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DUNDAS METALLIFEROUS GEOPHYSICAL SURVEYS TASMANIA 1960

by

W J Langron

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ABSTRACT

This report describes the results of geophysical surveys carried out over three adjoining areas in the Dundas Mineral Field near Zeehan, Tasmania. Two areas, Razorback and Grand Prize are situated about deposits and old workings of those names; the third area, the Intermediate, lies between these two areas.

The aim of the geophysical work was to investigate the tin resources in the region and to do this, electro-magnetic, self-potential and magnetic methods were applied to the search for sulphide bodies with which the tin is intimately associated.

In the Razorback area distinct indications were obtained with all methods in the region of the Main Open Cut. Elsewhere, the e.m. Turam indications are weaker but in the northern portion of the grid they are of good quality and originate from a conductor at fair depth. Apart from one traverse (over exposed sulphides) the magnetic results are inconclusive over sulphides. The most intense magnetic "highs" are due to concentrations of magnetite within the serpentine. Good quality S-P. indications were obtained over the known mineralisation in the open cut.

In the Grand Prize area, a strong magnetic anomaly was found near the serpentine-slate contact and associated with gossan. The anomaly is associated in part with a distinct Turam indication. It is felt that these indications are favourable as regards sulphide mineralisation and some testing is recommended. No useful results were obtained with the S-P. method on this area.

On the Intermediate grid distinct indications were obtained with the Turam and magnetic methods but again the S-P. method gave no worthwhile results. The Turam indication located on the northern portion of the Razorback grid was followed through on the Intermediate grid. Other, weaker, indications are located near the serpentine-sediment contact and could also be favourable as regards sulphides. Most of the magnetic indications are not related to the Turam results and are probably caused by concentrations of magnetite in serpentine. The serpentine sediment boundary is clearly indicated by steep magnetic gradients and elsewhere structural bends are indicated. Some magnetic anomalies more closely associated with Turam indications may be favourable as regards sulphide mineralisation. A list of recommended drilling and trenching sites is given.

1. INTRODUCTION

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In March 1959 the Director of Mines, Department of Mines, Tasmania requested the Bureau to undertake a geophysical survey over a strip of country in the Dundas mineral field, West Coast Region. The area was to include the Razorback and Grand Prize mines, and a possible extension beyond Grand Prize towards Melba and Renison Bell. Subsequently Dr. J. Horvath (Senior Geophysicist from the Bureau), in company with Messrs. T. Hughes (Chief Geologist, Mines Department, Hobart) and A.H. Blissett (Regional Geologist, Mines Department, Zeehan) inspected the area and it was decided to survey three separate grids, the Razorback and Grand Prize areas (about the workings of those names respectively) and an Intermediate grid. The location of these areas is shown on Plate 1 together with the topography and geology.

The Razorback mine has been a small tin producer for many years and a small local syndicate has also worked the Grand Prize mine for some time. Three bore holes put down by the Mines Department (shown on Plate 2) gave promising results and this evidence supported the contention of the Mines Department that extensive deposits of tin could exist in the Razorback-Grand Prize area.

Certain geological conditions were recognized as providing a locus for tin (and associated sulphide) mineralization, but geological mapping was hindered because of a varying thickness of soil and vegetation cover. Because of the intimate relation of the tin and sulphide mineralization it was considered that geophysical methods should prove useful in the search for further tin resources. This view was supported by results from an earlier survey on the Renison Bell field where indications were obtained over a similar type and setting of mineralization. In the present work, in addition to the magnetic and self-potential methods which were used at Renison Bell, the electromagnetic (Turam) method was used along all traverses.

The geophysical party, consisting of W.J. Langron (party leader), R.C. Stubbs and F.F. de Castillejo (geophysicists), R. Smith and J. Sparrow (University Students) and one field hand arrived at Zeehan on 7th January 1960. Traverse clearing had commenced in December 1959 but because of adverse weather conditions and lack of sufficient track cutters, this work had not proceeded very far by the time the geophysical party arrived. As a consequence much time was spent initially in assisting with track-cutting before geophysical work could commence.

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Dr. Horvath visited the party from 11th to 15th February. Messrs. Smith and Sparrow returned to Melbourne on 19th February 1960 and two additional field hands were engaged for the remainder of the survey. Field work terminated on 7th April 1960 when the Bureau personnel returned to Melbourne.

Surveying of the Geophysical grids was carried out by Mr. B. Lynch surveyor, Department of Interior and one chainman. The clearing of traverses was done by a team of trackcutters provided by the Mines Department the strength of which varied from 2 to 10 persons.

The areas are largely covered with thick rain forest and this together with the rough topography slowed the progress of the work considerably. Access to the Razorback and Grand Prize areas was by tracks to the two mines, respectively. These tracks were navigable at all times by 4 wheel drive vehicles. Access foot tracks were cut to the Intermediate Area.

2. GEOLOGY

The earliest descriptions of the geology of the Dundas region were given by Montgomery (1890, 1896) and Twelvetrees (1900), Ward (1909) and Condor (1918). Reid (1925) gives a more specific description of the geology and history of mining operations in the Razorback area since tin was discovered there in 1909. Some useful geological observations, particularly in connection with the serpentine and ultra-basic suite of rocks are summarized by Taylor (1955).

