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DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORD No. 1963/52



# LONG PLAINS MAGNETIC SURVEY,

## TASMANIA 1961-62



by

E.N. EADIE

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ILLUSTRATIONS

## SUMMARY

At the request of the Tasmanian Department of Mines a geophysical survey in the Long Plains region of north-western Tasmania, was made by the Bureau of Mineral Resources, Geology and Geophysics during the period December 1961 to May 1962.

The survey consisted of a detailed magnetic survey of the Long Plains iron deposits using a traverse spacing of 250 ft and a reconnaissance magnetic survey of the area between the Long Plains and Savage River deposits using a traverse spacing of 1000 ft.

The magnetic results indicate that the Long Plains iron deposits extend over a length of about two miles and terminate abruptly at the northern end. No magnetic anomalies that would indicate the presence of magnetic deposits were observed in the area between the Long Plains and the Savage River deposits, a distance of about three and a half miles.

On the basis of the magnetic results and the topographical survey, recommendations have been made for drilling to test the Long Plains deposits.

## 1. INTRODUCTION

At the request of the Tasmanian Department of Mines a geophysical survey of the Long Plains iron deposits, and of the area between the Long Plains and Savage River deposits, was made by the Bureau of Mineral Resources, Geology and Geophysics, between December 1961 and May 1962. The purpose of the survey was to determine in detail the position and extent of the Long Plains deposits, and to locate any other deposits in the area between the Long Plains and Savage River Deposits.

The existence of the Long Plains deposits was indicated by the aeromagnetic survey done by the Bureau during 1956. Following this survey some exploration was done in the area by Rio Tinto Australian Exploration Pty Ltd, as part of its general exploration programme in Tasmania, and included one diamond-drill hole to test the deposit.

The survey described in this Record was an extension southwards of the ground magnetic surveys previously completed by the Bureau in the Savage River area (Eadie, 1962) and consisted of:

(a) a detailed magnetic survey of the Long Plains iron deposits with traverse spacing of 250 ft. In a highly disturbed area near the northern end of the deposits the traverse spacing was reduced to 50 ft. At the northern and southern extremities of the detailed survey area, the traverse spacing was 500 ft,

(b) a reconnaissance magnetic survey of the area between the Long Plains and Savage River deposits using a traverse spacing of 1000 ft.

In Plate 1 the boundaries of the detailed and reconnaissance ground magnetic surveys are shown superimposed on the aeromagnetic map of total intensity. The magnetic method is applicable because the iron in the Long Plains deposits occurs mainly as magnetite, which is highly magnetic and gives rise to strong magnetic anomalies.

Access to the northern part of the Long Plains area was by means of a vehicle track which turned off from the Waratah-Corinna road at about 30 miles from Waratah (see Plate 3). During the survey described in this Record this track was extended through the reconnaissance area to join the vehicle track in the Savage River area.

Pegging of the traverses was done by surveyors of the Department of the Interior, who also made a level survey of the Long Plains area using Askania microbarometers. The purposes of the levelling were:

(a) to provide surface profiles, which are required in selecting drill sites,

(b) to provide a surface contour plan for comparison with the magnetic contours to show the relation of the deposits (indicated by the magnetic results) to the topography, and

(c) to assist in planning further development of the area.

The method of marking the traverses is given in the Appendix together with other information relating to the topographic survey.

The partyleader E.N. Eadie, geophysicist of the Bureau, was assisted by the following Bureau personnel: geophysicists F. Maranzana (during December 1961, January and March 1962) and R.J. Smith (during March 1962), assistant geophysicists G. Jacobson and J.E. Shirley (from January to March 1962), and field assistants B.P. Murray and D.W. Locke. A cadet geologist D.I. Groves and a university student R. Goninon employed by the Tasmanian Department of Mines were attached to the party from January until March 1962. The surveying was done by surveyors N. Vaughan and R. Grace of the Department of the Interior assisted by four chainmen. A cook, a field assistant, and track-cutters were provided by Industrial and Mining Investigations Pty Ltd, which has an exploration licence over an area embracing the deposits.

## 2. GEOLOGY

As no detailed geological work on the Long Plains area has been published, some geological observations made by D.I. Groves are given below. Also included is a brief account of information obtained from the Rio Tinto diamond-drill hole at Long Plains and supplied by the Tasmanian Department of Mines.

In the Long Plains/Savage River region, there is a succession consisting of quartzite, phyllite, chlorite schist, and talc schist, which have been called the Corinna beds by Spry and Ford (1957). These have a well-marked schistosity striking just west of north in the Long Plains area and swinging to just east of north in the Savage River area, this schistosity generally having a steep easterly dip. The bedding and schistosity, where distinct, are almost parallel and make an angle of less than five degrees with each other.

These rocks represent a metamorphic series of Precambrian age. Structurally this area is probably on the eastern limb of a large anticlinal structure. However, isoclinal folding was observed in isolated outcrops, indicating the possibility that there could be a succession of isoclinally-folded beds constituting the major structure of this area.

The metamorphic rocks have been intruded by basic igneous rocks, large swarms of such intrusions having been reported south of this area in the Corinna/Pieman Heads region (Spry and Ford, 1957). A concordant body of such material intrudes the Precambrian beds in the Long Plains/Savage River area. The rock is an amphibolite which has probably been derived from a rock of doleritic composition.

The Precambrian rocks are overlain in parts unconformably in the Long Plains and Savage River areas by a formation consisting of unfossiliferous, siliceous quartz conglomerate and breccia of Tertiary age. In the southern and northern parts of the Savage River area, there is part of a Tertiary olivine basalt flow lying on the Precambrian sediments.

Detailed geological examination of the area surveyed is extremely difficult as the depth of weathering is great, and hence there are very few outcrops. However, certain facts about the environment in the immediate vicinity of the iron ore can be ascertained.

In the southern part of the Long Plains area there are apparently three separate bodies of amphibolite which are concordant with the metamorphosed sedimentary succession. Of these three, only one of the bodies (the most easterly) contains outcropping iron ore, although the magnetic results indicate that the central body contains iron towards its northern end. North of L 6000N in this area, between 25E and 575W on the traverses, there is one large mass of concordant amphibolite which contains irregular masses or lenses of iron ore. The total thickness of the three separate bodies south of Traverse L 6000N is approximately equal to the thickness of the large single body north of Traverse L 6000N, the thicknesses being 575 ft and 600 ft respectively.

The iron ores occur as discontinuous, elongate bodies associated with the amphibolite generally, and not with any one horizon in the amphibolite.

The diamond-drill hole at Long Plains (located as shown in Plate 5) is situated in relation to the geophysical grid at 11,085N 345E. Drilling was toward the west, and approximately parallel to the traverses. The hole was depressed at 45 degrees, and was 639 ft in length.

Two main iron-bearing zones were intersected by the drill hole, viz. from 79 ft to 116 ft (average 56.6 percent Fe), and from 315 ft to 498 ft (average 49.1 percent Fe). Assays indicated similar impurities to those in the Savage River deposits. The following averages represent the content of impurities in the two zones:

| Zone (ft) | $SiO_2$ (%) | $TiO_2$ (%) | Mn (%) | $P_2O_5$ (%) | S (%) |
|---|---|---|---|---|---|
| 79-116 | 6.07 | 1.54 | 0.09 | 0.08 | 1.64 |
| 315-498 | 7.57 | 0.95 | 0.06 | 0.07 | 7.64 |

## 3. FIELD WORK AND RESULTS

The layout of the traverses is shown in Plate 2. Vertical magnetic readings were made along the traverses at horizontal intervals of 25 ft and 50 ft in the Long Plains and reconnaissance areas respectively. Two ABEM MZ-4 torsion magnetometers were used.

The magnetic field at each station was obtained relative to the field, taken arbitrarily as zero, at a base station situated outside the magnetically anomalous zone. The base station was identical with that used in the survey of the Savage River area, viz. 700W on Traverse A (Eadie, 1962). An auxiliary base station was established at Long Plains and tied-in to the base at Savage River.

