

COMMONWEALTH OF AUSTRALIA

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BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

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**RUM JUNGLE EAST (WOODCUTTERS
AND COOMALIE GAP WEST AREAS)
GEOPHYSICAL SURVEYS,**

NORTHERN TERRITORY 1965

by

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SUMMARY

Detailed electromagnetic and radiometric surveys were made in the Woodcutters and Coomalie Gap West areas, in conjunction with a geochemical survey, to study in more detail anomalies that had been revealed by a reconnaissance survey of the Rum Jungle East area in 1964.

No large conducting bodies were found in the Woodcutters area.

In the Coomalie Gap West area, the 1965 survey was a southern extension of the 1964 survey. The electromagnetic anomalies in the Coomalie Gap West area do not correspond to any major geochemical anomalies and base-metal mineralisation is considered unlikely to be the cause of the anomalies.

1. INTRODUCTION

Detailed geophysical surveys using electromagnetic and surface radiometric methods were made in the Woodcutters and Coomalie Gap West areas of the Rum Jungle East area, which had been covered by reconnaissance geophysical surveys in 1964 (Duckworth, 1966). The localities are shown in Plate 1.

The Woodcutters area survey was made to provide detailed geophysical coverage of an area known to contain a strong geochemical lead anomaly. This anomaly was discovered during a geochemical survey done in 1964 in the Rum Jungle East area (Dodson & Shatwell, 1965). Detailed geochemical work was also done in 1965 concurrently with the geophysical survey (Shatwell, 1966).

The Coomalie Gap West area surveyed was an extension to the south of the area surveyed in detail in 1964. The reason for the extension was the discovery in 1964 of geochemical copper anomalies (between traverses 408S and 432S) that could extend to the south of traverse 432S. The geophysical survey was made in conjunction with a geochemical survey (Shatwell, 1966) to provide detailed geophysical coverage over geochemical anomalies.

2. GEOLOGY

The rocks within the Woodcutters area are predominantly of the Golden Dyke Formation with some Coomalie Dolomite in the north.

The structure is anticlinal, the axis of the structure passing north-south through the centre of the area. The geological map shown in Plate 2 shows these features. Geochemical and auger hole radiometric results are also included in Plate 2 for comparison with geophysical results.

In the Coomalie Gap West area (Plate 3) the rocks are of the Golden Dyke Formation with Coomalie Dolomite in the western part of the area.

3. FIELD WORK

Electromagnetic and surface radiometric methods were employed over the whole of the traverse plan in the Woodcutters area and over traverses 436S to 456S in the Coomalie Gap West area. Traverses north of traverse 436S in the Coomalie Gap West area are part of the 1964 survey area (Duckworth, 1966). Instruments used were the Aktiebolaget Electrisk Malmletning Slingram equipment and Harwell ratemeters, type 1368A.

Electromagnetic and radiometric methods were used in the hope that the areas contained conductive sulphide mineralisation and, possibly, uranium mineralisation in association with such sulphides. This association is known to occur in the Rum Jungle area.

The surveys were carried out by one geophysicist (K. Duckworth) and two field-hands. The time taken was approximately one and a half months.

4. RESULTS AND INTERPRETATION

Woodcutters area

The Slingram real- and imaginary-component contours are shown in Plates 4 and 5, and the radiometric results are shown as zones of high surface radioactivity in Plate 6.

The most prominent feature of the Slingram results is an almost completely undisturbed zone in the north. This is probably caused by the presence of the Coomalie Dolomite, which forms the core of the anticline. Thus it seems that the anticline plunges to the south and that its axis trends north-east in the northern part of the area. Similar zones occur throughout the area; this possibly indicates that the Coomalie Dolomite approaches the surface at these zones but does not actually crop out. It seems therefore that the axis of the anticline passes almost centrally through the area.

Several conductors are shown by troughs in the real component (Plate 4). Auger hole results show that these conductors generally occur over black shales. The high conductivity of such shales may be due to a high sulphide or graphite content.

The abrupt termination of some of these conductors indicates faulting. The positions and trends of the faults inferred from the geophysical results are shown in Plate 6. These faults correspond fairly well in trend with the faulting in the geological map (Plate 2), but the respective positions are not in good agreement.

The distribution of the conductors along the edges of the area suggests that they represent the two limbs of the anticline, and the geological map appears to confirm this.

The radiometric results show no very pronounced anomalies. The zones marked in Plate 6 are greater than twice background, but in most cases are only just greater. It seems, from a comparison of Plate 6 with the geological map (Plate 2), that zones C, F, and G might have a subsurface source. This is inferred from the fact that these zones coincide with zones of increased radioactivity in auger holes. The area had been previously investigated with shallow costeans in 1957 and the conclusion was that there were no anomalies due to economic uranium mineralisation in the area (Warin, 1959).

Coomalie Gap West area

The Slingram results are shown in Plates 3, 7, and 8. These results do not alter the conclusions of the report on the 1964 work (Duckworth, 1966). The plates show part of the 1964 results (traverses 384S to 432S) as well as the 1965 results.

Points of interest in the 1965 results are the sudden termination at about traverse 440S of the broad central low zone (centred near 18E/432S), and the clearly defined real-component anomaly through 28E/436S, which also terminates abruptly. The termination of these features suggests faulting with a north-east trend through about 24E/432S.

The real-component anomaly through 28E/436S apparently represents a strong conductor. This anomaly appears to be an extension of the anomaly at 32E/420S. In the report on the 1964 work it was indicated that this last mentioned anomaly shows special characteristics which indicate that the 'low' in the real-component values may not lie directly over the

conducting body or bodies that produce it. This arises from peculiar geometrical circumstances connected with the distance of separation of the Slingram coils. Thus the anomaly discovered in the 1965 extension must be treated with the same reservations.

No radiometric results of any interest were obtained in the 1965 survey.

