COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

**BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS**

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RECORD No. 1964/102



# TANAMI / THE GRANITES AIRBORNE MAGNETIC AND RADIOMETRIC SURVEY, NORTHERN TERRITORY 1962



*BY*

*A.G. SPENCE*

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## CONTENTS



## ILLUSTRATIONS



## SUMMARY


An airborne magnetic and radiometric survey was made over the Tanami and The Granites 1:250,000 map areas during the period June to August 1962.

A number of magnetically anomalous areas have been delineated, some of which occur in areas of little or no outcrop. The magnetic map should provide a useful guide to further mapping and prospecting in this region.

Radioactivity in the area is generally low and uniform. Twenty-six areas of higher average intensity and fifty-four radioactive anomalies are indicated by the results.

## 1. INTRODUCTION

The Tanami and The Granites goldfields are about 350 miles north-west of Alice Springs. Gold was first discovered in the area in 1900 and the fields have been worked intermittently since that time. Up to the end of 1960 the total recorded production from The Granites field was about 13,500 oz of gold (Crohn, 1961). No reliable figures exist for the Tanami field but Hossfeld (1940) gives an estimate of 2500 oz for the total production up to 1927.

Until 1959 no systematic work had been done to evaluate the mineral potential of the whole of the Tanami and The Granites region. Previous investigations, notably by Hossfeld (1940) and Hall (1953), were mainly confined to the mines and adjacent areas. In 1939, the Aerial, Geological, and Geophysical Survey of North Australia (AGGSNA) made geophysical surveys, using magnetic and electrical methods, at The Granites goldfield. The results of this work were summarised by Daly (1962).

Mt Isa Mines Ltd, carried out a diamond-drilling campaign in 1941 and 1947-48 at The Granites goldfield. In 1959, Enterprise Exploration Co. Pty Ltd, which holds an Authority to Prospect covering a large part of Tanami and The Granites 1:250,000 map areas, made a geological reconnaissance and did further detailed geological and ground magnetic work during 1961 and 1962. A geological examination of portion of The Granites goldfield has been made by Crohn (1961).

During the period June to August 1962, an airborne magnetic and radiometric survey of the Tanami and The Granites 1:250,000 map areas was made by the Bureau of Mineral Resources, Geology and Geophysics. The survey is described in this Record.

The Bureau's DC.3 aircraft, VH-MIN, was used and the staff engaged were: A.G. Spence (party leader), F.E.M. Lilley, D. Upton, J. Janulaitis, C.J. Braybrook, D. Park, K. Mort, J. Smith and H. Irwin. Trans-Australia Airlines personnel were Capt. H.P. Korsman, First Officer D.S. Baker and the engineer, R. McNamee.

The survey was based on the airstrip at Gordon Downs station in Western Australia. The permission to use the airstrip and the assistance received from the manager Mr S. Jones, his wife, and station staff are gratefully acknowledged .

## 2. METHOD

The area surveyed lies between latitudes 19°S and 21°S, and longitudes 129°E and 130°30'E.

The variation in total magnetic intensity over the area was continuously measured along east-west lines one mile apart. North-south tie-lines spaced at intervals of 15 miles were flown to provide the information required to remove systematic error from the profiles and to relate them to a common datum.

At the same time gamma radiation from the ground was continuously measured by scintillographs to indicate radioactive anomalies (i.e. localised areas of above-average radioactivity) and changes in the background level of radioactivity.

The aircraft was flown at an altitude of 500 (± 50) ft above ground level. Mosaics of aerial photographs on which the proposed flight lines were marked were used for navigation and the actual flight path over the ground was recorded by a vertical camera.

A ground-station magnetometer was used to indicate the occurrence of magnetic storms while surveying was in progress.

## 3. EQUIPMENT

The aircraft carried a saturable-core fluxgate magnetometer, the detector head of which was mounted in a boom projecting from the tail of the aircraft in order to reduce interference from the aircraft's magnetic field. The output of the magnetometer was recorded in two forms - in analogue form on a Speedomax chart recorder and in digital form on 5-hole punched paper tape.

The aircraft was equipped with two sets of radiometric equipment. One set comprised two modified MEL scintillation detectors mounted inside the aircraft and feeding into a BMR-type ratemeter. The other set consisted of a plastic phosphor scintillation detector, housed in a 'bird' trailed 300 ft below the aircraft, and feeding into a second BMR-type ratemeter. The outputs of the ratemeters were recorded on Kelvin & Hughes chart recorders.

An STR30B frequency-modulated radio-altimeter was used to measure altitude, and the altitude profile was continuously recorded on a Kelvin & Hughes chart recorder.

The path of the aircraft over the ground was photographed by an Aeropath 35-mm strip camera.

An air-position indicator produced a continuous plot of the aircraft's air position and this record was used in conjunction with the strip film to plot the aircraft's track.

## 4. GEOLOGY

The following summary of the geology of the Tanami-The Granites district is largely drawn from the report of the 1959 reconnaissance by Enterprise Exploration (Phillips, 1959).

Outcrops in the district consist mainly of Lower Proterozoic metamorphosed sediments, with intrusive granite, adamellite, and porphyry, and assumed Upper Proterozoic/Lower Cambrian conglomerate and sandstone.

The Lower Proterozoic metasediments are mainly haematite shale, siliceous and micaceous shale, silty shale, greywacke, and tuffaceous sandstone and siltstone, with white quartz blows generally filling fractures and secondary cleavage planes. Quartz-haematite, quartz-limonite, and quartz-jasper-haematite ironstone bodies are developed within the Lower Proterozoic evidently in particular stratigraphic horizons within the haematite shales. Coarse cubical pyrites occurs in shale and siltstone in certain stratigraphic horizons.

Ironstones occur in many places throughout the area but the greatest concentrations are in the Tanami and South Tanami areas, the Black Hills, the Smoke Hills, the Schist Hills (also referred to as the Ditjiedoonkuna Hills), near Dead Bullock Soak, and at Mount Ptilotus.

A diamond-drill hole put down by Enterprise Exploration Co. Pty Ltd in 1961, was drilled under a 400 ft wide cross-section of haematite shales containing two prominently outcropping parallel ironstone bodies, which were selected as typical of the ironstones of the Tanami field. In depth the cross-section consisted of black pyritic shales (Knight, pers. comm.).

The Lower Proterozoic metasediments near Tanami and Gardiner Range are reported by Phillips (1959) to bear a striking resemblance to the Halls Creek Metamorphics at Halls Creek and the Warramunga Group at Tennant Creek. At The Granites, owing to intrusive adamellite, granite, and porphyry, the sediments have been more highly metamorphosed with formation of mica and hornblende schists and quartzites.