The vertical magnetic profile was drawn for each traverse. From these profiles a contour plan of the magnetic field was drawn for the Long Plains area with contour intervals of 10,000 gammas and at a scale of 200 ft to 1 in. (Plate 4). The contours in the highly disturbed area near the northern end of the deposits are shown in a separate plan (Plate 5) at a scale of 50 ft to 1 in. The magnetic profiles and surface profiles along selected traverses where drilling recommendations have been made are shown in Plates 6 to 9.

The reconnaissance survey of the area between the Long Plains and Savage River deposits did not reveal any anomalies due to iron deposits. Therefore, the results for this area are not included in the illustrations.

## 4. INTERPRETATION

### Theoretical Considerations

The nature of the magnetic anomaly caused by a magnetic body is determined by several factors including the shape, size, orientation, depth, and magnetic properties of the body. In assessing the significance of an observed anomaly the amplitude, width, gradient, and shape of the anomaly should be considered together and not as isolated features.

The influence of the depth and width of a magnetic body on the vertical magnetic anomaly arising from it has been investigated by considering the theoretical anomaly due to an infinitely-long dipping vein of infinite depth extent. The assumptions used and the theoretical profiles are given in Plate 10. The traverse is assumed to be normal to the direction of strike of the vein and the zero point of the traverse is taken as being above the centre of the upper surface of the vein.

The influence of the depth of cover of a magnetic vein (i.e. depth to the upper surface) on the magnetic anomaly arising from the vein is illustrated in Figure 1 of Plate 10 where the anomalies due to three veins of equal width but different depths are shown. A vein of width 100 ft is considered, and the depth of cover is taken as 25 ft, 50 ft, and 100 ft, in A, B, and C respectively. A comparison of the three anomalies shows that, as the depth increases, the anomaly decreases in amplitude from 52,000 gammas for a depth of 25 ft to 21,000 gammas for a depth of 100 ft, and the anomaly becomes broader and has less-steep gradients. The decrease in amplitude is such that for a depth of cover of 1000 ft the amplitude of the anomaly is less than 2500 gammas, and for a depth of 2500 ft, less than 1000 gammas. Thus, although the magnetic vein considered in the example is assumed to have an infinite depth extent, only a minor contribution to the anomaly is from material at a depth greater than 1000 ft from the surface.

The influence of the width of a magnetic vein is illustrated in Figure 2 where the anomalies due to three veins of equal depth but different widths are shown. A vein at 50-ft depth is considered, and the width of the vein is taken as 50 ft, 100 ft, and 200 ft, in A, B, and C respectively. A comparison of the three anomalies shows that, as the width of the vein increases, the anomaly arising from it increases in both amplitude and width. An identical vein has been considered in Figures 1B and 2B to enable a comparison between the two sets of theoretical anomalies shown in Figures 1 and 2.

The vertical magnetic field due to a magnetic vein of width W and with depth of cover D at a point distance n W (where n is a numerical multiplier) from the point above the centre of the upper surface of the vein along a traverse normal to the direction of strike is a function of n and of the depth-to-width ratio D/W, and not of D and W independently, This is illustrated by reference to Figures 1 and 2 where the ratio D/W is 0.25, 0.50, and 1.00 in A, B, and C respectively in each case. The amplitude of the anomaly increases as D/W decreases provided D and W are the only variables, as illustrated in Figure 4.

The theoretical magnetic anomaly arising from two parallel magnetic veins is illustrated in Figure 3. Two veins each of width 50 ft and with depth of cover 50 ft are considered, and the separation between the veins is taken as 0, 25 ft, 50 ft, and 100 ft, in A, B, C, and D respectively. In case A, the two veins form a single vein with width 100 ft and depth 50 ft as in Figures 1B and 2B. A comparison of the four anomalies shows that as the separation between the veins is increased, the anomaly decreases in amplitude and increases in width. When the separation is sufficiently large, two distinct peaks are observed in the anomaly, one corresponding to each vein.

The dip of a magnetic body influences the gradient of the anomaly so that the anomaly due to a dipping body is not symmetrical about the maximum. For instance, for a north-striking body dipping east, the gradient east of the anomaly maximum will be more gradual than the gradient west of the maximum. The theoretical anomalies illustrated in Plate 10 exhibit such an asymmetry. (However, in this case the asymmetry is due to the influence of both dip and strike as the veins considered are not assumed to be north-striking).

An observed magnetic profile will show the integrated effect of all the influencing magnetic materials. For instance, sharp local anomalies of large amplitude caused by near-surface materials may be superimposed on a smooth anomaly caused by a deposit at greater depth. However, such effects are usually recognisable so that the less-important effects can be eliminated and due regard paid to the main component of the anomaly.

It is seen from the above discussion and reference to Plate 10 that the amplitude alone of a magnetic anomaly is not of great significance in the search for iron deposits, and that an assessment of the importance of an anomaly depends also on its width, gradients, and general form.

The above considerations have been taken into account in the interpretation of the magnetic results and in making the drilling recommendations.

Discussion of Results

The magnetic contours on Plates 4 and 5 indicate that the iron-bearing zone extends continuously from near the Waratah-Corinna road to about Traverse L11,500N, a distance of about two miles. An easterly dip of the zone is indicated by the profiles. The iron deposits are shown to occur in the form of elongate lenses. The width of the deposits is variable and in general less than that of the Savage River deposits.

The Long Plains deposits terminate abruptly at their northern end near Traverse L11,500N; between that traverse and the southern end of the Savage River deposits, a distance of about three and a half miles, no significant magnetic anomalies were observed, indicating that no magnetic deposits occur in this region.

The magnetic results and elevation profiles provide a basis on which to plan a diamond-drilling programme to test the Long Plains deposits. Recommendations are made for drilling on 11 traverses spaced at intervals ranging from 750 to 1500 ft. The magnetic and surface profiles and recommended drill holes for these traverses are shown in Plates 6 to 9. A brief discussion of the magnetic anomalies on the traverses is given below. Along each traverse the magnetic profile has been used to estimate the approximate width of the iron-bearing zone. This width refers to the horizontal distance over which iron concentrations occur and may include barren or weakly-mineralised sections within the deposit.

Traverse L250N (Plate 6). This traverse crosses the southern end of the deposits, near the Waratah-Corinna road. The anomaly indicates that the iron-bearing zone is about 40 ft wide and that the ore probably occurs as a single lens.

Traverse L1750N (Plate 6). The anomaly indicates that the iron-bearing zone is about 130 ft wide, and that the deposit, which probably occurs as a single lens, is closer to the surface than on Traverse L250N.

Traverse L3250N (Plate 6). The anomaly indicates that the iron-bearing zone is about 240 ft wide, and that the ore probably occurs as several lenses separated by barren regions.

Traverse L4000N (Plate 7). The anomaly indicates an iron-bearing zone about 220 ft wide, in which the ore probably occurs as several lenses separated by barren regions.

Traverse L5000N (Plate 7). The anomaly indicates an iron-bearing zone about 450 ft wide in which the ore occurs as several lenses separated by barren regions. As the zone of mineralisation is particularly broad and a large deposit of iron is indicated, two drill sites are recommended, including one to be drilled towards the east.

Traverse L6000N (Plate 7). The anomaly indicates an iron-bearing zone about 270 ft wide, in which the iron occurs as several lenses separated by barren regions.

Traverse L7000N (Plate 8). The iron-bearing zone is about 380 ft wide and the ore occurs as several lenses separated by barren regions. The zone of mineralisation is broad, and a large deposit of iron ore is indicated. Two drill sites are recommended on this traverse, including one to be drilled towards the east.

Traverse L8000N (Plate 8). The main anomaly (with peak at 275W) indicates that the main iron-bearing zone is about 110 ft wide, and that probably most of the iron occurs as a single lens.

A sharp narrow anomaly (with peak at the baseline) is due to a shallow narrow body of iron, but is of little economic interest.