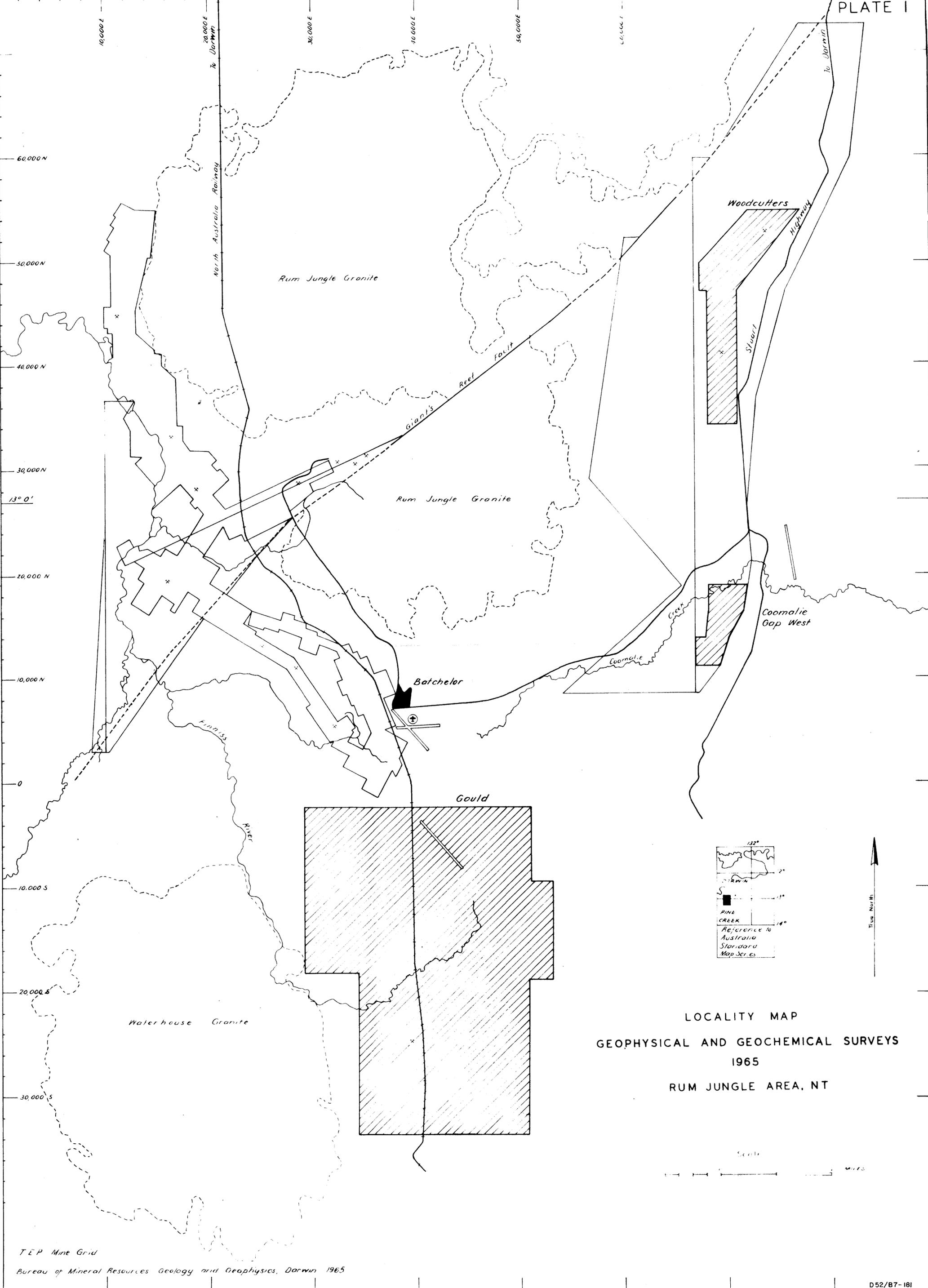
5. CONCLUSIONS

The Woodcutters area does not appear to contain any large conducting bodies within 100 ft of the surface. Therefore large concentrations of economic base-metal sulphides are unlikely to occur near the surface in this area.

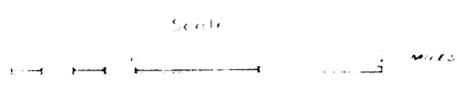
In the Coomalie Gap West area, the work on the southern extension of the 1964 grid showed a strong conductor in the eastern part of the grid and a possible fault trending north-east through about 24E/432S. The results of the 1965 work did not alter the conclusion reached in the report on the 1964 work that the electromagnetic anomalies in the Coomalie Gap West area do not correspond to any major geochemical anomalies, and thus it seems that there is little possibility of economic base-metal mineralisation being the cause of the anomalies.

