COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS.

RECORDS.

1960/90

RESULTS OF DIAMOND DRILLING 1959 - 1960.

AT ADELAIDE RIVER URANIUM MINE NORTHERN TERRITORY.

by

K. A. PLUMB

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SUMMARY

Four diamond drill holes were drilled at the Adelaide River Uranium Mine, N.T., to test for the extension or repetition of the Black Lode Orebody at depth and to the south.

Although three drill holes intersected uranium mineralization only one intersected ore.

Information was obtained on the position and structure of the Hanging Wall Fault and Black Lode Shear Zone.

A possible ore reserve of 5,500 tons of 0.22% eU_3O_8 grade is indicated.

INTRODUCTION

The Adelaide River Uranium Mine is situated about two and a half miles south of the township of Adelaide River. It is about 75 miles by road south-south-east of Darwin and about 30 miles by road or rail from the treatment plant at Rum Jungle.

Production records and the geology of the mine are summarized by Walpole (1957).

Uranium mineralization at the Adelaide River Mine occurs in sediments of Lower Proterozoic age. The main ore shoot is the Black Lode and is located at the intersection of the Black Lode Shear Zone with the Upper Greywacke (Plate 1).

Mining ceased in February, 1957, and the workings are now flooded.

Under an agreement with Robert Rixon, who holds the lease (M.L. 198B), the Bureau of Mineral Resources carried out a diamond drilling programme of four holes, to test for the extension of the Black Lode orebody below the existing workings; and to prospect for a possible repetition of the ore shoot at the projected intersection of the Black Lode Shear Zone and the Lower Greywacke. Drilling was carried out between April, 1959, and March, 1960.

DRILLING RESULTS

The four drill holes totalled 2,496½ feet. Uranium mineralization was intersected in BMR. No. 1, BMR. No. 2, and BMR. No. 3 (Plates 2,3,4).

Plate 6 shows the drill intersections on a longitudinal projection. BMR. No. 1 was below the existing workings and intersected the ore zone in the Upper Greywacke. No. 2 was aimed for a deeper intersection at RL 600, but [redacted] did not penetrate the target area. No ore was intersected. The original target for No. 2 was subsequently tested by No. 4 hole but no ore was found. BMR. No. 3 was aimed north of AUC. No. 13 to test for repetition of the ore shoot in the Lower Greywacke, but intersected only weak mineralization.

The drilling results suggest that the Black Lode ore shoot dies out between RL 650 and RL 550; and that there is no repetition of the ore-shoot in the Lower Greywacke even though mineralization has been found in three diamond drill holes (AUC. 12, 13, BMR. 3).

The uranium ore intersected in BMR. No.1 was over a true width of 14 feet. The average grade by probing was 0.28% eU_3O_8 : but the average radiometric core assay was 0.22% eU_3O_8.

GEOLOGICAL RESULTS

Geological Structure

The drilling, combined with surface mapping (Plate 1) and geological plans of the mine workings (by Geosurveys of Aust. Ltd. for Australian Uranium Corporation) gave the following information on the structure of the area:

East of the Black Lode Shear Zone the bedding strikes about 317° and dips at about 60° south west. Near the Shear Zone the strike changes to 330°-335° and the dip steepens to about 65°. The Shear Zone is marked by intense shearing and bedding drag.

A reverse fault - the Hanging Wall Fault - marks the hanging wall of the shear zone. The fault has a dip-slip of about 23 feet. Although the Hanging Wall Fault is present at the 750S co-ordinate, the Black Lode Shear Zone is poorly developed south of the 650S co-ordinate.

The strike of the Black Lode Shear Zone changes from 5° at 380S to about 12° at 750S. The dip changes from 83°E at 380S to 78°E at 808S.

Uranium ore occurs where the Black Lode Shear Zone intersects greywacke, the known orebody occurring within the Upper Greywacke. Little ore has been found in siltstone.

The potential lode is calculated to plunge at 46° towards a grid bearing of 178°.

Mineralogy

W.M. Roberts of the Bureau of Mineral Resources has identified pitchblende as the ore mineral in the core from BMR. No. 1 drill hole. Accessory minerals are pyrite and chalcopyrite with minor amounts of marcasite, arsenopyrite, linnaeite, and galena. The minerals occur associated with vein quartz, as coatings on joint planes, and disseminated in the country rock. The accessory minerals occur throughout the unoxidized zone in all four drill cores.