Traverse L9250N (Plate 8). The anomaly indicates an iron-bearing zone about 320 ft wide in which the iron occurs as separate lenses which are close to the surface.

Traverse L10,250N (Plate 9). The iron occurs in a zone greater than 400 ft wide, but that the main iron-bearing zone is about 320 ft wide (giving rise to the anomaly west of about 125E) in which the ore probably occurs as separate lenses which are close to the surface.

Traverse L11,250N (Plate 9). This traverse is situated near the northern end of the Long Plains deposits in an area which is highly disturbed magnetically. The profile indicates an iron-bearing zone about 600 ft wide. However, the most significant part of the profile is between 200E and 550E. The sharp irregularities west of this are attributable to near-surface material and are probably not of economic interest. The relatively smooth anomaly between about 400E and 550E indicates a lens of iron ore about 70 ft wide. The anomaly with very steep gradients between about 200E and 350E indicates a body of iron ore about 100 ft wide and close to the surface.

During 1959 drilling was done by Rio Tinto Australian Exploration Pty. Ltd, in the vicinity of Traverse L11,100N (Plate 5). The drilling results from this hole are in good agreement with the interpretation of the magnetic results.

## Drilling Recommendations

The drilling recommendations are summarised in the table below:

RECOMMENDED DRILL SITES

| PLATE | TRAVERSE | SITE | DIRECTION | | | DEPRESSION (degrees) | LENGTH (ft) |
|---|---|---|---|---|---|---|---|
| 6 | L 250N | 100E | West | along | Traverse | 50 | 225 |
| 6 | L 1750N | 150E | " | " | " | 50 | 400 |
| 6 | L 3250N | 380E | " | " | " | 50 | 600 |
| 7 | L 4000N | 150E | " | " | " | 50 | 650 |
| 7 | L 5000N | 100E | " | " | " | 60 | 1000 |
| 7 | L 5000N | 700E | East | " | " | 45 | 1250 |
| 7 | L 6000N | 150E | West | " | " | 50 | 800 |
| 8 | L 7000N | 250E | " | " | " | 50 | 950 |
| 8 | L 7000N | 650E | East | " | " | 45 | 1100 |
| 8 | L 8000N | 150E | West | " | " | 45 | 650 |
| 8 | L 9250N | 250E | " | " | " | 45 | 600 |
| 9 | L10,250N | 350E | " | " | " | 45 | 725 |
| 9 | L11,250N | 650E | " | " | " | 45 | 575 |

## Conclusions

The magnetic survey at Long Plains indicates large iron ore deposits of variable width extending continuously for about two miles. The northern end of the Long Plains deposits is about three and a half miles south of the southern end of the Savage River deposits.

The Long Plains deposits are of special interest when considered in conjunction with the Savage River deposits, and warrant a thorough economic investigation, including drilling.

## 5. REFERENCES


EADIE, E.N. 1962 Savage River geophysical surveys, Tasmania 1960-61. Bur. Min. Resour. Aust. Rec. 1962/116 (unpubl.)

SPRY, A.H. and FORD, R.J. 1957 A reconnaissance of the Corinna - Pieman Heads area. Pap. roy. Soc. Tas. 91,1-7.

# APPENDIX

## TOPOGRAPHIC SURVEYING

The topographical surveying carried out at Long Plains by the Department of the Interior was primarily required for the geophysical survey but it should also be of assistance in connexion with any further investigation or development of the area. Additional information on this work is given below.

Along each traverse shown in Plate 2, wooden pegs were inserted at horizontal intervals of 50 ft. A concrete block was placed on Traverse L 00 at its junction with the walking track near the Waratah-Corinna road Permanent marks were placed at the zero points of other traverses in the Long Plains area. These consisted of steel fence posts, usually protruding about a foot above the ground and painted yellow, with an aluminium tag indicating the traverse number. Reference marks were cut on trees at several locations in the Long Plains and reconnaissance areas. Table 1 gives the reference of these marks to stations along the baseline. A list of distances and bearings along the baseline is given in Table 2.

In the level survey of Long Plains area, the known elevation of the Blackguards Hill Trig. Station (SPM 2846) was used as the basis of the elevation determinations, and all levels are referred to mean sea level as datum.

The elevation of the zero point of each traverse was determined by conventional levelling methods, and elevations along the traverses were obtained using Askania microbarometers. Microbarometer readings were taken at each peg (horizontal interval 50 ft) along the traverses except where there were abrupt changes in slope; in these places additional readings were made. The pressure drift during the period between successive readings at the zero peg was assumed to be linear in determining the elevation of each station relative to the zero peg.

The topographic contours are shown in Plate 3 using a scale of 200 ft to 1 in. and contour intervals of 20 ft. As the contours are based only on levels along the traverses, abrupt changes and irregularities in topography between traverses have not been taken into account. However, the approximate courses of most creeks have been shown and the contours in their vicinities have been inferred.

TABLE 1

# REFERENCES TO CONCRETE BLOCK AND MARKED TREES

| STATION | BEARING | DISTANCE | TO |
|---|---|---|---|
| L00000N | 76° 12' | 13·8 | CONCRETE BLOCK |
| L02750N | 41° 52' | 21·2 | R275 MYRTLE |
| L05000N | 181° 46' | 13·9 | R500 MYRTLE |
| L07500N | 76° 30' | 12·6 | R750 MYRTLE |
| L10000N | 161° 55' | 19·2 | R1000 MYRTLE |
| L12500N | 112° 47' | 18·0 | R1250 MYRTLE |
| L14000N | 182° 49' | 35·0 | R1400 MYRTLE |
| L22000N | 81° 51' | 13·3 | R2200 MYRTLE |
| L30000N | 200° 51' | 25·5 | R3000 MYRTLE |