6. REFERENCES

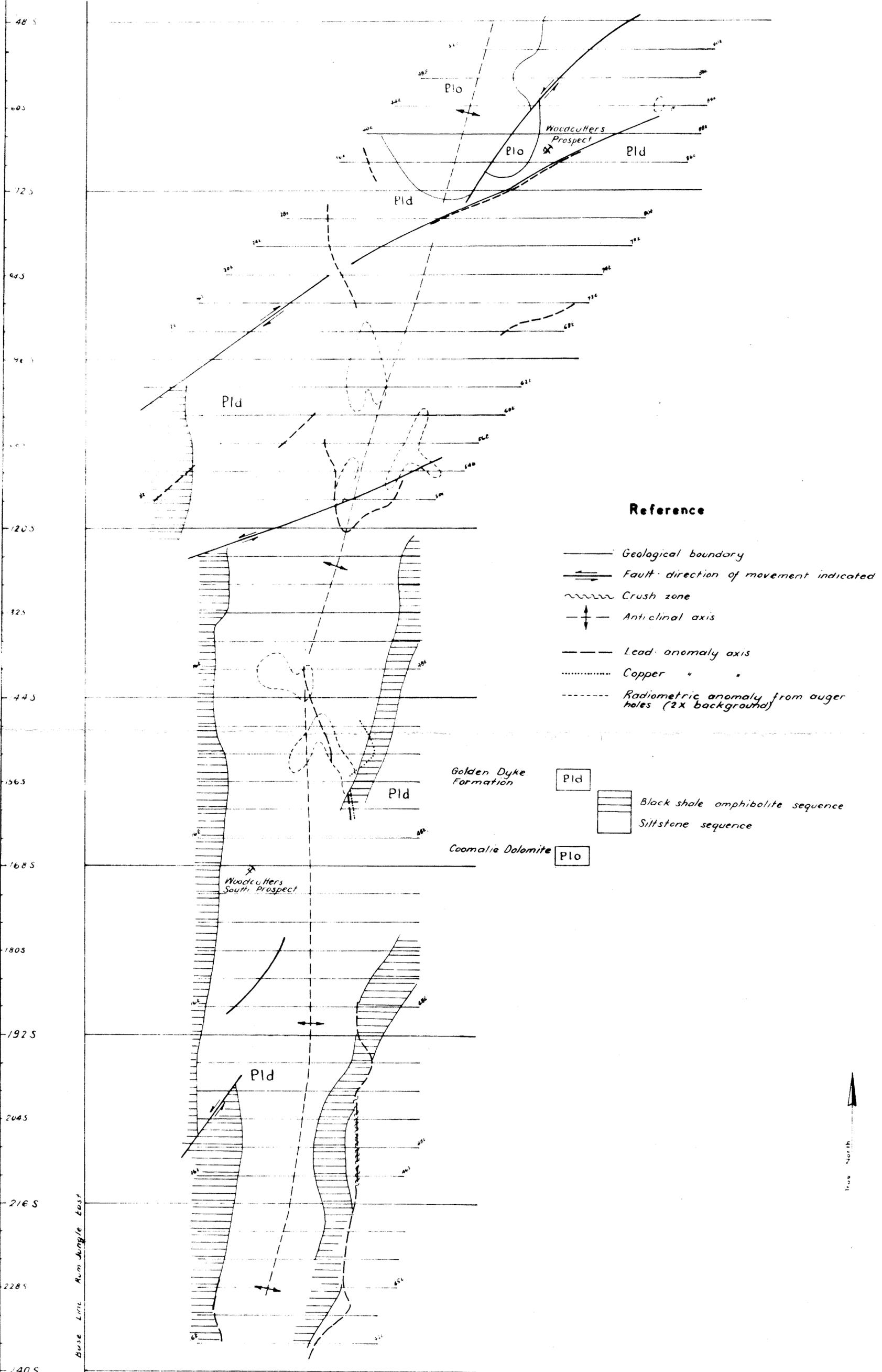
- | | | |
|---------------------------------|------|--|
| DODSON, R.G. and SHATWELL, D.O. | 1965 | Geochemical and radiometric survey, Rum Jungle 1964. <u>Bur. Min. Resour. Aust. Rec. 1965/254.</u> |
| DUCKWORTH, K. | 1966 | Rum Jungle East electromagnetic and radiometric survey, NT 1964. <u>Bur. Min. Resour. Aust. Rec. 1966/98.</u> |
| SHATWELL, D.O. | 1966 | Geochemical and radiometric investigations, Rum Jungle East area, 1965 (Coomalie Gap West and Woodcutters areas). <u>Bur. Min. Resour. Aust. Rec. 1966/34.</u> |
| WARIN, G.N. | 1959 | Report of investigation of radiometric anomalies discovered by Auster aircraft in the Rum Jungle district, NT. <u>Bur. Min. Resour. Aust. Rec. 1959/18.</u> |