ORE RESERVES

Assuming an average width of five feet and continuity of ore, there is a possible reserve of 5,500 tons between No. 2 level (R.L. 736 feet) and BMR. No. 1 (R.L. 650 feet).

In the area mined drilling indicated a grade of 0.22% eU_3O_8 over five feet. Channel sampling gave an average of 1.34% U_3O_8 over 45.5 inches (Walpole, 1957) but the ore was patchy. Total production was 3,800 tons of 0.5% U_3O_8 grade.

Grade for the possible ore reserve can only be estimated from the assay of core from BMR. No. 1 hole (14 feet x 0.22%eU_3O_8) and AUC. No. 5 (2 feet x 0.72% U_3O_8). The lower figure is accepted in this case but previous drilling indicated a grade considerably less than that

mined, and it is possible that mining of the inferred extension may reveal ore of a higher grade than that indicated by BMR. No. 1.

1,500 tons of broken ore of 0.5% U_3O_8 grade remain in the stopes but this grade may have been considerably reduced by dilution (Walpole, 1957).

Present ore reserves in the Black Lode are therefore:

Reserve	Amount	Grade
Broken ore	1,500 tons	0.5% U_3O_8 (grade doubtful)
Possible ore	5,500 tons	0.22% eU_3O_8 (Grade possibly higher).

CONCLUSIONS

The Black Lode ore-shoot is controlled by the intersection of the Black Lode Shear Zone and the Upper Greywacke. The ore shoot pitches south at about 46° and pinches out somewhere between RL. 650 and RL. 550.

Three drill holes have intersected the Lower Greywacke but none has intersected ore. The potential ore zone in the area above BMR. No. 3 and AUC. 13, and south of AUC. 12 has not been explored: but only a small tonnage could be contained in this zone and it is not considered to warrant an additional drill hole.

The drilling results are not encouraging and the tonnage of possible ore indicated is probably not large enough to warrant re-equipping and re-opening the mine.

REFERENCE

Walpole, B.P., 1957 - The Adelaide River Uranium Mine, Northern Territory. Rec.Bur.Min.Resour.Aust. 1957/58 C9

PLATE I

SURFACE MAP

ADELAIDE RIVER URANIUM MINE

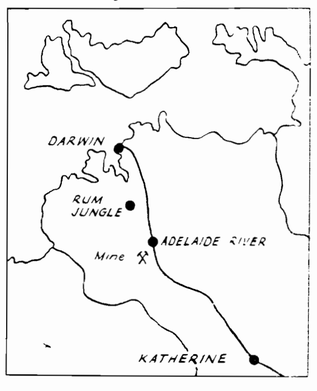
N.T.

PLANE TABLE SURVEY by W. Mc Queen, K. Plumb, June 1959.
GEOLOGY by K. Plumb, June 1959.
Grid based on plan by Geosurveys of Aust. Ltd.
Adopted Bench Mark - N.E. Corner of top of No 5 Shaft
Coordinates - 00 E., 400 S.
Elevation - 947'
Grid North 2° magnetic

Reference

- Quartz conglomerate and coarse grit with greywacke matrix.
- Interbedded quartz conglomerate and medium to coarse greywacke etc.
- Medium to coarse grained greywacke, subgreywacke and arkose.
- Fine grained sandstone
- Slaty siltstone
- Slaty siltstone in thin beds
- Established geological boundary, major unit, position accurate.
- " " " minor unit, " "
- Established geological boundary, major unit, position approximate.
- " " " minor unit, " "
- Inferred, probable or ind
- Outcrop boundary
- Established fault, position accurate
- Established fault, position approximate.
- Inferred, probable or indefinite fault.
- Strike and dip of bedding
- Shear zone
- Q Quartz outcrop
- Q.H. Quartz-hematite outcrop
- D.D.H Diamond Drill Hole, position mapped
- D.D.H. Diamond Drill Hole, position scaled from Geosurvey plans.
- Shaft
- Adit entrance
- Costean
- Cutting or excavation
- Dump
- Vehicle track
- Topographic contour

Locality Map



Scale

40 0 40 80 120 160 FT.