*Note References are relative to the baseline*

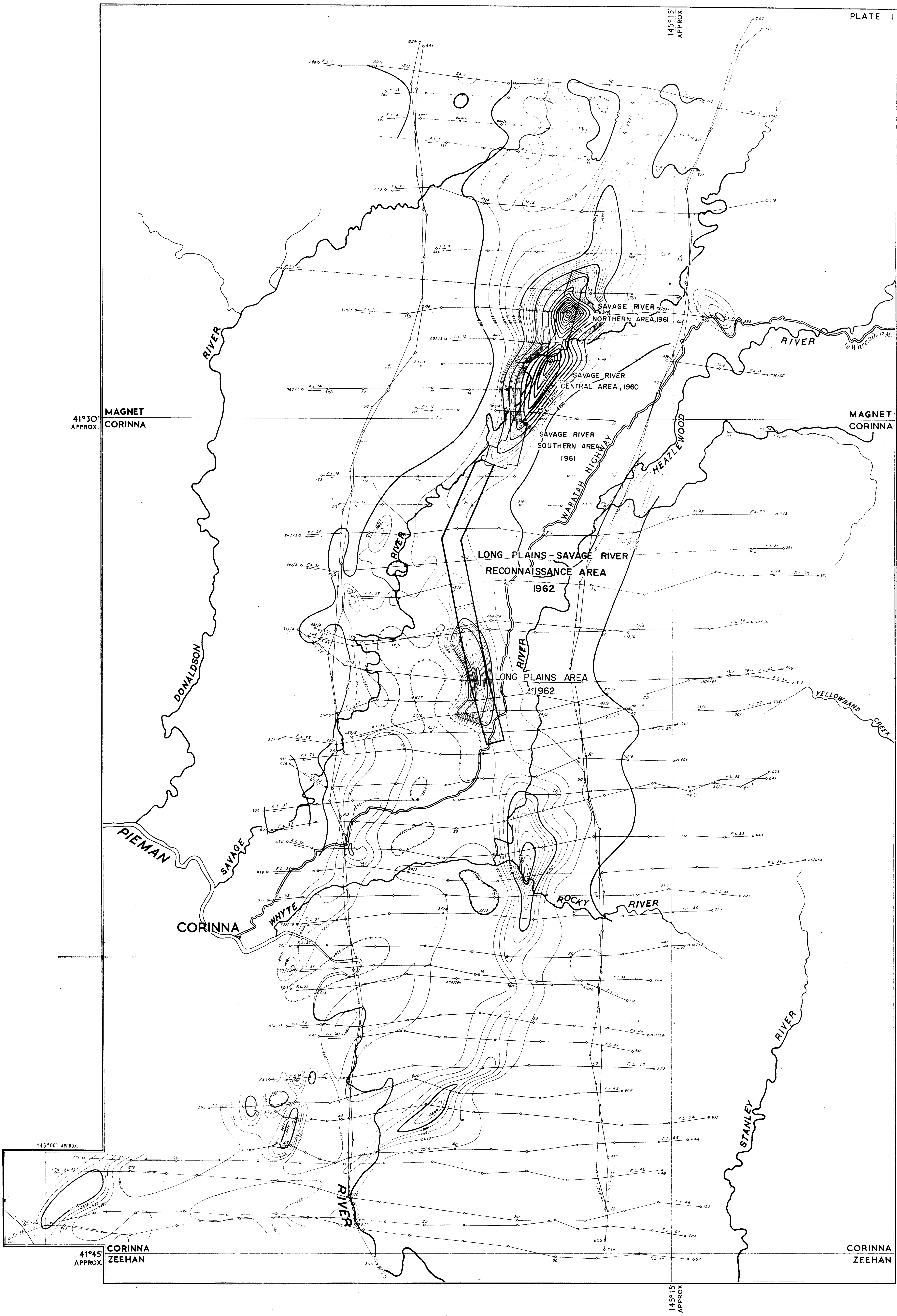
TABLE 2

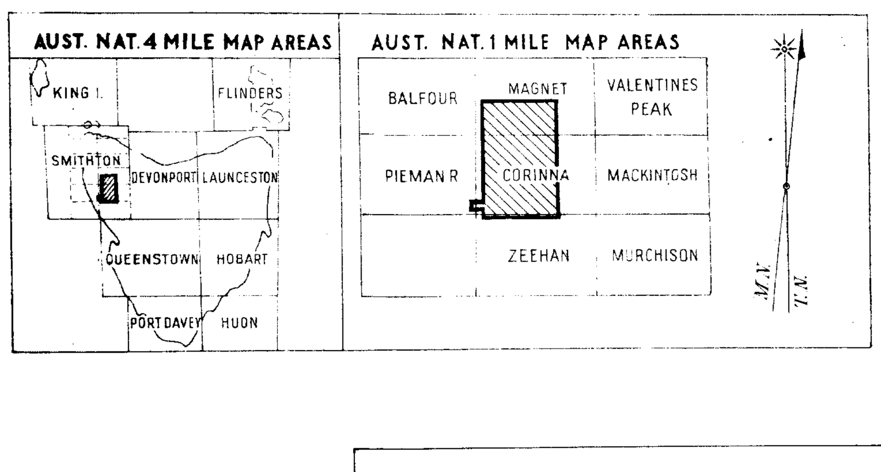
# REFERENCES TO BASELINE

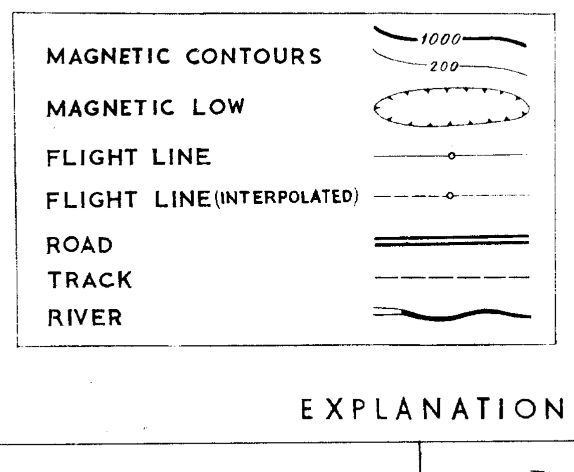
| LINE | BEARING | DISTANCE |
|---|---|---|
| 1000'S - 500'S | 346° 22' | 500' |
| 500'S - 00 | 346° 22' | 500' |
| 00 - 250'N | 346° 22' | 250' |
| 250'N - 500'N | 346° 06' | 250' |
| 500'N - 750'N | 345° 40' | 250' |
| 750'N - 1000'N | 345° 40' | 249' |
| 1000'N - 1250'N | 345° 39' | 250' |
| 1250'N - 1500'N | 345° 22' | 250' |
| 1500'N - 1750'N | 345° 22' | 250' |
| 1750'N - 2000'N | 344° 54' | 250' |
| 2000'N - 2250'N | 344° 59' | 249' |
| 2250'N - 2500'N | 343° 43' | 251' |
| 2500'N - 2750'N | 344° 29' | 250' |
| 2750'N - 3000'N | 344° 29' | 250' |
| 3000'N - 3250'N | 344° 28' | 250' |
| 3250'N - 3500'N | 344° 21' | 251' |
| 3500'N - 3750'N | 344° 25' | 249' |
| 3750'N - 4000'N | 344° 28' | 240' |
| 4000'N - 4250'N | 344° 46' | 251' |
| 4250'N - 4500'N | 345° 28' | 240' |
| 4500'N - 4750'N | 345° 35' | 250' |
| 4750'N - 5000'N | 345° 37' | 241' |
| 5000'N - 5250'N | 345° 42' | 260' |
| 5250'N - 5500'N | 345° 40' | 245' |
| 5500'N - 5750'N | 345° 53' | 263' |
| 5750'N - 6000'N | 346° 23' | 251' |
| 6000'N - 6250'N | 347° 41' | 250' |
| 6250'N - 6500'N | 347° 27' | 248' |
| 6500'N - 6750'N | 347° 28' | 247' |
| 6750'N - 7000'N | 347° 37' | 251' |
| 7000'N - 7250'N | 348° 04' | 253' |
| 7250'N - 7500'N | 348° 00' | 249' |
| 7500'N - 7750'N | 348° 10' | 250' |
| 7750'N - 8000'N | 348° 10' | 250' |
| 8000'N - 8250'N | 347° 49' | 250' |
| 8250'N - 8500'N | 348° 48' | 250' |
| 8500'N - 8750'N | 347° 58' | 250' |
| 8750'N - 9000'N | 348° 03' | 250' |
| 9000'N - 9250'N | 347° 52' | 250' |
| 9250'N - 9500'N | 347° 31' | 250' |
| 9500'N - 9750'N | 347° 52' | 250' |
| 9750'N - 10000'N | 347° 52' | 750' |
| 10000'N - 10250'N | 347° 44' | 250' |
| 10250'N - 10500'N | 345° 22' | 250' |
| 10500'N - 10750'N | 347° 47' | 250' |
| 10750'N - 11000'N | 347° 47' | 250' |
| 11000'N - 11250'N | 347° 46' | 250' |
| 11250'N - 11500'N | 347° 46' | 250' |
| 11500'N - 11750'N | 347° 46' | 250' |
| 11750'N - 12000'N | 347° 20' | 250' |
| 12000'N - 12250'N | 347° 26' | 250' |
| 12250'N - 12500'N | 347° 32' | 250' |
| 12500'N - 12750'N | 347° 48' | 250' |
| 12750'N - 13000'N | 348° 37' | 250' |
| 13000'N - 13500'N | 348° 40' | 500' |
| 13500'N - 14000'N | 348° 40' | 500' |
| 14000'N - 15000'N | 345° 03' | 1002' |
| 15000'N - 16000'N | 347° 33' | 1005' |
| 16000'N - 17000'N | 347° 38' | 1001' |
| 17000'N - 18000'N | 347° 30' | 993' |
| 18000'N - 19000'N | 347° 32' | 1002' |
| 19000'N - 20000'N | 347° 29' | 991' |
| 20000'N - 21000'N | 347° 31' | 1000' |
| 21000'N - 21200'N | 347° 31' | 196' |
| 21200'N - 21750'N | 17° 31' | 562' |
| 21750'N - 22000'N | 17° 31' | 250' |
| 22000'N - 23000'N | 17° 31' | 1000' |
| 23000'N - 24100'N | 17° 31' | 1100' |
| 24100'N - 25100'N | 17° 31' | 1000' |
| 25100'N - 26000'N | 17° 31' | 900' |
| 26000'N - 27000'N | 17° 31' | 1000' |
| 27000'N - 28000'N | 17° 31' | 1000' |
| 28000'N - 29000'N | 17° 31' | 1000' |
| 29000'N - 30000'N | 17° 31' | 1000' |
| 30000'N - 30350'N | 17° 31' | 339' |
| 30350'N - 10500'S | 17° 31' | 360' |

