COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF
NATIONAL DEVELOPMENT

BUREAU OF MINERAL
RESOURCES, GEOLOGY
AND GEOPHYSICS

Record 1971/126

CORONATION HILL GEOPHYSICAL SURVEY, NORTHERN TERRITORY 1970

by

J.P. Williams

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ILLUSTRATIONS

SUMMARY

The Bureau of Mineral Resources made self-potential and surface radiometric surveys in 1970 at Coronation Hill in the South Alligator River area, Northern Territory to assist in the search for uranium. The self-potential survey was made to locate carbonaceous shales. In the South Alligator River area carbonaceous shales are known to be associated with uranium mineralization and to produce self-potential anomalies.

Two self-potential anomalies, one with an accompanying surface radiometric anomaly, were found which warrant testing by pattern drilling.

INTRODUCTION

Between 22nd and 30th April 1970 the Darwin Uranium Group of the Bureau of Mineral Resources (BMR) carried out a self-potential (S-P) and radiometric survey at Coronation Hill in the South Alligator River area in the Northern Territory (Pl. 1).

Carbonaceous shale of the Koolpin Formation is present in almost all the uranium deposits in the South Alligator River area, and previous geophysical surveys by BMR (Rowston, 1961; Ashley 1962, 1963) have shown that this shale often has associated S-P anomalies. Carbonaceous shale is known to be associated with the Coronation Hill orebody, and S-P anomalies are known nearby at Coronation Hill South-East (Ashley, 1963). The area surveyed in 1970 was a western extension of the Coronation Hill South-East area (Pl. 1).

GEOLOGY

The geology of part of the South Alligator River area is described by Prichard (1965) and is shown on Plate 1. The stratigraphy of the area is controlled by a basement ridge running northwest along the South Alligator River valley. The Koolpin Formation, with which almost all the uranium deposits are associated, was deposited on the eastern side of this ridge in the Lower Proterozoic. The Lower Proterozoic beds were steeply folded, faulted, and eroded before the basal unit of the Upper Proterozoic succession, the Edith River Volcanics, was laid down. Overlying this is the Kombolgie Formation (sandstone with interbedded volcanics). The Upper Proterozoic beds are gently folded. The Zamu Complex is a Lower Proterozoic swarm of dolerite dykes and sills.

In the Coronation Hill area, the Scinto Breccia Member of the Edith Creek Volcanics forms a resistant cap of pink and white silicified breccia on Coronation Hill. This breccia covers the Koolpin Formation as scree and covers the area surveyed.

METHODS

Self-potential measurements were made with a laboratory AVO electronic multimeter, thermally insulated for use in the field. All readings were tied to a common base station, 0/200E.

Surface radiometric measurements were made with a Harwell 1368A ratemeter.

RESULTS

The S-P results are shown on Plates 2 and 3 and the surface radiometric results on Plate 4.

The radiometric results show a high trending roughly northwest on the northern end of the grid, from 550N to 800N on Traverse 200E, 800N to 900N on Traverse 100E, and 800N to 1000N on Traverse 0. This high appears to extend beyond the surveyed area. An S-P anomaly with negative centre at about 850N/50E coincides in position and trend with the radiometric high. These anomalies are just south of the Coronation Hill open-cut and may be due to carbonaceous shale with some accompanying uranium mineralization.

The S-P anomaly with negative centre at about 550N/200W has no associated surface radiometric anomaly. It is also probably due to a shale bed.

The radiometric high in the southwest of the area surveyed, with peak value at 200N/300W has no associated S-P anomaly and its origin is unknown.

Other S-P variations in the area surveyed are small and not considered significant.

CONCLUSIONS AND RECOMMENDATIONS

Two S-P anomalies (centred at 850N/50E and 500N/200W) were found in the area surveyed. One (850N/50E) has an accompanying surface radiometric anomaly and is just south of the Coronation Hill open-cut; this S-P and radiometric anomaly may be due to carbonaceous shale and accompanying uranium mineralization. The S-P anomaly centred at 550N/200W is also probably due to carbonaceous shale. This interpretation of the S-P anomalies is based on drilling results of S-P anomalies in the South Alligator River area in previous years. Both the S-P anomalies should be pattern drilled to test for uranium mineralization.

