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GEOPHYSICAL INVESTIGATIONS OF MINOR ZONES OF MINERALISATION IN THE CLONCURRY 1:250 000 SHEET AREA, NORTHWEST QUEENSLAND, 1973

by

N. SAMPATH

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GEOPHYSICAL INVESTIGATIONS OF MINOR ZONES OF MINERALISATION IN THE CLONCURRY 1:250 000 SHEET AREA, NORTHWEST QUEENSLAND, 1973

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SUMMARY

Between June and August 1973, the Bureau of Mineral Resources, Geology and Geophysics conducted ground geophysical surveys at several places in the Cloncurry 1:250 000 Sheet area, northwest Queensland.

The aim of the surveys was to provide data for an assessment of the potential economic significance of minor zones of mineralisation located during regional mapping.

Of the four areas tested, only one around BMR Cloncurry No. 5, 11 km west northwest of Mary Kathleen - was shown to contain enough sulphides to be worthy of further investigation. In this area, geophysical surveys indicate the presence of a large volume of magnetic sulphides in black shales. The economic significance of the sulphide mineralisation around BMR Cloncurry No. 5 should be tested by further geophysical surveys and drilling.

1. INTRODUCTION

Between June and August 1973, the Bureau of Mineral Resources, Geology and Geophysics (BMR) conducted ground geophysical surveys at several places in the Cloncurry 1:250 000 Sheet area, northwest Queensland.

The aim of the surveys was to provide data for an assessment of the potential economic significance of minor zones of mineralisation located during regional mapping by BMR and Geological Survey of Queensland (GSQ) geological parties. Some of these zones had been investigated by shallow BMR stratigraphic drilling. The areas investigated by the geophysical surveys were around Timberu, BMR Cloncurry Nos. 5 and 8, and Mount Frosty. All areas lie within the Marraba and Mary Kathleen 1:100 000 Sheet areas and their locations are indicated in Plate 1. The zones of mineralisation occur within the Corella Formation, a calcareous sequence in the eastern succession of the Lower Proterozoic Cloncurry Complex (Carter & others, 1961).

The geophysical methods used to investigate the zones of mineralisation were: magnetic, self-potential (S-P), Turam, Transient electromagnetic (TEM), resistivity/induced polarisation (IP) and downhole resistivity/IP logging. Most of the surveys were made along surveyed grids prepared by the Department of Services and Property.

2. METHODS

Magnetic

Magnetic surveys of the vertical field were made along surveyed traverses using a Sharpe fluxgate magnetometer type MF-1. Measurements were made at stations 30 m apart with additional readings taken at 15 or 7.5 m intervals over magnetic anomalies. The observations were reduced to a base station in each area and plotted as profiles.

Self-potential (S-P)

S-P surveys were made on selected traverses using a Sharpe S-P meter, and nonpolarising electrodes. Measurements were made every 30 m; additional readings were made at 15 m intervals over anomalies. S-P measurements were tied to a fixed datum level in each area.

Electromagnetic (Turam)

ABEM Turam type-2S equipment with 30 m coil separation was employed in the Turam survey areas. Alternating primary-field frequencies of 220 and 660 Hz were employed using a straight cable grounded at both ends.

Amplitude ratio and phase difference were measured. The observed amplitude ratios were normalised by division of the calculated free-space field.

Induced Polarisation (IP)

The frequency domain resistivity/IP method employed a Geoscience transmitter and McPhar receiver; measurements were made on frequencies 0.3 and 5.0 Hz. The dipole-dipole array was used on all surveys. The results are presented as pseudosections of apparent resistivity, frequency effect, and metal factor.

Transient electromagnetic (TEM)

The single-loop Russian-built MPPO-1 equipment as described by Spies & Hone (1974) was used with loop size of 60 m x 50 m.

Down-hole IP Logging

BMR stratigraphic hole Cloncurry No. 7 was logged using a McPhar model 650 frequency domain unit operating at 0.3 and 5.0 Hz. The hole was logged with dipole-dipole array probes having electrode spacings of 3 m and 10 m. Measurements were taken at 3 m intervals. Poor repeatability using lead electrodes necessitated the construction of porous pots.

3. TIMBERU AREA SURVEY

Geology

In the Timberu area, small-scale disseminated copper mineralisation occurs in a belt of scapolite-bearing limestone, granofels, and calc-silicate rock in part of the lower Corella Formation. The metasediments are steeply

dipping and locally show minor drag-folding along shears. The copper occurs as chalcopyrite blebs 1 to 2 mm in diameter.

Work done

During 1972, magnetic, S-P, and IP surveys were made in the Timberu area (Sampath & Ogilvy, 1974). The results of this work indicated a weak IP anomaly associated with the zone of mineralisation.

In 1973 the significance of the IP anomalies was investigated by further IP surveys and IP/resistivity logging of BMR stratigraphic hole Cloncurry No. 7, which intersected the zone of mineralisation.

IP survey

The 1972 IP survey was extended by making dipole-dipole array surveys using an electrode spacing of 60 m along traverses 0 and 500 S (Plate 1). The results of these surveys are shown in Plate 2. Surface mineralisation occurs near station 120E on traverse 0 and near 30W on traverse 500S.

On traverse 0 a distinct change in resistivity and frequency effect evident around station 90E probably reflects a rock contact. The increase in frequency effect to 2.7% for n=3 at station 120E probably reflects the weak disseminated mineralisation reported at this locality. The absence of any significant increase in frequency effect for array spacings of greater than n=3 indicates a weak, shallow, small source.

The IP results along traverse 500S do not reflect the presence of the mineralisation reported near station 30W, but they indicate a possible rock contact west of station 120W.

The IP responses recorded on traverses 0 and 500S are similar to the responses recorded on traverses D and 1650S in 1972 (Sampath & Ogilvy, 1974). None of the four IP traverses indicated the presence of a large volume of sulphides near the surface. Hence the economic potential of this mineralised zone must be considered low.

Logging of BMR Cloncurry No. 7

BMR Cloncurry No. 7 was collared at the western end of traverse 0 and drilled to a depth of 87 m on a bearing of 95° and an inclination of 50°. The geological log and IP/resistivity log of BMR Cloncurry No. 7 are shown in Plate 3.

A sharp increase in apparent resistivity at around 55 m in the resistivity log is probably an indication of the depth of weathering rather than an indication of a change in rock type.

Frequency effect values are fairly uniform throughout the length of the hole, but small changes in the log at 47 m and 62 m might reflect the minor veins of chalcopyrite in the core at these depths. The negative frequency effects at 47 m might be due to spurious coupling problems between the probe and the minor chalcopyrite mineralisation at this depth.

The frequency effect values recorded in BMR Cloncurry No. 7 are perhaps a little higher than might be expected from the results of IP measurements on Corella Formation rocks by Sampath & Ogilvy (1974). However, the results are not abnormal for metasediments, and at best indicate that only minor mineralisation is associated with the metasediments in this area.

Discussion

The results of IP surveys and in-hole IP/resistivity logging of BMR Cloncurry No. 7 show that only weak sulphide mineralisation occurs in the Timberu area.

4. BMR CLONCURRY NO. 8 AREA SURVEY

Geology

This area is underlain by the lower, middle, and upper members of the Corella Formation, which consists of grey laminated calcareous siltstone and minor quartzite and limestone. The rocks are exposed in a north-northwest-trending belt on the western limb of shallow north-plunging major syncline. Dips are generally about 60° to the east. Ferruginous slightly manganiferous gossans occur in an en echelon pattern with a northwesterly trend along the eastern side of a north-trending fault. Another gossanous zone occurs along a

northeast-trending fault which repeats the strata to the west of the north-trending fault. BMR Cloncurry No. 8 was drilled in a gossanous zone associated with calcareous siltstone and intersected only traces of mineralisation. Some of the features of the geology of the Cloncurry No. 8 area are indicated in Plate 4.

Work done

Gridlines were pegged across the Cloncurry No. 8 area (Plate 4), and IP, Turam, TEM, S-P, and magnetic surveys were made along selected traverses to investigate the extent of possible sulphide mineralisation beneath the ferruginous gossans.

IP survey

Dipole-dipole array IP surveys were made on traverses 400S, 400N, 500N, 600N, 700N, 800N and 1200N using a 60-m electrode spacing. Traverse 600N was also surveyed with a 30-m electrode spacing. The results of the IP surveys along traverses 600N and 1200N and 400S are shown in Plates 5, 6, 7, and 8. The IP results along traverses 500N, 600N, 700N, and 800N are indicated in Plate 4.

As indicated in Plate 4, weak poorly defined IP anomalies which appear to form a zone were detected by the 60-m dipole-dipole array surveys on traverses 500N, 600N, 700N and 800N. A somewhat better defined IP anomaly was detected on traverse 1200N at 240E (Plate 7), but the relation between this anomaly and the anomalies detected on lines 600N, 700N, and 800N is not clear.

The IP anomalies obtained with a 60-m dipole-dipole array on lines 500N, 600N, 700N, and 800N do not appear to be directly related to gossanous outcrops. However the source of these anomalies is obscure and some ambiguity exists as to the location and significance of the IP anomalies. To better define the source of the anomaly on traverse 600N, a 30 m dipole-dipole array survey was made and the results of this survey are shown in Plate 6. The results of the 30 m dipole-dipole array survey suggests that there are two IP sources. One of these sources appears to be at about 330E and corresponds to the gossanous zone tested by BMR Cloncurry No. 8. The other source is at about 90E and corresponds to the gossanous outcrop associated with the fault in the west of the area.

The results of the 30-m dipole-dipole array survey along traverse 600N indicate that the gossanous outcrops in the Cloncurry No. 8 area are underlain by sulphide mineralisation. However, none of the anomalies recorded in the survey area indicate an abundance of sulphides at shallow depth, so the economic potential of this mineralised zone appears to be low.

The IP results along traverse 400S show a poorly defined IP anomaly between 240E and 480E. This anomaly is similar to the 60-m dipole-dipole anomaly recorded on traverse 600N, and the anomaly occurs in the same relative geological position as the anomaly on 600N. Hence the results of the IP traverse along 400S suggest a continuation of the zone of weak mineralisation to the south.

Turam survey

A Turam survey was conducted along traverses 400N, 550N, 600N, 650N, 700N, 800N, 900N, and 1000N. The primary field was generated by means of a cable grounded at 200N/00E and 1200N/00E. Contours based on the results of the phase difference measurements at 660 Hz are shown in Plate 4.

In general the Turam results are very erratic, and features common to both phase difference and field ratio measurements are difficult to correlate from line to line. The response along traverse 600N is typical of the results along all traverses and is illustrated in Plate 5. The phase difference results indicate three general anomalies (A, B, and C). However, as indicated in Plate 5 the results are fairly erratic, particularly in the eastern part of the area. Anomaly A is parallel to a northeast-trending fault which is associated with gossanous outcrops between traverses 500N and 800N. Anomaly A has a relatively small phase difference and large field strength ratio, factors which suggest a high conductance. The long length of anomaly A and its close association with the fault suggest that the fault rather than mineralisation is the source of this Turam anomaly.

Anomaly B extends from 700 N to 1000N, and roughly parallels a drainage feature. The anomaly does not coincide with the gossanous outcrops, but has a response which indicates a high conductance. This anomaly is probably associated with shallow conductive sources arising from alluvium-filled stream beds.

Anomaly C is highly erratic and is clearly associated with conductive soils filling a large drainage feature in the east.

Although the correlation between IP and Turam results does indicate some coincident anomalies, the erratic nature of the Turam results precludes the use of Turam as a meaningful prospecting tool in this area.

TEM survey

The results of a trial TEM survey using 50 x 60 m loops along traverse 625N recorded low signals at all stations (less than 25 V/A at 1.1 ms) and electrical interference was therefore a major problem. In an attempt to minimise interference, a dual loop configuration (Spies, 1975) was used; it proved to have superior signal-to-noise characteristics.

The TEM results at 1.1 ms are shown in Plate 9. The different location of the anomalies for the single and dual loop configurations can be explained by different coupling characteristics. It appears that TEM sources were located at about 210E and around 30E to 60E. Neither of the TEM sources appeared to be associated with the gossanous zones or the IP anomalies located at 330E and 90E on traverse 600N. The dissimilarity of the TEM and Turam results is surprising but probably reflects the variation in surface conductivity throughout the area and the greater sensitivity of Turam to surface conductors.

Magnetics and S-P

Magnetic and S-P surveys were made along several traverses in the survey area. The magnetic results were all fairly flat with a gentle positive gradient to the west. The S-P results were fairly erratic and features could not be traced between lines. Typical results of the magnetic and S-P surveys were recorded on traverse 600N and are shown in Plate 5.

Discussion

The results of IP, EM, magnetic and S-P surveys in the Cloncurry No.8 area confirm that minor sulphide mineralisation is associated with the gossanous outcrops in the area. IP proved to be the only effective prospecting tool in this area.

The results indicate that the zone of minor sulphide mineralisation has a considerable strike extent.

5. MOUNT FROSTY AREA SURVEY

Geology

At Mount Frosty, minor pyrite, pyrrhotite, and chalcopyrite are associated with a large calcite lens which occurs with doleritic rocks within the Corella Formation. The area has been disturbed by several north-trending shear zones which are marked by quartz and quartz-hematite-magnetite veins. About one third of the area is covered by alluvium, and outcrops of meta-dolerite and schistose amphibolite are common. The calcite body has previously been worked for smelter flux. The geology of the Mount Frosty area is indicated in Plate 10.

Work done

The object of the survey in the Mount Frosty area was to detect, outline, and trace the extent of the sulphide mineralisation associated with the calcite body. Turam, TEM, IP, magnetic, and S-P surveys were made along 13 east-west traverses 50 m apart (Plate 10).

IP survey

Dipole-dipole array surveys with a 60-m dipole spacing were made along traverses 0, 100N, 150N, 200N and 300N. A 30-m dipole spacing was also used on traverse 100N.

The IP results do not show any anomalies which can be attributed to mineralisation. The metasediments produce an apparent frequency effect of about 6%, while the massive dolerite produced an apparent frequency effect of only 2%. The apparent resistivity results also show a zone of relatively low resistivity associated with the north-south-trending alluvium filled drainage channel between 30E and 150E.

A typical example of an IP/resistivity traverse across this area is shown in Plate 11.

Turam survey

A Turam survey was conducted along traverses using a grounded cable at 0/300E and 600N/300E. Contours based on the results of the phase difference measurements at 660 Hz are shown in Plate 10.

Like the Turam results at the Cloncurry No. 8 area, the features common to both phase difference and field ratio measurements are difficult to correlate. Most features appear to correlate with creek beds and other zones of surficial conductivity. The phase difference results indicate three anomalies (A, B, and C) which have a clear persistence over several lines.

Anomaly A corresponds with the zone of alluvium flanking the metasediment outcrop boundary. The anomaly exhibits a large field strength anomaly which indicates a relatively high conductance. The source of the anomaly is most likely conductive surface materials associated with drainage features. The IP survey results indicate that this anomaly has no IP response but does appear to have a low apparent resistivity.