K55/B7-38

TO ACCOMPANY RECORD No. 1963/52




APPROXIMATE SCALE IN MILES

1 0 1 2 3 4 5

CONTOUR INTERVAL 200 GAMMAS

SAVAGE RIVER AND LONG PLAINS, IRON DEPOSITS

# AEROMAGNETIC MAP OF TOTAL INTENSITY

## SHOWING AREA OF GROUND MAGNETIC SURVEYS

## 1960, 1961, AND 1962

EXPLANATION

*This map was compiled from the results of an airborne magnetometer survey of selected areas in the Rocky River - Rio Tinto district, Tasmania, conducted by the Bureau of Mineral Resources in May 1956. The object of the survey was to delineate magnetic anomalies showing the extent and distribution of probable iron ore deposits.*

*The data remain uncorrected for regional gradient in total field intensity of 5.6 γ per mile in a direction of S 19° W*

*The total intensity was continuously recorded by an airborne magnetometer. The survey was made at an altitude of 500 feet above ground level along lines spaced one half-mile apart.*

*Photo mosaic assemblies were used as a visual aid to navigation. The actual flight path of the aircraft was plotted from 35-mm continuous strip photography of the ground taken during flight.*

GEOPHYSICAL BRANCH, BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS

TO ACCOMPANY RECORD No 1963/52 (BASED ON G 252-2)

K55/B7-29

PLATE 2


TO ACCOMPANY RECORD No 1963/52

Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics

K55/B7-30

LONG PLAINS IRON ORE DEP. TAS.


PLATE 3
TRAVERSES L1000S - L14,000N
TOPOGRAPHICAL CONTOURS
NOTE:
Datum of Levels: MSL
Origin of Levels: SPM 2846, Blackguards Hill RL 966·60
Contours interpolated from levels along cross traverses
FEET
200 100 0 200 400 600 800
CONTOUR INTERVAL 20 FEET
T.N.
M.N.
TO ACCOMPANY RECORD No 1963/52
Bureau of Mineral Resources, Geology and Geophysics K55/B7-31