REFERENCES

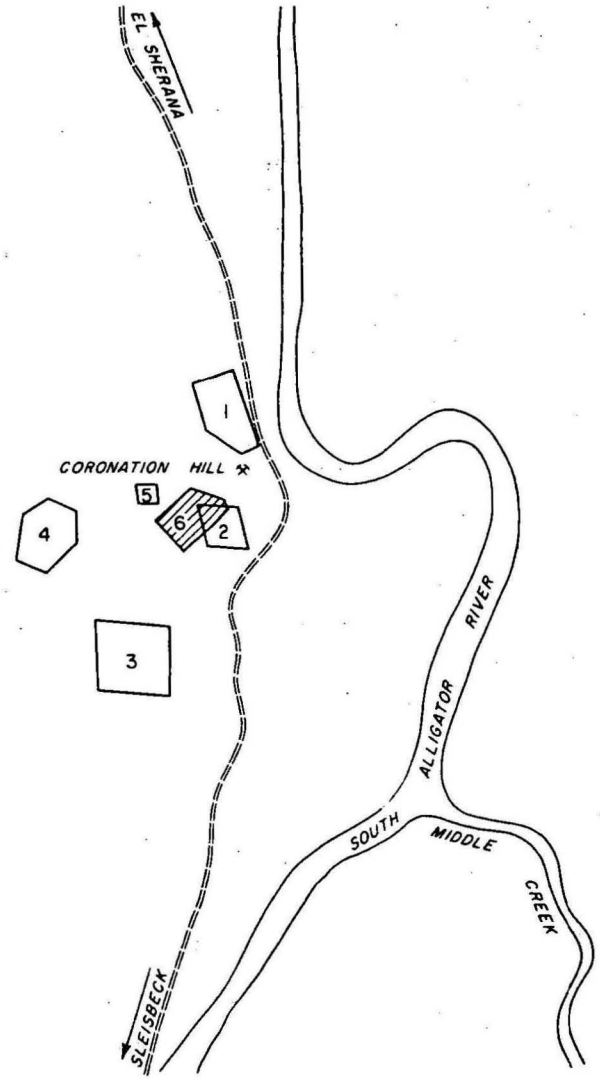
ASHLEY, J., 1962 - South Alligator River geophysical survey, Northern Territory, 1961. Bur. Miner. Resour. Aust. Rec. 1962/36 (unpubl.).

ASHLEY, J., 1963 - South Alligator River geophysical survey, Northern Territory, 1962. Ibid., 1963/112.

PRICHARD, C.E., 1965 - Uranium ore deposits of the South Alligator River. In GEOLOGY OF AUSTRALIAN ORE DEPOSITS. 8th Comm. Min. metall. Cong., 1, 207-9.

ROWSTON, D.L., 1961 - Koolpin Creek and El Sherana geophysical surveys, South Alligator River, Northern Territory, 1960. Bur. Miner. Resour. Aust. Rec. 1961/33 (unpubl.).

PLATE I



1 GEOPHYSICAL SURVEY AREA

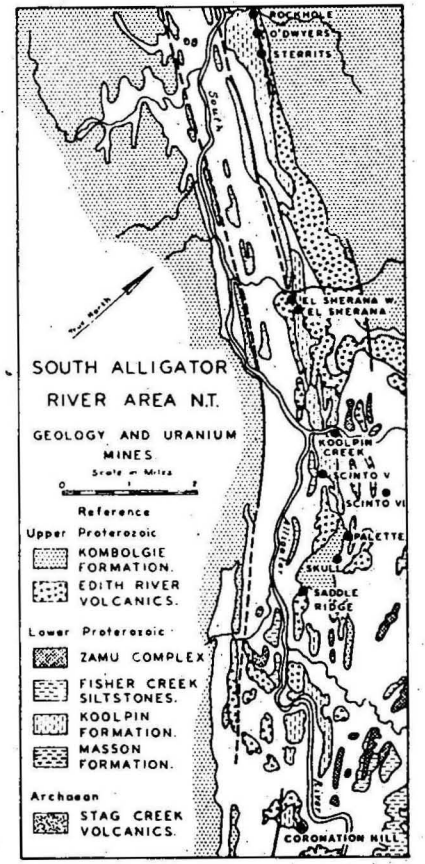
1 CORONATION HILL NORTH
2 CORONATION HILL SOUTH-EAST
3 CORONATION BIF
4 CORONATION HILL SOUTH
(1962 SURVEY)

