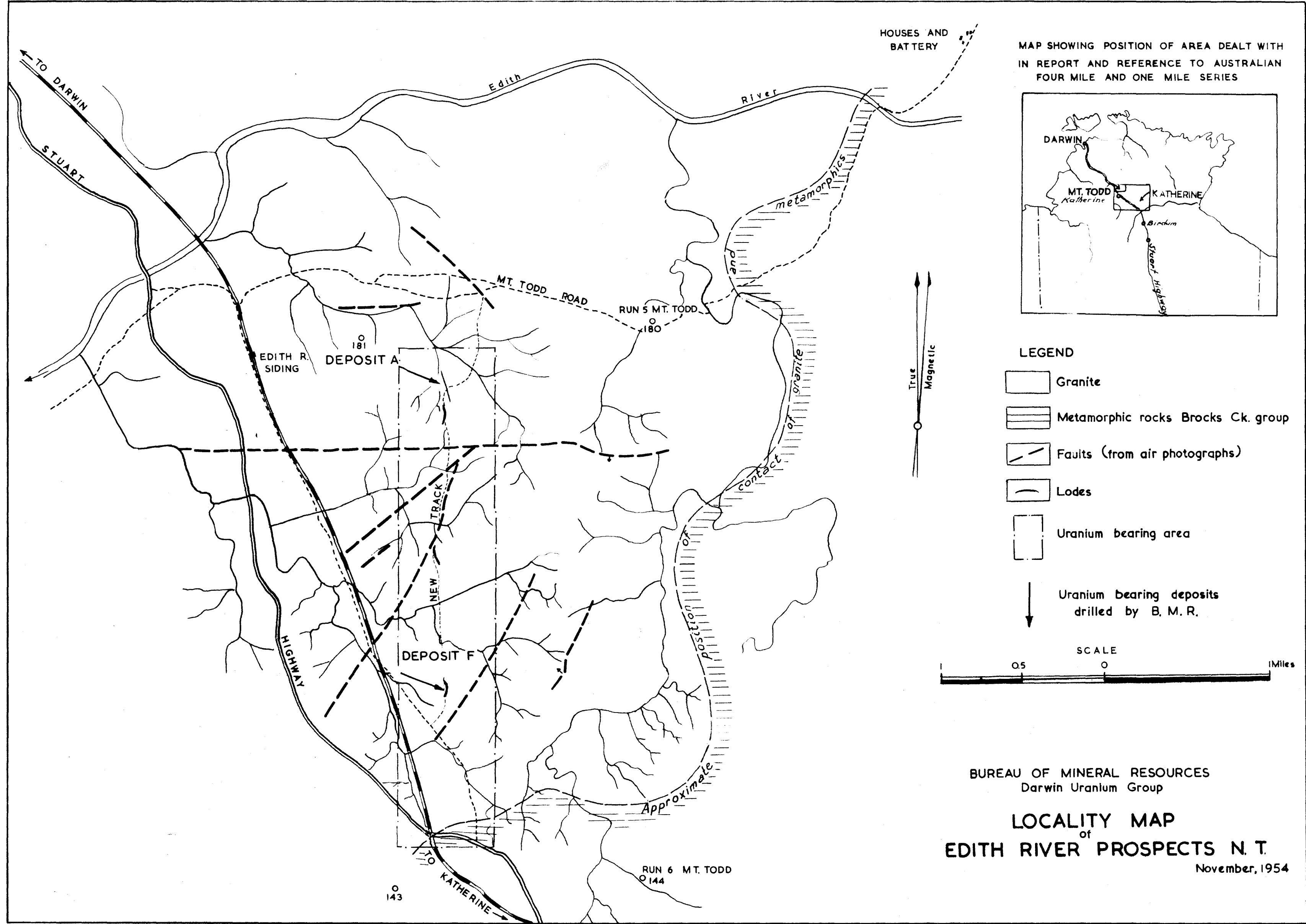
<u>Depth in Feet</u>		
<u>From</u>	<u>To</u>	
0	12	Soil
12	20	Dark chloritic rock; sheared at 45 degrees to hole; brecciated in part; contains quartz veinlets.
20	30	Aplitic granite; contains small amounts of hematite.
30	63	Coarse-grained granite.
63	81	Aplitic granite; porphyritic in places.
81	165	Coarse-grained granite with thin bands of fine-grained granite which is probably intrusive into the coarse-grained granite.
165	172	Coarse-grained granite; contains reddish-brown feldspar and some hematite in places.
172	176	Aplitic granite; contains quartz veinlets.
176	182	Medium-grained granite; contains reddish-brown feldspar and quartz veinlets.
182	211	Coarse-grained granite; feldspars are more weathered in the upper 6 feet.
211	230	Coarse-grained granite; feldspars are unweathered
End of hole.		