Bureau of Mineral Resources, Geology and Geophysics, Darwin July 1960

PLATE 2

Reference

- Medium to coarse grained greywacke and quartz greywacke.
- Fine grained sandstone
- Slaty siltstone
- Slaty siltstone in thin beds
- Established geological boundary of major unit position approximate.
- Established geological boundary of minor unit position approximate.
- Inferred boundary of shear zone.
- Inferred fault.

Scale

40 0 40 80 120 FT.

B.M.R. DDH No 1
Co-ordinates of collar 190E 6505
Reduced level of collar 993 ft.

Depth	Bearing	Depression
At collar	270°	57°
200 ft	275°	56°
350 ft	271°	56°
450 ft.	272°	56°
468 ft.	Bottom of hole.	

CROSS SECTION AT 650 S., SHOWING B.M.R. DIAMOND DRILL HOLE No. 1

ADELAIDE RIVER URANIUM MINE N.T.

Bureau of Mineral Resources, Geology and Geophysics, Darwin, March 1960.

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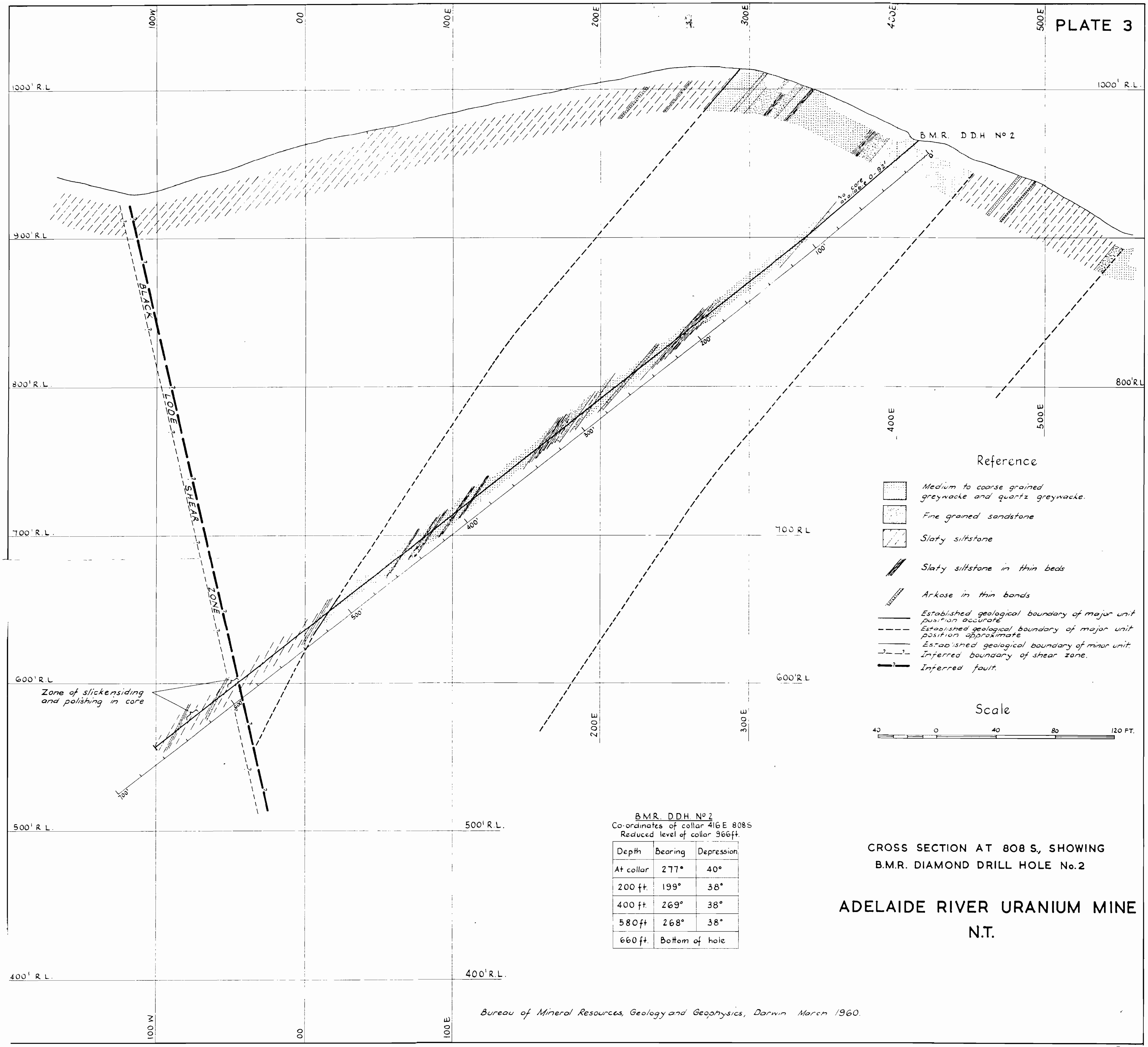
PLATE 3