Anomaly B mostly occurs within metasediments and has response characteristics indicating moderate conductance. There are no IP/resistivity features associated with this zone. Anomaly B may reflect a small conductive unit within the metasediments.

Anomaly C occurs within alluvium and is parallel to northwest-trending quartz veins in this area. The source of the anomaly is not clear, but it does not produce an IP/resistivity anomaly.

TEM survey

Most of the Mount Frosty area grid was surveyed using the MPPO-1 equipment, with single loop size of 50 m x 60 m and a 50% overlap. The results of the survey are indicated in Plate 12.

Signal levels in the area are generally low, and electrical interference from nearby power lines was high. However, two anomalous zones were recorded adjacent to the open-cut mine. The eastern anomaly coincides with old mine workings. The western anomaly occurs in an area where large amounts of scrap metal are on the ground. Hence, the significance of these readings are suspect. The anomaly over the old mine workings is difficult to explain. No IP or significant Turam anomaly was recorded in this area, and the TEM anomaly seems to have a very limited extent and is probably also the result of scrap metal.

Magnetic survey

Very erratic magnetic profiles were recorded along all traverses in the Mount Frosty area. On some traverses large variations in magnetic intensity were observed over distances of less than 5 m. Anomalies occur over alluvium, mine spoil, and over metasediments containing hematite schists. The cause of the anomalies is probably magnetic units within the metasediments and the numerous dolerite bodies. The magnetic data cannot be used for mapping or exploration purposes owing to the random nature of the results.

S-P survey

Several test traverses were made with S-P. The results were erratic and showed no characteristics which could be associated with significant geological or geophysical features.

Discussion

The results of IP, EM, magnetic, and S-P surveys in the Mount Frosty area do not indicate the presence of any substantial bodies of near-surface mineralisation. In particular, the sulphide mineralisation in the open-cut calcite mine appears to be minor and have no significant strike extensions. A TEM anomaly over old mine workings north of the open cut is believed to be due to the presence of metallic objects.

6. BMR CLONCURRY NO. 5 AREAS SURVEY

Geology

The area occupies part of a shallow north-plunging syncline which has been locally faulted. Carbonaceous shale conformably overlies laminated calcareous siltstone in the west and is faulted against the same unit in the east. Pyrrhotite and pyrite lenses weathered to limonite near the surface occur in the black shales and are about 50 cm long and 5 cm thick. The rock types in the area are indicated in Plate 13 (I. Wilson, pers. comm.).

BMR Cloncurry No. 5 was collared at latitude 20°46'45"S and longtitude 139°52'50"E. This hole, drilled in 1971 (Hill & Duff, 1975), was designed to test the significance of the minor pyrrhotite lenses in the carbonaceous shale unit at the top of the Corella Formation. The core, of which 96% was recovered between 6 m and the final depth of 54 m, consisted of black carbonaceous shale with intercalations, less than 10 mm thick, of evaporatic minerals and sulphides. The principal sulphide content is pyrrhotite although pyrite is more abundant toward the top of the core.

Work done

As shown in Plate 13 the area was covered with four parallel traverses separated by 100 m. Magnetic and S-P surveys were made along all traverses, IP surveys were made along traverses 100N and 300N, and a TEM survey was made along traverse 300N.

IP survey

The results of the 60-m dipole-dipole array surveys along traverses 100N and 300N are shown in Plate 14. The survey along traverse 100N indicates a sharp change in resistivity and IP effect at about station 630E: west of this station high IP effects and low resistivities are evident. The change in IP and resistivity at station 630 E probably indicates a change in rock type, and the high IP effects and low-resistivity zone to the west reflect the black shales and minor sulphides tested by BMR Cloncurry No. 5. The survey along traverse 300N shows very low resistivities and extremely high IP effects associated with subcropping black shales between 300E and 600E. A possible change in rock type is indicated at about station 600E.

S-P survey

The results of an S-P survey along traverses 00, 100N, 200N, and 300N are shown as contours in Plate 15, which shows a strong S-P anomaly associated with the black shale on traverse 300N between 400E and 600E. The black shale around BMR Cloncurry No. 5 does not produce the same magnitude of S-P effect as the black shale on traverse 300N. The strong S-P anomaly on traverse 300N corresponds to the large IP/resistivity anomaly recorded on this traverse.

Magnetic survey

The results of the magnetic survey (Plate 16) along traverse 0, 100N, and 200N have no prominent features, but there appears to be some evidence of a contact or fault along a trend passing through 200E/0 and 400E/100N. The small magnetic anomaly at 540E/200N appears to have a discrete source and in view of its proximity to the BMR Cloncurry No. 5 collar might be due to magnetic sulphides in black shale.

The substantial magnetic anomalies between 300E and 700E on traverse 300N appear to have shallow sources and may indicate a number of discrete magnetic bodies. These anomalies occur in an area of limited outcrop of black shale, and correspond to the strong IP/resistivity and S-P anomalies recorded on traverse 300N.

TEM survey

During the course of this survey a single-loop TEM survey was made along traverse 300N to investigate the source of the IP/resistivity, S-P, and magnetic anomalies between 300E and 600E. As shown in Plate 17 a strong TEM anomaly was recorded over the area in which other geophysical anomalies were recorded.

Following the survey, more detailed work was done to determine the culmination of the TEM anomaly which was found to occur at 325N/400E (Hone and Spies, 1974).

Discussion

As indicated in Plate 17 the results of IP/resistivity, S-P, magnetics, and TEM indicate a highly conductive magnetic and polarisable source between 300E and 600E on traverse 300N. The results also suggest that the source of the anomaly on traverse 300N is related to the black shale and minor sulphides intersected by BMR Cloncurry No. 5.

Although Hill and Duff (1975) reported no significant base-metal mineralisation with the pyrrhotite in BMR Cloncurry No. 5, the electrical and magnetic anomalies are significantly larger on traverse 300N than on traverse 100N, and indicate that the concentration of sulphides in the black shale increases to the northeast.

7. CONCLUSIONS AND RECOMMENDATIONS

The results of geophysical surveys in the Timberu, BMR Cloncurry No. 8, BMR Cloncurry No. 5, and Mount Frosty areas were useful in helping to assess the economic significance of minor zones of mineralisation located during regional mapping.

At Timberu the geophysical results show that only weak sulphide mineralisation occurs throughout the area.

In the BMR Cloncurry No. 8 area the results of geophysical surveys confirm that only minor sulphide mineralisation is associated with gossanous outcrops.

At Mount Frosty the results of geophysical surveys do not indicate the presence of any substantial bodies of near-surface mineralisation.

In the BMR Cloncurry No. 5 area the results of geophysical surveys indicate a highly conductive and magnetic source which is likely to be black shale containing a considerable volume of pyrrhotite and perhaps other sulphides. This body of sulphides is likely to be associated with the weak sulphide mineralisation intersected in BMR Cloncurry No. 5.

Further magnetic and electrical surveys are recommended, to establish the northerly extension of the sulphide zone. On present information a possible drilling target to test the metal content of the black shale north of BMR Cloncurry No. 5 would be at 325N/480E. It must be noted, however, that the TEM high recorded at this locality is open to the northwest and northeast.

8. REFERENCES

CARTER, E.K., BROOKS, J.H., & WALKER, K.R., 1961 - The Precambrian mineral belt of northwestern Queensland. Bureau of Mineral Resources, Australia, Bulletin 51.

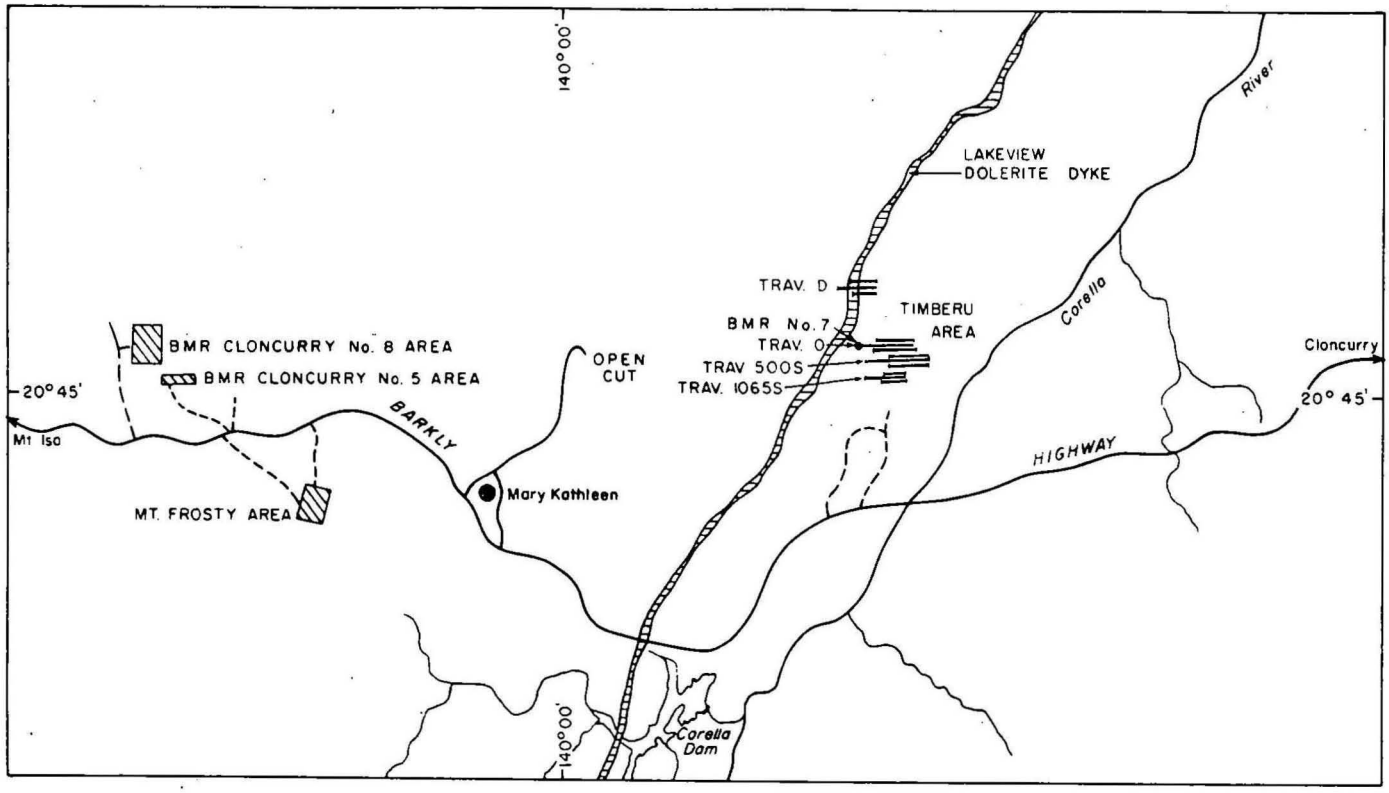
HILL, R.M., & DUFF, B.A., 1975 - Metalliferous diamond drilling Mount Isa area, 1971 - Bureau of Mineral Resources, Australia, Record 1975/84 (unpublished).

HONE, I.G., SPIES, B.R., 1973 - Transient electromagnetic field tests Northern Territory and Queensland, 1973 - Bureau of Mineral Resources Australia, Record 1974/191 (unpublished).

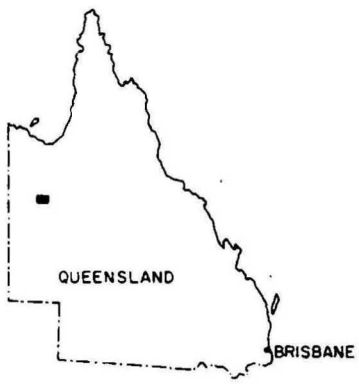
SAMPATH, N., & OGILVY, R.D., 1974 - Cloncurry area geophysical survey, Queensland, 1972. Bureau of Mineral Resources, Australia, Record 1974/135 (unpublished).

SPIES, B.R., & HONE, I.G., 1974 - Transient electomagnetic field tests, NT and Qld. Bureau of Mineral Resources, Australia, Record 1974/167 (unpublished).

PLATE 1



LOCATION MAP



LEGEND

ROAD ——————

TRACK - - - - -

5 0 5 10 km

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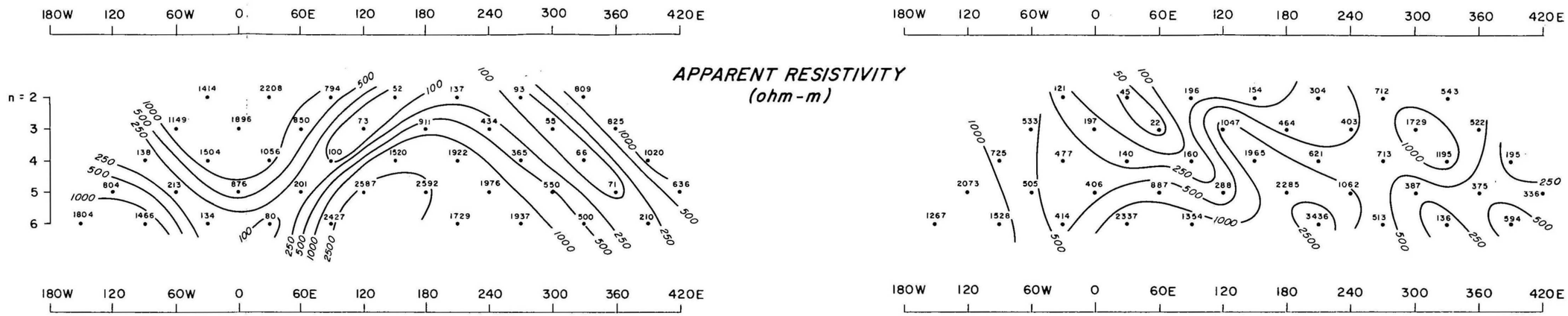
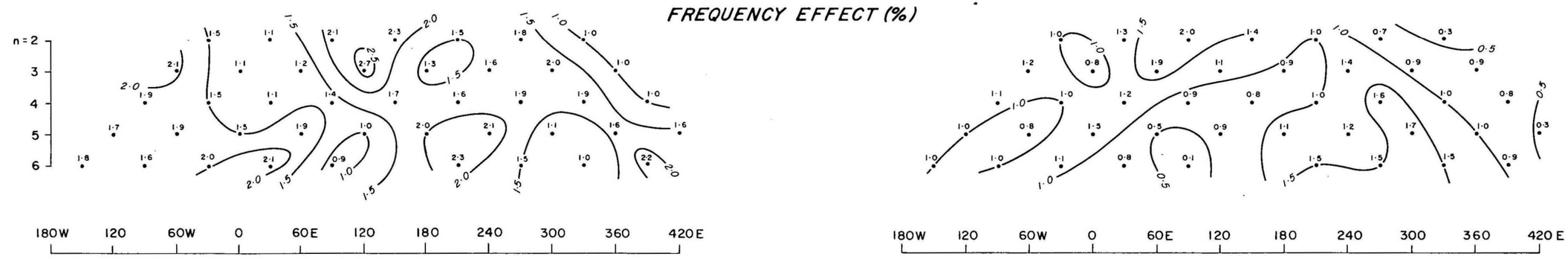
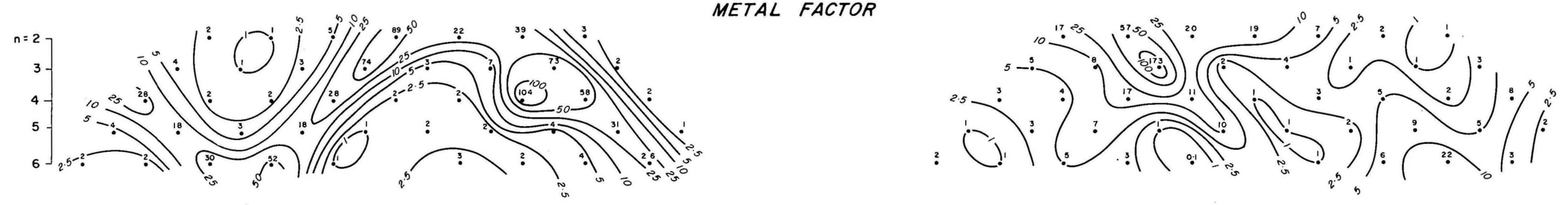
F 54/B7 - 31A

