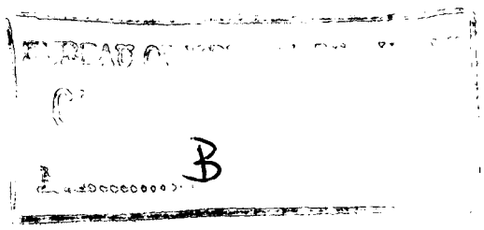
COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

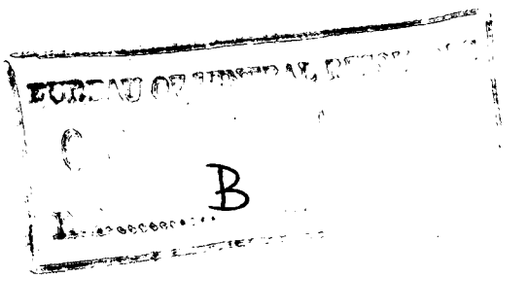


RECORD No. 1962/103

BATCHELOR LATERITES AREA GEOPHYSICAL SURVEY, NORTHERN TERRITORY 1961

by

D.L. Rowston



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SUMMARY

Radiometric and electromagnetic surveys were carried out over the Batchelor Laterites area as part of the Bureau of Mineral Resources' 1961 programme of uranium prospecting in the Rum Jungle district.

The radiometric results confirmed previous work and also showed that the radiometric anomaly at the Batchelor Laterites is more extensive than was formerly thought. The anomaly, however, appears to be caused by a purely surface feature. There is no evidence that it is related to uranium mineralisation at depth.

The only electromagnetic anomalies of note occur along the eastern limit of the area. These anomalies lie within a conducting zone that extends into adjacent survey areas. It seems likely that these anomalies are related to a certain rock type (shale and siltstone) rather than to a zone of mineralisation. However, the more intense anomalies could indicate sulphide mineralisation within this rock type. As uranium is often associated with sulphides in the Rum Jungle area it is recommended that these electromagnetic anomalies be tested by drilling.

1. INTRODUCTION

The Batchelor Laterites area is situated at the south-eastern end of the Upper Proterozoic quartzite breccia ridge and about one mile from the Batchelor township along the all-weather road to Meneling Homestead (Plate 1). The area name refers to an extensive radiometric anomaly associated with the laterite which crops out in the area. The normally flat terrain is deeply scored by gravel pits.

Radiometric and electromagnetic (Slingram) methods were used to investigate the area, which was one of nine originally selected for surveying by Territory Enterprises Pty Ltd (TEP). The work was carried out by geophysicists of the Bureau of Mineral Resources during 1961.

The application and limitations of the methods employed have been adequately described by Daly (1962) in his introductory record to the geophysical surveys in the Rum Jungle district during 1960-61.

2. SURVEY DATA

The relation of the Batchelor Laterites survey grid to the grids in the adjacent Power Line and Castlemaine areas and the Hundred of Goyder co-ordinates is shown by Daly (1962, Plate 2).

The baseline 14200E (abbreviated 142E) has a magnetic bearing of 030 and extends from 00N to 30N. Thirteen traverses spaced 200 ft apart were surveyed between 6N and 30N; each was 2400 ft long and pegged at 50-ft intervals from 130E to 154E.

The results of the geophysical work are shown as contour plans on Plates 2, 3, and 4.

3. DISCUSSION AND INTERPRETATION OF RESULTS

Radiometric

A strong surface radiometric anomaly, with a maximum of 0.1 mr/hr, was detected (Plate 2). The results confirmed earlier exploration by TEP and also showed that the anomaly is more extensive than that originally delineated. The anomalous radioactivity is restricted to the laterite, which overlies a quartz greywacke rock.

It has been found that laterite frequently exhibits high radioactivity but this rarely indicates economic uranium deposits at depth. This appears to be the case at the Batchelor Laterites, where shallow drilling has shown no evidence of uranium mineralisation below the laterite and soil cover.

Electromagnetic

The Slingram results (Plates 3 and 4) show that the area may be conveniently divided into three distinct zones with different electrical characteristics. The division agrees substantially with lithological boundaries mapped during the Bureau's 1961 geochemical survey; these boundaries are shown on Plate 3.