The Lower Proterozoic metasediments are highly folded and sheared. The structural pattern is apparently not as complex as that of the Warramunga Group.

Upper Proterozoic conglomerate and sandstone of the Nullagine type unconformably overlie the Lower Proterozoic metasediments. These sediments are generally thin but may attain a thickness of about 4000 ft in the Stake Range and about 2000 ft in the Mount Frederick Range.

Basic igneous intrusives occur in the Black Hills, Schist Hills, and near Dead Bullock Soak. Basic volcanic flows or sills occur at Mount Ptilotus and near Bluebush Hills. An extensive area of granite intrudes the Lower Proterozoic and possibly the Upper Proterozoic rocks in the Mount Winnecke area. The southern limit of this granite lies just north of the north-east corner of the Tanami sheet.

Granite-gneiss and garnet-mica schist of probable Archaean age occur in the north-western corner of the Tanami sheet.

An area in the south-western corner of The Granites sheet is occupied by Lower Palaeozoic sediments. These sediments are referred to as the Lucas Beds where they occur on the Western Australian side of the border (Veevers and Wells, 1961).

Gold is known to occur at a number of places in the Tanami-The Granites district, but has been mined only at Tanami and The Granites. At Tanami two types of lode are found (Hossfeld, 1940). One type consists of small lenticular quartz bodies with enrichment of favourable beds in their vicinity and the other consists of quartz-jasper haematite reefs. At The Granites the known mineralisation occurs intermittently over a length of about five miles. The structure and stratigraphy of the field are not well known. The rocks dip steeply and there is evidence of complex folding, particularly at the eastern end of the field. Two types of gold deposit are described by Crohn (1961):

(a) Lodes consisting of narrow quartz stringers which do not persist in depth,

(b) The mineralised zone, which has been traced intermittently for a distance of over a mile in the central part of the field and appears to be conformable to the surrounding sediments. The lode appears to consist largely of quartz and calcite veinlets and disseminated sulphides. The mineralisation carries low to moderate gold values and persists to depths of at least 400 ft.

Two types of igneous rock occur in The Granites field:

(a) small pegmatite veins and granitic rock, described as adamellite, comprising the main outcrop in the south-eastern part of the field; and

(b) small isolated outcrops north of the main body.

## 5. RESULTS

### Magnetic

The magnetic results for each area are presented as total-intensity profiles. In Plates 1 and 2 the east-west scale is four miles to one inch but the north-south scale has been expanded to one mile to one inch to enable all the profiles to be presented. Plates 3 and 4 are at a scale of four miles to one inch and show every fourth profile in relation to the outcrop geology, which has been reproduced from mapping done in 1959 and 1961 by K.M. Phillips of Enterprise Exploration Co. Pty Ltd.

The profiles show a considerable variation in magnetic relief over the survey area. Anomalies of various types and intensities occur and there appears to be a wide range of depths to anomaly sources. In many places magnetic rocks are within 1000 ft of the surface. On the other hand, in some areas of very flat magnetic profiles, depths are estimated to exceed 8000 ft.

Comparison of the magnetic profiles with the available geological information does not give any systematic correlation between magnetic features and geology. Some of the zones of magnetic anomalies lie in regions of little or no outcrop. Rocks that crop out within the anomalous zones are mainly the Lower Proterozoic metasediments. However, the profiles are relatively smooth over much of the Lower Proterozoic outcrop including some areas in which ironstone bodies occur. This points to a possible similarity to conditions at Tennant Creek where variations in magnetic response of ironstone bodies are due to variations in their degree of oxidation. Above the water table the iron has been largely oxidised to haematite but remains in the form of magnetite below it.

In some places at least the magnetic anomalies are probably due to basic intrusives. In general, however, the geology of the area is not known well enough to enable the magnetic material to be identified with certainty or to determine if there is any relation between the magnetic features and mineralisation.

Tanami. The following is a summary of the principal magnetic features shown by the profiles (Plates 1 and 3).

Near the centre and extending to the western boundary of the Tanami sheet there is a large area of smooth and mainly featureless profiles. This area is overlain by Upper Proterozoic conglomerate and sandstone and the depth to magnetic rocks is estimated to be not less than 8000 ft.

Near the Killi Killi Hills between Lines 56 and 65 an anomalous zone trends slightly west of north for about nine miles in an area where several Lower Proterozoic outcrops have been mapped. On the eastern side of the zone, the anomalies are estimated to arise from depths of 800 to 1000 ft. Other Lower Proterozoic outcrops occur south and south-east of the zone and are known to include ironstone bodies, but do not produce any magnetic effects.

The area south of Line 58, between longitudes 129°20'E and 130°15'E, is strongly disturbed. Several narrow linear anomalies striking roughly north are evident in the area. One of these continues from near the Black Hills northwards with decreasing amplitude, as far as Line 47. In the Black Hills area there is a complex pattern of anomalies that are due, in part at least, to the basic igneous metamorphosed calcarenite complex containing basalt, amphibolite, and micro-gabbro, which crop out in this vicinity. Phillips (1959) has reported that quartz-haematite and quartz-limonite ironstone reefs are especially prominent in the Black Hills area and it is possible that magnetic effects also arise from magnetite present at depth in the ironstone bodies. Another linear anomaly at about longitude 129°20'E marks the western boundary of the disturbed area. It is due to magnetic material at depth estimated to be less than 1000 ft. The anomaly lies in an area of no outcrop. Its extension northwards with reduced amplitude can be traced as far as Line 46.

The Tanami goldfield coincides with a fairly broad anomaly striking roughly north-west, i.e. parallel to the strike of the outcropping Lower Proterozoic rocks. The anomaly is estimated to be due to a body at a depth of about 1000 ft and dipping to the west. North-westwards from Tanami, the anomaly continues into the Black Hills area. To the sorth it can be traced to the vicinity of Black Peak in The Granites sheet. On the basis of the geological reconnaissance Phillips (1959) suggested that both the Black Hills and Black Peak areas are extensions of the Tanami field. The suggestion is supported by the magnetic data which show that the same magnetic formation continues through the three areas.

On the eastern side of the Black Hills, a granitic body inferred from evidence of soil and photo-interpretation coincides with smooth magnetic profiles. Farther east, two anomalous zones can be recognised. These trend northwards and show steep magnetic gradients in many places. No outcrops are shown in this vicinity on the geological map but the sources of the anomalies are generally shallow. Depth estimates based on some of the steeper gradients are of the order of 500 ft. The anomalous zone at about longitude 130°05'E continues southwards into The Granites sheet.