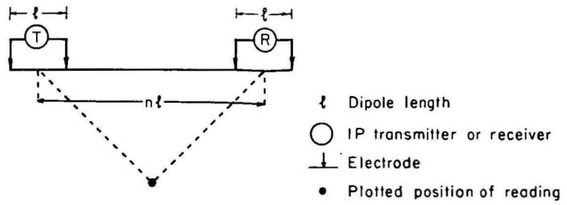
TRAVERSE 0

TRAVERSE 500 S









TIMBERU AREA
IP RESULTS
TRAVERSES 0 AND 500 S

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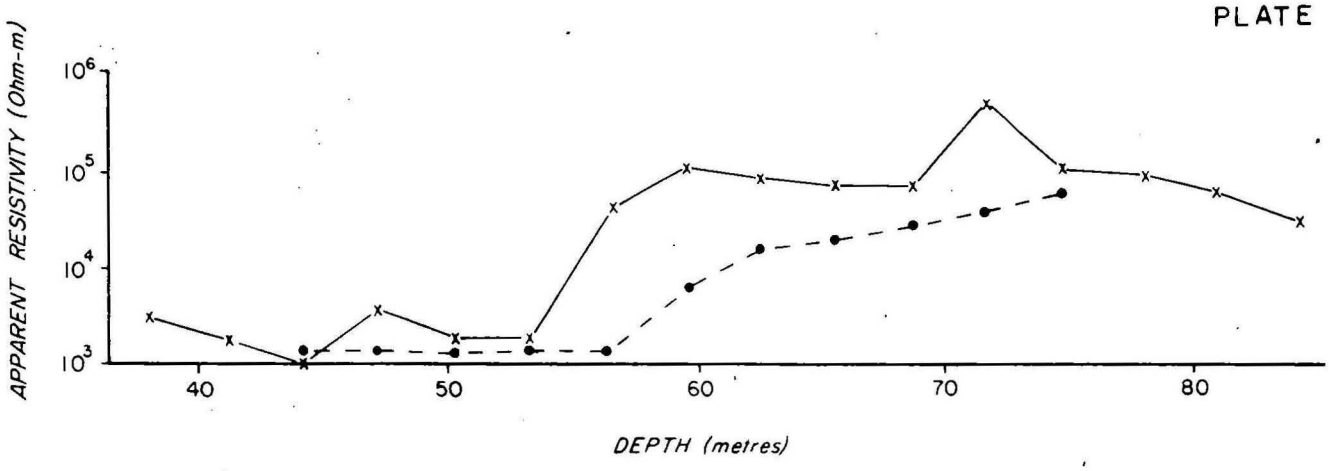
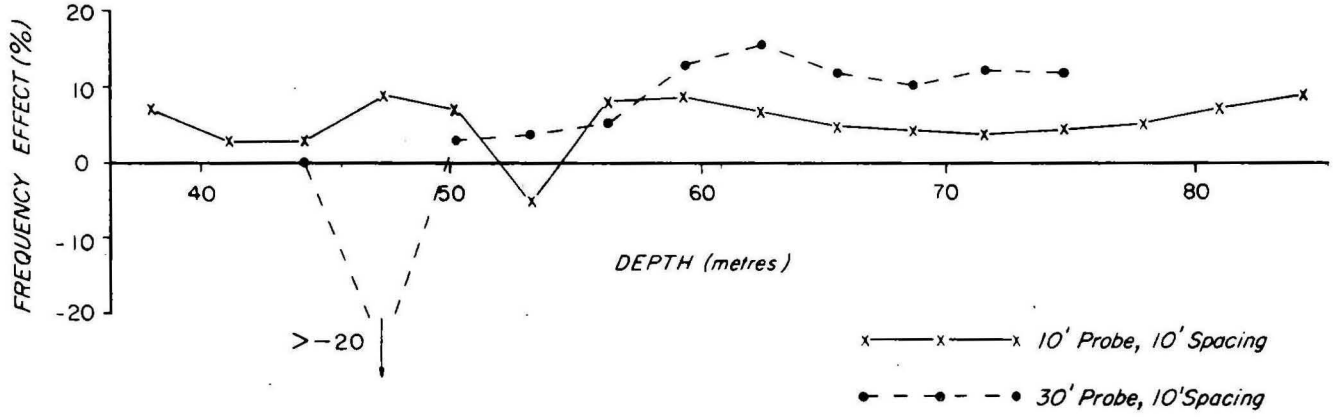
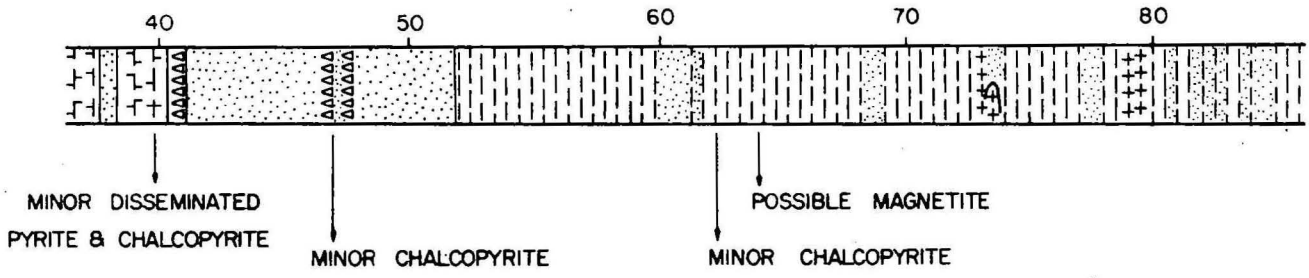
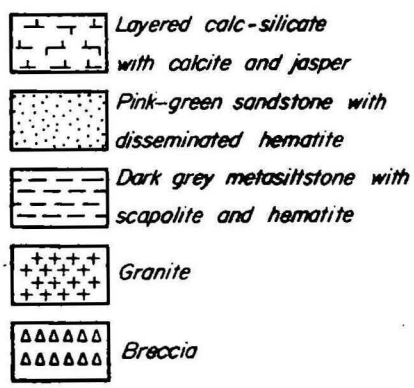
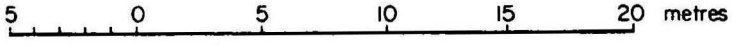
PLATE 3











TIMBERU AREA

DOWN-HOLE IP LOGGING RESULTS

BMR CLONCURRY No. 7

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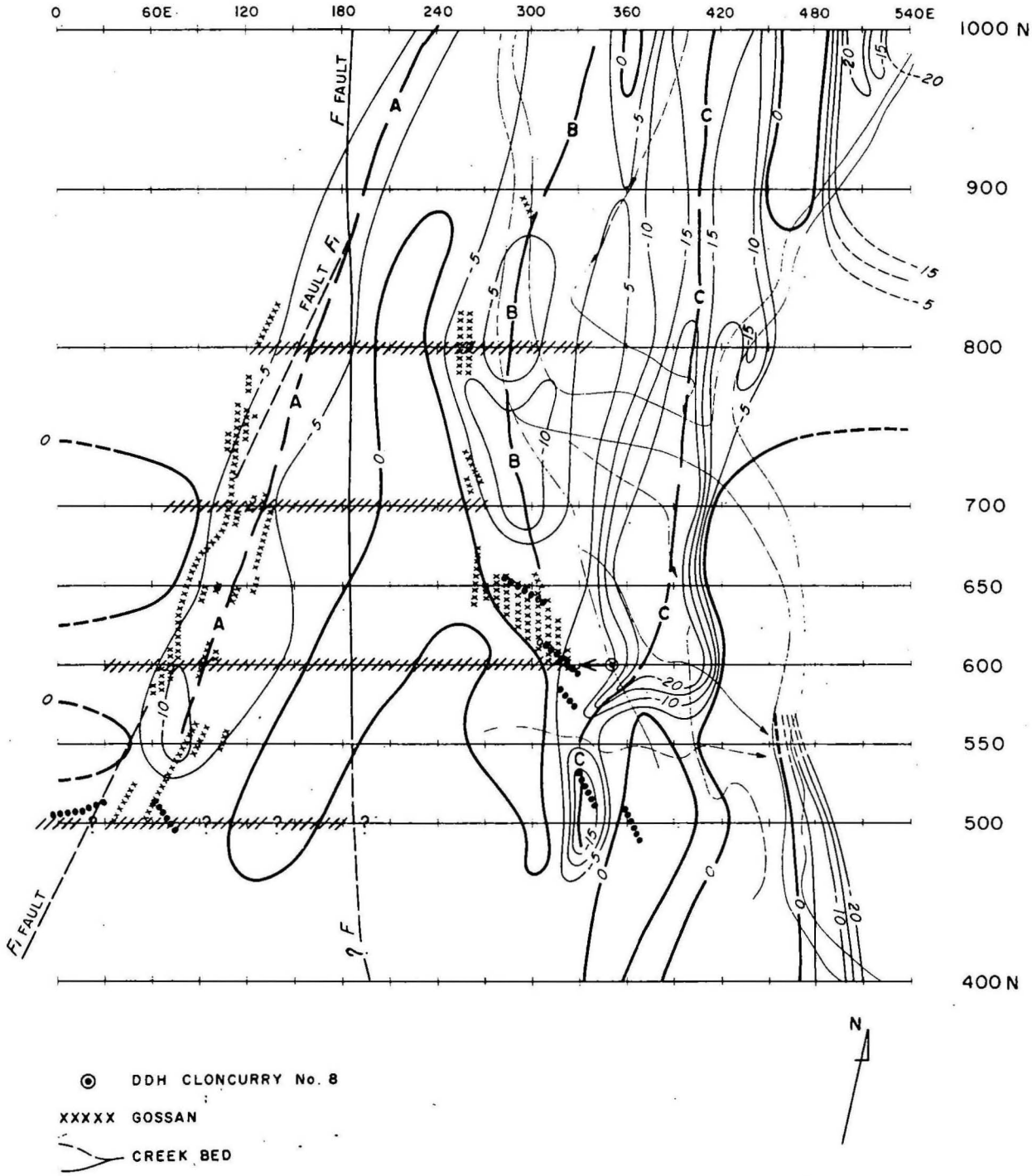


⊙ DDH CLONCURRY No. 8

XXXXX GOSSAN

CREEK BED

●●●●●● SHEAR ZONE

CONTOUR INTERVAL 5°

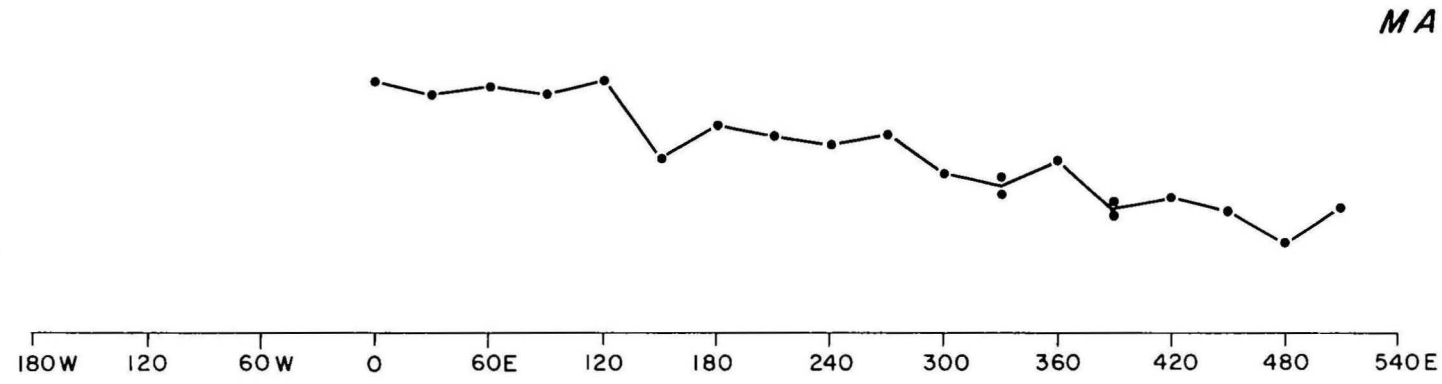
//////// IP ANOMALY 60m DIPOLE – DIPOLE ARRAY

—A— TURAM ANOMALY AXIS

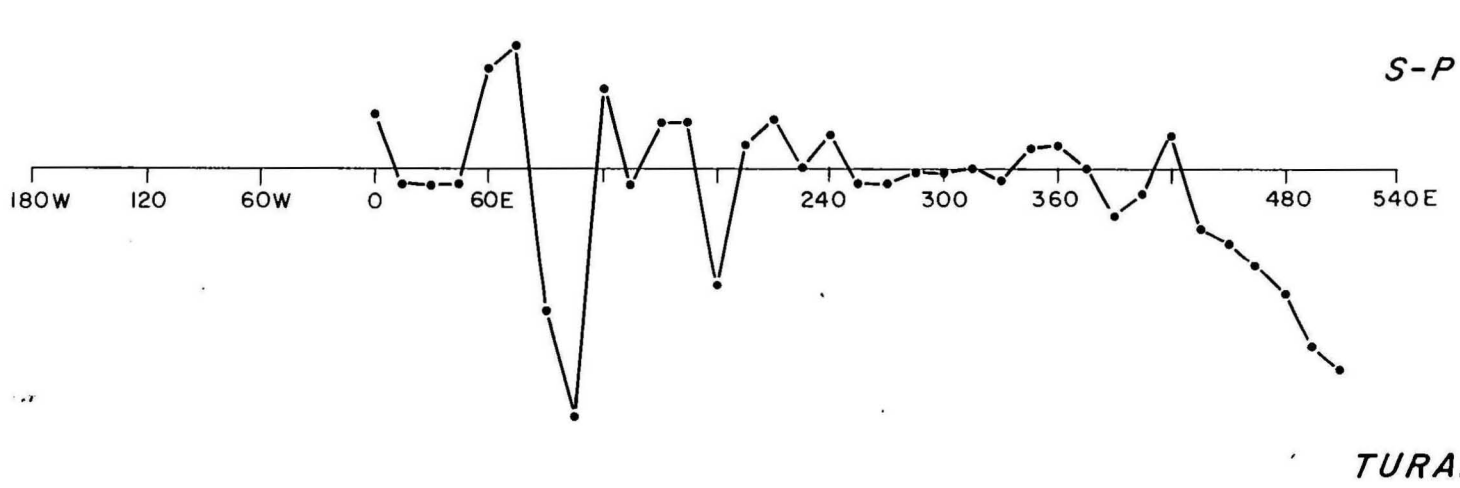
BMR CLONCURRY No.8 AREA
TURAM PHASE CONTOURS
(660 Hz)