The central zone, bounded approximately by the lines 6N/137E to 16N/131E and 6N/148E to 30N/146E, shows relatively small variations in the secondary field components. The general poor conductivity indicated is in accord with that expected of the quartz greywacke rock mapped in this locality.

Except for a weak imaginary component anomaly along its contact with the greywacke, the shale section in the western corner of the grid is devoid of geophysical anomalies.

The eastern section of the surveyed area is characterised by large variations in the imaginary component and is defined, to a lesser degree, by a more regular real-component contour pattern. The apparent relatively high conductivity is associated with the grey (carbonaceous?) shale and siltstone which underlie this section. The boundary between shale and greywacke is sharply delineated, but the eastern margin of this conducting zone is outside the geophysical layout.

Although there is no direct evidence to link this conducting zone with that of the Castlemaine area (see Daly, 1962), it is most likely that they combine to form one conducting horizon asymmetrically disposed around the southern end of the quartzite breccia. Additional work should be done to test this suggestion.

The conductivity within the siltstone and shale is variable, and the disposition of the conductors is by no means certain. However, anomalies between 6N and 20N indicate a wide horizontal conductor with maximum conductivity along Traverse 10N.

The northerly trend of the conducting bed is markedly disrupted at Traverse 20N and the real and imaginary component anomaly at 24N/153E suggests a possible east-west cross-fault or shear. This feature is apparently confined to the shale bed and, on geophysical evidence, does not continue into the greywacke. The easterly extent of this disturbed section is to be investigated during the 1962 field season.

From Traverse 22N the conductors resume the northerly strike, and continue into the adjacent Power Line area. The strong negative imaginary-component anomaly centred about 24N/149E has no distinctive real-component counterpart, and is therefore classified as indicating a moderate conductor.

4. CONCLUSIONS AND RECOMMENDATIONS

Geochemical evidence has shown that the radiometric anomaly is superficial and that it does not directly indicate a commercial uranium deposit (Ruxton and Shields, in preparation).

The electromagnetic anomalies are, in general, restricted to the grey shale and siltstone rocks along the eastern section of the grid. These anomalies are attributed to a fairly continuous conductor about 250 ft wide, which probably extends from Rum Jungle Creek South to the Power Line area. At the Batchelor Laterites, the conductor is disrupted by a possible east-west cross-fault passing through 151E on Traverse 22N.

Only drilling can determine whether or not the sections of higher conductivity are caused by sulphides or by graphitic material. These sections are indicated by the intense anomalies on Traverses 8N and 24N.

Drill holes to a vertical depth of 150 ft at 9N/149E, 9N/150.5E, 9N/152E and at 24N/149E, 24N/152E are recommended to test the more important anomalies.

5. REFERENCES

DALY, J. 1962 Rum Jungle district, Northern Territory, introductory report on geophysical surveys 1960-61 Bur. Min. Resour. Aust. Record 1962/27.

RUXTON, B.P. and SHIELDS, J.W. - Geochemical and radiometric surveys Rum Jungle N.T., 1961 Bur. Min. Resour. Aust. Record (in preparation).

PLATE 1

RUM JUNGLE AREA, N.T.