In the eastern third of the Tanami sheet, north of Line 55, the profiles show a band of generally weak anomalies of varying character, striking north for over 50 miles. It appears to have no relation to the few outcrops that lie along it. A group of stronger anomalies occurs near the north-eastern corner of the sheet and is probably related to the Lower Proterozoic metasediments which are known to crop out adjacent to the Mount Winnecke granite, which lies just beyond the northern boundary of the sheet.

It is difficult to detect structural features from the profiles. A broad anomaly of small amplitude commencing just east of the centre of the northern boundary of the Tanami sheet and trending south-east appears to correspond to a concealed fault in this vicinity.

The Granites. A definite change occurs in the magnetic pattern towards the south-western corner of The Granites sheet, where there is an area of very smooth profiles contrasting with the generally disturbed profiles to the north and east. The change is interpreted as the boundary of the Lower Palaeozoic sediments, which have been mapped on the Western Australian side of the border and, according to the Tectonic Map of Australia, extend onto The Granites sheet, as shown in Plate 4.

An anomalous zone extends southwards from the boundary with the Tanami sheet near longitude 130°15'E to Line 83 and then continues to the south-west and terminates in the Smoke Hills. Outcrops of Lower Proterozoic metasediments with ironstone bodies occur in the area. Westwards, however, the same rocks are not associated with anomalous profiles.

A narrow zone of fairly intense anomalies extends in a general southerly direction just east of Black Peak. This is a continuation of the anomalous area around Tanami and the Black Hills.

Another anomalous area extends west from Bluebush Hills between Lines 78 and 98 in a region of little outcrop. Several linear anomalies striking roughly north can be traced through the area. Some of the magnetic gradients are very steep and indicate an average depth of burial of anomaly source of less than 1000 ft. Basic volcanic rocks are known to occur in the area and may be responsible for some of the magnetic effects.

Near the centre of The Granites sheet there is a group of anomalies trending generally north, some of which are fairly intense and have steep gradients indicating sources at shallow depth. The anomalies near the Dead Bullock Soak are probably due to basic igneous intrusives and ironstones in the Lower Proterozoic metasediments.

An anomalous zone covers the Schist Hills where anomaly intensities up to 2000 gammas were recorded. Volcanic flows or sills and a basic igneous intrusive as well as various ferruginous materials occur in this area and could account for the anomalies.

An anomaly of about 700 gammas was recorded on Line 110 over The Granites goldfield. The source of the anomaly is estimated to be about 500 feet below the surface. Another anomaly of similar intensity is centred about three miles to the north-west. More-detailed information on the magnetic anomalies in The Granites field is available from a ground survey made in 1939 (Daly, 1962). This survey revealed a zone of strong and regular anomalies continuing over the whole field, indicating a strongly magnetic formation, which is closely related to the known mineralisation, but whose exact nature could only be determined by test drilling.

The anomalies of The Granites field appear to continue southwards through Hordern Hills and south-westwards to Grimwade Ridge. West of Grimwade Ridge, there is a zone of generally weaker anomalies variable in character and trending mainly north. Three other areas of anomalies of variable character and with moderate or low intensities occur in south-eastern corner and near the central southern boundary of the sheet.

Radiometric

Radiometric results for the Tanami and The Granites areas area presented in Plates 5 and 6. Every second profile recorded by the inboard scintillometer is shown on a base map at a scale of 1:250,000 which also shows the regional geology of the area. Where the profiles indicate a change in the average level of radioactivity and where it is possible to correlate these changes on adjacent profiles, lines are shown joining up these points of change. The direction and order of intensity of the change are indicated.

Radiometric anomalies have been selected from the record of the outboard scintillometer and are included in Plates 5 and 6. The criterion for selection was designed to accept anomalies equivalent to those arising from circular superficial sources lying within the following limits of radius and offset - a source 300 ft in radius with its centre on the line of flight and a point source offset 300 ft from the line of flight.

The radiometric data have been positioned with a probable error of $\pm\frac{1}{4}$ mile.

Tanami. The radioactivity is generally low and fairly uniform throughout the whole of the area. Consequently contrasts in intensity where changes of level occur are not well-defined.

Seventeen zones of higher intensity are broadly defined by the lines showing changes of intensity but reveal no systematic correlation with outcropping rock types. For instance, in the south-western corner of the area there appears to be some correspondence with outcropping Lower Proterozoic metasediments and in the central west of the area, with Upper Proterozoic sandstone; however, other zones of higher intensity, such as Black Hills, include both types of rocks.

Twenty-one anomalies were recorded.

The Granites. The radioactivity in this area is also low and fairly uniform. Nine broadly defined zones of higher average radioactivity were recorded. Almost all of these include outcrops of Lower Proterozoic metasediments. The geological information gives no clue to the identification of the radioactive material present.

Thirty-three radiometric anomalies were recorded.

## 6. CONCLUSIONS

The aeromagnetic survey of the Tanami-The Granites region has revealed a large number of anomalous zones, which in general show complex anomaly patterns. Individual anomalies are estimated to originate at depths ranging from near surface to over 8000 ft. Linear anomalies due to shallow bodies with a predominant near-meridional strike are common and some continue for considerable distances.

It has not been possible to establish a systematic correlation between the known outcrop geology and the magnetic profiles. From the available geological information, probable sources of the magnetic anomalies are basic intrusives, basic volcanic flows or sills, and the ironstone bodies which occur in the Lower Proterozoic metasediments. The significance of the anomalies in relation to mineral occurrence is not clear. However, an earlier ground magnetic survey in The Granites goldfield revealed a zone of magnetic anomalies closely associated with the known mineralisation and it is probable that a similar association exists elsewhere in the region. The suggestion that the Tanami field extends northwards to the Black Hills and southwards to the Black Peak area is supported by the continuous anomalous zone through the three areas.

A complete interpretation of the aeromagnetic data would require a more-detailed knowledge of the geology and also a knowledge of the magnetic properties of the rocks from tests on representative samples. Although the present interpretation is tentative, it is considered that the data would be of considerable assistance in further investigations of the geology and mineral potential of the region.

The radiometric results showed the radioactivity to be generally low over the survey area. Small changes in the level of radioactivity occur in many places but reveal little correlation with the outcropping rock types. A total of 54 radioactive anomalies was recorded. A ground examination would be required to determine the cause of these anomalies.