Since 1958, the Tasmanian Department of Mines has undertaken a programme of detailed geological mapping in the Zeehan area. The following description of the Razorback - Grand Prize area involving those points relative to the geophysical problem, is based on information supplied by Mr. A.H. Blissett, Regional Geologist, Department of Mines, Zeehan (personal communication). The geological data included on Plates 1,2,6 & 8 has also been supplied by the Department of Mines, and follows from an examination of mine records, adits, old workings and surface mapping facilitated by the clearing of the geophysical grid.

In the Razorback - Grand Prize area, the mineralization occurs in the form of fissure veins striking approximately NNW. The host rocks are a thick series of Middle Cambrian slates, greywackes, breccia conglomerates and also a distinctive chert conglomerate which serves as an important marker horizon.

In late Cambrian time the sediments were intruded by a pyroxenite mass which was later serpentinized. Near the Razorback mine the serpentine is faulted against the Cambrian sediments and mineralization took place along the line of faulting. At the Grand Prize mine the mineralization is wholly within the sediments.

The serpentine contains magnetite in the form of irregular veins of variable thickness and as larger concentrations in some localities.

At the Razorback mine the tin is found as fine grained cassiterite intimately associated with marcasite, pyrite, pyrrhotite and arsenopyrite in a quartz gangue. Galena occurs sporadically in small quantities both here and in the Grand Prize Mine. Near the orebody, fluids accompanying the mineralization impregnated and altered the serpentine to talc and dolomite and some silicification took place. The sulphide orebody is oxidized down to about 100 feet into a limonitic and haematitic gossan up to 15 feet wide and containing fine disseminated cassiterite often associated with fine rather gritty quartz. Minor quantities of cassiterite are also found disseminated through the talcose and dolomitic zones. The lode is almost vertical with a steep westerly dip in the northern part of the workings.

Similar gossan is found at the Grand Prize Mines and on the western slope of Black Hill. At the Grand Prize the lode is near vertical. There do not appear to be any mine plans of the Grand Prize available, but some old records show that the shaft was sunk to a depth of 240 feet.

The lode at Razorback has been worked by opencut (in which pyrite, pyrrhotite and other sulphides are exposed) and a system of adits and drives, some of which are at present being worked. The workings at the Grand Prize consist of adits and drives on several different levels. Each mine has a small treatment plant; these mills are operated by local syndicates.

3. GEOPHYSICAL METHODS USED DURING THE SURVEY

Three methods of survey were employed, namely electromagnetic, self-potential and magnetic, the principles of which have been described in textbooks. The description of the methods will not be repeated here but only features relative to the problem being investigated are discussed.

(a) Electromagnetic (Turam).

Because of the steep topography and thick vegetation, it was not practical to use closed loops to provide the primary field in the electromagnetic investigations. For the same reasons, it was not practical to

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survey the areas from both the hanging-wall and foot-wall sides of the lodes. The primary layout used in each area consisted of a long grounded cable placed along the grid base line where the topography was relatively gentle. The resistance of the primary circuit was about 200 ohms.

In the Intermediate area, two primary layouts were necessary, the first with the cable laid along the baseline and the second with the cable along 500 S. The two layouts were necessary because of the presence and shielding effect of a highly conductive zone at about 500 S in the southern ~~position~~ portion of the grid.

The Turam method consists of making measurements along the traverse lines of the intensity ratios and phase differences of the currents induced in two search coils. In the present survey the separation between search coils was 100 ft. Frequencies of 440 and 880 c/s were used. In general, it was found that the indications were clearer when operating with 880 c/s. Only the vertical component of the field was measured.

The results of the Turam survey are shown in the form of indications on the plans of the areas. The profiles and ratio-phase diagrams for a few selected traverses are also shown. The ratio-phase diagrams are useful in interpretation as they have a characteristic shape depending on the conductivity, dip and shape, of the conducting bodies. If the conductivity or thickness of the conductor increases, the slope of the axis of the indication becomes steeper. Wait (1951) has given a theoretical explanation of this behaviour.

(b) Self-potential Method

Measurements were made with a transistorised milli-voltmeter, designed and constructed in the Bureau's Geophysical Laboratory, Footscray. It was not possible to survey all the traverses with this method. While good agreement with the other geophysical methods and with the known mineralisation was found in the Razorback open cut, no confirmation was found of the strong Turam indications in the Intermediate area and both in this and the Grand Prize area, the S-P results were of little interest.

(c) Magnetic Method

Measurements of the vertical component of the Earth's magnetic field were made using an Askania torsion magnetometer (No. 581649). The magnetic measurements were made along several traverses at Razorback, most traverses at Grand Prize and all traverses on the Intermediate grid.

4. DISCUSSION OF RESULTS

The results from the three areas which were surveyed will be discussed separately. The investigations were commenced on the Razorback and Grand Prize areas where results over known mineralization could be studied before deciding on the disposition of the Intermediate grid. The results of the work will therefore be discussed in the same order.