100W
00
100E
200E
300E
400E
500E
1000' R.L.
900' R.L.
800' R.L.
700' R.L.
600' R.L.
500' R.L.
400' R.L.
B.M.R. D.D.H. No 2
100'
200'
300'
400'
500'
700'
BLACK LODE SHEAR ZONE
Zone of slickensiding and polishing in core
Reference
Medium to coarse grained greywacke and quartz greywacke.
Fine grained sandstone
Slaty siltstone
Slaty siltstone in thin beds
Arkose in thin bands
Established geological boundary of major unit position accurate
Established geological boundary of major unit position approximate
Established geological boundary of minor unit.
Inferred boundary of shear zone.
Inferred fault.
Scale
40
0
40
80
120 FT.

B.M.R. DDH No 2
Co-ordinates of collar 416E 808S
Reduced level of collar 966ft.

Depth	Bearing	Depression
At collar	277°	40°
200 ft.	199°	38°
400 ft.	269°	38°
580 ft.	268°	38°
660 ft.	Bottom of hole	

CROSS SECTION AT 808 S., SHOWING
B.M.R. DIAMOND DRILL HOLE No. 2

ADELAIDE RIVER URANIUM MINE
N.T.

Bureau of Mineral Resources, Geology and Geophysics, Darwin March 1960.

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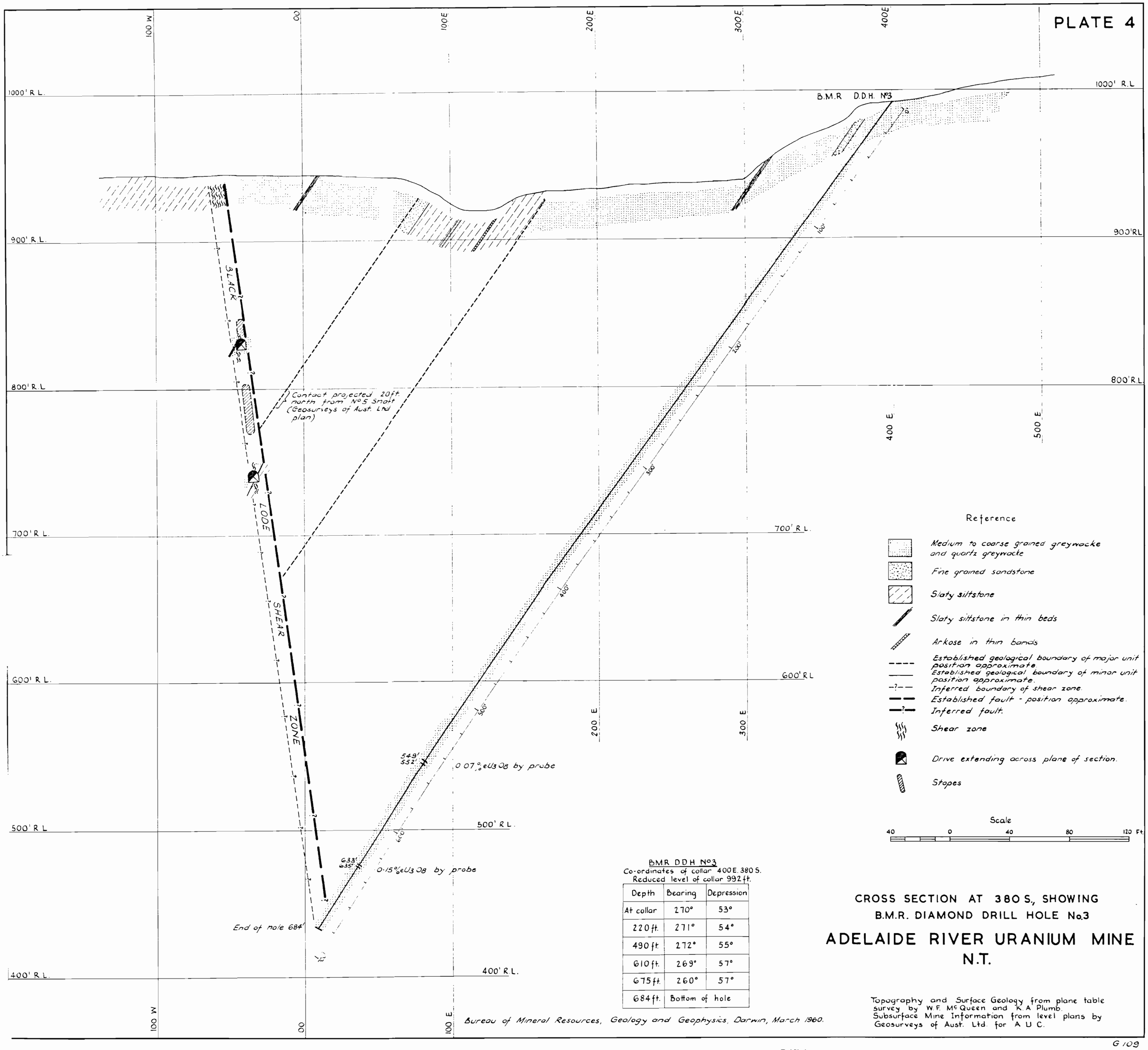
PLATE 4