LOCALITY MAP
 GEOPHYSICAL AND GEOCHEMICAL SURVEYS
 1965
 RUM JUNGLE AREA, NT



TEP Mine Grid
 Bureau of Mineral Resources Geology and Geophysics, Darwin 1965

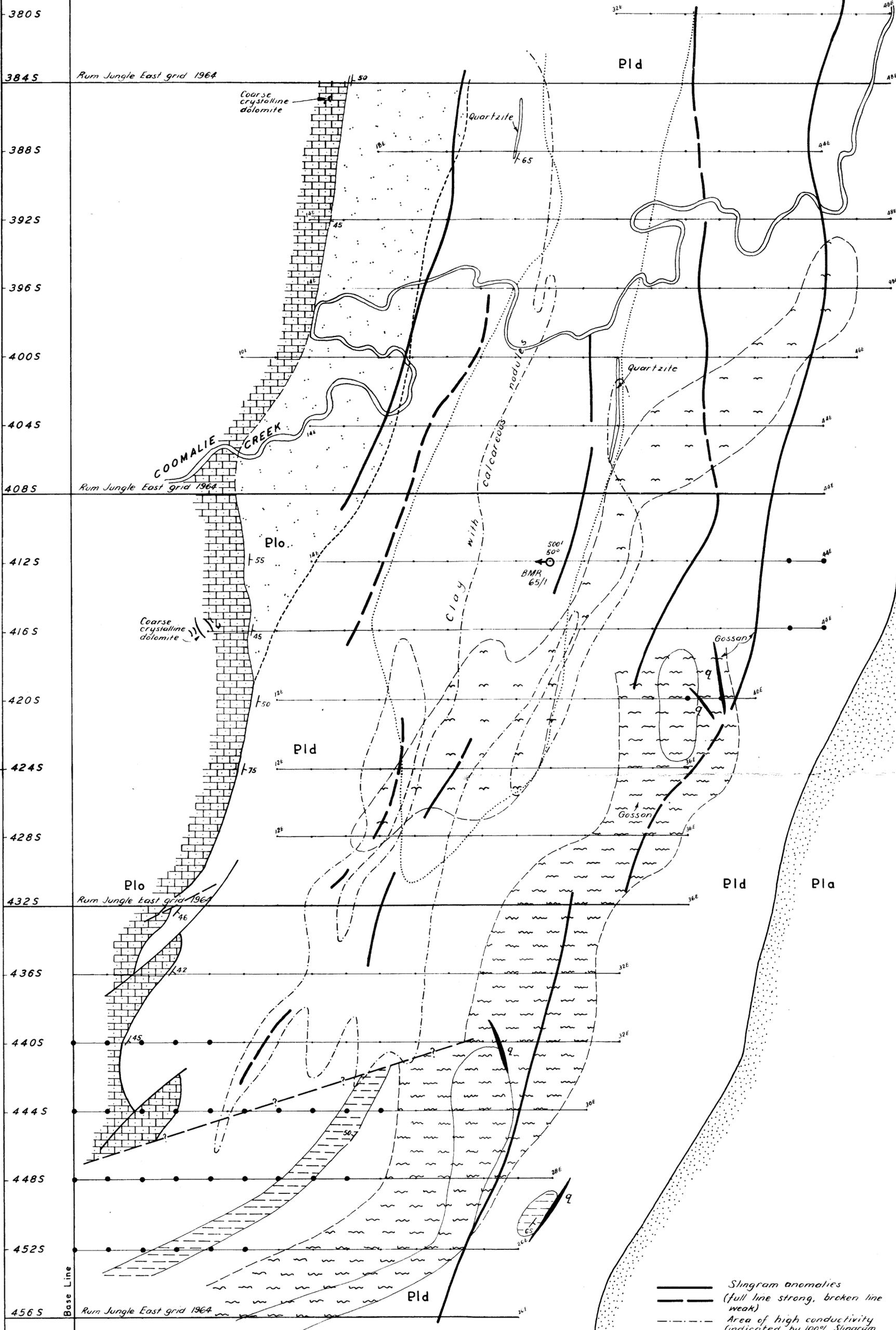


WOODCUTTERS - RUM JUNGLE EAST, NT

GEOLOGY AND GEOCHEMISTRY

(AFTER SHATWELL, 1966)





— Slingram anomalies (full line strong, broken line weak)
 - - - Area of high conductivity (indicated by 100% Slingram contour)

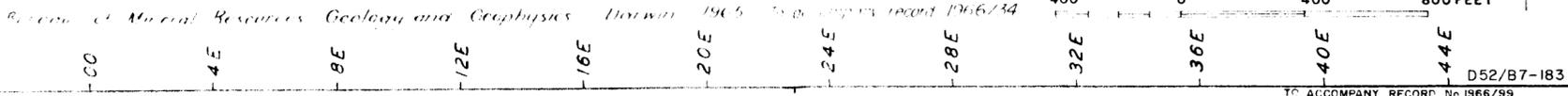
● Mattock samples

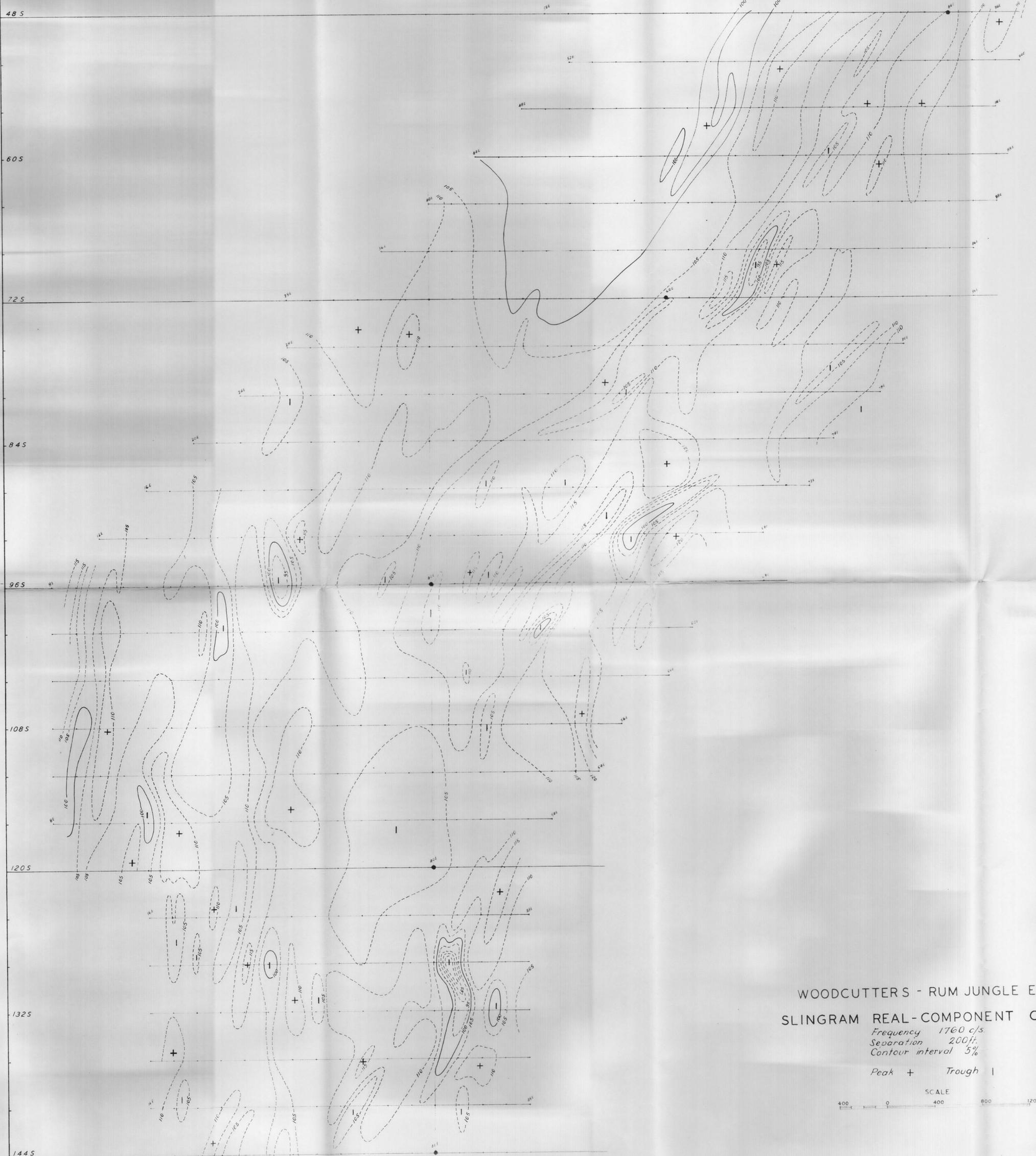
Reference

	Alluvium		Formation boundary full line position accurate, broken line position approximate.
	Pyritic quartzite		Outcrop boundary
	Shale and graphitic shale		Lithological boundary
	Shale and siltstone		Fault - full line position accurate, broken line position approximate, broken and queried inferred.
	Chlorite-sericite schist		Quartz vein
	Silicified limestone		Dip and strike of bedding
	Caliche		Area of calcareous clay
			Diamond-drill hole