LOCALITY MAP

GEOPHYSICAL SURVEYS, 1961

Scale: 1 inch to 1 mile

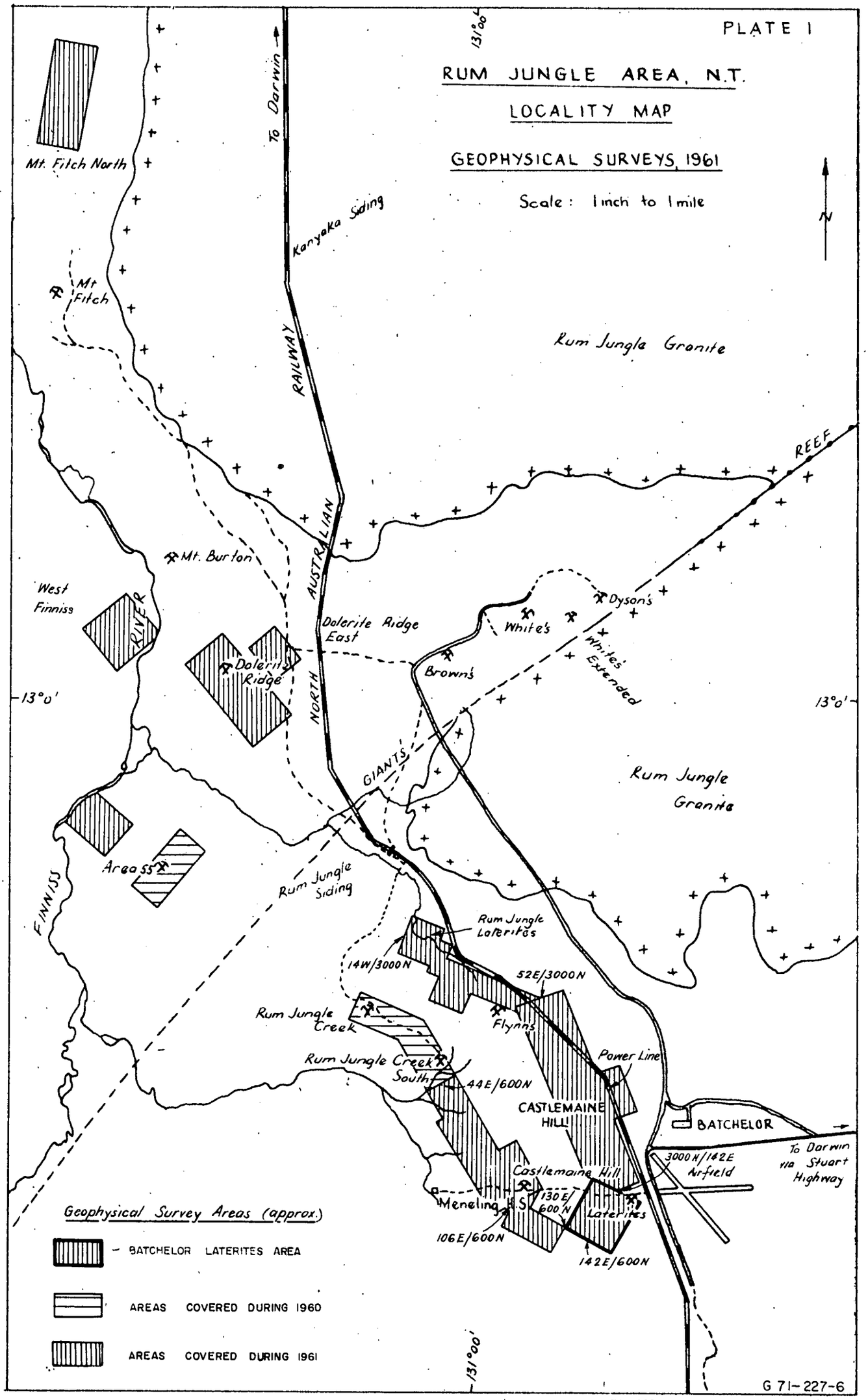

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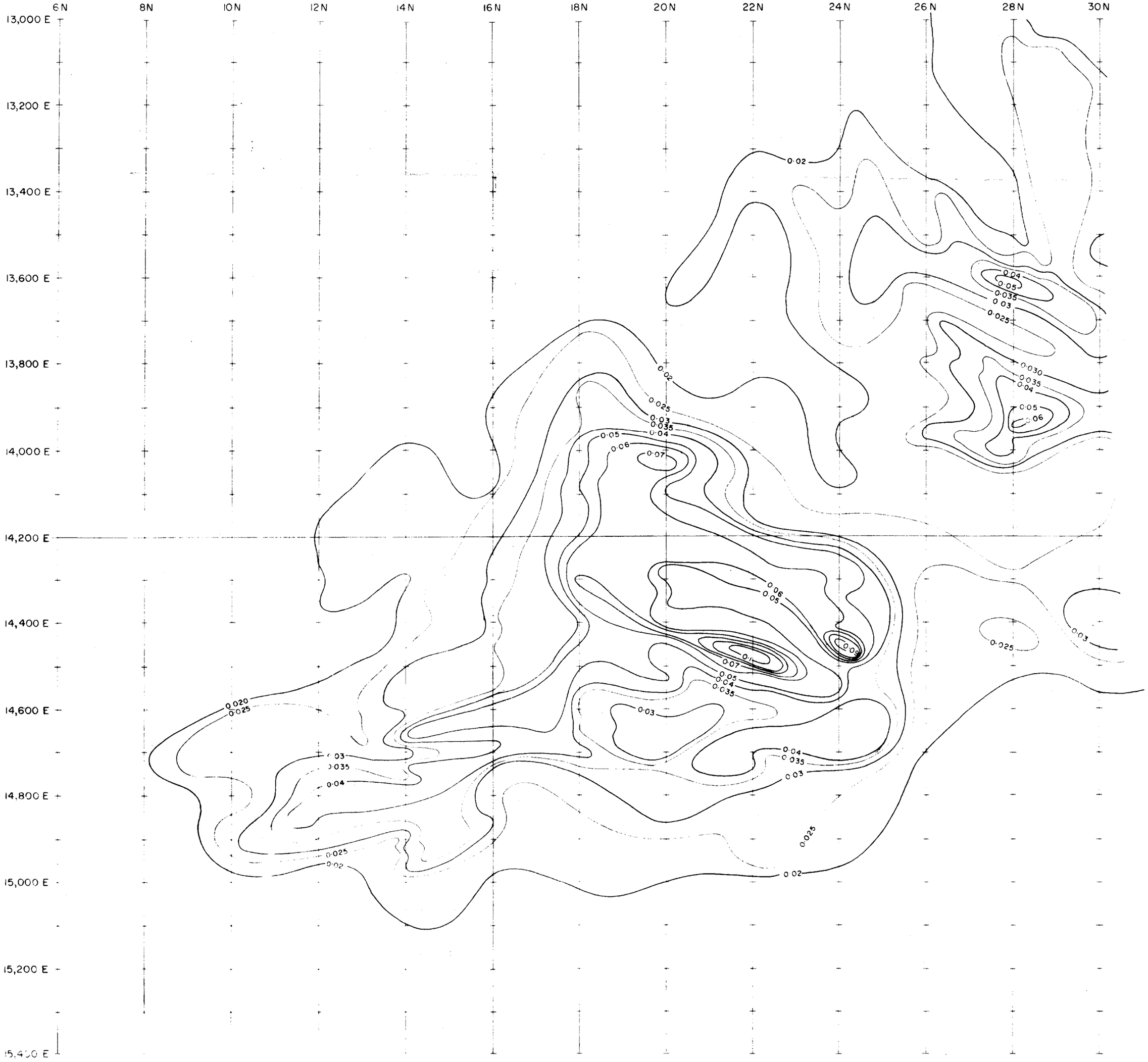
PLATE 2



SCALE IN FEET

200 100 0 200 400 600

GEOPHYSICIST:

GEOPHYSICAL SURVEY IN RUM JUNGLE AREA, 1961

BATCHELOR LATERITES

RADIOMETRIC CONTOURS

GENERAL BACKGROUND 0·015 mR/hr (approx.)

Bureau of Mineral Resources, Geology and Geophysics, Darwin, N.T., October 1961

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TO ACCOMPANY RECORD No 1962/103