Reference

- Medium to coarse grained greywacke and quartz greywacke
- Fine grained sandstone
- Slaty siltstone
- Slaty siltstone in thin beds
- Arkose in thin bands
- Established geological boundary of major unit position approximate.
- Established geological boundary of minor unit position approximate.
- Inferred boundary of shear zone.
- Established fault - position approximate.
- Inferred fault.
- Shear zone
- Drive extending across plane of section.
- Stopes

Scale

40 0 40 80 120 Ft.

BMR DDH No3

Co-ordinates of collar 400E. 380S.
Reduced level of collar 992ft.

Depth	Bearing	Depression
At collar	270°	53°
220ft.	271°	54°
490ft.	272°	55°
610ft.	269°	57°
675ft.	260°	57°
684ft.	Bottom of hole	

CROSS SECTION AT 380 S., SHOWING B.M.R. DIAMOND DRILL HOLE No.3

ADELAIDE RIVER URANIUM MINE N.T.

Topography and Surface Geology from plane table survey by W.F. McQueen and K.A. Plumb.
Subsurface Mine Information from level plans by Geosurveys of Aust. Ltd. for A.U.C.

Bureau of Mineral Resources, Geology and Geophysics, Darwin, March 1960.

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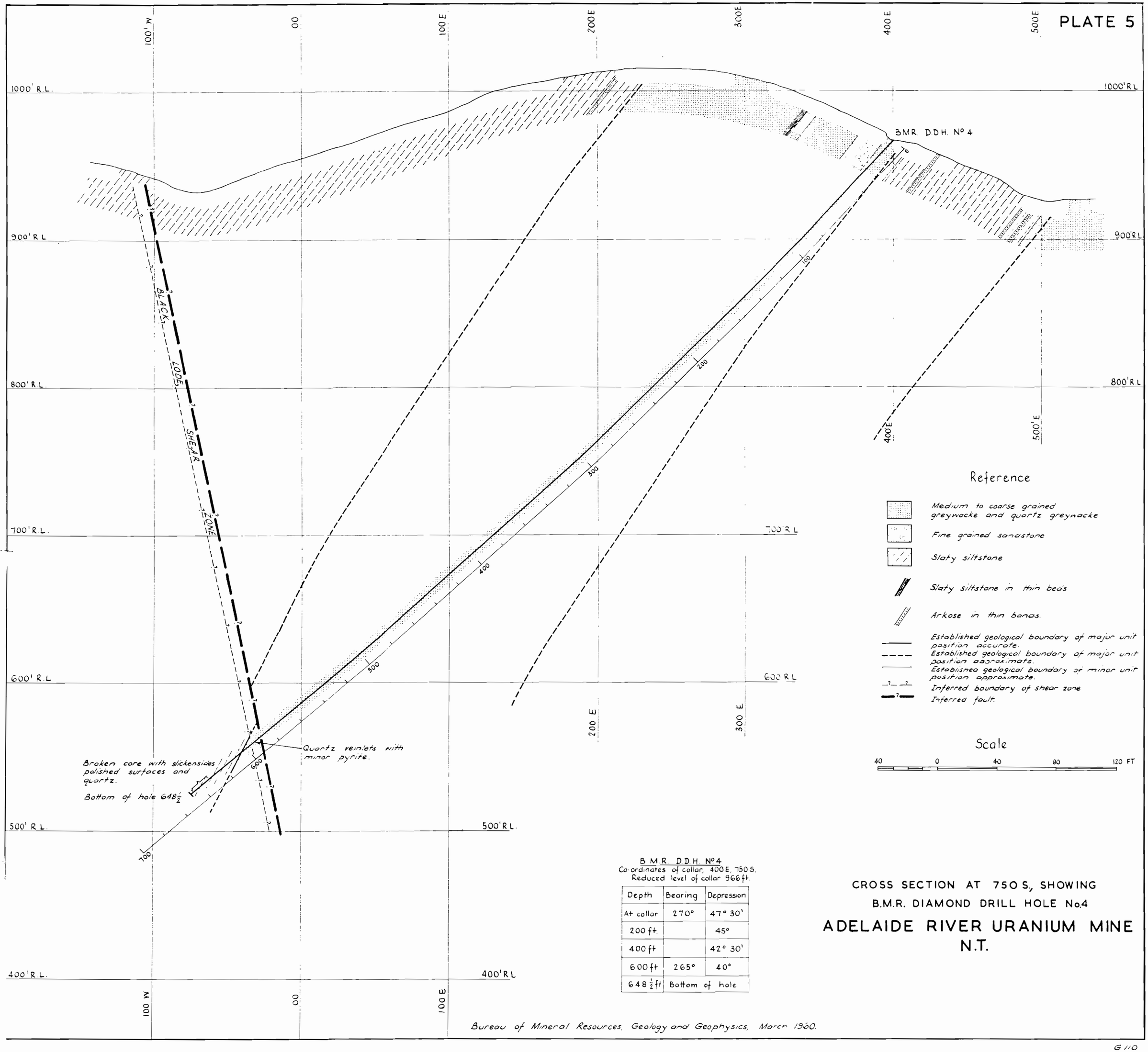
PLATE 5



Reference

- Medium to coarse grained greywacke and quartz greywacke
- Fine grained sandstone
- Slaty siltstone
- Slaty siltstone in thin beds
- Arkose in thin bands.
- Established geological boundary of major unit position accurate.
- Established geological boundary of major unit position approximate.
- Established geological boundary of minor unit position approximate.
- Inferred boundary of shear zone
- Inferred fault.

Scale

40 0 40 80 120 FT

B.M.R. DDH. N°4
Co-ordinates of collar, 400E, 750S.
Reduced level of collar 966ft.

Depth	Bearing	Depression
At collar	270°	47° 30'
200 ft.		45°
400 ft		42° 30'
600 ft	265°	40°
648½ ft	Bottom of hole	

CROSS SECTION AT 750 S., SHOWING B.M.R. DIAMOND DRILL HOLE No.4

ADELAIDE RIVER URANIUM MINE N.T.

Bureau of Mineral Resources, Geology and Geophysics, March 1960.