Diamond Drill Hole F2.

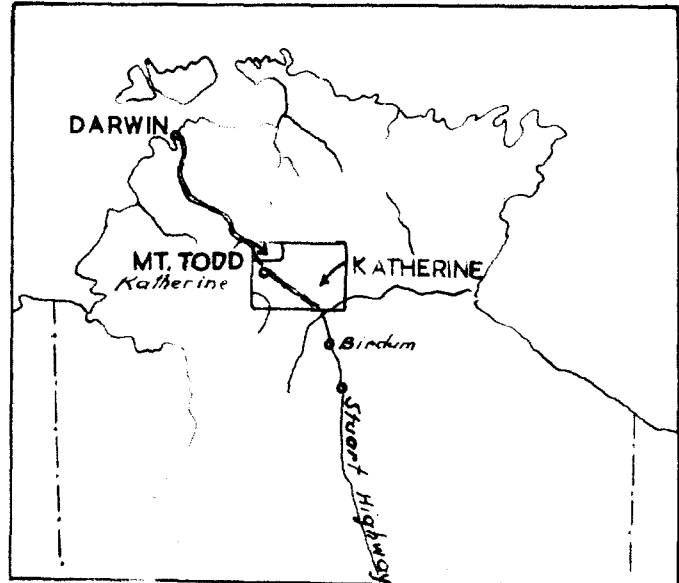
Depth in Feet

<u>From</u>	<u>To:</u>	
0	22	Soil.
22	89	Coarse-grained granite; shears at 45 degrees to hole are quartz-filled in places.
89	93	Aplitic granite; sheared and contains quartz vein.
93	103	Coarse-grained granite.
103	106	Aplitic granite with quartz-filled shears.
106	202	Coarse-grained granite; biotite recognisable from 117 to 202 feet; feldspars relatively unweathered from 135 feet to 190 feet.
202	208	Aplitic granite with thin stringers of quartz.
208	225	Coarse-grained granite; quartz-filled shears at 50 degrees to hole.
225	250	Aplitic granite with numerous shears, some quartz-filled and one at 245 feet contains clay.
250	255	Coarse-grained granite; brecciated in part; contains dark reddish-brown feldspar and quartz vein 1 foot wide at 254 feet.
255	287	Coarse-grained granite; contains dark reddish-brown feldspar and irregular fractures coated with fluorite.
287	288	Aplitic granite; contains quartz vein.
288	298	Coarse-grained granite with irregular fractures containing quartz and fluorite and with shears 45° to hole.
298	299	Medium-grained granite; strongly chloritised.
299	320	Coarse-grained granite with irregular fractures containing fluorite; feldspars fresh and relatively unweathered.

END OF HOLE.



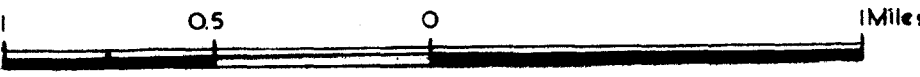
MAP SHOWING POSITION OF AREA DEALT WITH
IN REPORT AND REFERENCE TO AUSTRALIAN
FOUR MILE AND ONE MILE SERIES