COOMALIE GAP WEST
 RUM JUNGLE EAST, N T
 GEOLOGY
 AND GEOPHYSICAL ANOMALIES

(GEOLOGY AFTER SHATWELL, 1966)





WOODCUTTERS - RUM JUNGLE EAST, NT
 SLINGRAM REAL-COMPONENT CONTOURS

Frequency 1760 c/s
 Separation 200ft.
 Contour interval 5%
 Peak + Trough I



1445

1565

1685

1805

1925

2045

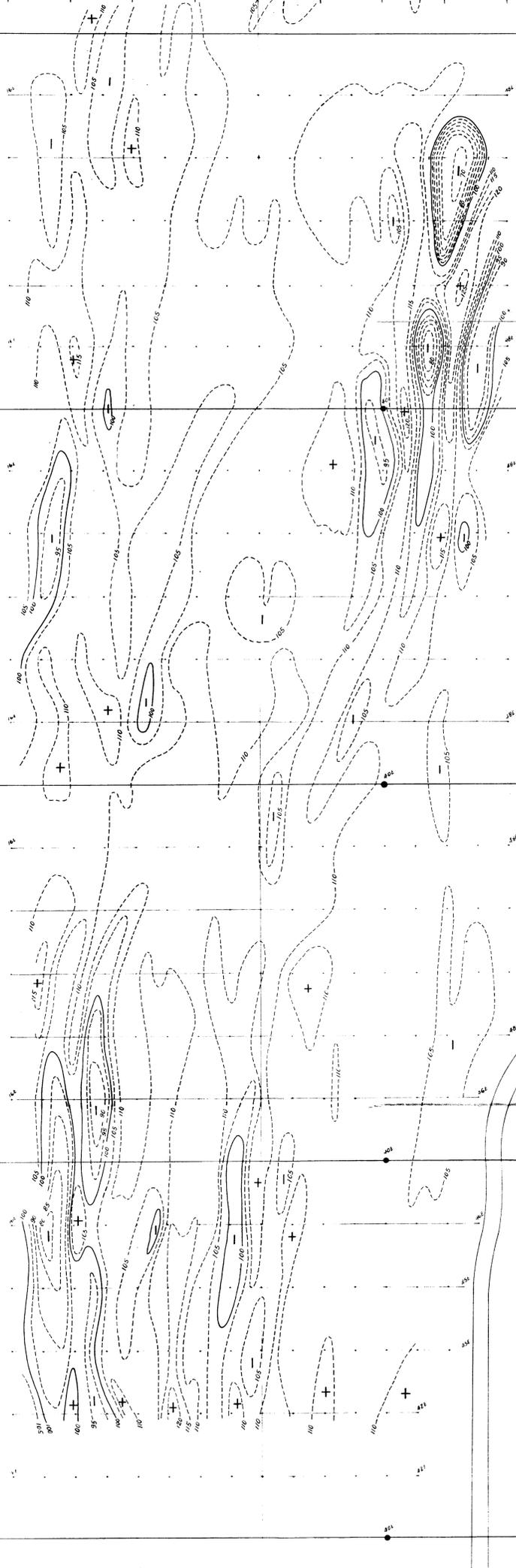
2165

2285

2405

2525

2605



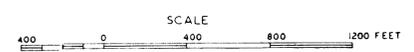
Base Line 179° 00' 00"