Record No. 1978/56

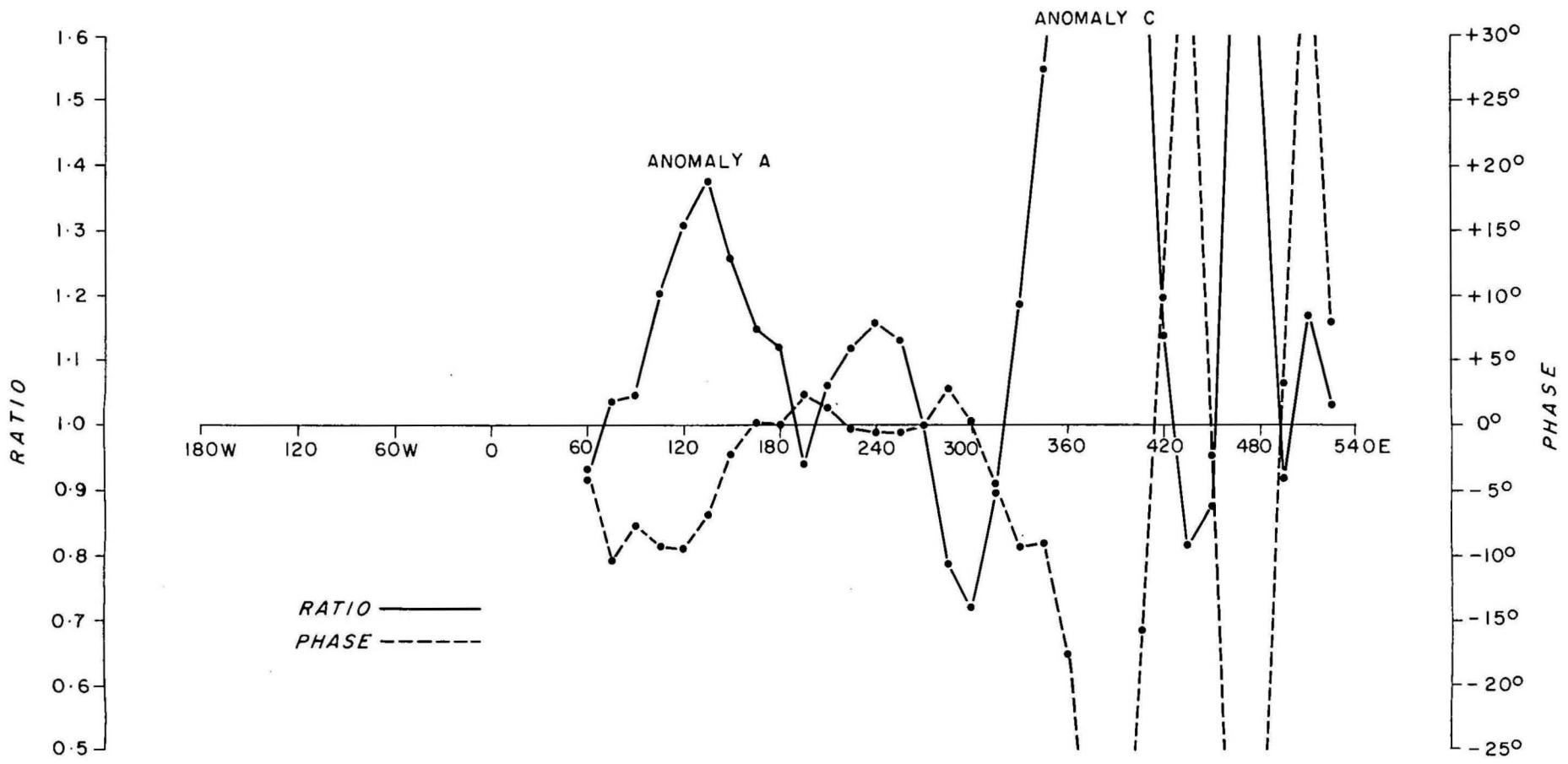
MAGNETIC RESULTS



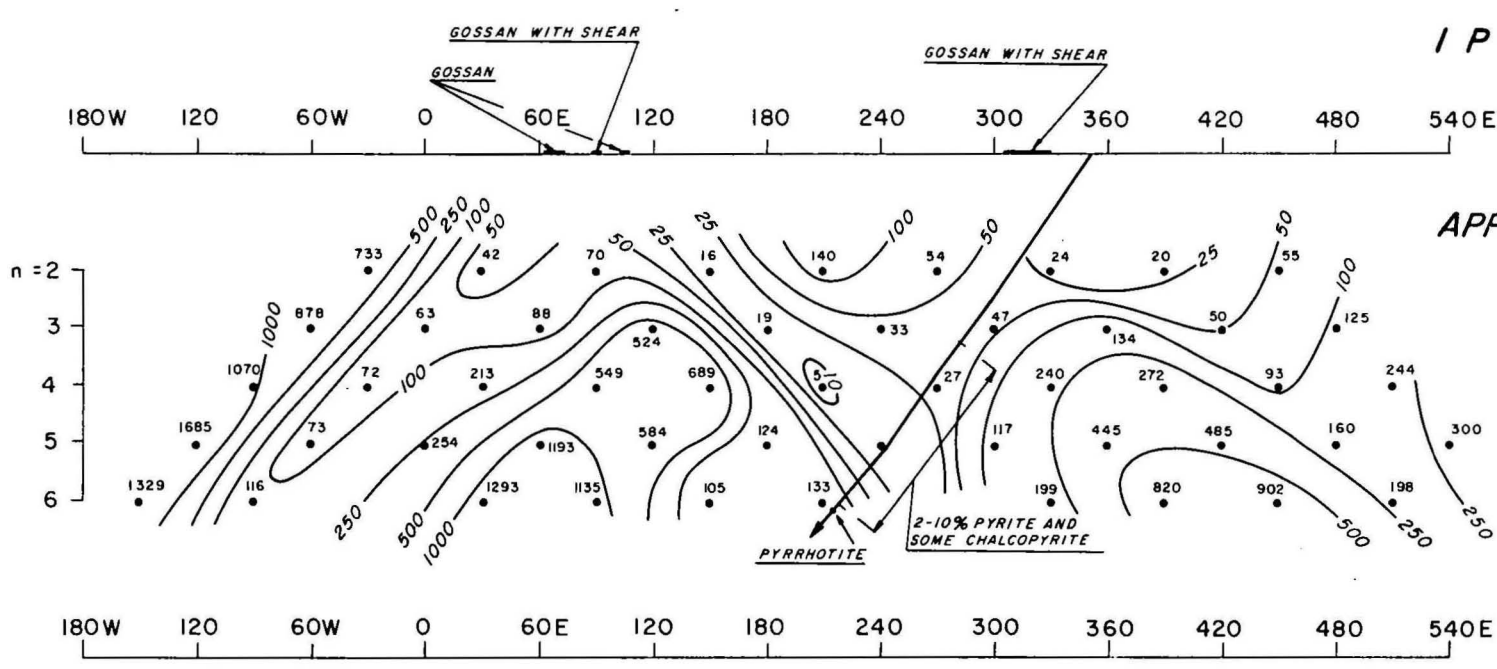
S-P RESULTS



TURAM RESULTS

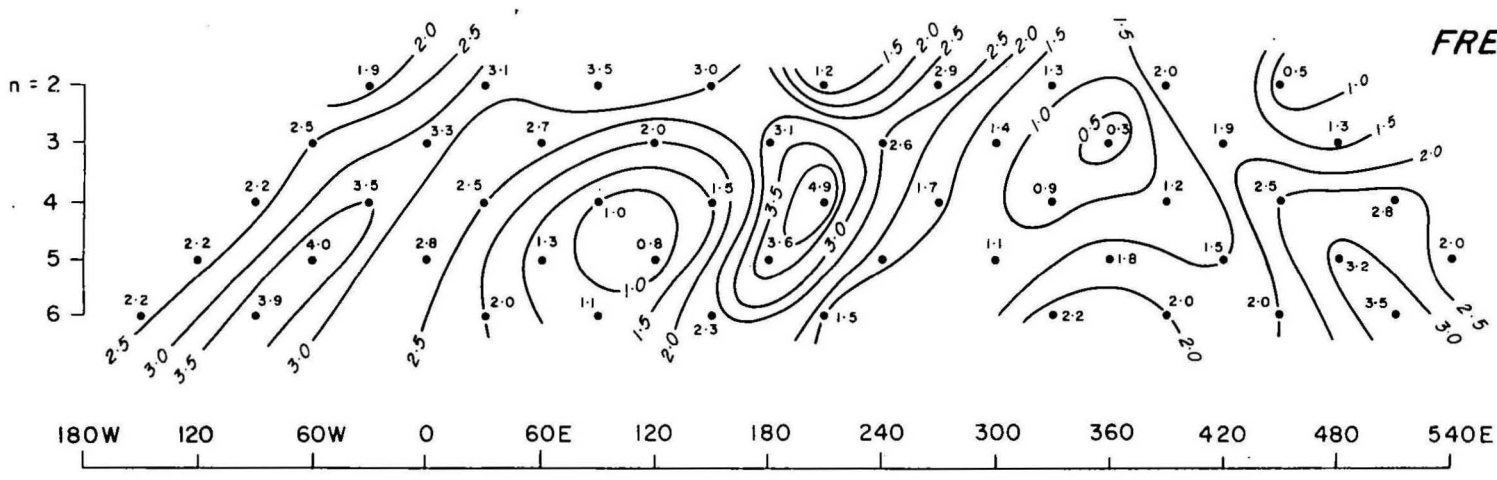


I P RESULTS

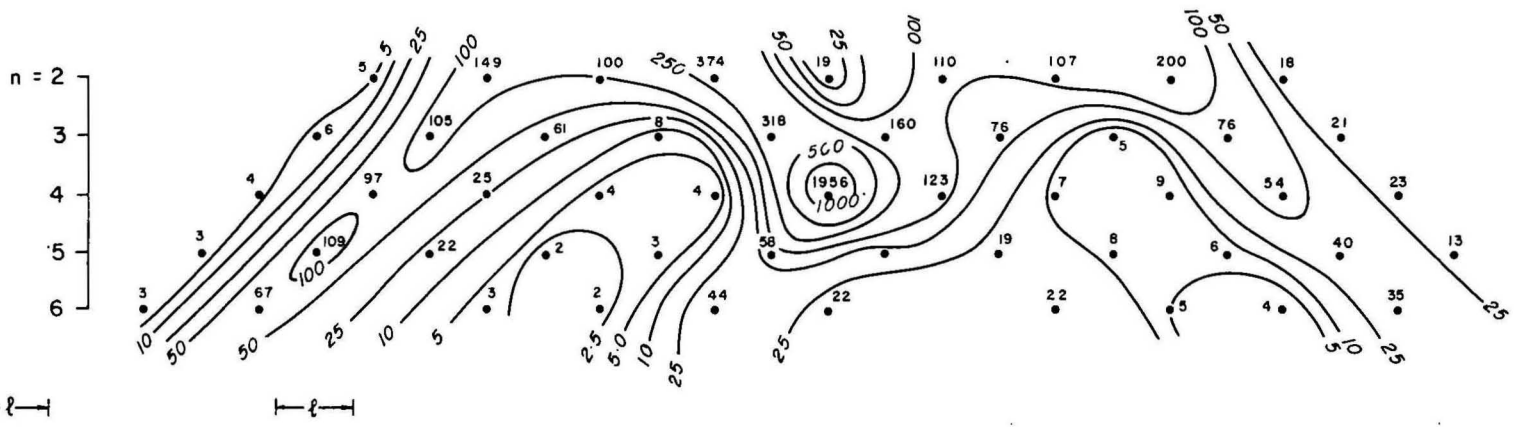


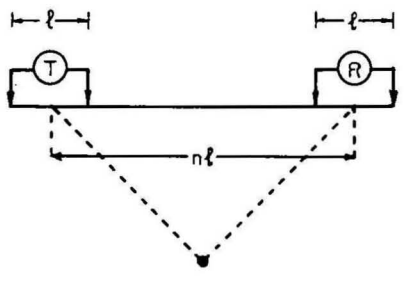
APPARENT RESISTIVITY (ohm-m)

FREQUENCY EFFECT (%)



METAL FACTOR





ℓ Dipole length
IP transmitter or receiver
Electrode
Plotted position

BMR CLONCURRY No.8 AREA MAGNETIC, S-P, TURAM AND IP RESULTS, TRAVERSE 600N
(Stations at 60 m interval)

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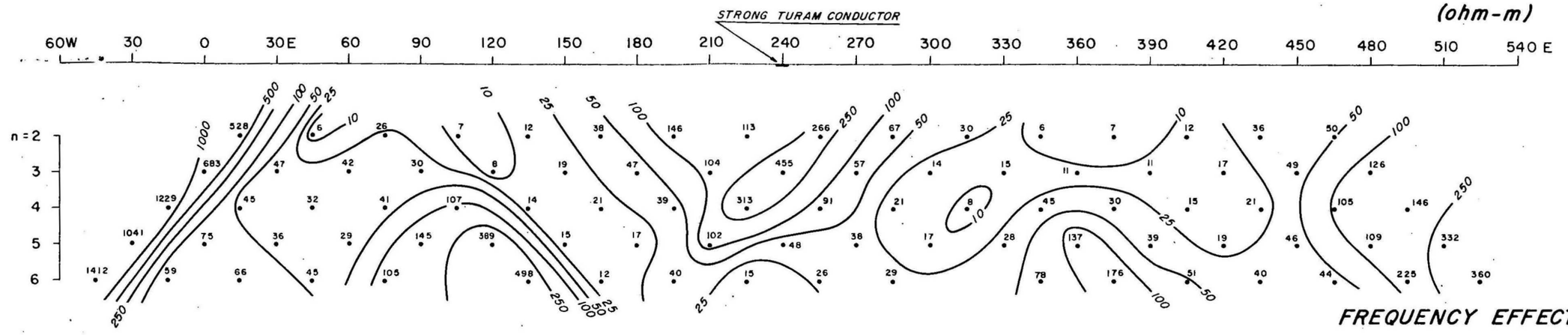
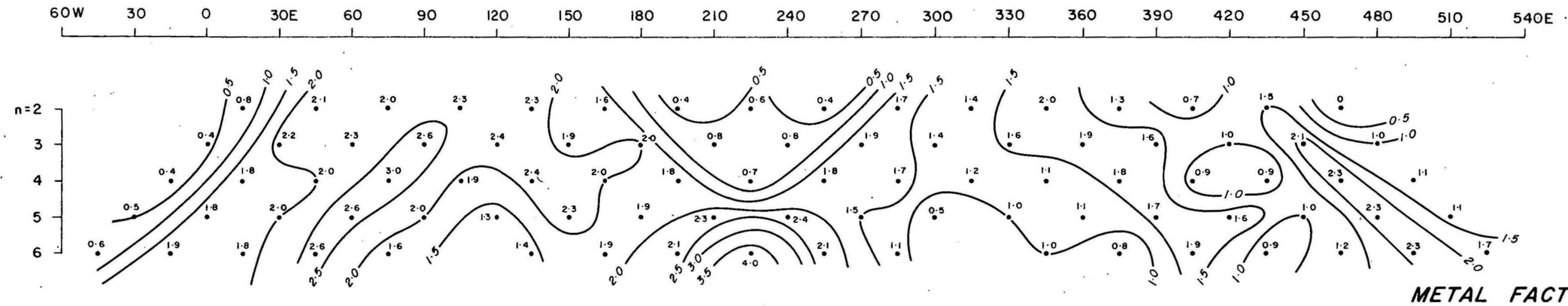
PLATE 5