## 7. REFERENCES

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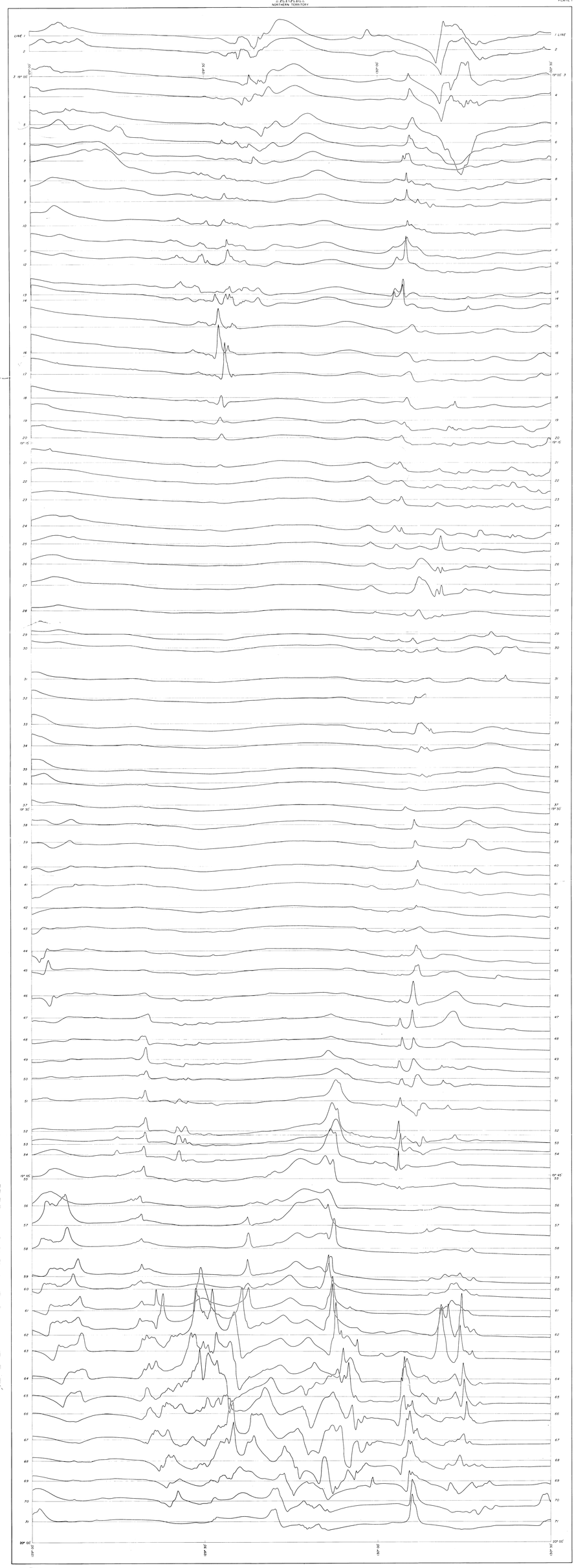



# TOTAL MAGNETIC INTENSITY PROFILES

AIRBORNE SURVEY, TANAMI-THE GRANITES, N.T. 1962

GRATICULE SCALES

EAST-WEST SCALE

NORTH-SOUTH SCALE

APPROX PROFILE SCALE

EXPLANATORY NOTES

THE SURVEY WAS MADE WITH A CONSTANT TERRAIN CLEARANCE OF AN ALTITUDE OF 500 FEET ABOVE SPECIAL LEVEL ALONG LINE SPACING ONE MILE APART.

THE TOTAL MAGNETIC INTENSITY PROFILES WERE RECORDED BY A METTLER-HEERBRUGG AND HAVE BEEN CORRECTED FOR THE DIURNAL COMPONENT OF A MEAN DIURNAL GRADIENT IN TOTAL INTENSITY OF 10 GAMMAS PER MILE IN A DIRECTION 125°M.

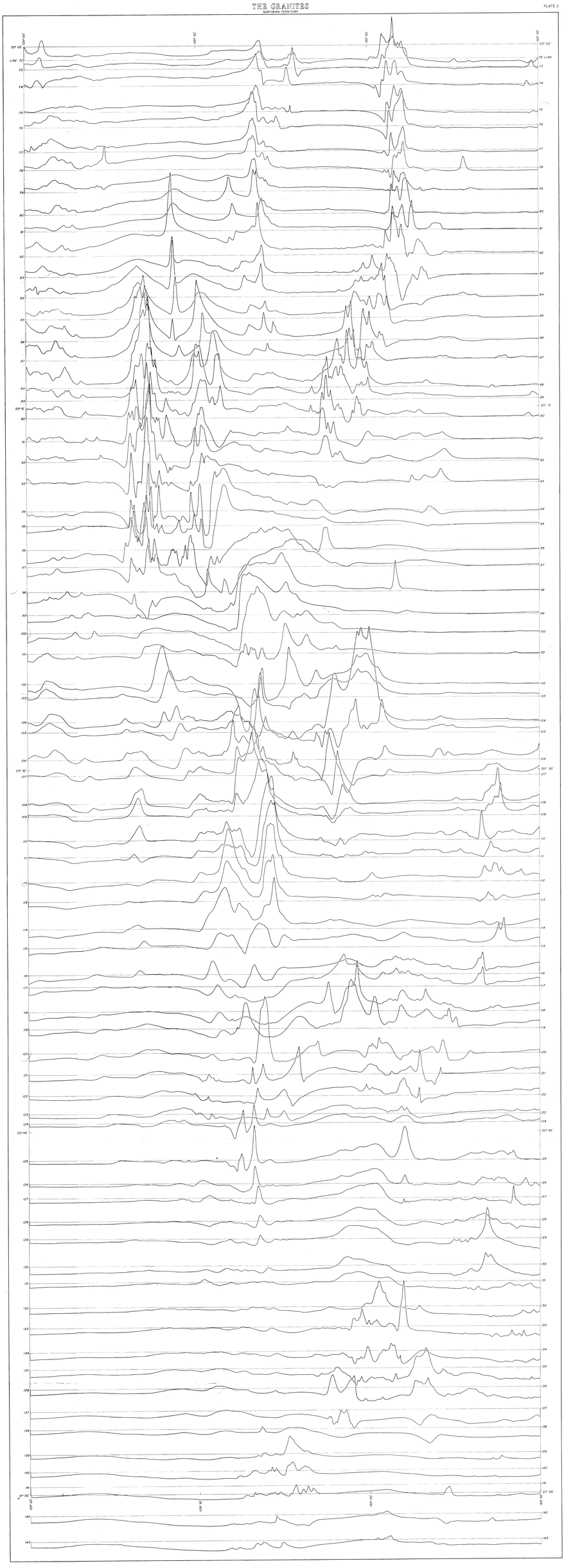
THE PROFILES HAVE BEEN PLOTTED AS NEARLY AS PRACTICABLE TO THE PARALLEL PROJECTION OF THE FLIGHT LINE ON A PLANE INCLINED AT A PERPENDICULAR ANGLE OF 5 TO MILE AS CONTROL AT LONGITUDES 129°30' AND 130°10'.