5 CORONATION HILL SOUTH-WEST (1961 SURVEY)

6 CORONATION HILL 1970

1000 0 1000 2000 METRES

2000 0 2000 4000 6000 FEET

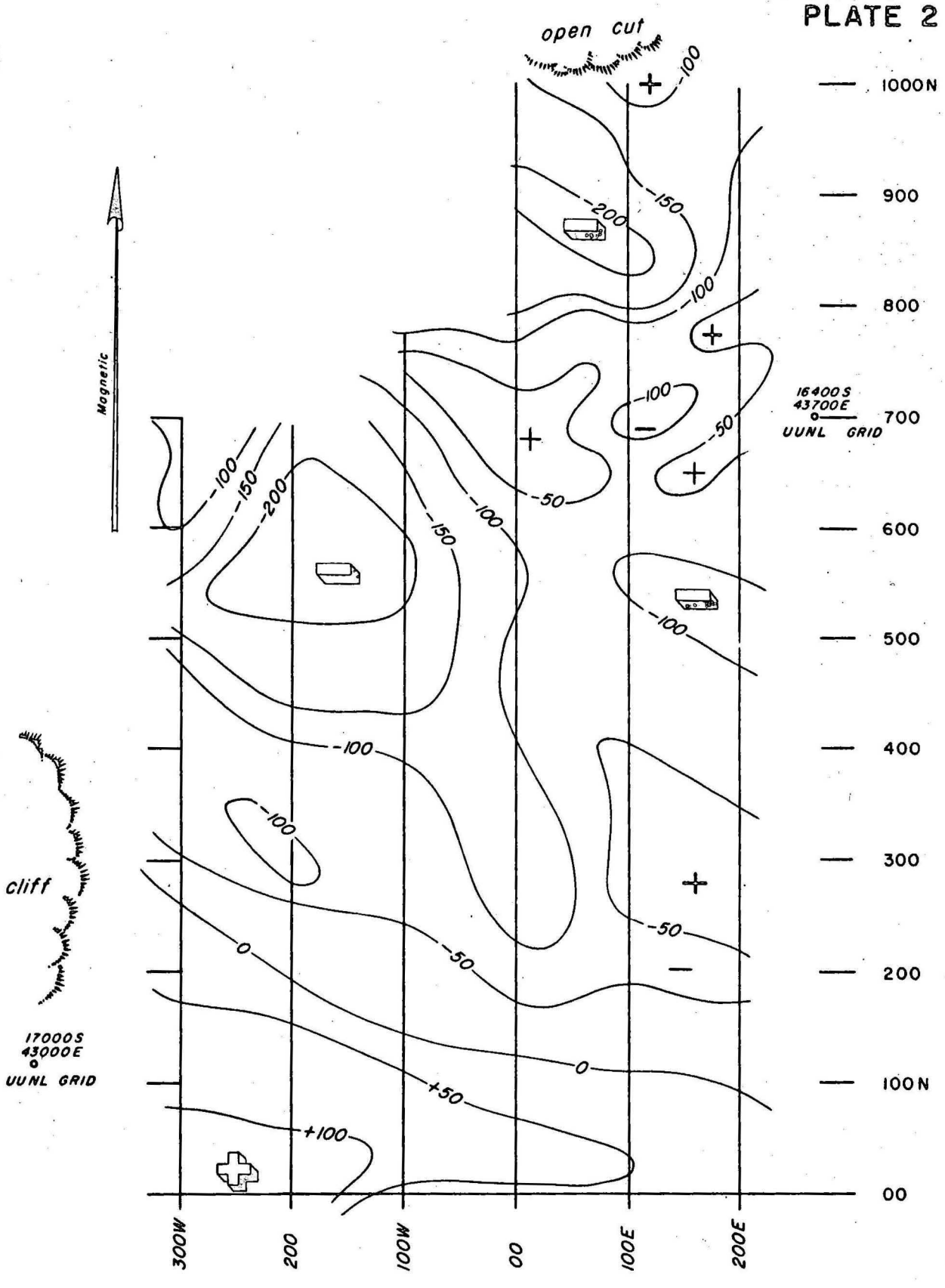


CORONATION HILL NT 1970 LOCALITY and GEOLOGICAL MAPS

To accompany Record No 1971/126

D53/B7-46

PLATE 2



S-P CONTOURS

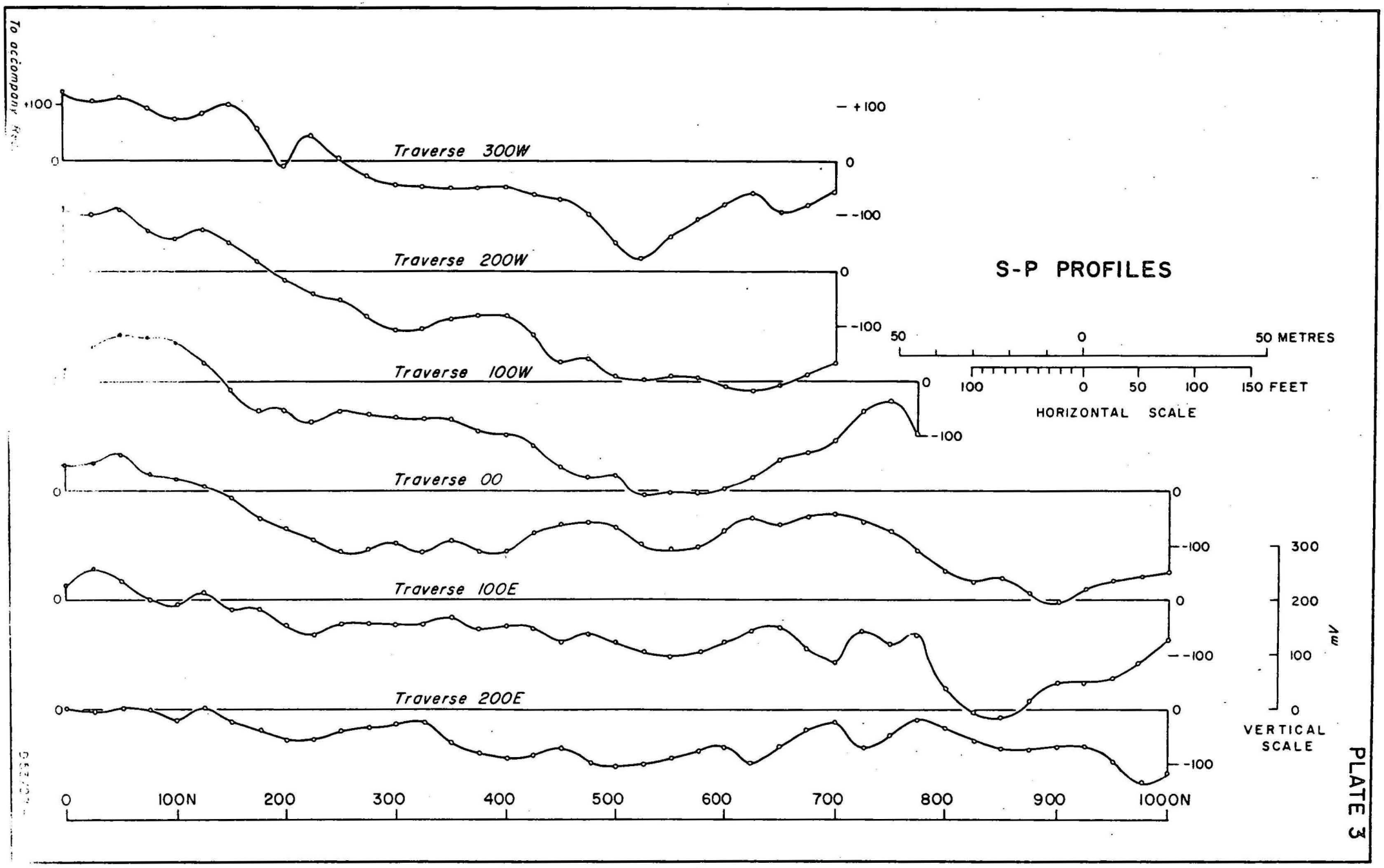
50 0 50 100 METRES

100 0 100 200 300 FEET

CONTOUR INTERVAL 50mV

To accompany Record No 1971/126

D53/B7-47A


To accompany
+100
0
Traverse 300W
Traverse 200W
Traverse 100W
Traverse 00
Traverse 100E
Traverse 200E
-100
+100
S-P PROFILES
50
0
50 METRES
100
0
50
100
150 FEET
HORIZONTAL SCALE
300
200
100
0
VERTICAL SCALE
0
100N
200
300
400
500
600
700
800
900
1000N
PLATE 3