APPARENT RESISTIVITY (ohm-m)

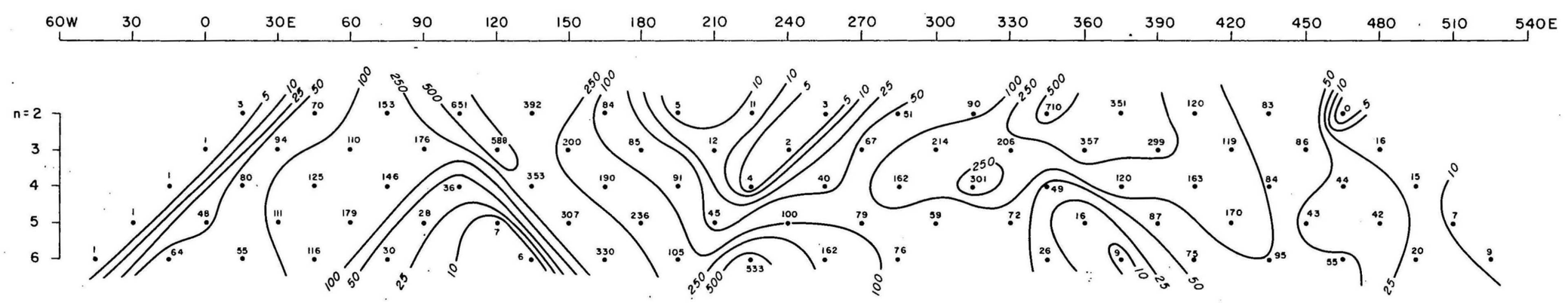
STRONG TURAM CONDUCTOR

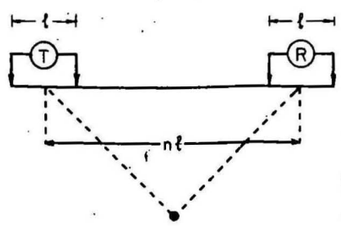


FREQUENCY EFFECT (%)



METAL FACTOR





ℓ Dipole length

IP transmitter or receiver

Electrode

Plotted position of reading

BMR CLONCURRY No.8 AREA

IP RESULTS, TRAVERSE 600N

(30 m electrode spacing)

Record No. 1978/56

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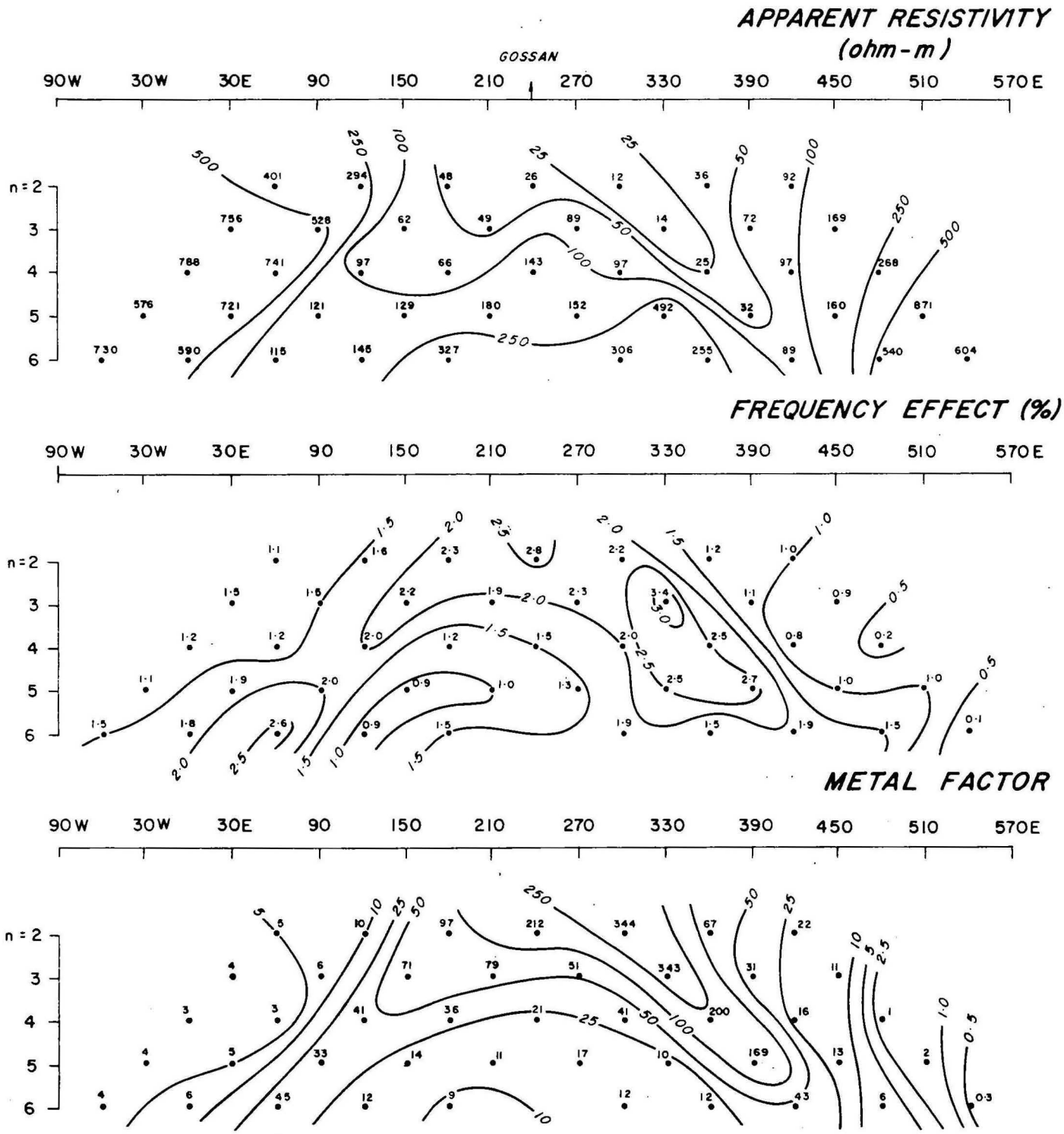
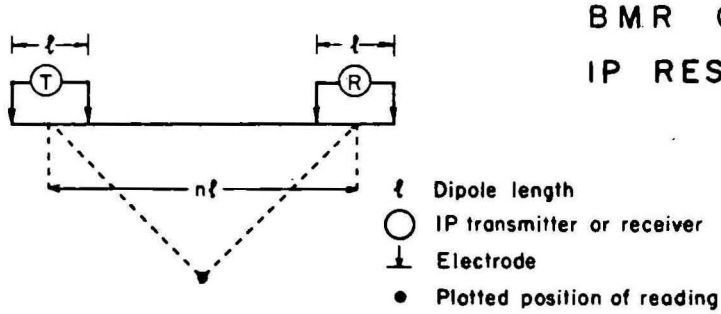
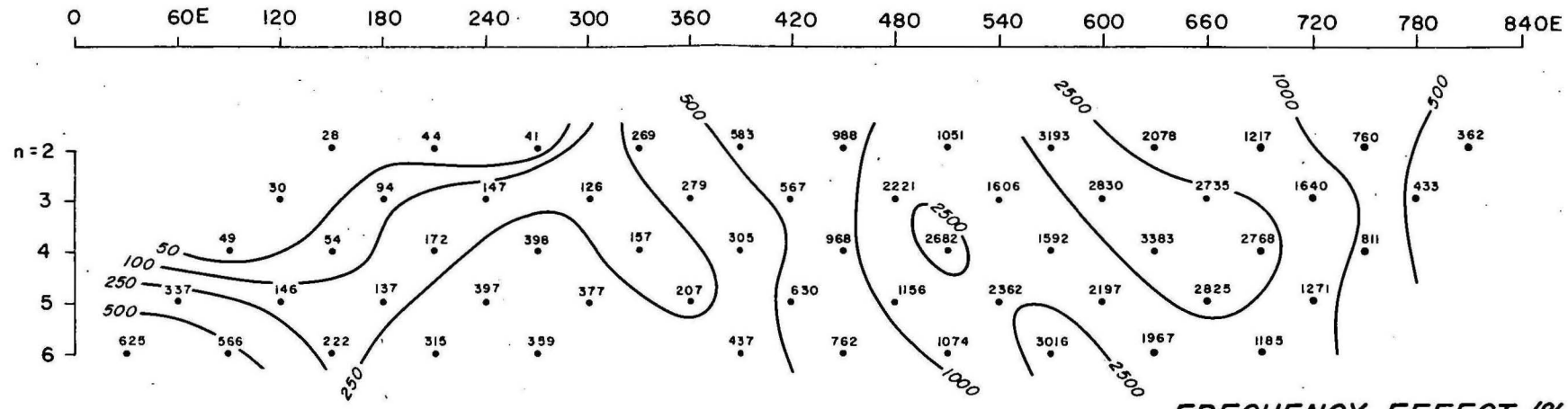


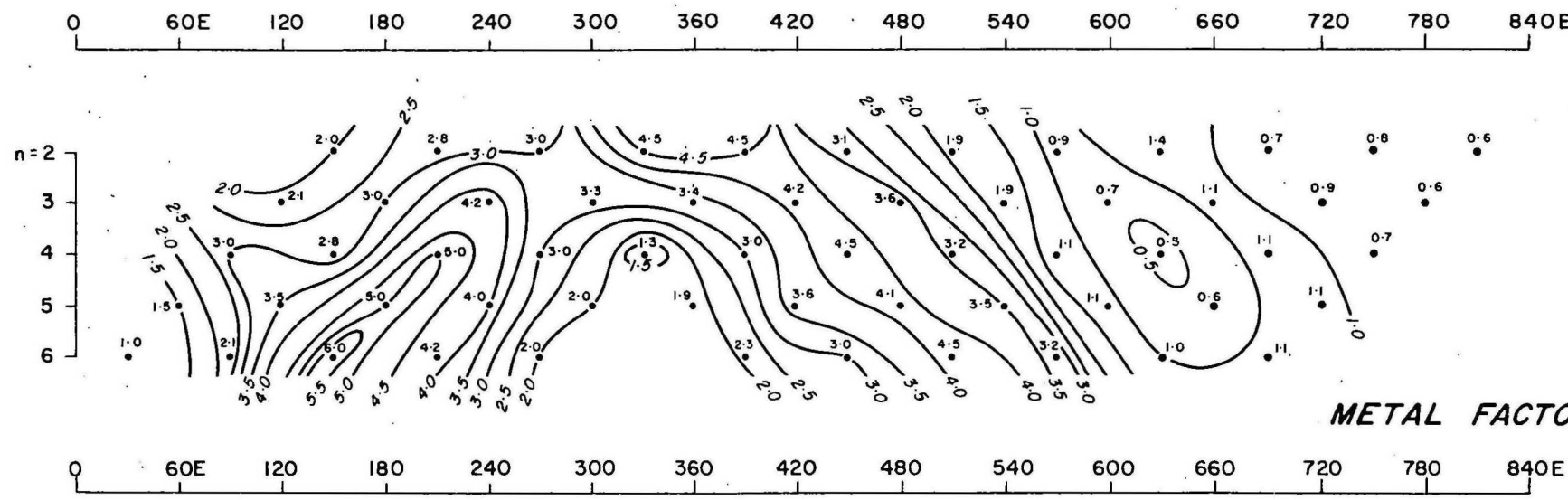
BMR CLONCURRY No.8 AREA
IP RESULTS, TRAVERSE 1200 N



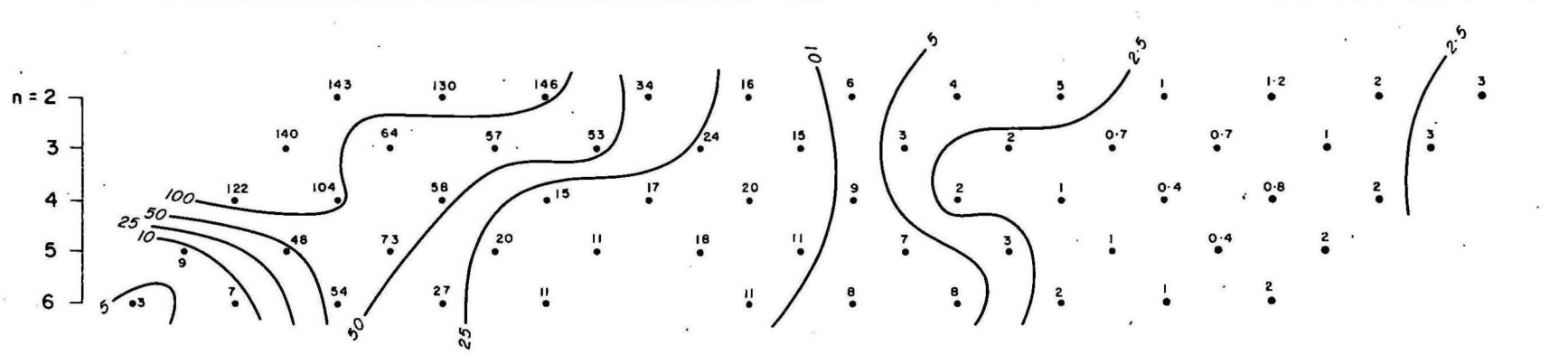
APPARENT RESISTIVITY (ohm-m)