INDEX TO ADJOINING SHEETS

| | | |
|---|---|---|
| GORDON DOWNS | BORROLOOLA | BONAPART BASIN |
| BILLILUNA | TANAMI | TANAMI EAST |
| LUCAS | THE GRANITES | MT WALPURE |

LOCATION DIAGRAM


Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics. E52/B1-2
TO ACCOMPANY RECORD No. 1964/123




# TOTAL MAGNETIC INTENSITY PROFILES

AIRBORNE SURVEY, TANAMI-THE GRANITES, N.T. 1962

INDEX TO ADJOINING SHEETS

| | | |
|---|---|---|
| BULLOCK | TANAMI | TANAMI EAST |
| LUCAS | THE GRANITES | MT. BILLYARD |
| STANDERWICK | HOOKLAND RIVER | MT. THEO |

LOCATION DIAGRAM


GRATICULE SCALES

EAST-WEST SCALE

NORTH-SOUTH SCALE

APPROX PROFILE SCALE

EXPLANATORY NOTES

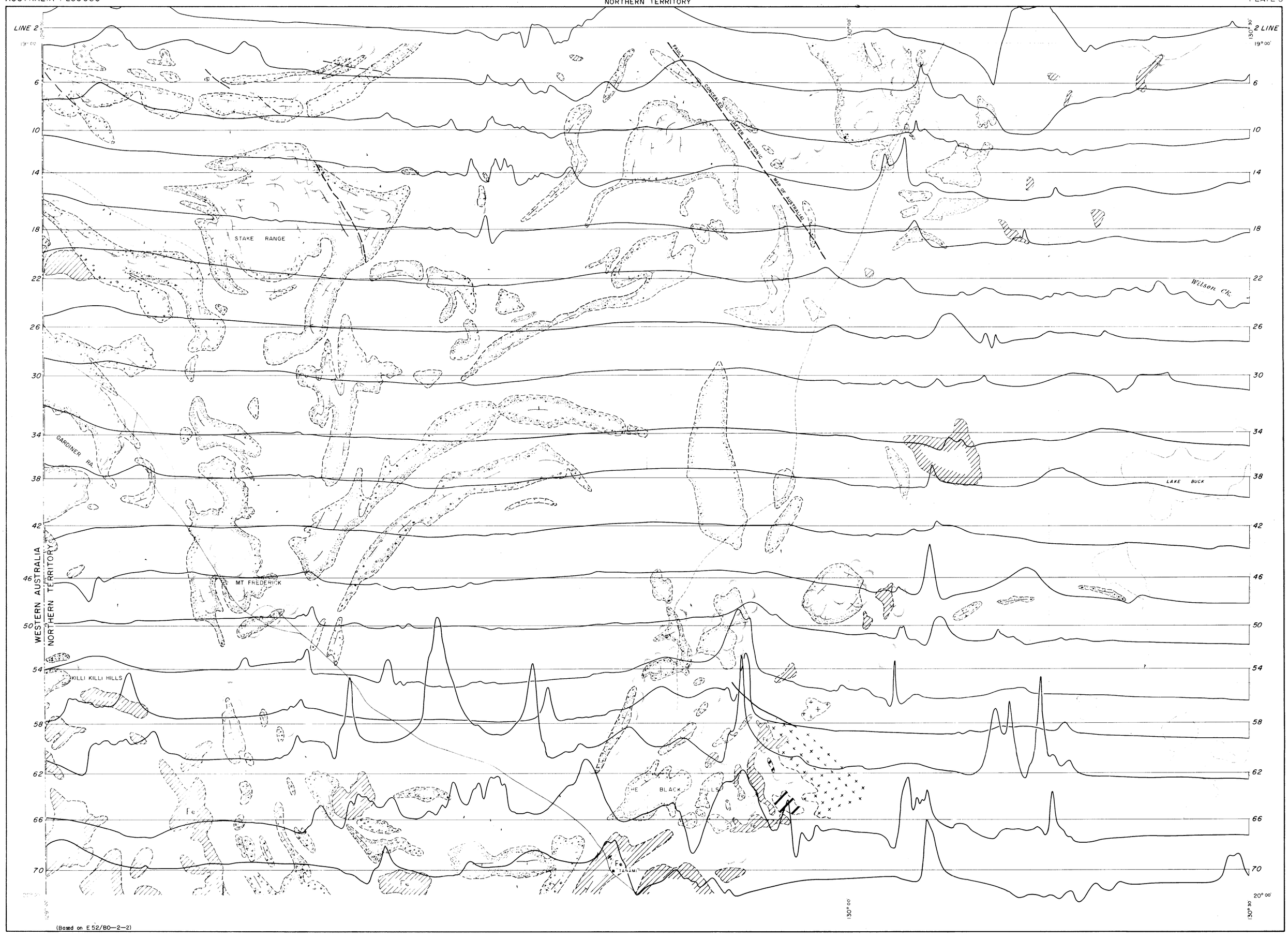
THE SURVEY WAS MADE AT A 'TRUE' ALTITUDE OF 500 FT. ALTITUDE OF SURVEY ABOVE GROUND LEVEL VARIES LARGELY WITH THE RELIEF OF THE GROUND.

THE TOTAL MAGNETIC INTENSITY PROFILES WERE RECORDED BY A RECTILINEAR RECORDER, AND HAVE BEEN CORRECTED FOR THE SOUTH COMPONENT OF A MEAN REGIONAL GRADIENT IN TOTAL INTENSITY OF 10 GAMMAS PER MILE IN A DIRECTION 37°N

THE FLIGHT LINES WERE FLOWN AT RIGHT ANGLES TO THE PREVAILING RUNS WERE POSITIONED ON THE BASIS THEY WERE WITH A TOLERABLE ERROR OF 1/16 MILE BY CONTROL OF LONGITUDE (GPS-FT AND CAPTAIN

Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics F52/B1-2

TO ACCOMPANY RECORD NO. 1964/139




GEOLOGICAL LEGEND

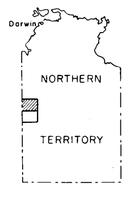
PROTEROZOIC
- UPPER — Sandstone and conglomerate
- LOWER — Metasediments, ironstone, etc.
- Granite, adamellite, porphyry, granitic body inferred from photo interpretation (no outcrop)
- Granite - gneiss, micro-garnet, schist
- Fe — Ironstone bodies present
- Basic intrusives
- Fault
- Fault concealed
- Bedding trends

Geology after mapping by Enterprise Exploration Co. Pty Ltd (1959, 1961)

INDEX TO ADJOINING SHEETS

| | | |
|---|---|---|
| GORDON DOWNS | BIRRINDUDU | WINNECKE CREEK |
| BILLILUNA | TANAMI | TANAMI EAST |
| LUCAS | THE GRANITES | MT SOLITAIRE |

LOCATION DIAGRAM




AIRBORNE SURVEY, TANAMI - THE GRANITES, NT 1962

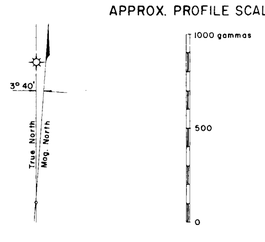
# TOTAL MAGNETIC INTENSITY PROFILES AND GEOLOGY

SCALE

5 0 5 10 15 20 MILES

5 0 5 10 15 20 25 30 KILOMETRES

APPROX. PROFILE SCALE




EXPLANATORY NOTES

THE SURVEY WAS MADE WITH A DC3 AIRCRAFT AT AN ALTITUDE OF 500 FEET ABOVE GROUND LEVEL ALONG LINES SPACED ONE MILE APART.