Part Mapped North Grid 1964

WOODCUTTERS - RUM JUNGLE EAST, NT
SLINGRAM REAL-COMPONENT CONTOURS

Frequency 1760 c/s
Separation 200 ft.
Contour interval 5%

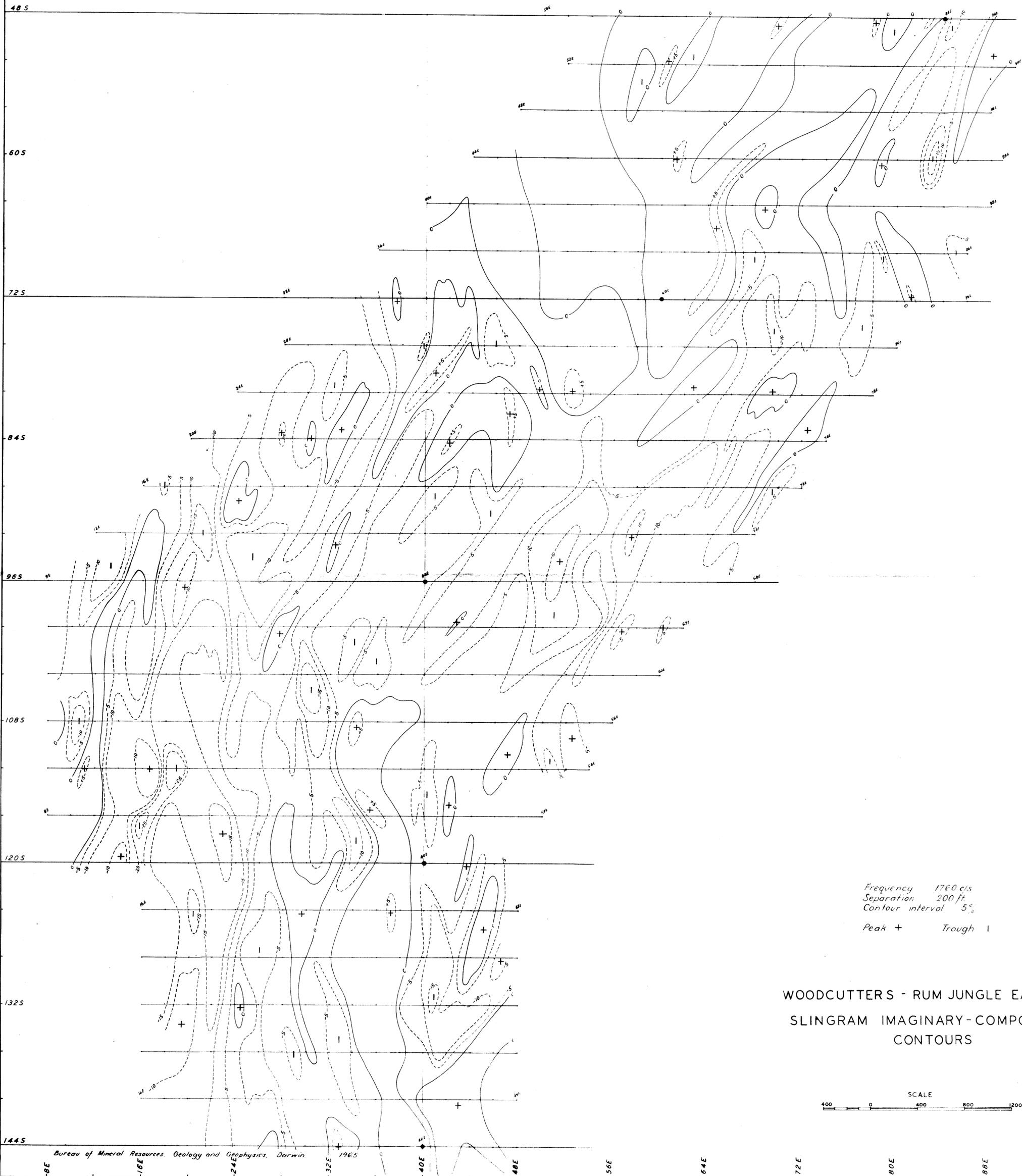
Peak + Trough 1



Scale 1:25000

under cultivation

local cultivation



Frequency 1760 c/s
 Separation 200 ft.
 Contour interval 5°
 Peak + Trough -

WOODCUTTERS - RUM JUNGLE EAST, N T
 SLINGRAM IMAGINARY-COMPONENT
 CONTOURS



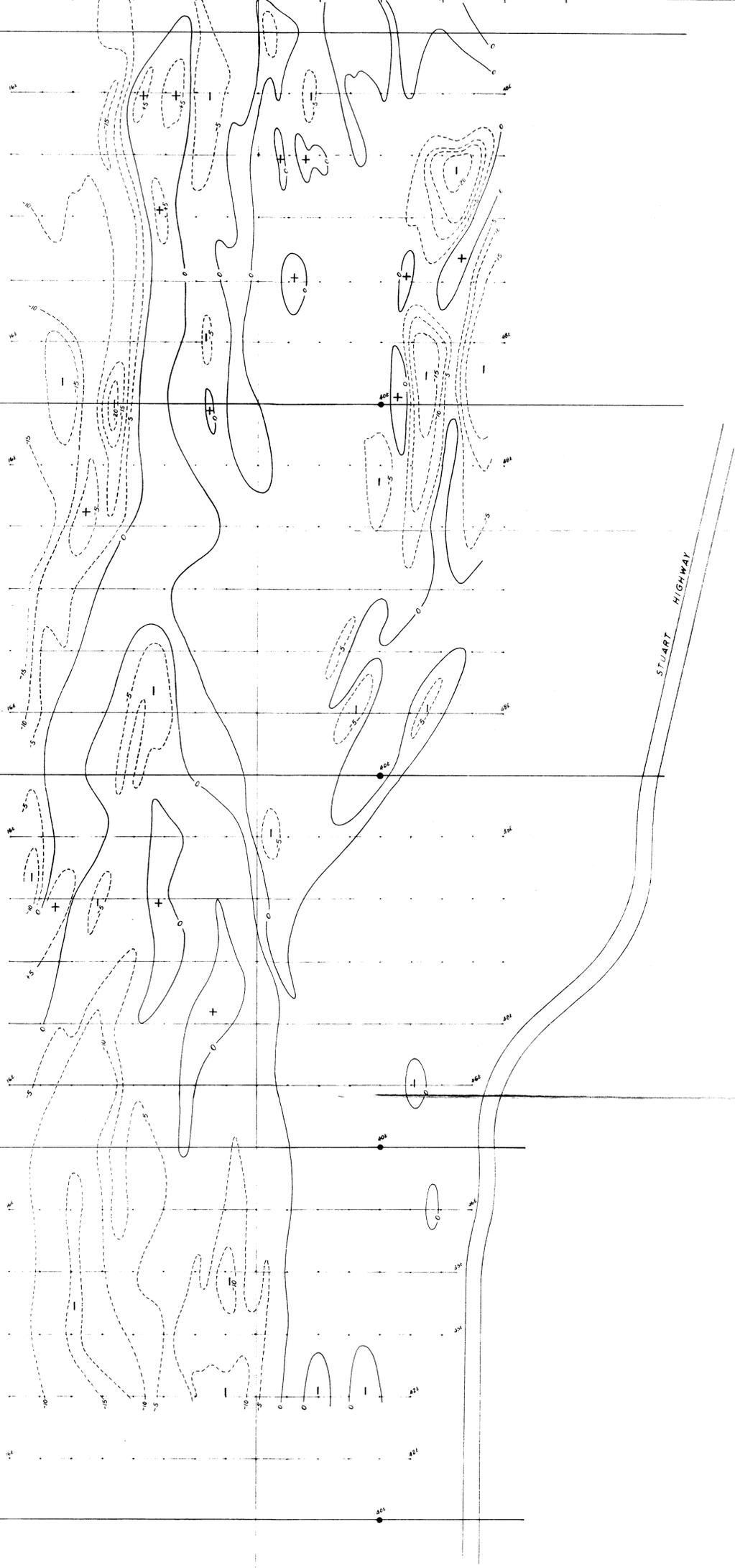
1445
1585
1685
1805
1925
2045
2165
2285
2405
2525
2605