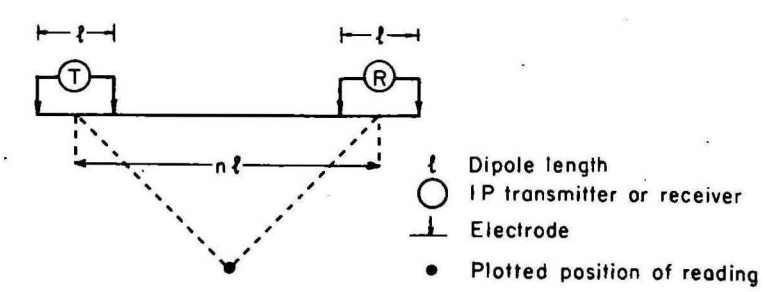


FREQUENCY EFFECT (%)

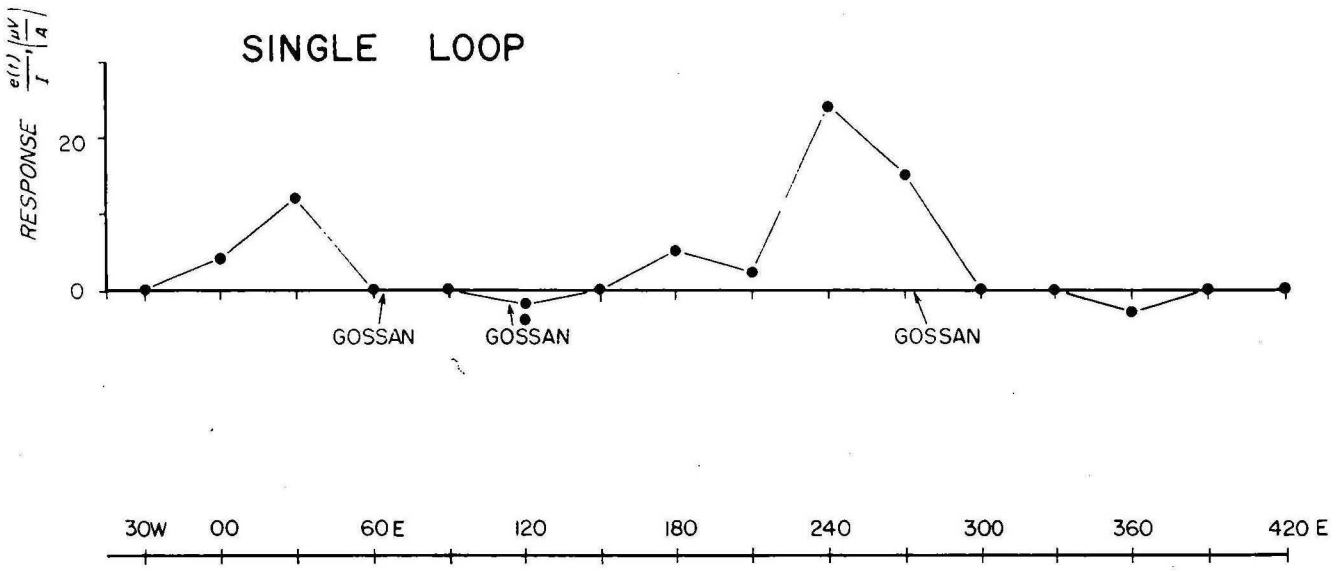


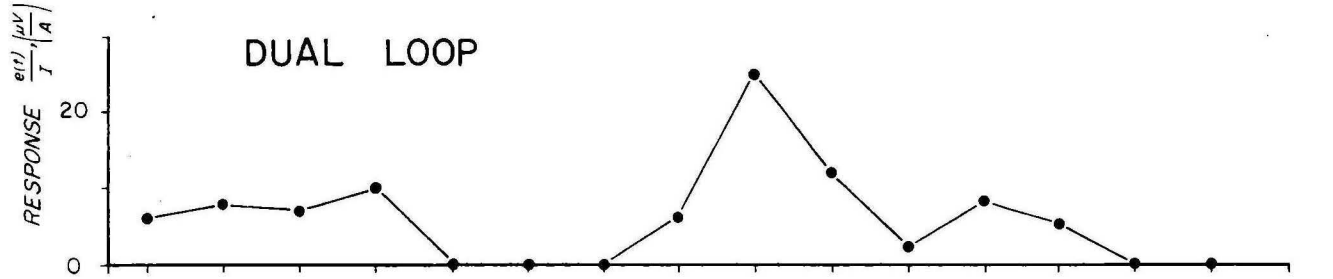
METAL FACTOR





BMR CLONCURRY No.8 AREA
IP RESULTS, TRAVERSE 400S





30 0 30 60 90 120 150 metres

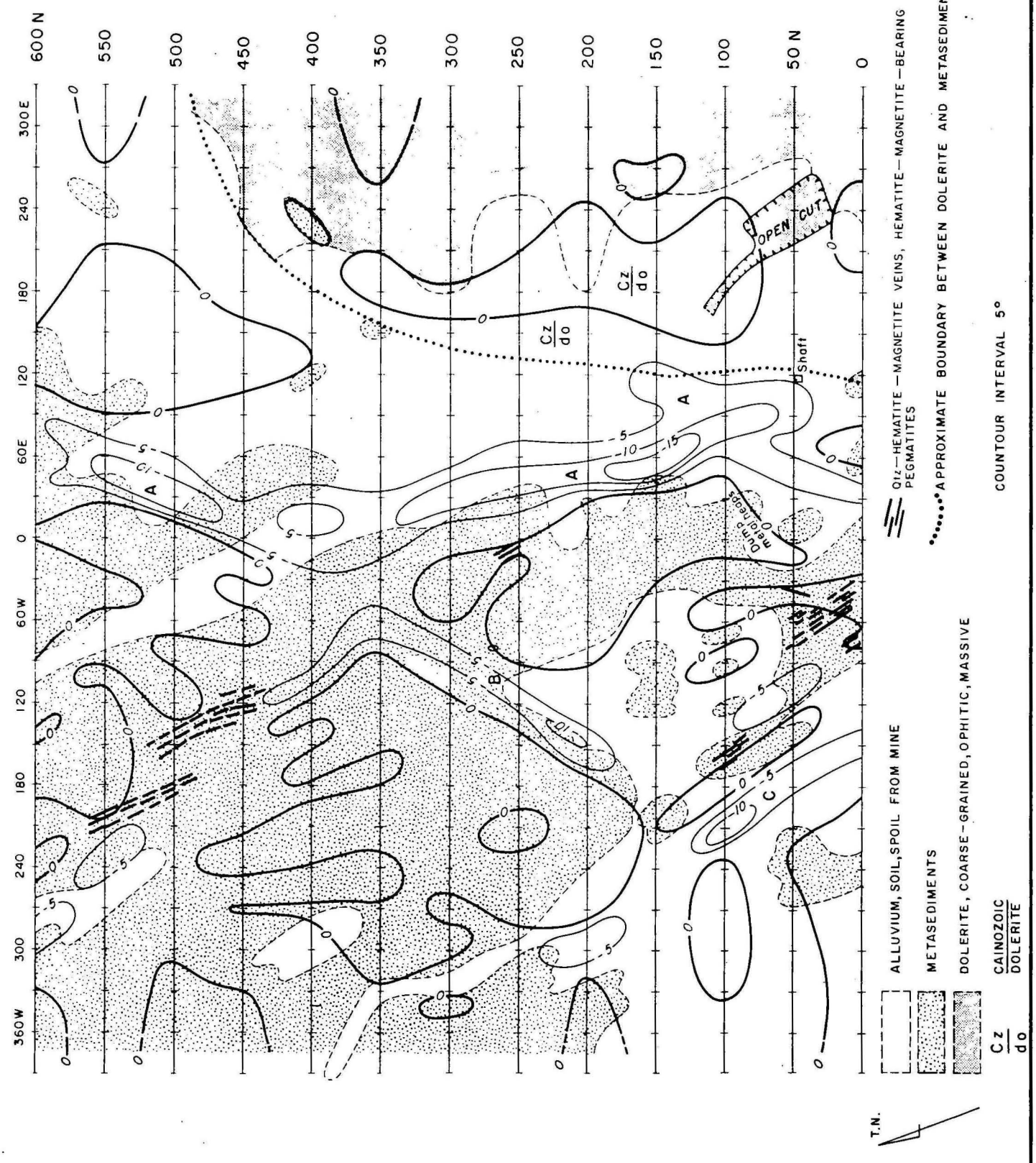
t = 1·1 ms

60 x 50 m loops

50% overlap

BMR CLONCURRY No.8 AREA
TEM RESULTS, TRAVERSE 625 N

PLATE 10

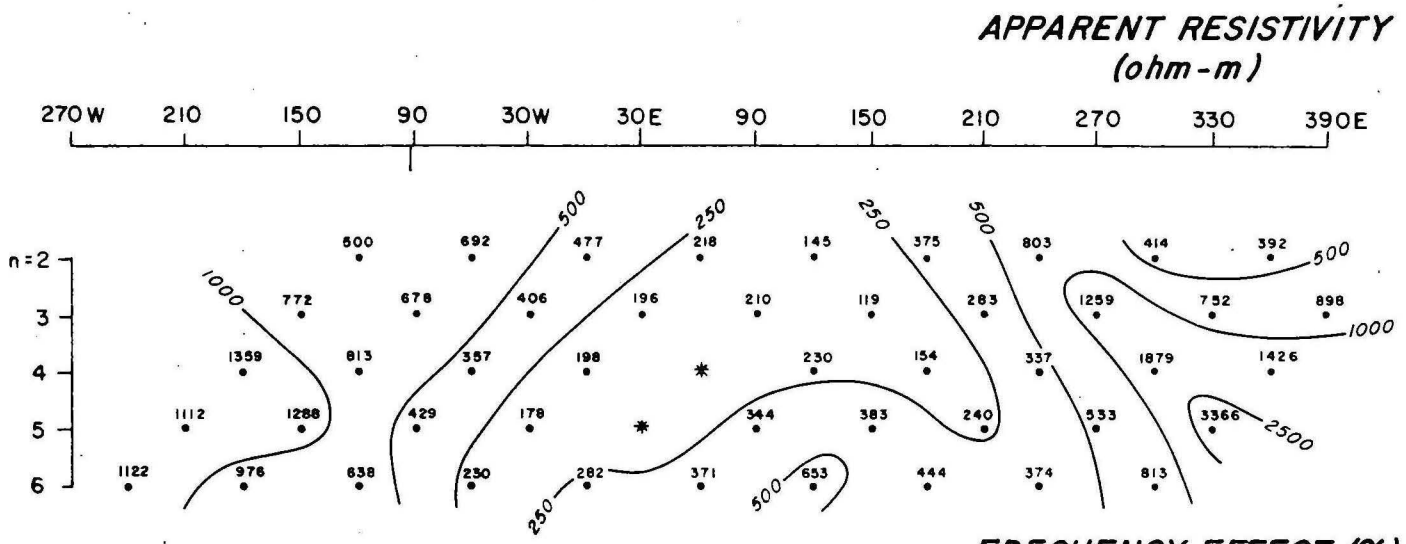


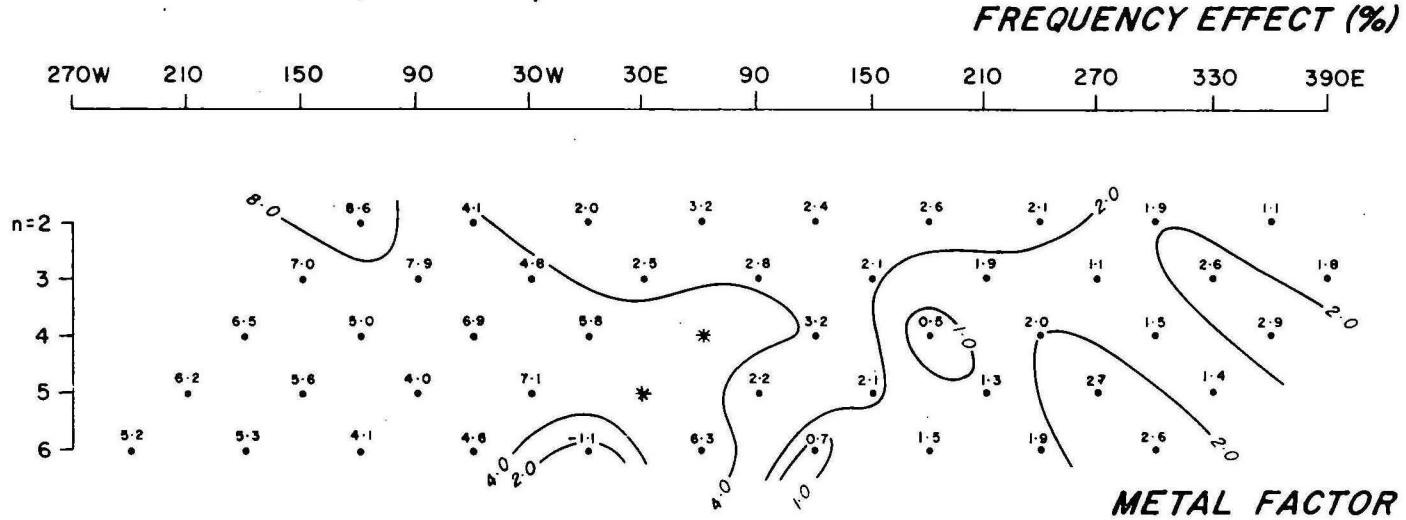
MOUNT FROSTY AREA
TURAM PHASE DIFFERENCE CONTOURS
(660 Hz)