THE TOTAL MAGNETIC INTENSITY PROFILES WERE RECORDED BY A RECTILINEAR RECORDER, AND HAVE BEEN CORRECTED FOR THE SOUTH COMPONENT OF A REGIONAL GRADIENT IN TOTAL INTENSITY OF 10 GAMMAS PER MILE IN A DIRECTION S 39°W. PROFILES RECORDED AT INTERVALS OF FOUR MILES ARE SHOWN ON THE MAP.

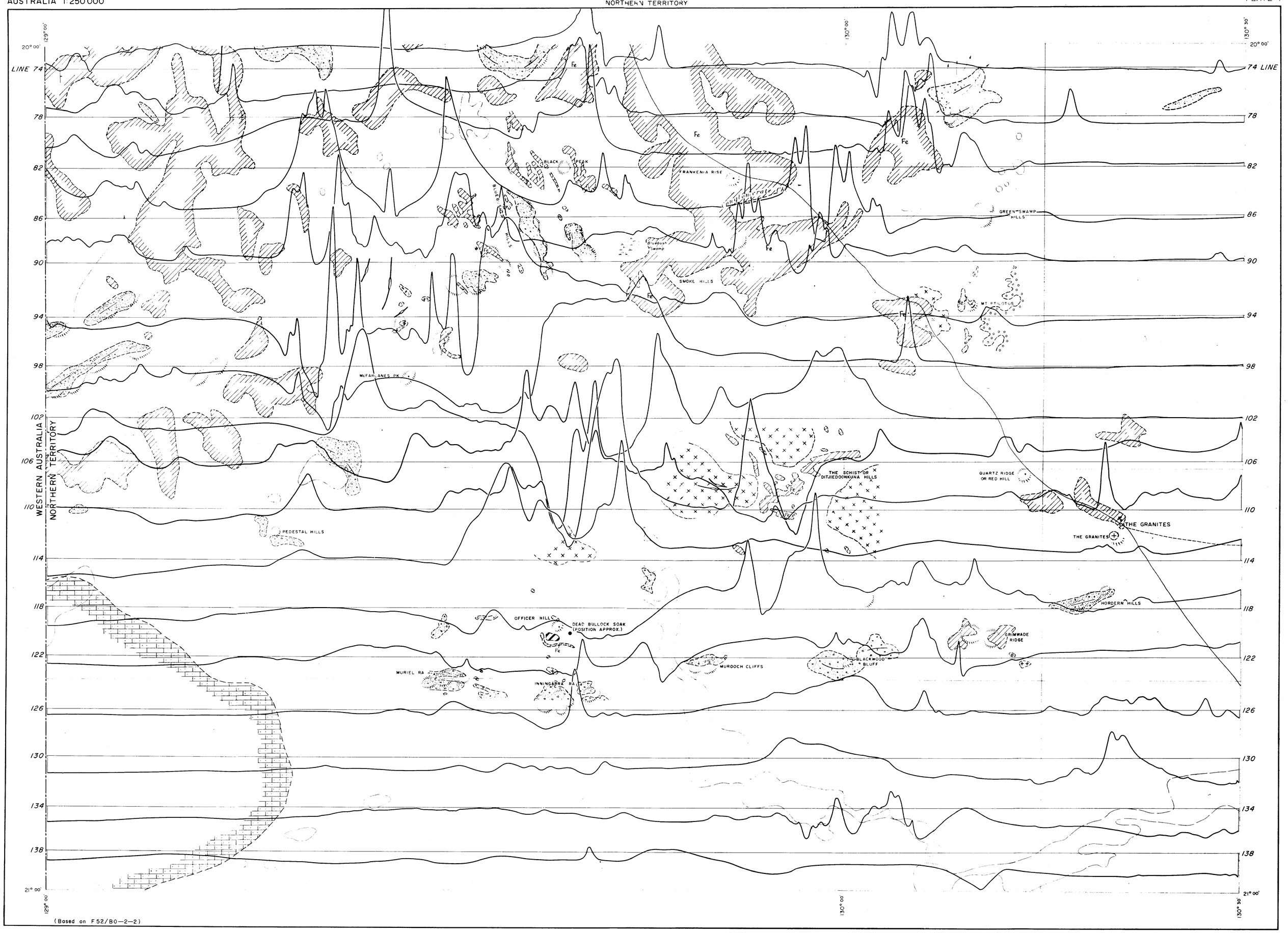
THE FLIGHT LINES, WHICH ALSO SERVE AS BASELINES TO THE PROFILES, HAVE BEEN POSITIONED ON THE BASE MAP WITH A PROBABLE ERROR OF ± 1/4 MILE BY CONTROL AT LONGITUDES 129°20' AND 130°10'.

Geophysical Project, Bureau of Mineral Resources, Geology and Geophysics. E 52/B1-3

TO ACCOMPANY RECORD NO 1964/102

# THE GRANITES
NORTHERN TERRITORY






## GEOLOGICAL LEGEND

LOWER PALAEOZOIC — Limestone, sandstone, shale (After Tectonic Map Of Australia)

PROTEROZOIC
- UPPER — Sandstone and conglomerate
- LOWER — Metasediments, ironstone, etc.