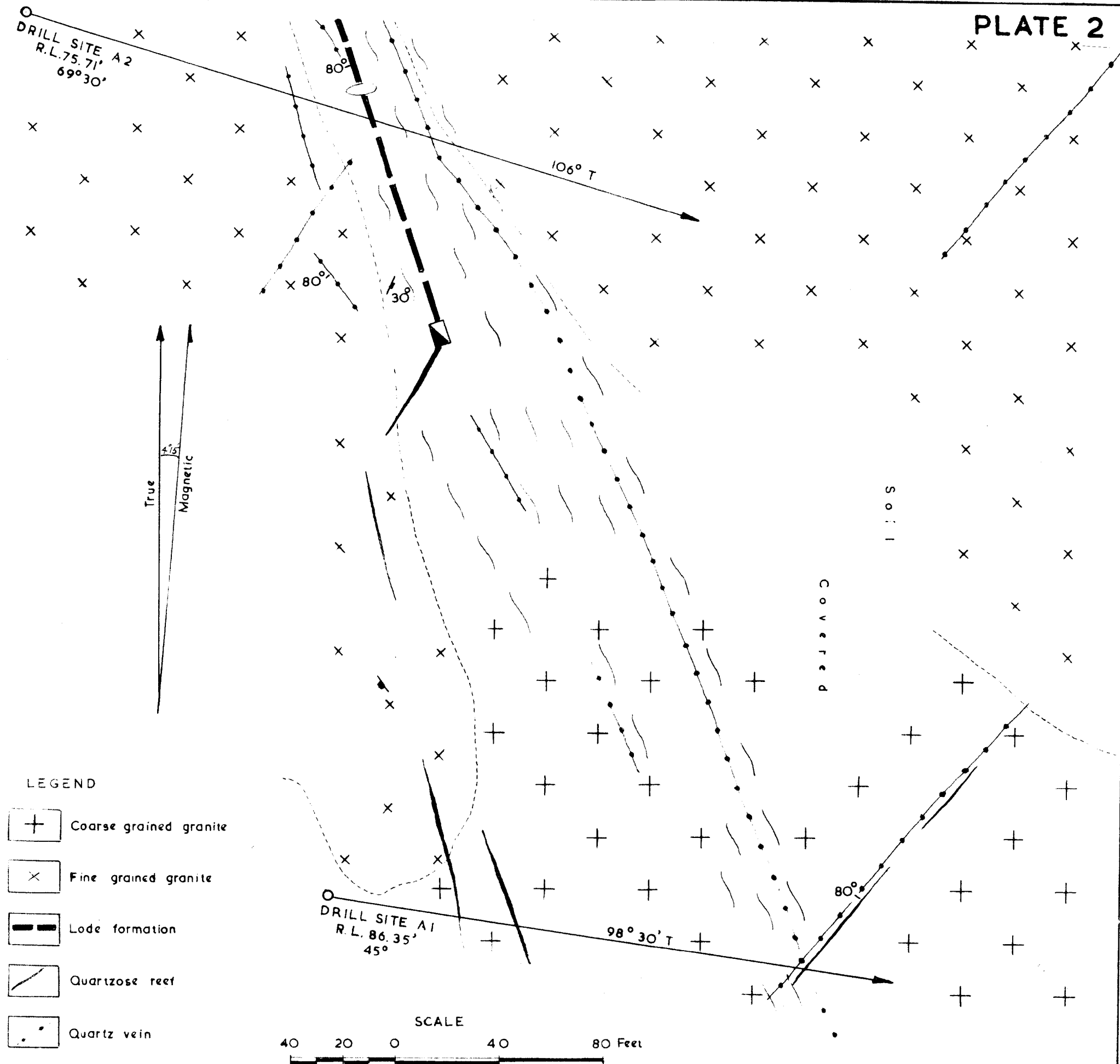
LEGEND

- Granite
- Metamorphic rocks Brocks Ck. group
- Faults (from air photographs)
- Lodes
- Uranium bearing area
- Uranium bearing deposits drilled by B. M. R.

SCALE



BUREAU OF MINERAL RESOURCES
Darwin Uranium Group
LOCALITY MAP
of
EDITH RIVER PROSPECTS N. T.
November, 1954