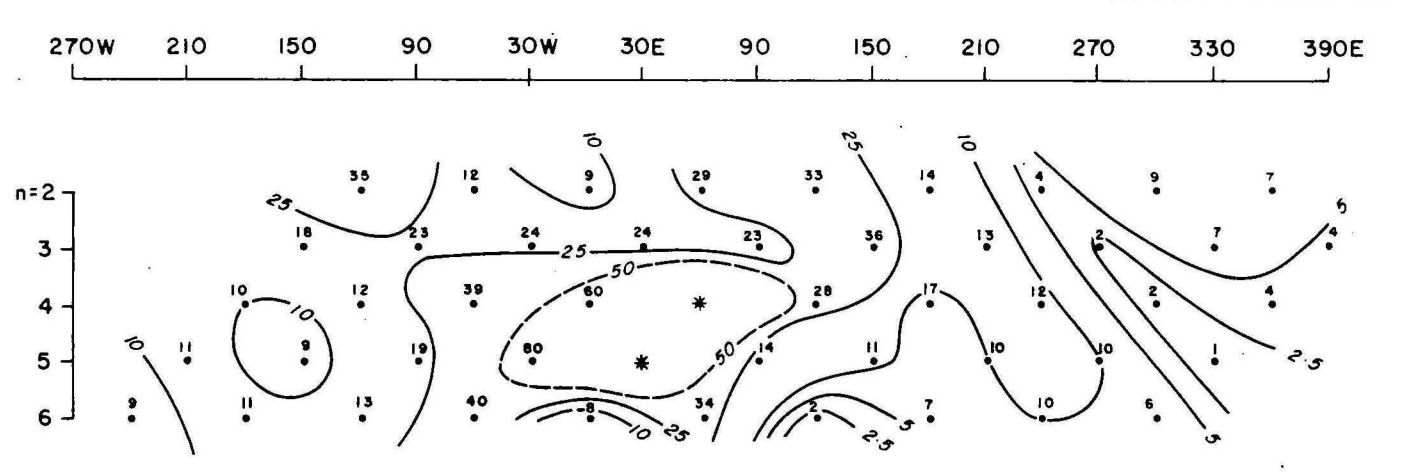
Record No. 1978/56

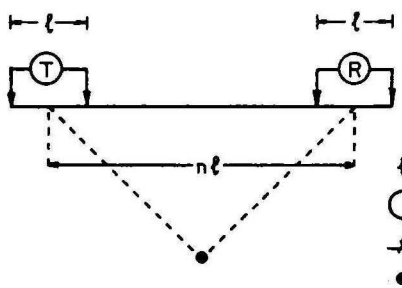
F 54/B7-39A

PLATE II









MOUNT FROSTY AREA

IP RESULTS, TRAVERSE 100N

ℓ Dipole length

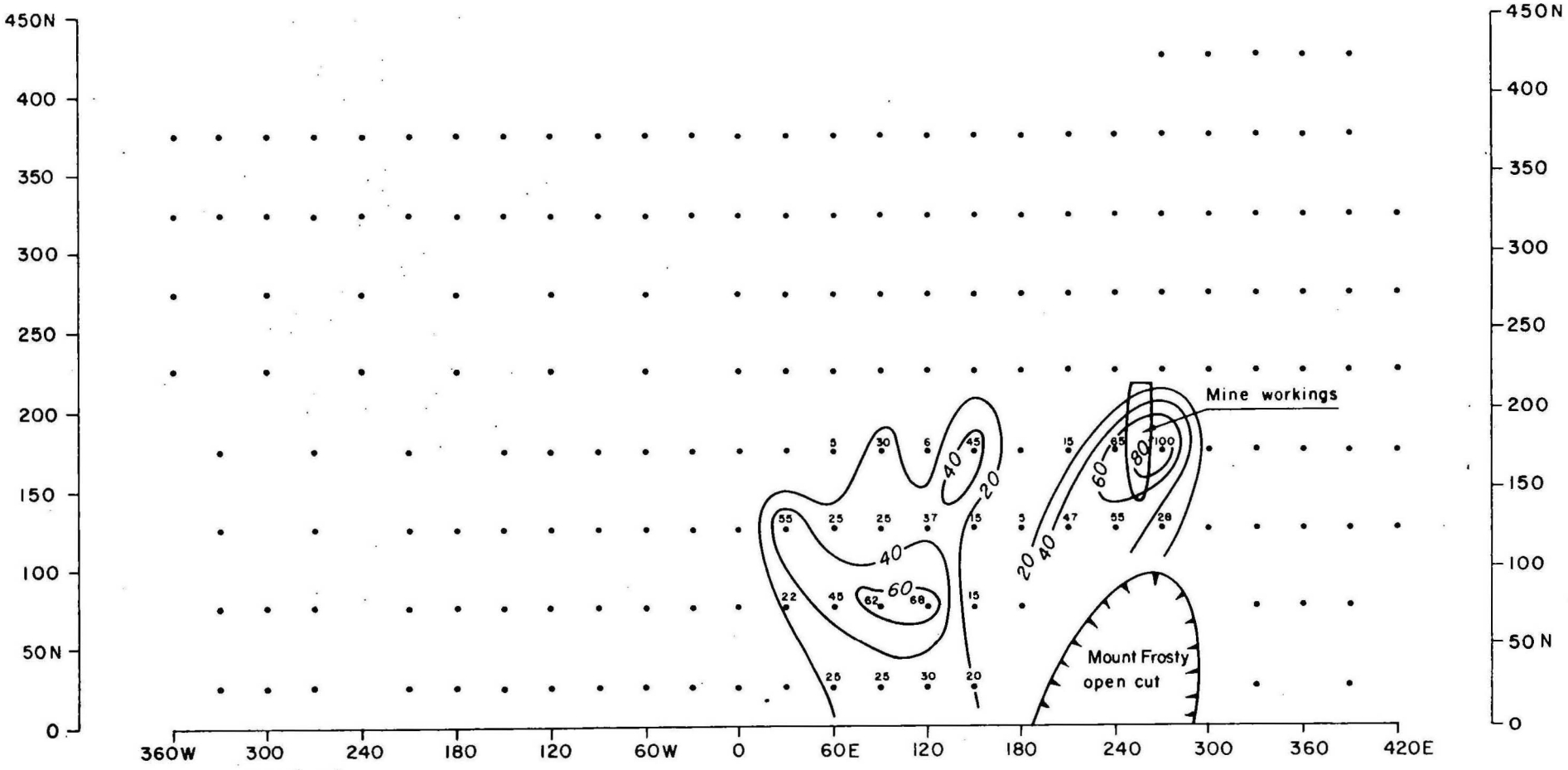
○ IP transmitter or receiver

⊥ Electrode

● Plotted position of reading

✱ Noisy reading

Record No. 1978/56



Contours of $\frac{\theta(t)}{I}\left(\frac{\mu V}{A}\right)$, $t = 1 \cdot 1\,ms$

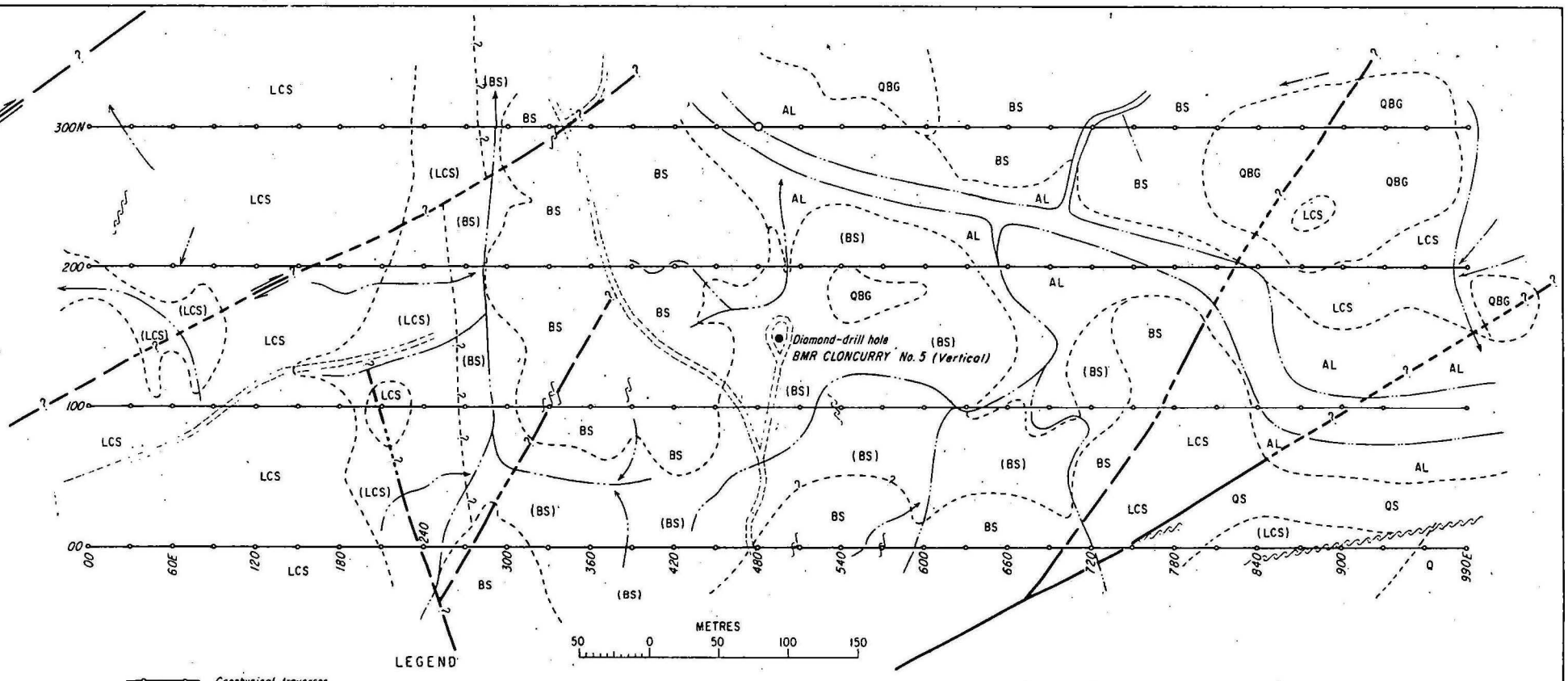
Loop size 50 x 60 m

MOUNT FROSTY AREA
TEM CONTOURS

PLATE 12

F54/87-41A

Record No. 1978/56



N

- Geophysical traverses
- Geological boundary
- Fault
- Fault, position doubtful
- Fault, inferred
- Fault, concealed
- Fault, concealed, inferred
- Shear zone
- Stream, intermittent
- Track
- Recomended diamond-drillhole

	Quaternary	AL	Alluvium
	Cainozoic	QS	Quartz scree
		QBG	Quartzite boulder gravel
LOWER PROTEROZOIC OR CARPENTARIAN	Upper Corella	BS	Black to grey shale and siltstone
	Cainozoic	(BS)	Black to grey shale and siltstone scree
	Upper Corella	LCS	Laminated calcareous siltstone, scapolitic in part, and impure limestone
	Cainozoic	(LCS)	" " " " " " " " scree
	Middle Corella	Q	Quartzite

BMR CLONCURRY No 5 AREA
GEOLOGY AND TRAVERSE LOCATION

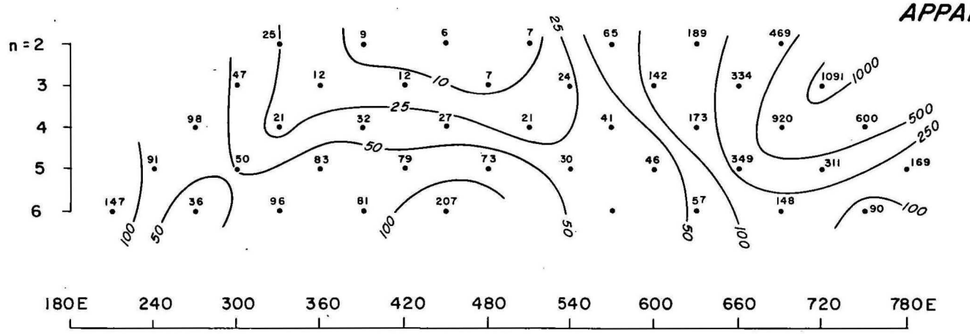
F 54/B7-57 AR

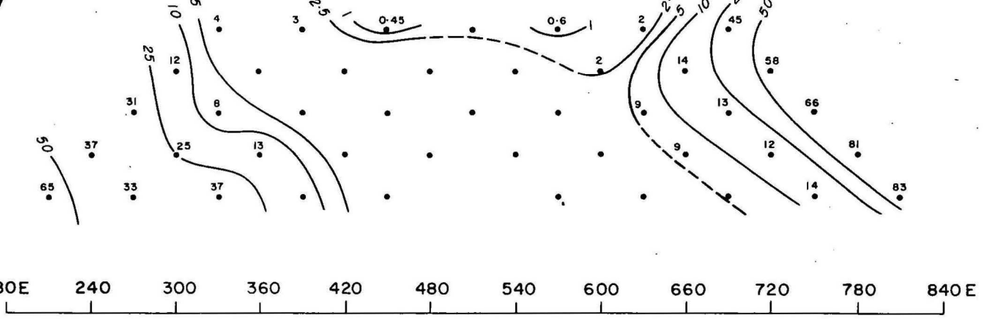
PLATE 13

TRAVERSE 100 N

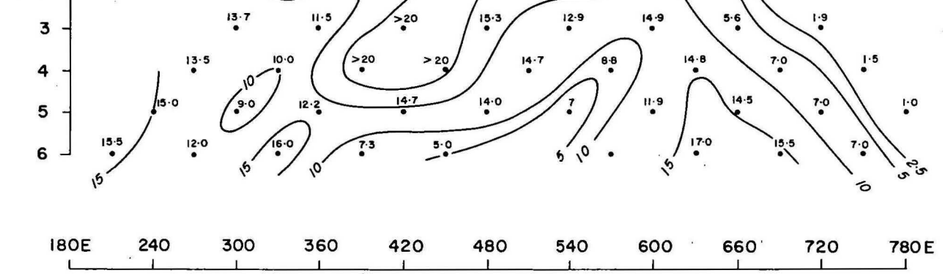
TRAVERSE 300 N

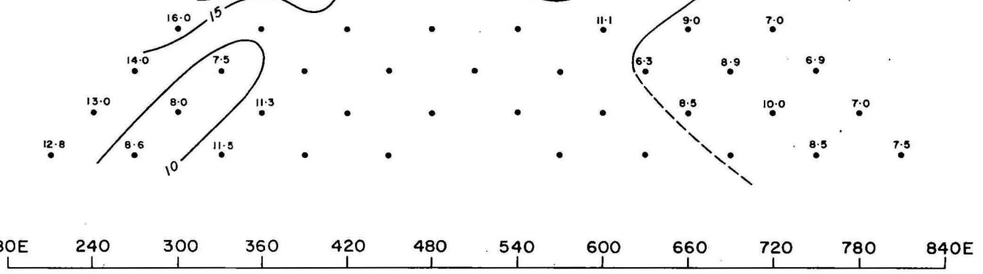
APPARENT RESISTIVITY (ohm-m)



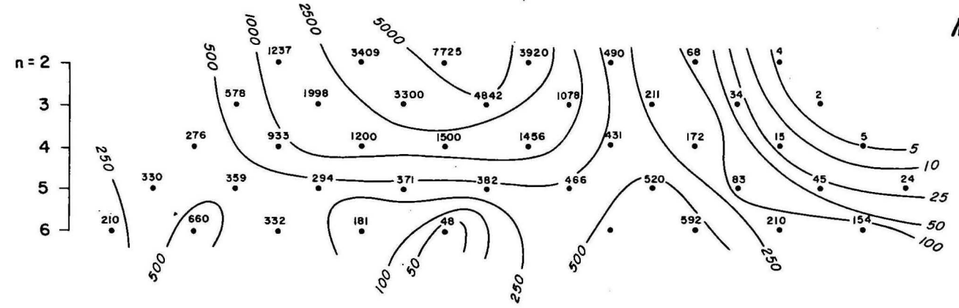


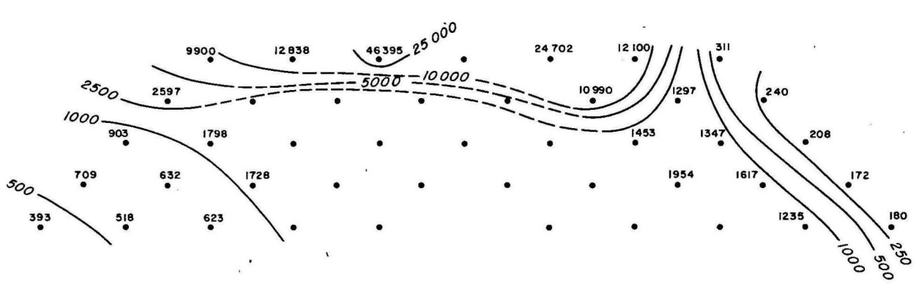
FREQUENCY EFFECT (%)