Granite, adamellite, porphyry.

granitic body inferred from photo interpretation (no outcrop)

Schists - gneiss, mica - garnet, schist

Fe — ironstone bodies present

Basic intrusives

Laterite

Fault with massive white quartz blows

Fault concealed

Bedding trends

Geology after mapping by Enterprise Exploration Co. Pty Ltd (1959, 1961)

## INDEX TO ADJOINING SHEETS

| | | |
|---|---|---|
| BILLILUNA | TANAMI | TANAMI EAST |
| LUCAS | THE GRANITES | MT SOLITAIRE |
| STANSMORE | HIGHLAND ROCKS | MT THEO |

## LOCATION DIAGRAM

Darwin

NORTHERN TERRITORY

AIRBORNE SURVEY, TANAMI - THE GRANITES, N.T. 1962

# TOTAL MAGNETIC INTENSITY PROFILES AND GEOLOGY

## SCALE

5 0 5 10 15 20 MILES

5 0 5 10 15 20 25 30 KILOMETRES

## APPROX. PROFILE SCALE

3° 40'

True North
Mag. North

1000 gammas

500

0

## EXPLANATORY NOTES

THE SURVEY WAS MADE WITH A DC3 AIRCRAFT AT AN ALTITUDE OF 500 FEET ABOVE GROUND LEVEL ALONG LINES SPACED ONE MILE APART.

THE TOTAL MAGNETIC INTENSITY PROFILES WERE RECORDED BY A RECTILINEAR RECORDER, AND HAVE BEEN CORRECTED FOR THE SOUTH COMPONENT OF A REGIONAL GRADIENT IN TOTAL INTENSITY OF 10 GAMMAS PER MILE IN A DIRECTION S 3° W. PROFILES RECORDED AT INTERVALS OF FOUR MILES ARE SHOWN ON THE MAP.

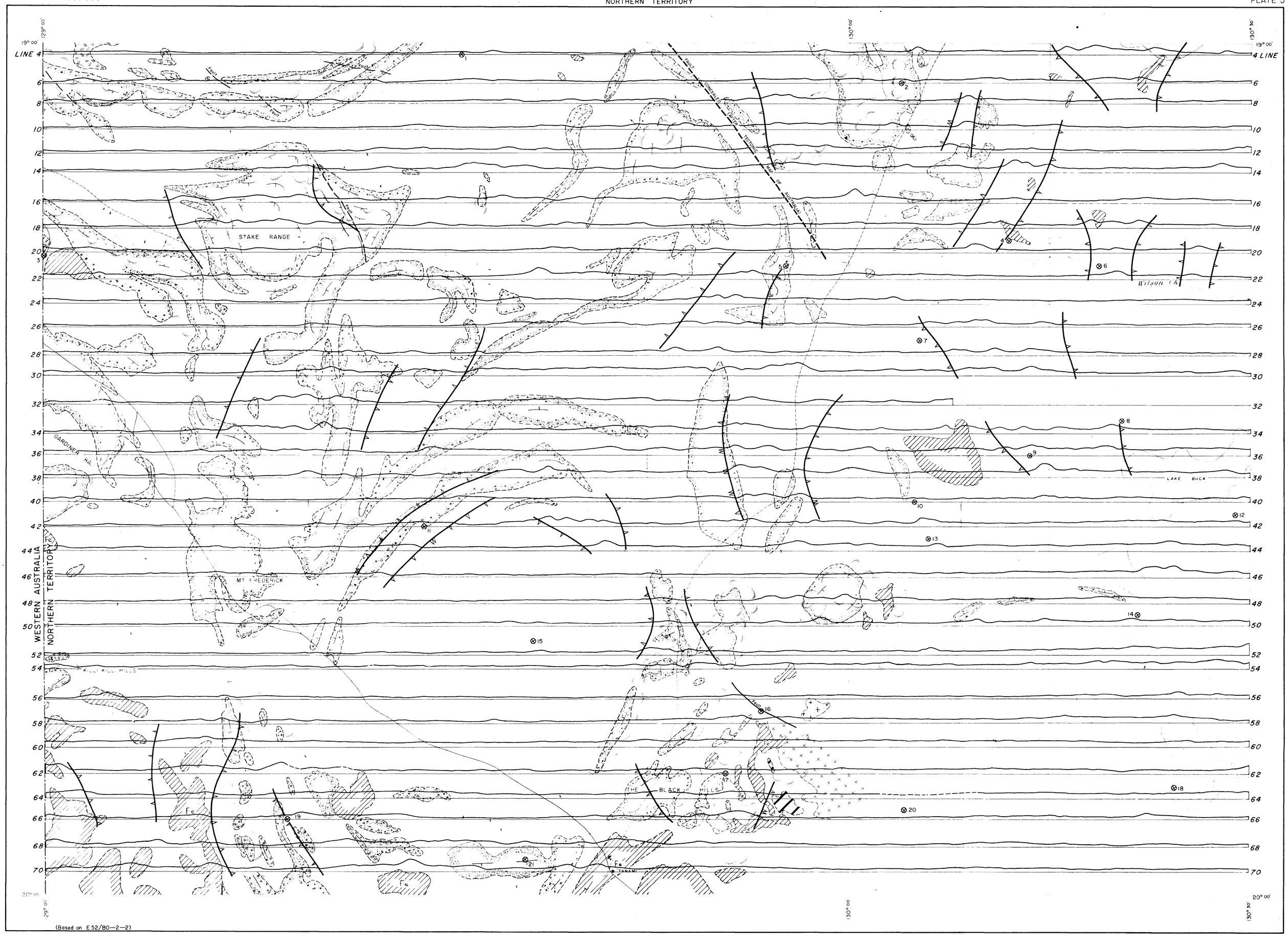
THE FLIGHT LINES, WHICH ALSO SERVE AS BASELINES TO THE PROFILES, HAVE BEEN POSITIONED ON THE BASE MAP WITH A PROBABLE ERROR OF ± 1/4 MILE BY CONTROL AT LONGITUDES 129°20' AND 130° 10'.

Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics. F 52/B1-3

TO ACCOMPANY RECORD NO. 1964/102.

# TANAMI
NORTHERN TERRITORY






(Based on E 52/B0—2—2)

## GEOLOGICAL LEGEND

PROTEROZOIC
- UPPER — Sandstone and conglomerate
- LOWER — Metasediments, ironstone, etc.