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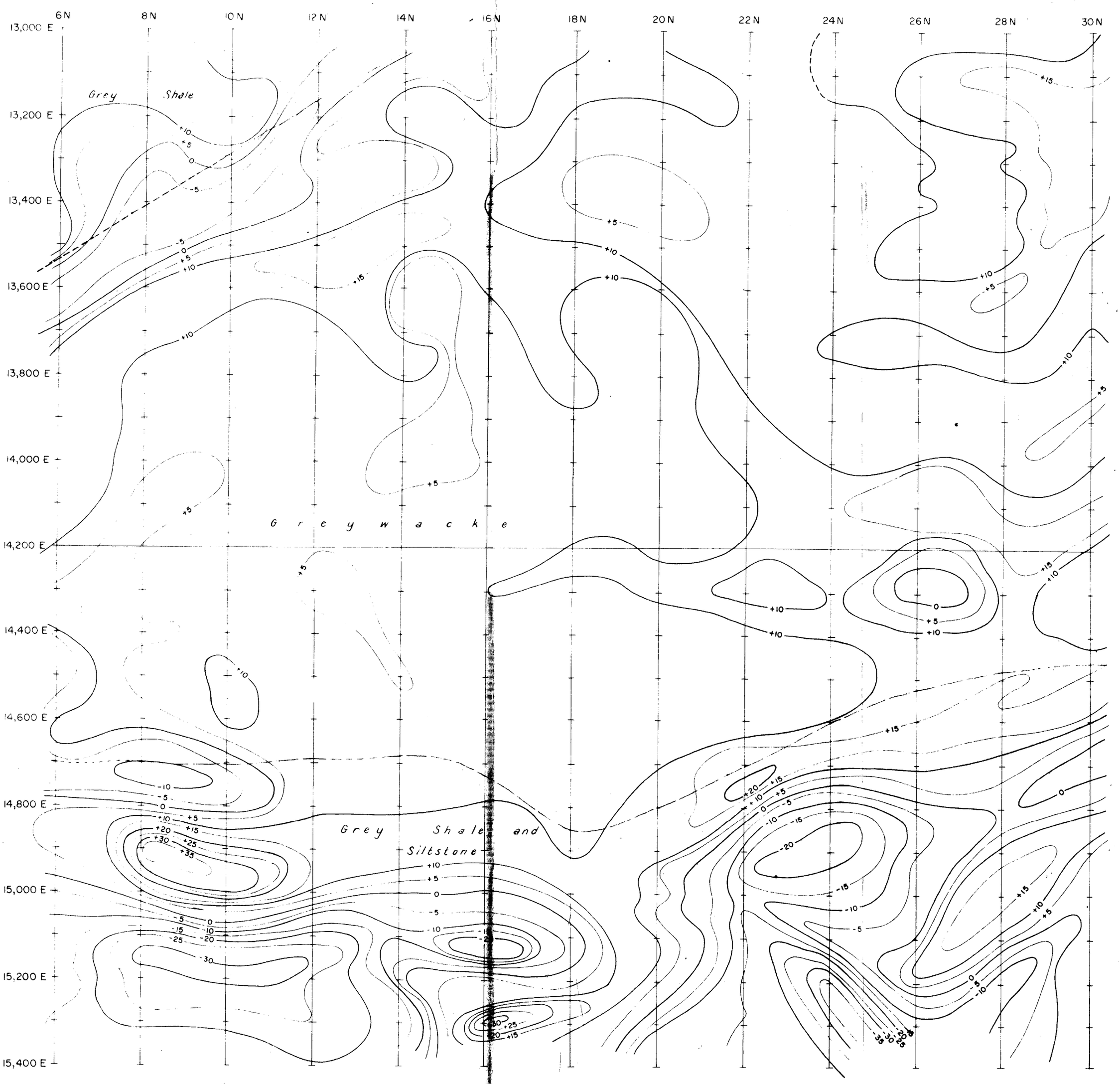
PLATE 3



GEOPHYSICIST: N. Singh

SCALE IN FEET

200 100 0 200 400 600

CONTOUR INTERVAL 5%

GEOPHYSICAL SURVEY IN RUM JUNGLE AREA, 1961

BATCHELOR LATERITES

SLINGRAM IMAGINARY COMPONENT CONTOURS

FREQUENCY 1760 CPS COIL SEPARATION 200'