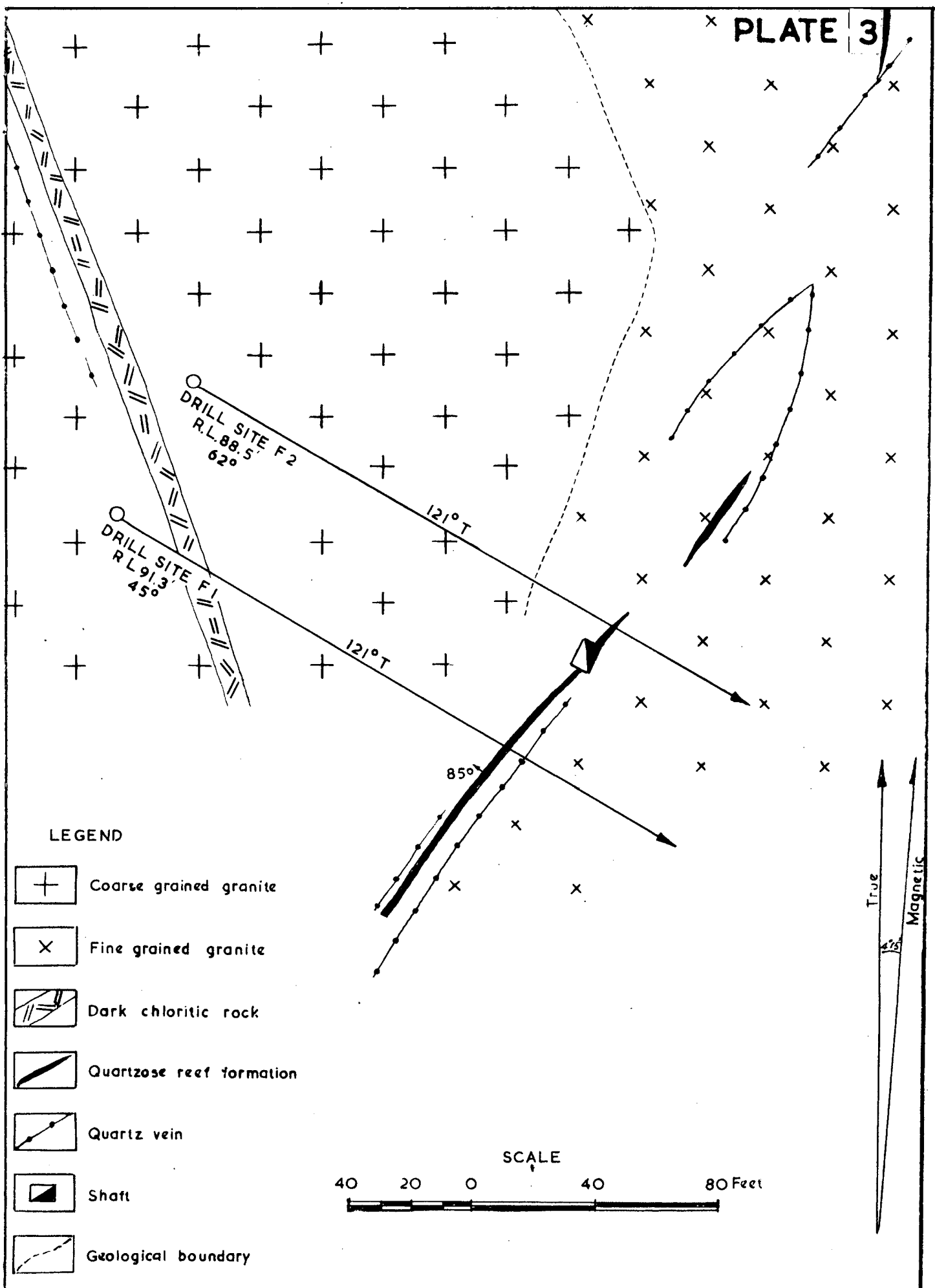
LEGEND

- Coarse grained granite
- Fine grained granite
- Lode formation
- Quartzose reef
- Quartz vein
- Shear zone
- Geological boundary
- Shaft

BUREAU OF MINERAL RESOURCES
 Darwin Uranium Group
PLAN OF DEPOSIT A
 Near
 EDITH RIVER N.T.
 Showing Diamond Drill Holes A1 and A2
 Compiled by J. B. Firman and J. D. Wyatt