12W
00
08E
16E
24E
32E
40E
48E

Under cultivation

Part Huandar North Grid 1964

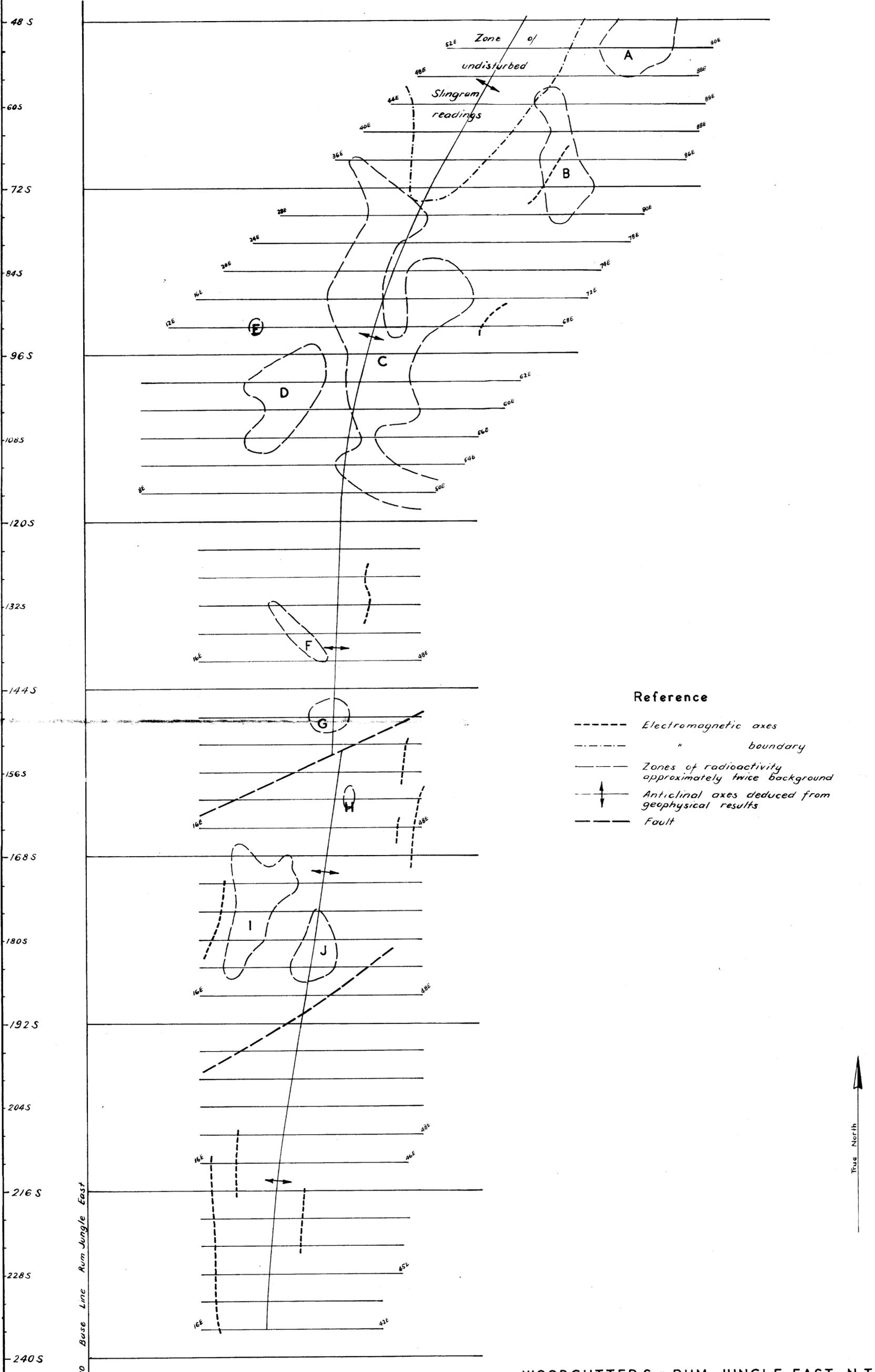
Base Line 179° 00' 00"



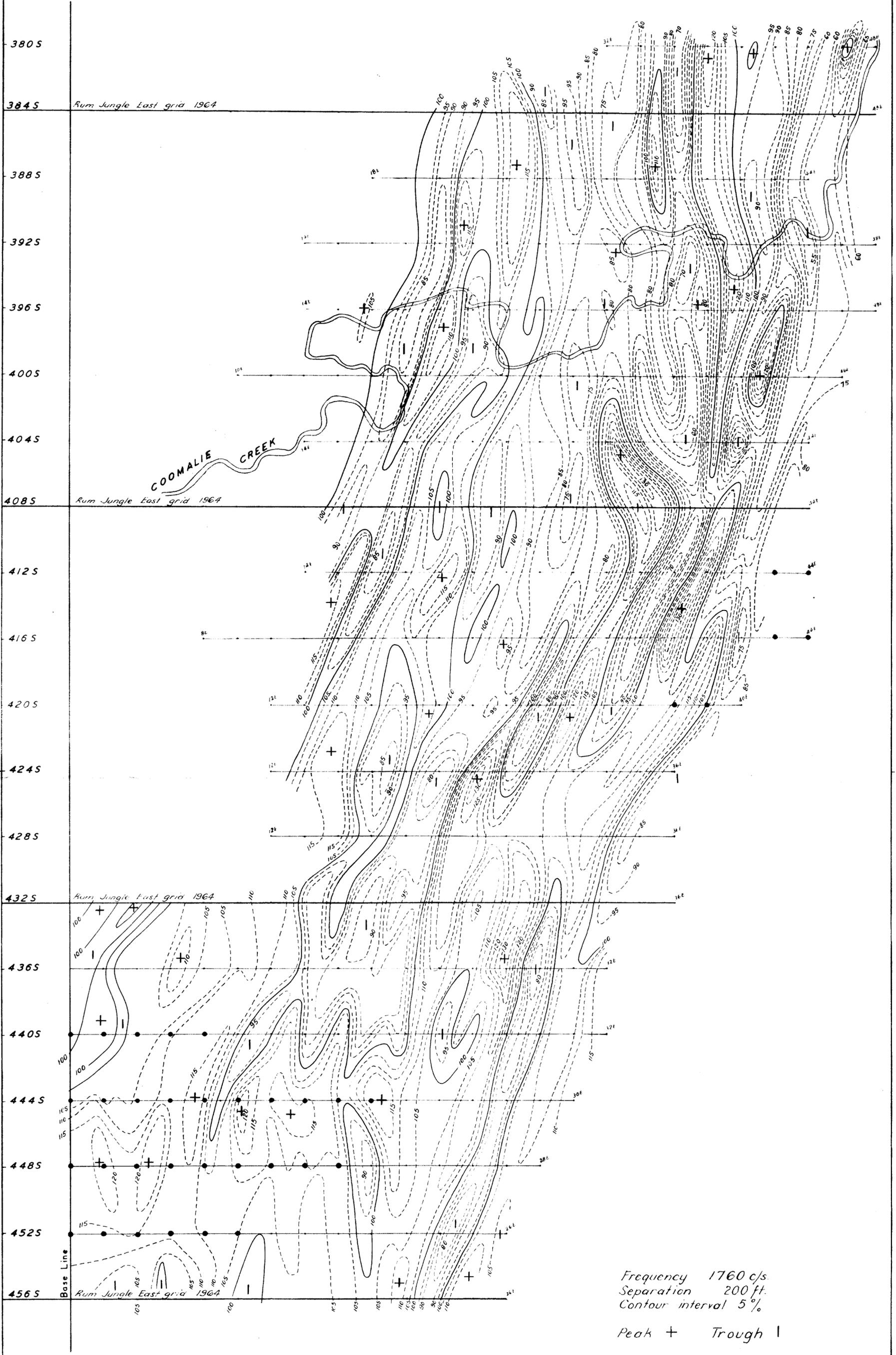
Frequency 1760 c/s
Separation 200 ft
Contour interval 5'
Peak + Trough 1