Bureau of Mineral Resources, Geology and Geophysics, Darwin, N.T., October 1961

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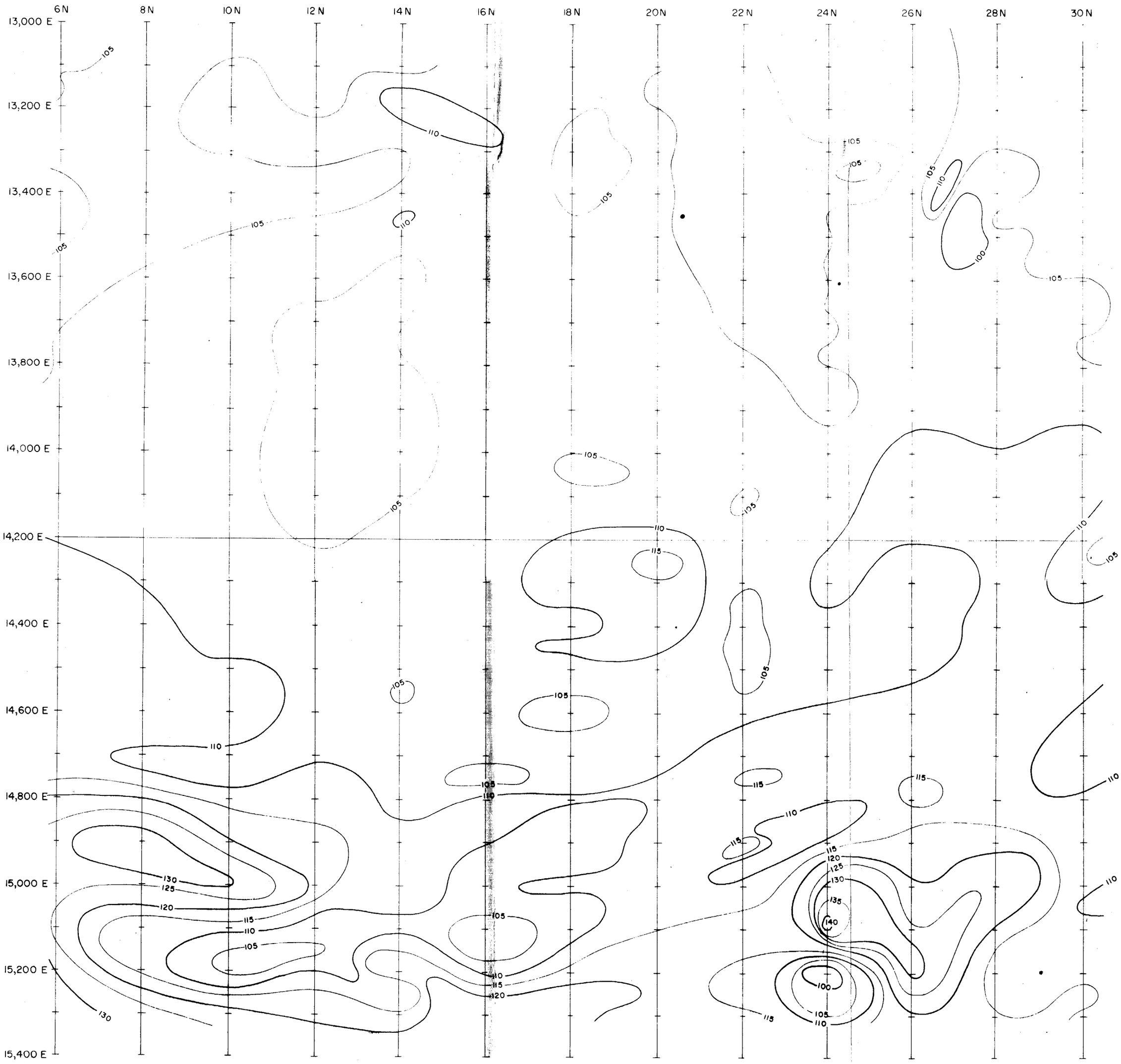
TO ACCOMPANY RECORD No 1962/103 390-GP

PLATE 4



True North

GEOPHYSICIST: A Douglas

SCALE IN FEET

200 100 0 200 400 600

CONTOUR INTERVAL 5%

GEOPHYSICAL SURVEY IN RUM JUNGLE AREA, 1961

BATCHELOR LATERITES

SLINGRAM REAL COMPONENT CONTOURS

FREQUENCY 1760 CPS COIL SEPARATION 200'

Bureau of Mineral Resources, Geology and Geophysics, Darwin, N.T., October 1961

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TO ACCOMPANY RECORD No 1962/103 S91. GP