Geology after N. Jones

November, 1954



BUREAU OF MINERAL RESOURCES
Darwin Uranium Group

PLAN OF DEPOSIT F

Near

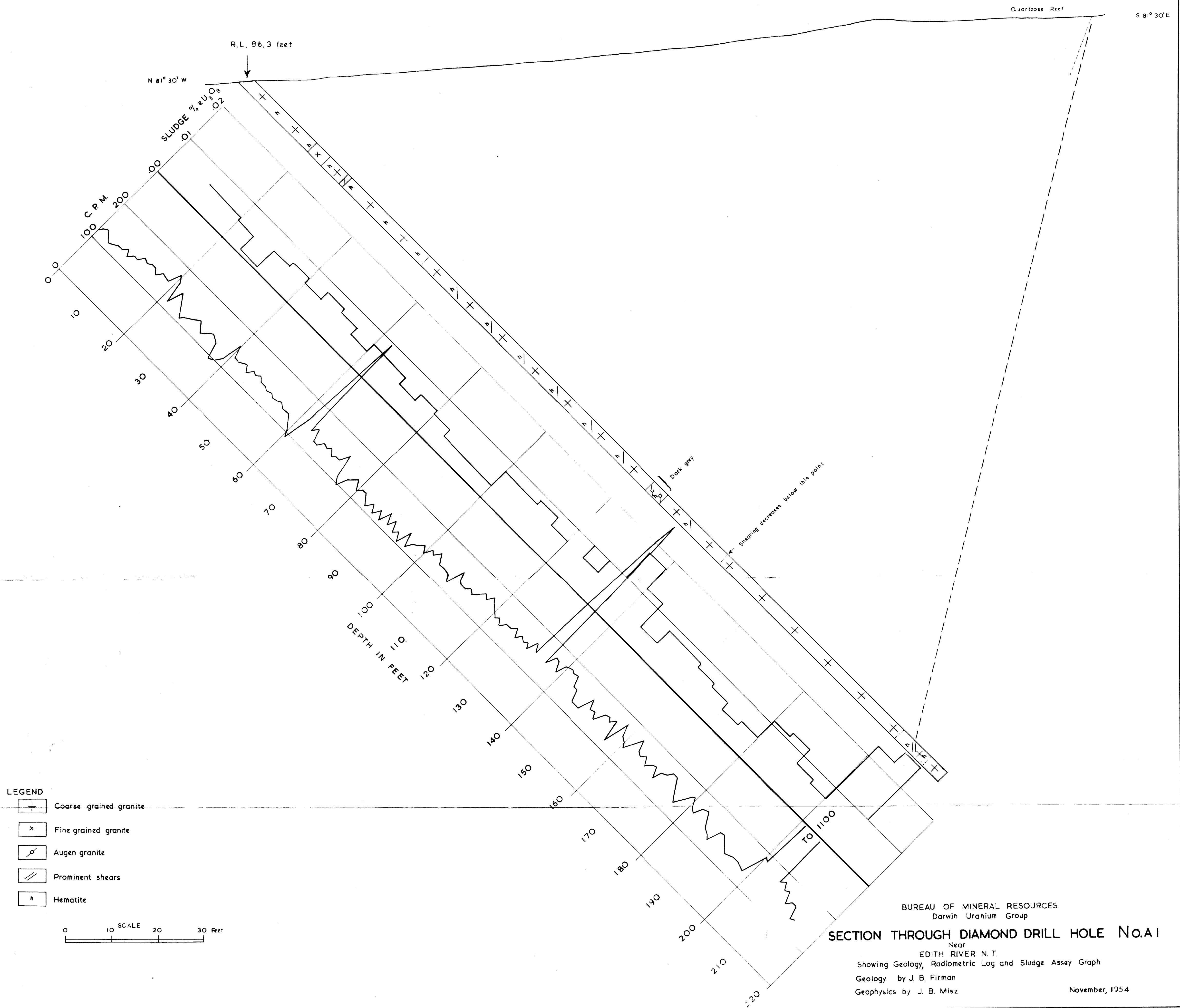
EDITH RIVER N.T.