LONG PLAINS AREA, TASMANIA, 1962

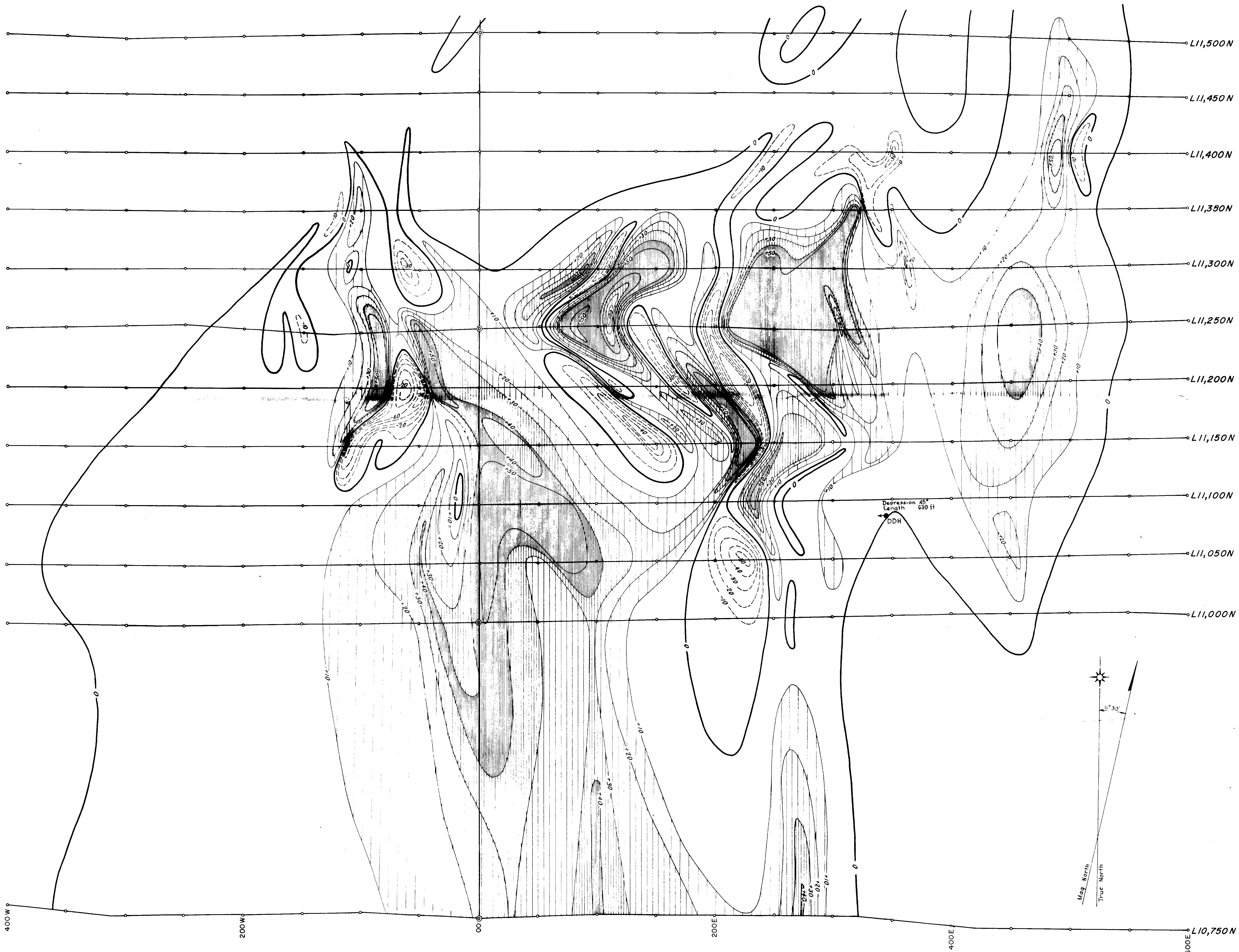
TRAVERSES L1000S – L14,000N

VERTICAL MAGNETIC CONTOURS

TO ACCOMPANY RECORD No 1963/52

Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics K55/B7-32

PLATE 5




**LEGEND**

Greater than 40,000 gammas

30,000 - 40,000 gammas

20,000 - 30,000 gammas

10,000 - 20,000 gammas

Less than 10,000 gammas

Traverse and station

DDH Completed diamond-drill hole

+20 +20,000-gammas contour

FEET

50 0 50 100 150

Contour interval 10,000 gammas

Contours greater than 50,000 gammas not shown

LONG PLAINS AREA, TASMANIA 1962

TRAVERSES L10,750N - L11,500N

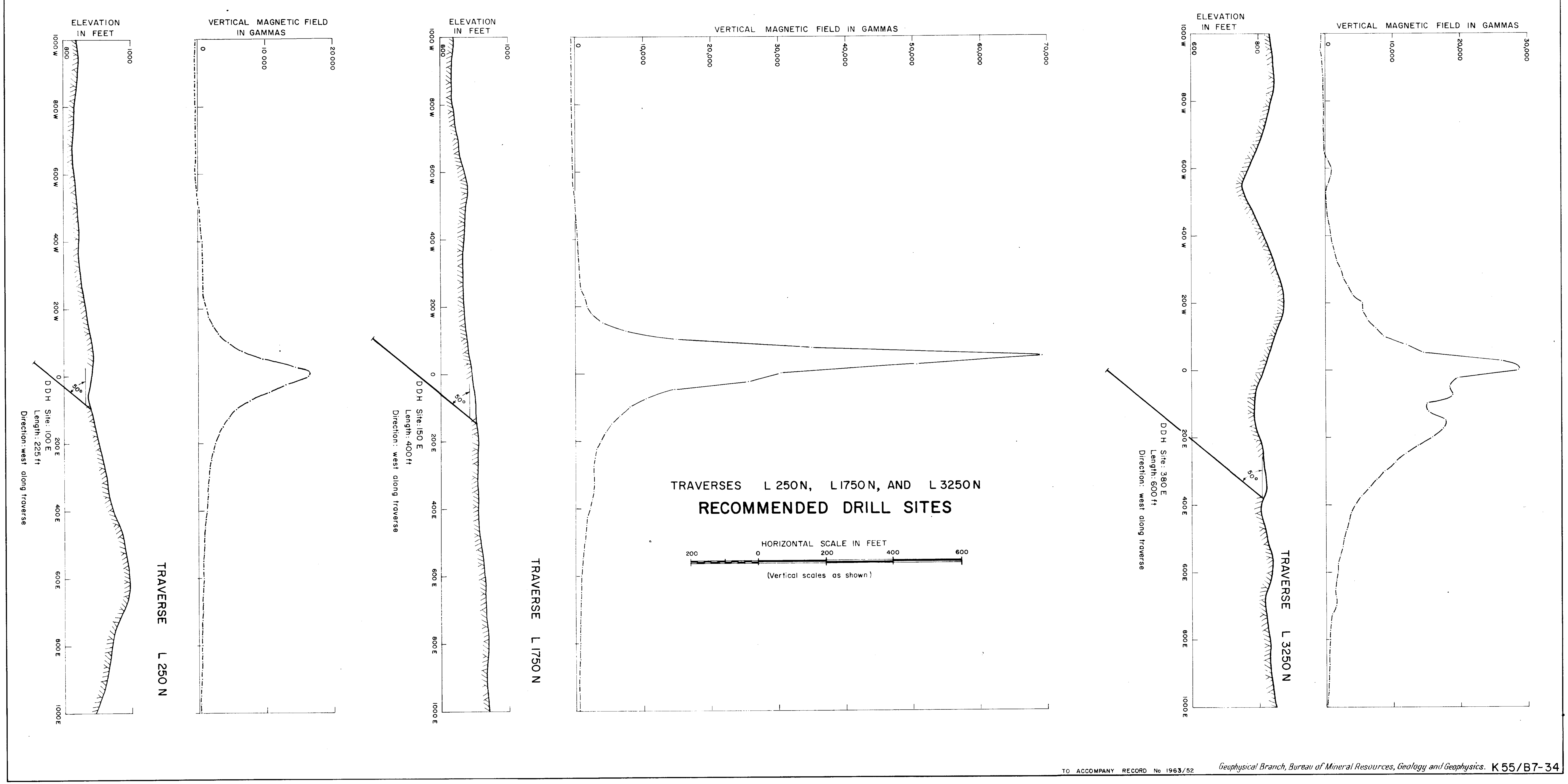
VERTICAL MAGNETIC CONTOURS

TO ACCOMPANY RECORD No 1963/52

Geophysical Branch, Bureau of Mineral Resources, Geology & Geophysics. K55/B7-33

LONG PLAINS AREA, TAS. 1962

PLATE 6




TO ACCOMPANY RECORD No 1963/52

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LONG PLAINS, TAS. 1962

PLATE 7


LONG PLAINS, TAS. 1962

TO ACCOMPANY RECORD No 1963/52

*Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics* K55/B7-35

PLATE 8


TRAVERSES L 7000 N, L 8000 N, AND L 9250 N

## RECOMMENDED DRILL SITES

HORIZONTAL SCALE IN FEET

200 0 200 400 600

(Vertical scales as shown)

TO ACCOMPANY RECORD No 1963/52

*Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics.* K55/B7-36

*LONG PLAINS, TAS, 1962*


TRAVERSES L 10,250 N AND L 11,250 N

## RECOMMENDED DRILL SITES

HORIZONTAL SCALE IN FEET

200 0 200 400 600

(Vertical scales as shown)

LONG PLAINS, TAS. 1962

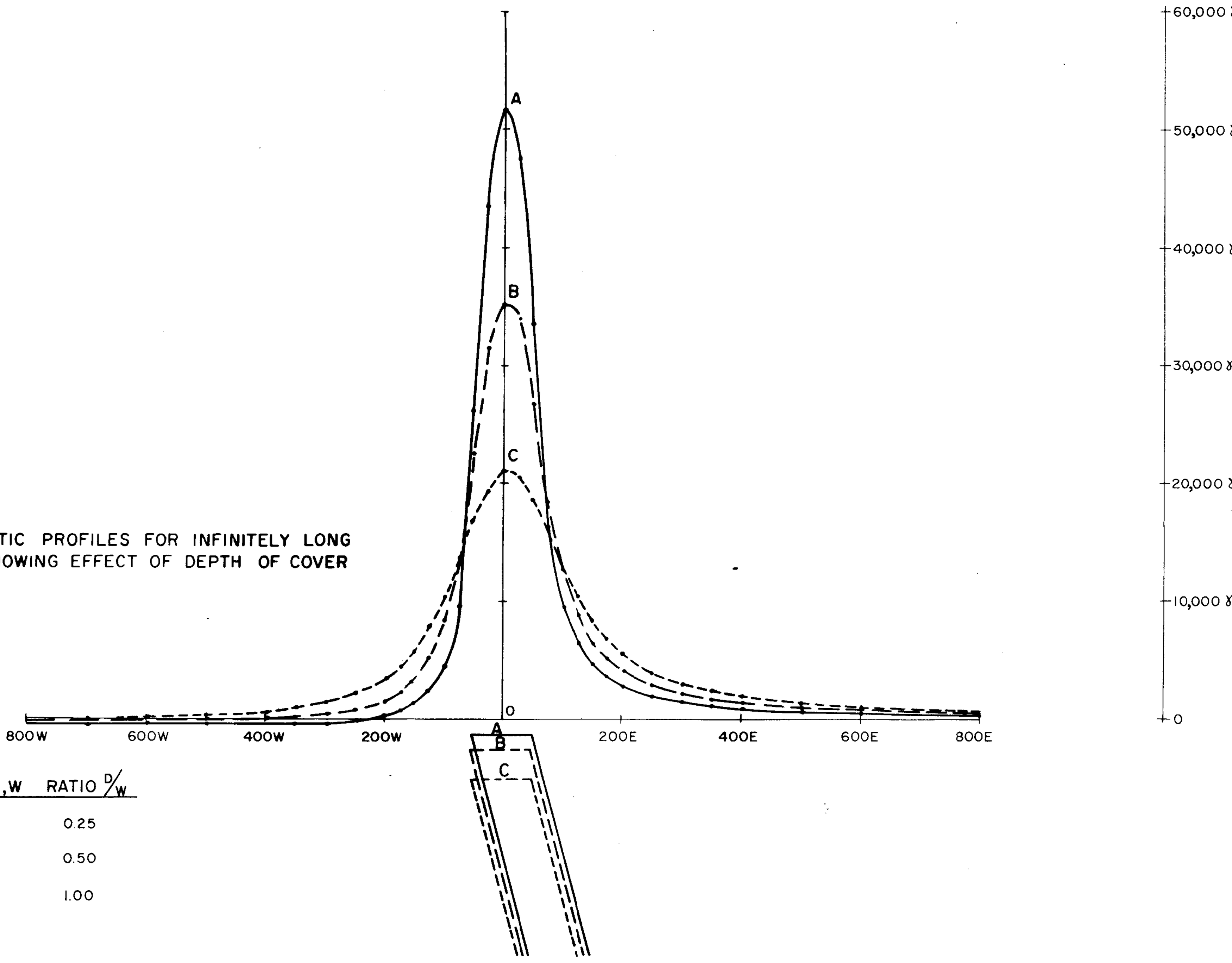



FIG. 1 VERTICAL MAGNETIC PROFILES FOR INFINITELY LONG DIPPING VEIN, SHOWING EFFECT OF DEPTH OF COVER

| | DEPTH, D | WIDTH, W | RATIO D/W |
|---|---|---|---|
| A | 25 ft | 100 ft | 0.25 |
| B | 50 ft | 100 ft | 0.50 |
| C | 100 ft | 100 ft | 1.00 |