WOODCUTTERS - RUM JUNGLE EAST, N T
SLINGRAM IMAGINARY-COMPONENT
CONTOURS





WOODCUTTERS - RUM JUNGLE EAST, NT
GEOPHYSICAL ANOMALIES



Frequency 1760 c/s.
 Separation 200 ft.
 Contour interval 5%

Peak + Trough I

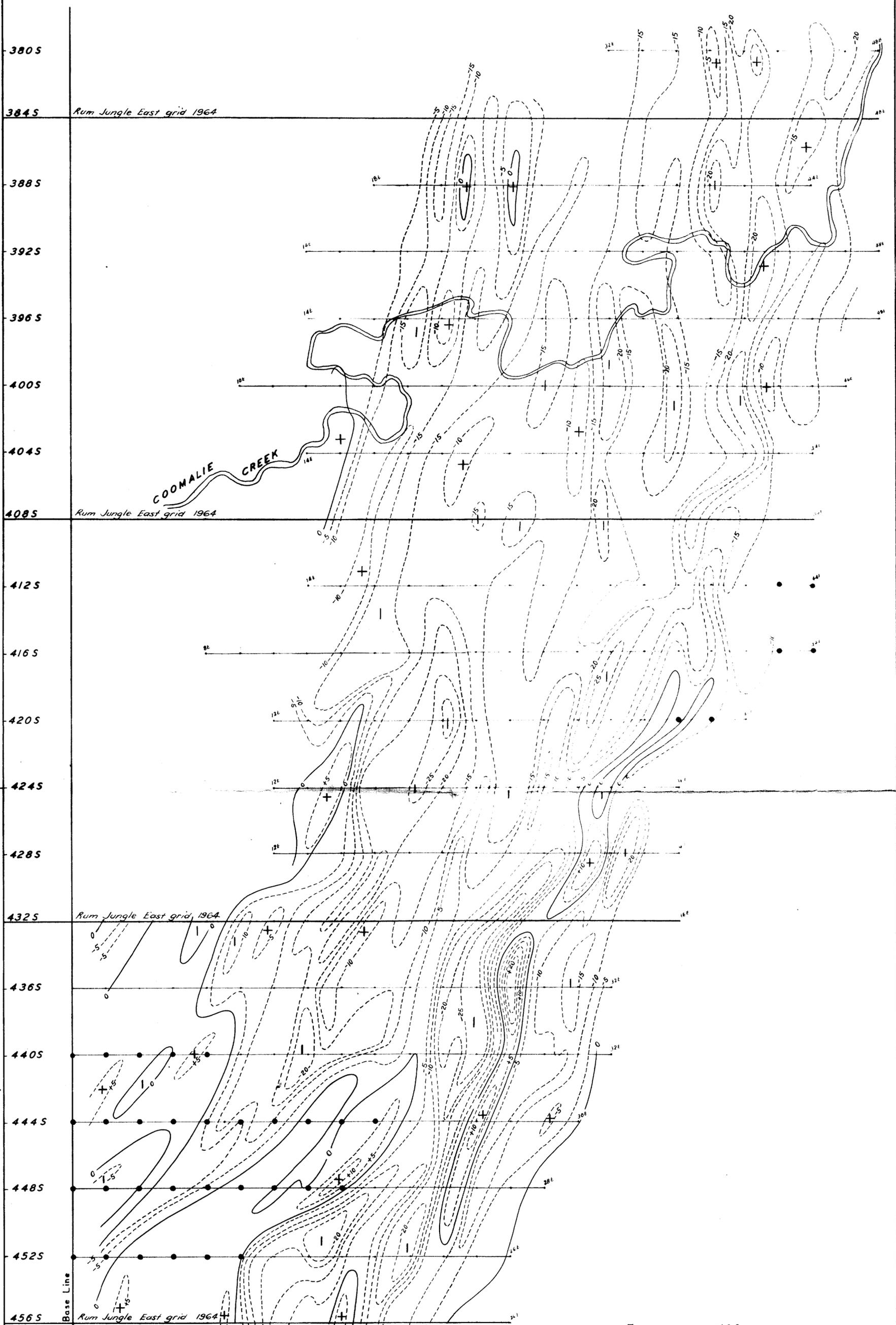
COOMALIE GAP WEST
 RUM JUNGLE EAST, N T

SLINGRAM REAL-COMPONENT CONTOURS



SCALE





Frequency 1760 c/s.
 Separation 200ft.
 Contour interval 5'
 Peak + Trough 1

COOMALIE GAP WEST
 RUM JUNGLE EAST, N T

SLINGRAM IMAGINARY-COMPONENT CONTOURS