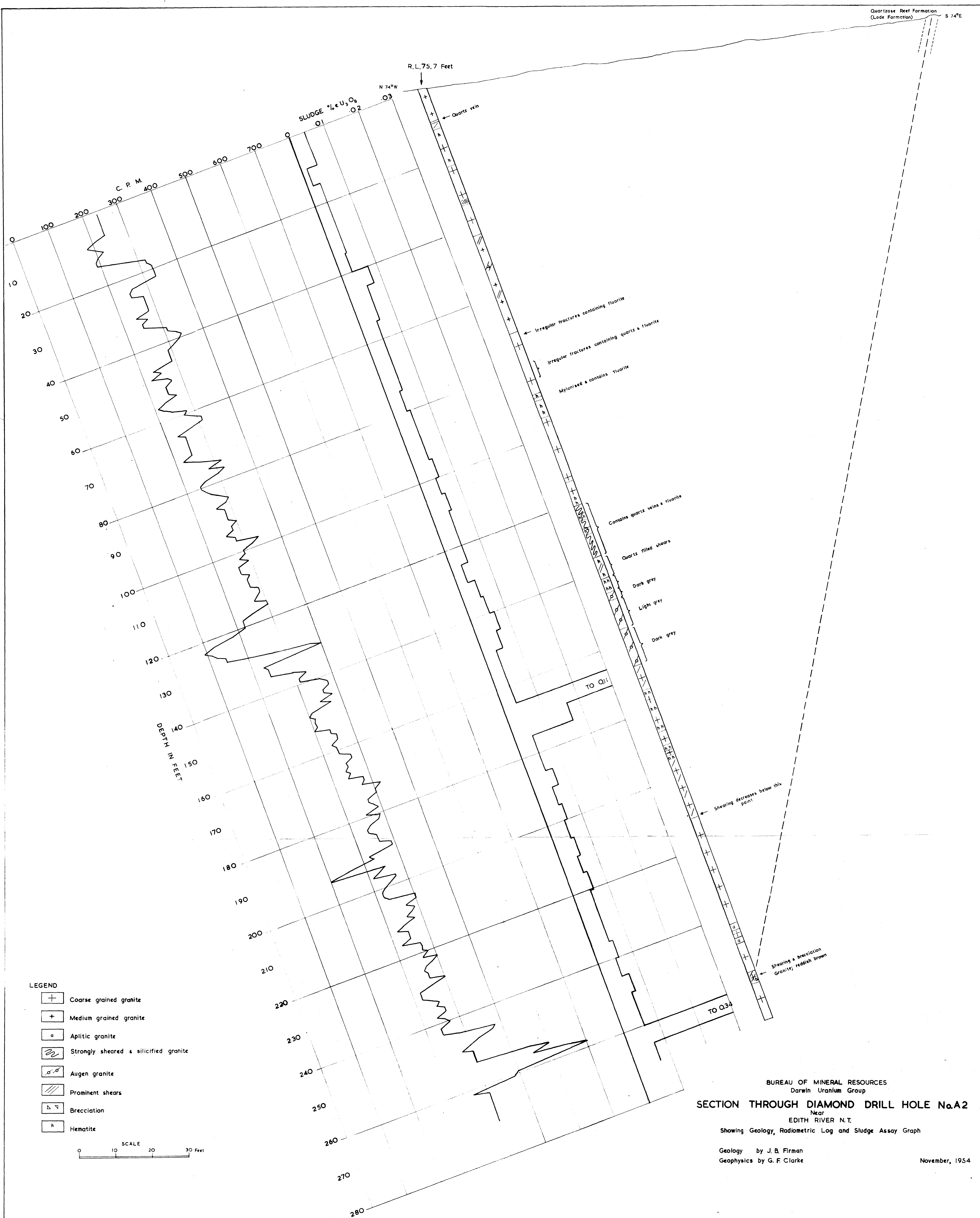
Showing Diamond Drill Holes F1 and F2

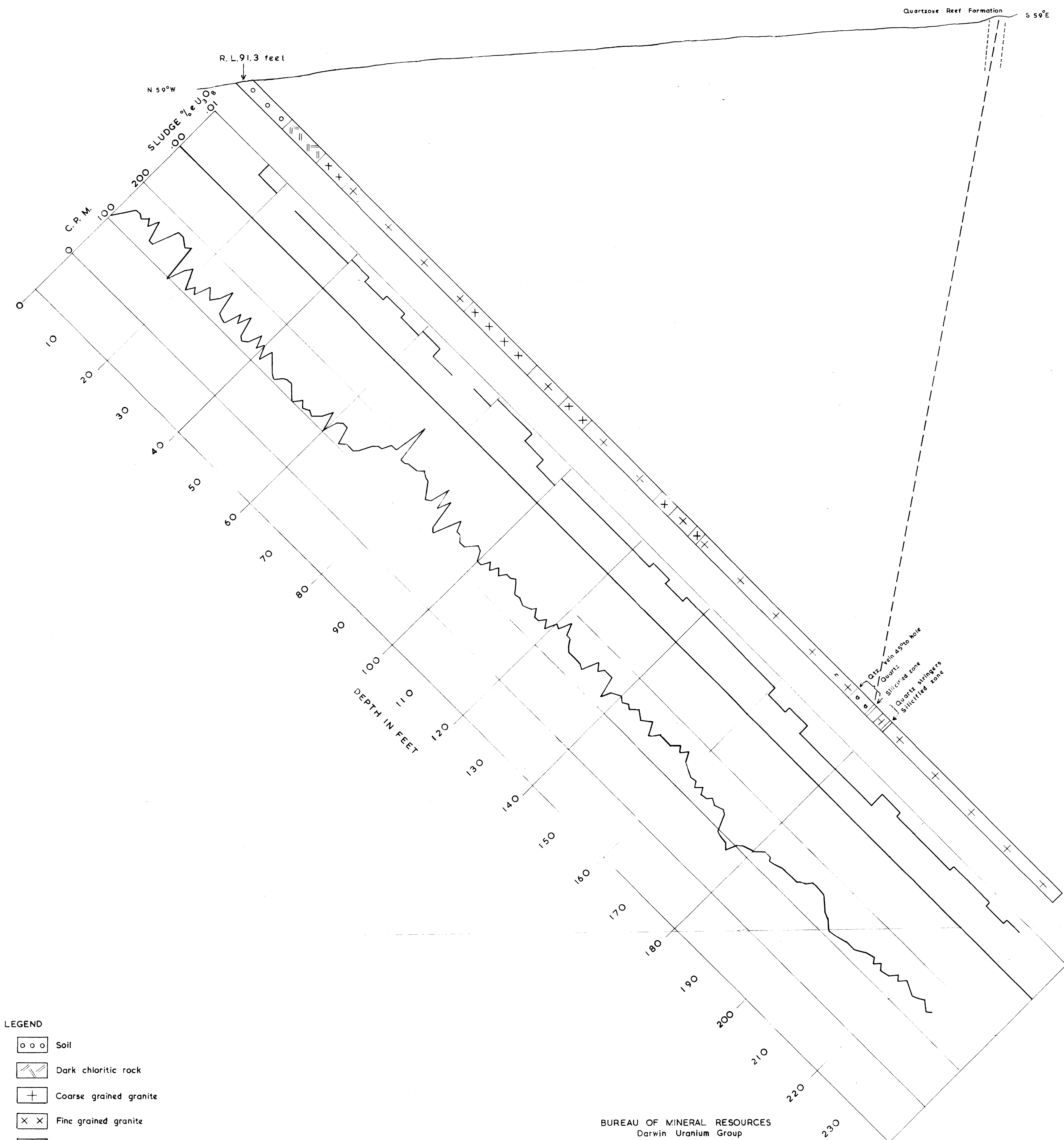
Geology after N. Jones

Compiled by J. B. Firman and J. D. Wyatt

November, 1954







LEGEND

- o o o Soil
- Dark chloritic rock
- + Coarse grained granite
- x x Fine grained granite
- a Aplitic granite
- h Hematite

0 10 20 30 Feet
SCALE

BUREAU OF MINERAL RESOURCES
Darwin Uranium Group

SECTION THROUGH DIAMOND DRILL HOLE No. F1

Near
EDITH RIVER N.T.
Showing Geology, Radiometric Log and Sludge Assay Graph

Geology by J. B. Firman

Geophysics by J. B. Misz

November, 1954

R.L. 88.5 Feet

N 59°W

SLUDGE % U_3O_8

C. P. M.

0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
270
280
290
300
310
320

DEPTH IN FEET

LEGEND

- o Soil
- + Coarse grained granite
- + Medium grained granite
- a Aplitic granite
- |||| Prominent shears
- b Brecciation

SCALE
0 10 20 30 Feet

BUREAU OF MINERAL RESOURCES
Darwin Uranium Group

SECTION THROUGH DIAMOND DRILL HOLE No. F 2

Near
EDITH RIVER N.T.
Showing Geology, Radiometric Log and Sludge Assay Graph

Geology by J. B. Firman

Geophysics by G. F. Clarke

November, 1954