To accompany Record No 1971/126

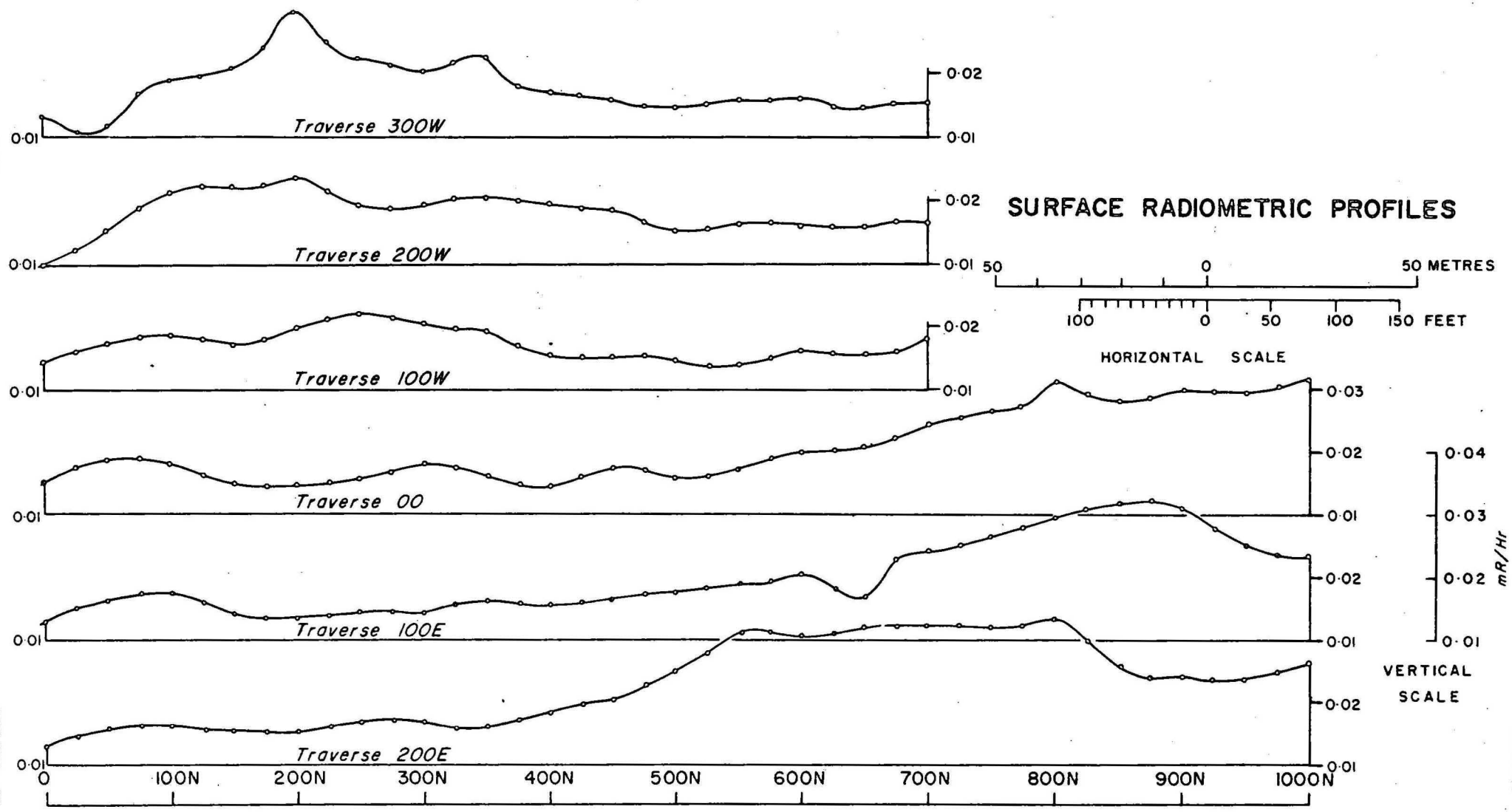


PLATE 4

D52/87-49