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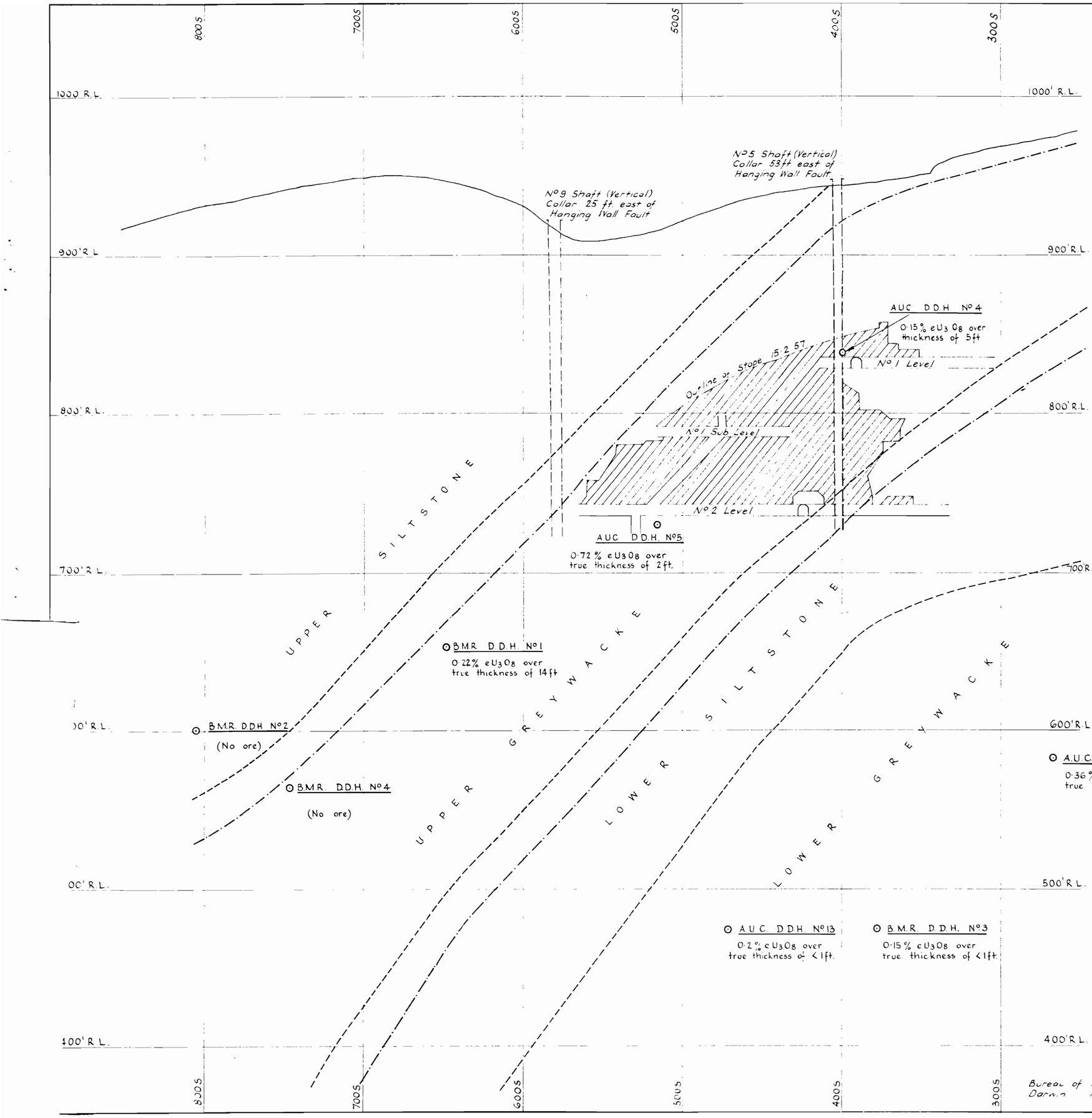
PLATE 6



Reference

- Established geological boundary on hanging wall of Hanging Wall Fault position approximate
- Established geological boundary on footwall of Hanging Wall Fault position approximate.
- Mine workings within shear zone.
- Mine workings not in shear zone.
- Cross-cut
- Stoped ore
- Intersection of diamond drill hole with Hanging Wall Fault.

Scale

40 0 40 80 120 FT

LONGITUDINAL PROJECTION
IN PLANE OF HANGING WALL FAULT
BLACK LODE SHEAR ZONE

ADELAIDE RIVER URANIUM MINE
N.T.