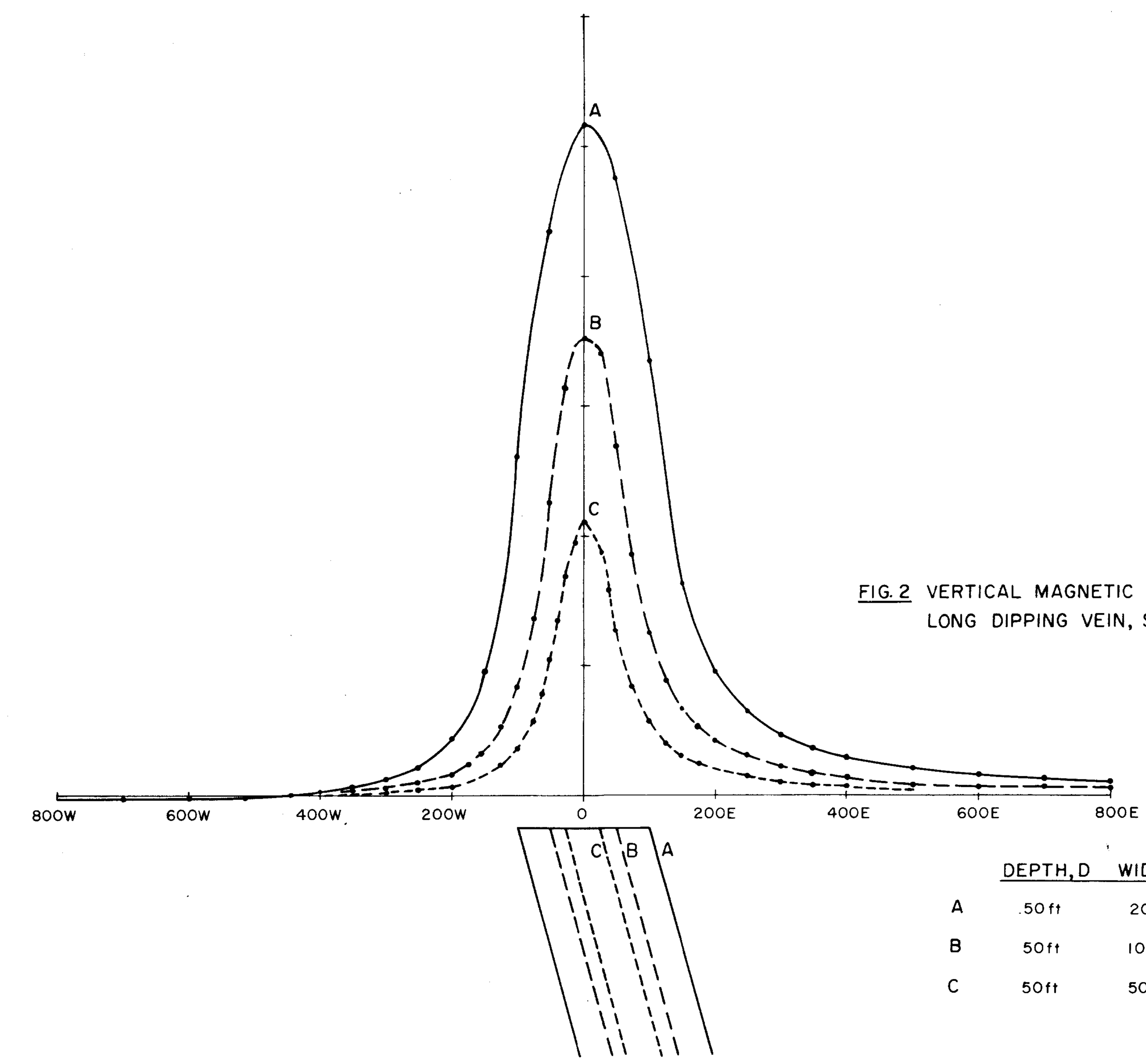
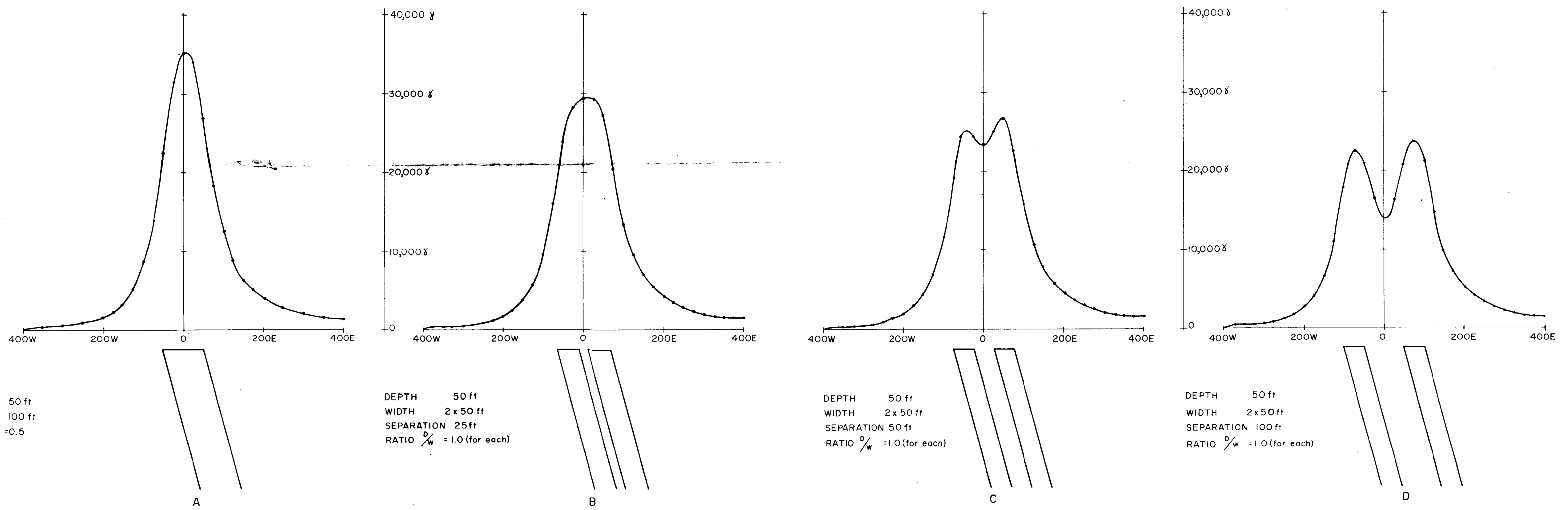



FIG. 2 VERTICAL MAGNETIC PROFILES FOR INFINITELY LONG DIPPING VEIN, SHOWING EFFECT OF WIDTH

| | DEPTH, D | WIDTH, W | RATIO D/W |
|---|---|---|---|
| A | 50 ft | 200 ft | 0.25 |
| B | 50 ft | 100 ft | 0.50 |
| C | 50 ft | 50 ft | 1.00 |

FIG. 3 VERTICAL MAGNETIC PROFILES FOR TWO PARALLEL INFINITELY LONG DIPPING VEINS




A: DEPTH 50 ft, WIDTH 100 ft, RATIO D/W = 0.5

B: DEPTH 50 ft, WIDTH 2 x 50 ft, SEPARATION 25 ft, RATIO D/W = 1.0 (for each)