Granite, adamellite, porphyry, granitic body inferred from photo interpretation (no outcrop)

Granite - gneiss, micro-garnet, schist

Fe — Ironstone bodies present

Basic intrusives

Fault

Fault concealed

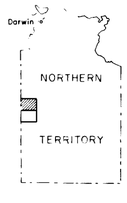
Bedding trends

Geology after mapping by Enterprise Exploration Co. Pty Ltd (1959, 1961)

## INDEX TO ADJOINING SHEETS

| | | |
|---|---|---|
| GORDON DOWNS | BIRRINDUDU | WINNECKE CREEK |
| BULLITA | TANAMI | TANAMI EAST |
| LUCAS | THE GRANITES | MT SOLITAIRE |

## LOCATION DIAGRAM




AIRBORNE SURVEY, TANAMI-THE GRANITES, N T 1962

# RADIOMETRIC RESULTS AND GEOLOGY

SCALE

5 0 5 10 15 20 MILES

5 0 5 10 15 20 25 30 KILOMETRES

3° 40'
True North
Mag. North

APRROX. PROFILE SCALE

700 c.p.s.
350
0

## GEOPHYSICAL LEGEND

RADIOMETRIC PROFILE

12 — RADIOMETRIC ANOMALY (ANOMALIES ARE NUMBERED FOR REFERENCE ONLY)

RADIOACTIVE INTENSITY CHANGE NOT EXCEEDING ½ x BACKGROUND

RADIOACTIVE INTENSITY CHANGE NOT EXCEEDING 1 x BACKGROUND

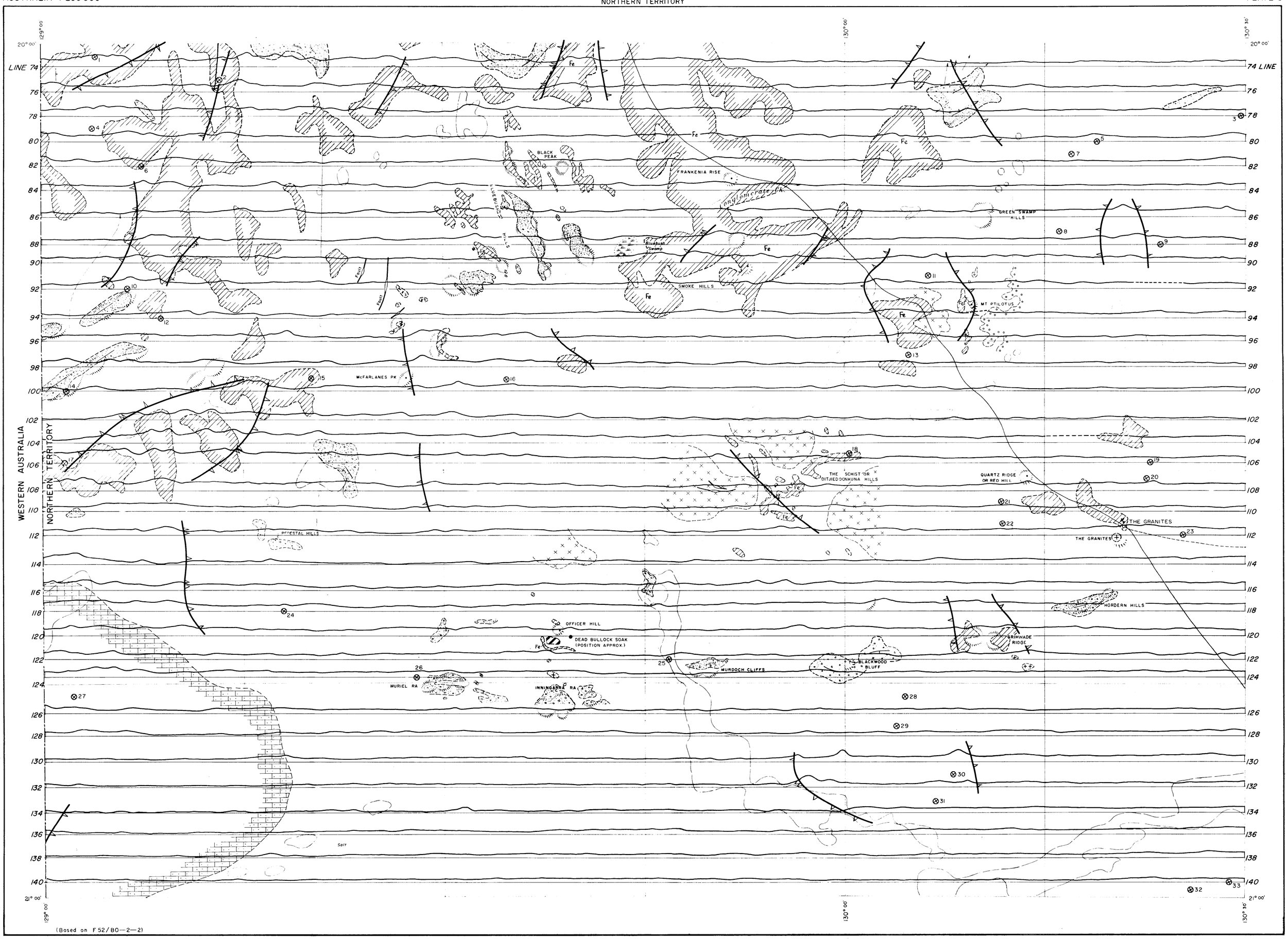
THE BARBED EDGE IS ON THE SIDE OF LOWER INTENSITY

Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics. E52/B1- 4

TO ACCOMPANY RECORD NO 1964/102

# THE GRANITES
NORTHERN TERRITORY






(Based on F 52/B0—2—2)

GEOLOGICAL LEGEND

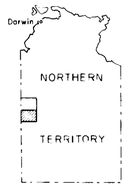
| | | |
|---|---|---|
| LOWER PALAEOZOIC | | Limestone, sandstone, shale (After Tectonic Map of Australia) |
| PROTEROZOIC — UPPER | | Sandstone and conglomerate |
| PROTEROZOIC — LOWER | | Metasediments, ironstone, etc. |
| | | Granite, adamellite, porphyry, granite (only inferred from photo interpretation (no outcrop) |
| | | Granite - gneiss, mica - garnet, schist |
| | Fe | Ironstone bodies present |
| | | Basic intrusives |
| | | Laterite |
| | | Fault with massive white quartz blows |
| | | Fault concealed |
| | | Bedding trends |

Geology after mapping by Enterprise Exploration Co. Pty Ltd (1959, 1961)

INDEX TO ADJOINING SHEETS

| | | |
|---|---|---|
| BILLILUNA | TANAMI | TANAMI EAST |
| LUCAS | THE GRANITES | MT SOLITAIRE |
| STALSMORE | HIGHLAND ROCKS | MT THEIL |

LOCATION DIAGRAM




AIRBORNE SURVEY, TANAMI-THE GRANITES, NT 1962

## RADIOMETRIC RESULTS AND GEOLOGY

SCALE

5 0 5 10 15 20 MILES

5 0 5 10 15 20 25 30 KILOMETRES

3° 40'
True North
Mag. North

APPROX. PROFILE SCALE

700 c.p.s.
350
0

GEOPHYSICAL LEGEND

RADIOMETRIC PROFILE

⊗12 RADIOMETRIC ANOMALY (ANOMALIES ARE NUMBERED FOR REFERENCE ONLY)

RADIOACTIVE INTENSITY CHANGE NOT EXCEEDING ½ x BACKGROUND

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Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics. F52/B1-4

TO ACCOMPANY RECORD NO. 1964/102