Bureau of Mineral Resources Geology and Geophysics,
Darwin March 1960.

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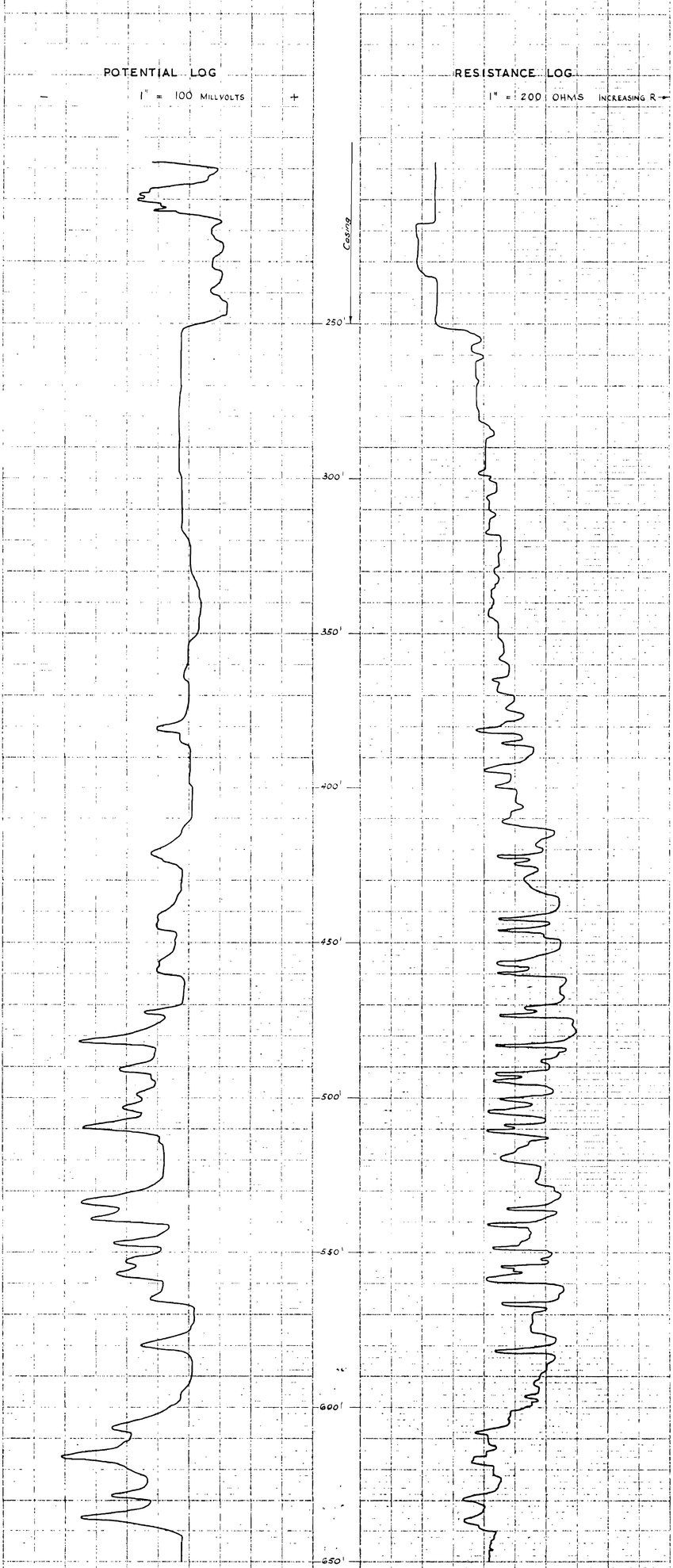
WIDCO ELECTRIC LOG
ADELAIDE RIVER – B.M.R. D.D.H. No 4



– POTENTIAL +

D.D.H. 4 ADELAIDE RIVER

Co-ordinates	400. E. 750. S
Azimuth	270°
Depression	47°
Hole diameter	BX
Cased to	250' Feet
Drilled to	648½' Feet

Bureau of Mineral Resources
Geology and Geophysics, Darwin.

RESISTANCE ——— INCREASING

Date logged	3.3.60
Depth logged	648 feet
Standing water	153 feet
Logged by	D.L. Ranston

PLATE 7