C: DEPTH 50 ft, WIDTH 2 x 50 ft, SEPARATION 50 ft, RATIO D/W = 1.0 (for each)

D: DEPTH 50 ft, WIDTH 2 x 50 ft, SEPARATION 100 ft, RATIO D/W = 1.0 (for each)

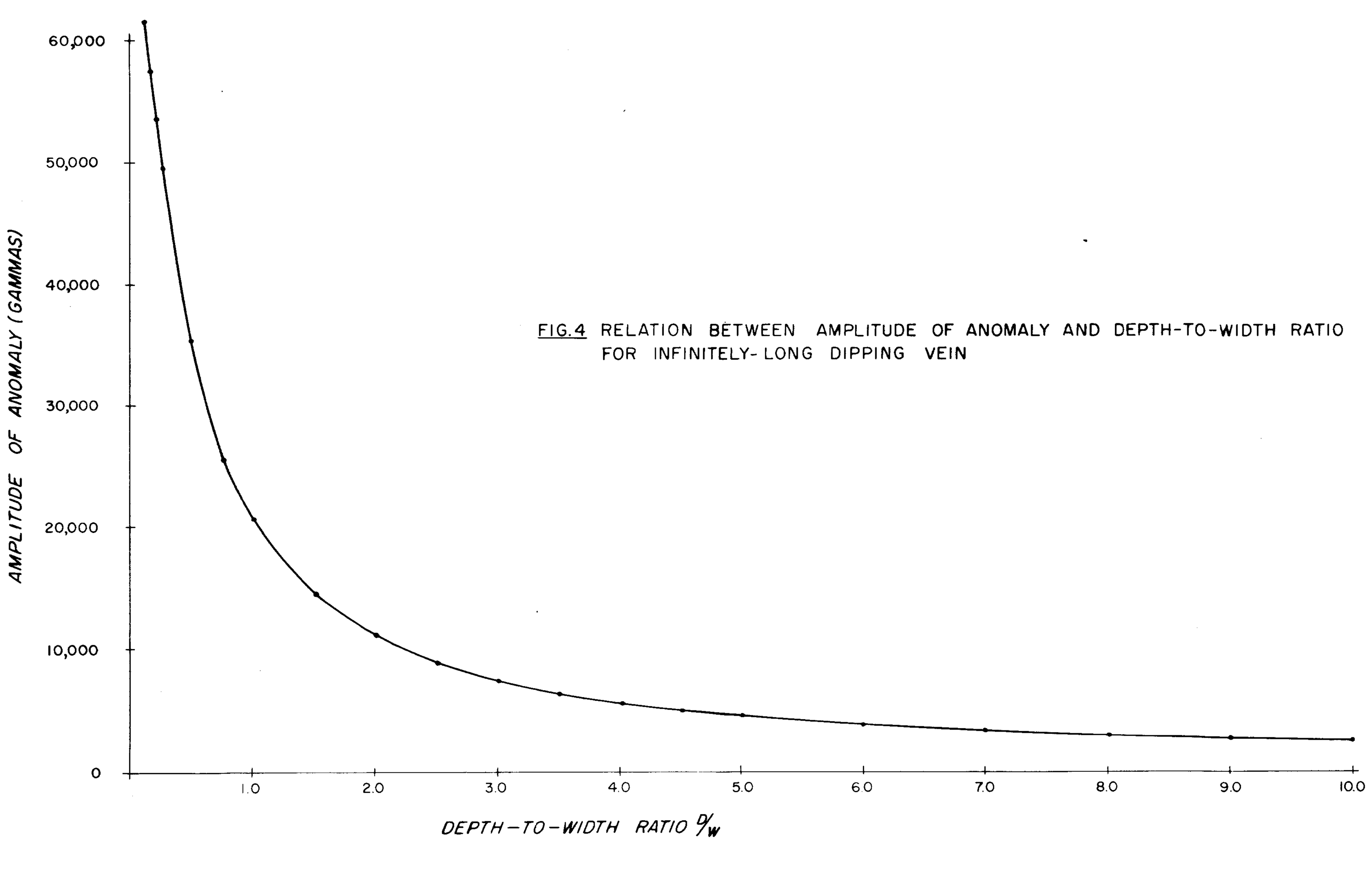
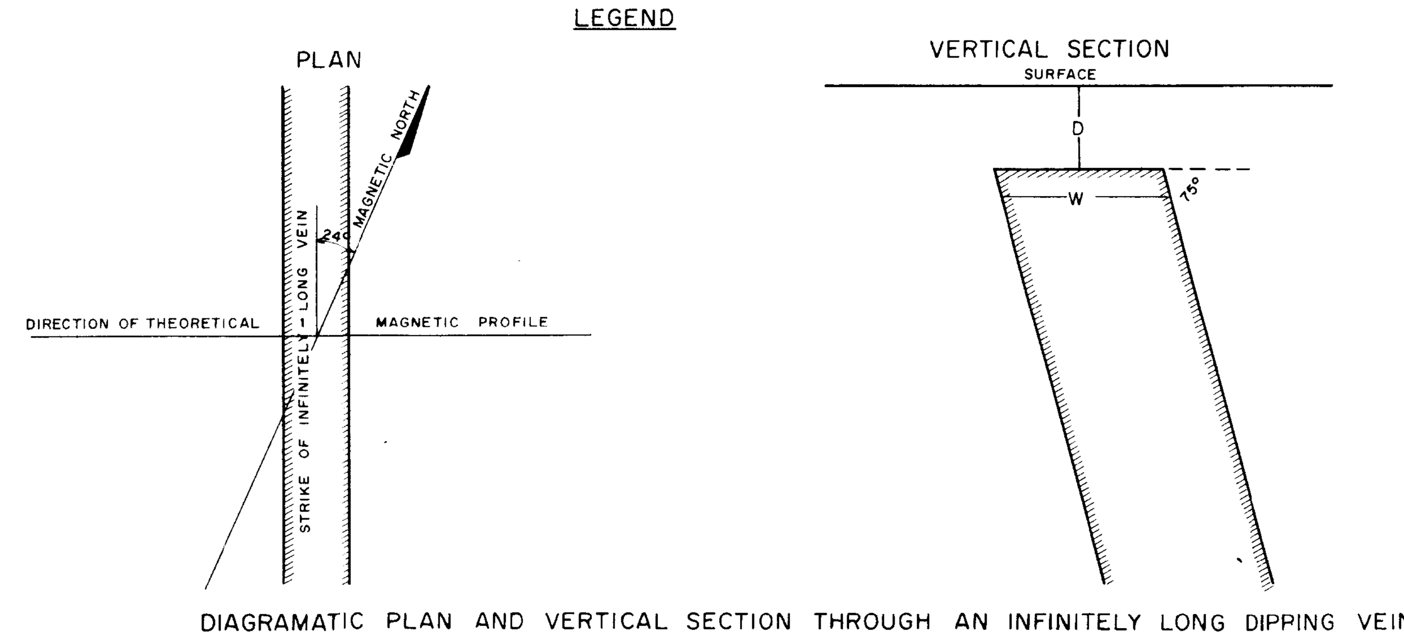



FIG. 4 RELATION BETWEEN AMPLITUDE OF ANOMALY AND DEPTH-TO-WIDTH RATIO FOR INFINITELY-LONG DIPPING VEIN

LEGEND




DIAGRAMATIC PLAN AND VERTICAL SECTION THROUGH AN INFINITELY LONG DIPPING VEIN

ASSUMPTIONS:

Susceptability of magnetic vein = 0.2 c.g.s. (Approx. based on lab. measurements for ore containing 50% Iron)
Horizontal component of Earth's normal field = 21,000 γ
Vertical component of Earth's normal field = 58,000 γ
Strike of magnetic vein = 24° W of N
Dip of magnetic vein = 75° E

# THEORETICAL VERTICAL MAGNETIC PROFILES FOR INFINITELY-LONG DIPPING VEIN OF INFINITE DEPTH EXTENT



SAVAGE R. LONG PLAINS TAS. 1962