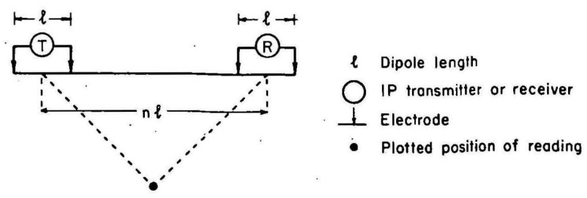




METAL FACTOR



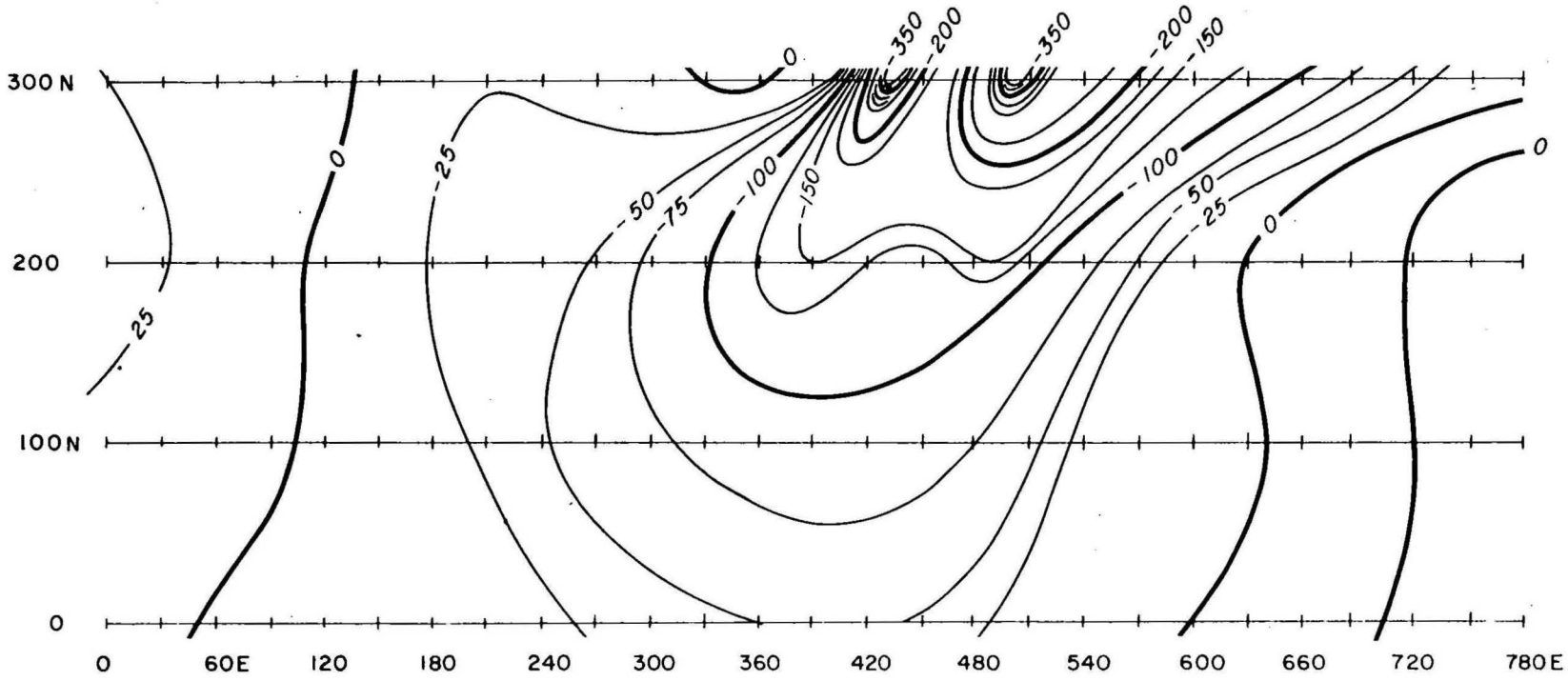




ℓ Dipole length
IP transmitter or receiver
Electrode
Plotted position of reading

BMR CLONCURRY No.5 AREA
TIP RESULTS, TRAVERSES 100N AND 300N

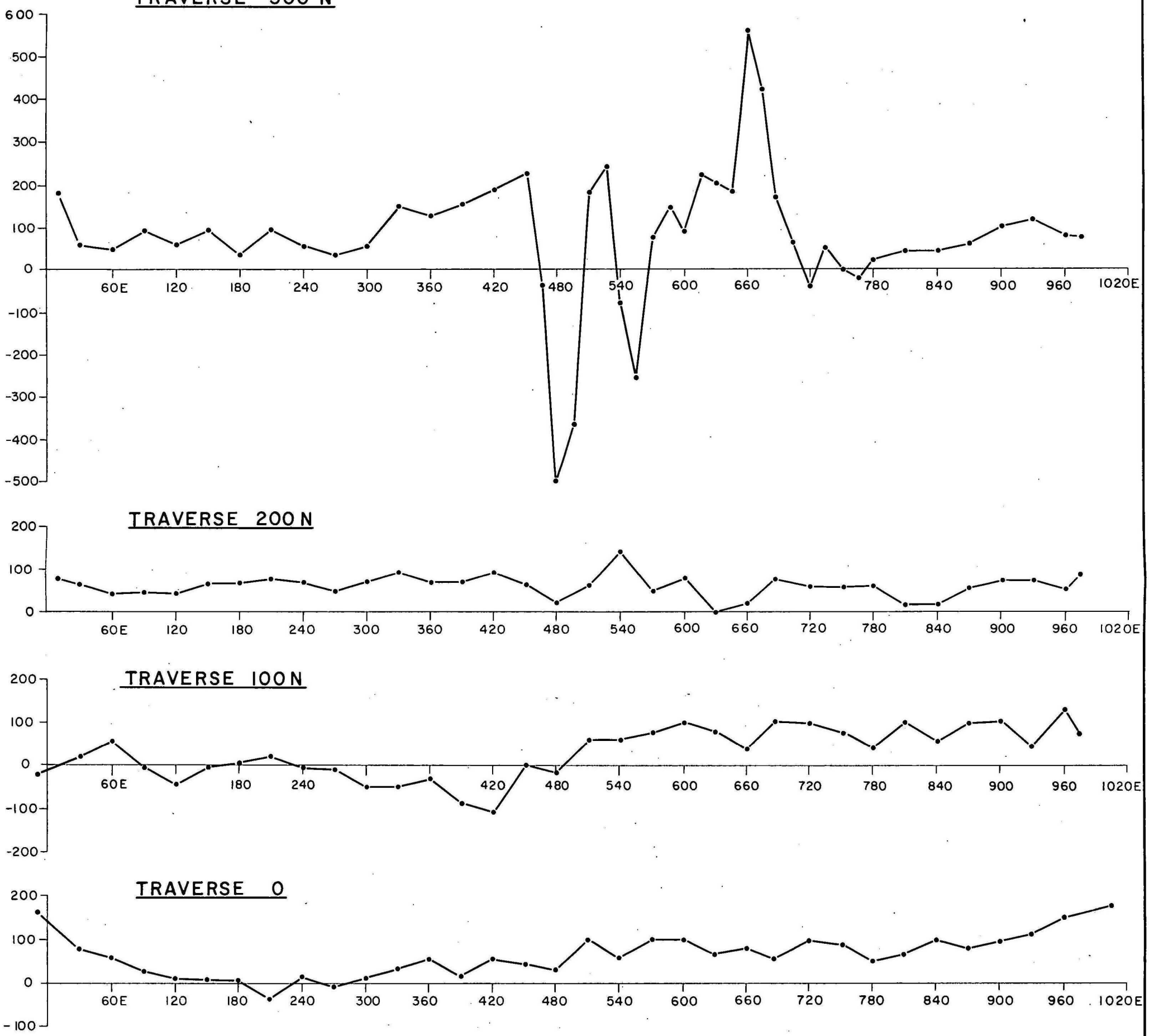
Record No. 1978/56



Contour interval 25 mV

BMR CLONCURRY No.5 AREA
S-P CONTOURS

Record No. 1978/56



BMR CLONCURRY No. 5 AREA MAGNETIC PROFILES
TRAVERSES 300 N, 200 N, 100 N AND 0

F54/B7-42

PLATE 16

Record No. 1978/56

MAGNETIC RESULTS

VERTICAL MAGNETIC INTENSITY - Z (nT)

600, 500, 400, 300, 200, 100, 0, -100, -200, -300, -400, -500, -600

60E 120 180 240 300 360 420 480 540 600 660 780 840 900 960E

S-P RESULTS

SELF-POTENTIAL (mV)

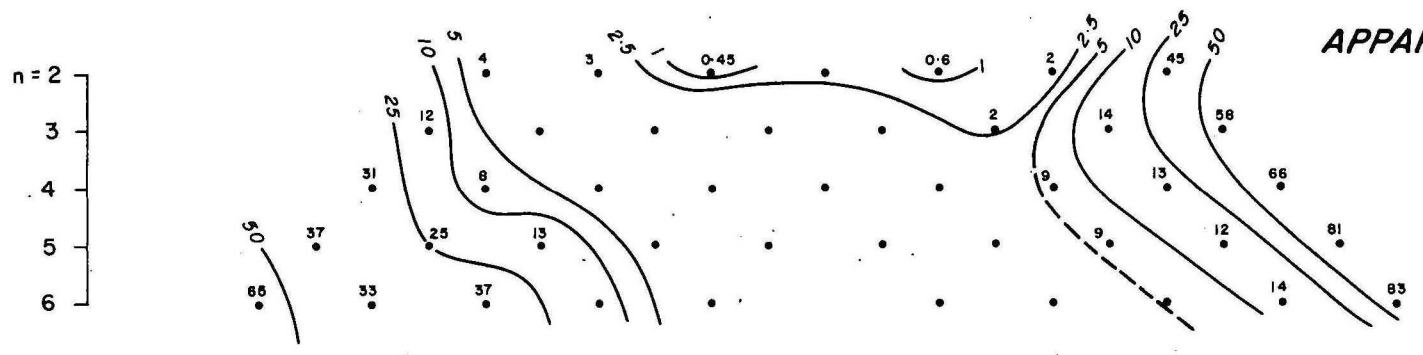
200, 100, 0, -100, -200, -300, -400

60E 120 180 240 300 360 420 480 540 600 660 720 780 840 900 960E

I P RESULTS

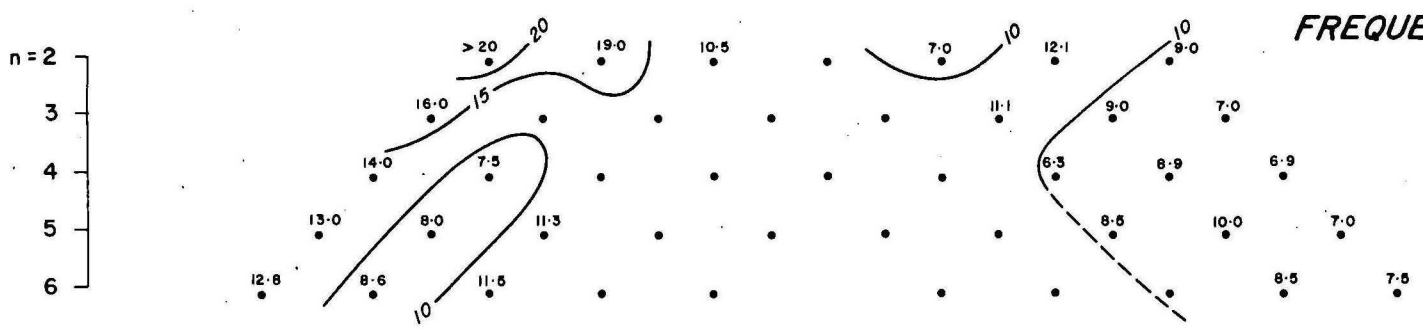
0 60E 120 180 240 300 360 420 480 540 600 660 720 780 840 900 960E

APPARENT RESISTIVITY (ohm-m)



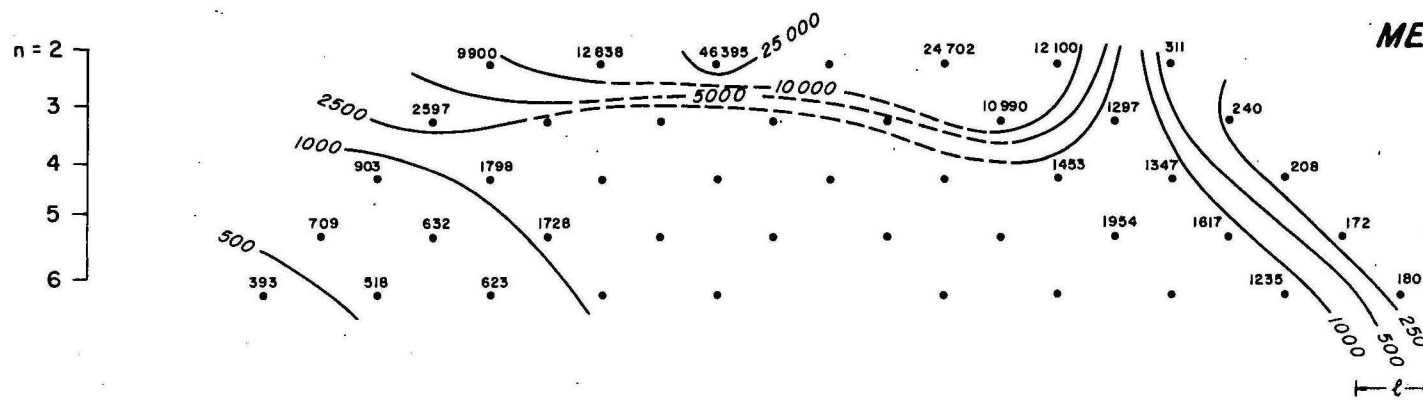
0 60E 120 180 240 300 360 420 480 540 600 660 720 780 840 900 960E

FREQUENCY EFFECT (%)



0 60E 120 180 240 300 360 420 480 540 600 660 720 780 840 900 960E

METAL FACTOR



Dipole length
IP transmitter or receiver
Electrode
Plotted position of reading

T E M RESULTS

50 x 60 m loop

t = 1·1 ms

RESPONSE $\frac{e(t)}{I}$ $(\frac{\mu V}{A})$

7000, 6000, 5000, 4000, 3000, 2000, 1000, 0

0 60E 120 180 240 300 360 420 480 540 600 660 720 780 840 900 960E

BMR CLONCURRY No. 5 AREA
MAGNETIC, S-P, IP, AND TEM RESULTS
TRAVERSE 300N

F54/B7-45

PLATE 17