A. Razorback Area

(a) Turam Method

All traverses were surveyed with this method using a frequency of 440 c/s. Traverses 18N to 36N were repeated using a frequency of 880 c/s.

The indications obtained in the Turam survey have been graded in terms of strength (strong, medium, weak, very weak) and this information is incorporated in the lines of indications on Plate 2. Plate 3 shows a selection of ratio-phase diagrams and a comparison between results using frequencies of 440 and 880 c/s (Figs. 5 and 6).

Definite Turam indications were observed over the known mineralisation in the region of the Open Cut. A very pronounced indication is shown by the ratio-phase diagram (Plate 3, Fig. 7) for traverse 22, which passes through the Open Cut where sulphide mineralisation is exposed. A line of indications, marked "A" on Plate 2, can be traced for a distance of about 600 feet in the direction of the strike of the lode. The indications are well pronounced at 21N/650W, 22N/650W, 23N/640W and 24N/625W. There is a rapid deterioration in the quality of the indications between 20N/625W and 19N/525W. On traverse 18N, there is only a very weak indication. Between traverses 24N and 26N the line of indications either terminates or is displaced to the west by a fault.

Three holes, whose positions are shown on Plate 2, have been drilled by the Tasmanian Mines Department. Drill holes Nos. 1 and 2 were entirely in the oxidised zone but intersected some good tin values. Drill hole No.3 intersected tin-bearing sulphides, mainly pyrrhotite.

A line of medium to weak indications can be traced from 26N/470W to 34N/750W. The indications suggest a conducting body at a depth of over 200 feet between 28N and 32N but at a somewhat shallower depth at 34N.

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Between traverses 36N and 42N there is a line of medium indications (marked "D" on Plate 2) which also appear to arise from a conductor at large depth but with a high conductivity at traverses 36N and 38N. The conductivity appears to decrease from 40N to 42N. Indication line "D" was also observed in the survey of the Intermediate grid which here overlaps the Razorback grid.

Another line of indications shown as "B" on Plate 2, was traced from 20N/840W to 6N/750W. The indications arise from a fairly shallow depth but do not suggest a body of very high conductivity and it is considered that they are caused by a zone of weak sulphide mineralisation. It is known from drilling information (Blissett, personal communication) that tin values greater than 0.1% have not been recorded south of traverse 12N.

To the west of Line "B", prominent indications were observed along a line (shown as "C" on Plate 2) extending from 6N/1130W to 18N/1420W. From the ratio-phase diagrams, an example of which is given in Fig.2, Plate 3, the indications appear to be due to a body of low conductivity, which, over most of its length, is wide and thick but becomes considerably narrower towards its northern end. The conductor is in a geologically unfavourable area for sulphide mineralisation and it is considered most probable that the indications are due to the graphitic and carbonaceous slates, which are present in the area. The only recommendation that can be made with respect to indication line "C" is that the northern end, where the conducting body appears to be narrow, should be examined geologically for any signs of mineralisation.

The ratio-phase diagrams for Traverse 20N from the measurements with 440 c/s and 880 c/s are shown in Figs. 5 and 6 respectively, of Plate 3. The axis of the indication is at 650W with 440 c/s and at 625W with 880 c/s. This displacement in the location of the axis is mainly due to the dip of the conductor; the indication using a frequency of 880 c/s will come from a current concentration lying nearer the surface (i.e. up-dip) than is the case when a frequency of 440 c/s is used. Under favourable conditions (and particularly when an insulated loop is used to supply the primary field) this displacement can be used to estimate the dip of the conductor but an examination of the results over the Razorback area shows that this relationship is not clear on most traverses. However, the evidence is that the fairly steep westerly dip of the conductors continues to Traverse 34N, beyond which no survey using 880 c/s was carried out. However, north of about Traverse 34N the Turam evidence (particularly from the results plotted in profile form) suggests that the dip of the conductor is now steeply to the east and continues thus, with slight flattening of dip, to the Intermediate area (see Plate 1C, Fig. 5).

To summarise the results of the Turam survey:- Indication line "A" represents the effect due to the known mineralisation. Line "B" is considered to represent mineralisation of generally poor quality at fairly shallow depth, but some testing would be recommended if it is found that the old workings do not extend far enough to adequately test the mineralised zone. Line "C" is probably not associated with mineralisation but a geological examination along some sections is considered desirable. Indication line "D" may be due to fairly deep mineralisation and some testing of this is recommended. Other indications shown on Plate 2 are considered to be only of minor importance.

(b) Self-Potential Method

Traverses 12N to 24N were surveyed with this method and the results are shown in the form of profiles on Plate 4. The method was not used more extensively at Razorback because of the shortage of time. Examination of the results shows that a survey of Traverses 26N to 38N would have been desirable.

It will be seen that there are distinct indications on many of the profiles and that generally there is close agreement between the S-P and the Turam results.

The S-P results between Traverses 12N and 22N confirm the conclusions drawn from the Turam results that the bodies responsible for the indications lie at a fairly shallow depth. On Traverse 24, where the Turam results show that the body is at a greater depth, there is only a rather indistinct S-P indication.

Towards the western ends of traverses 12N to 20N, the S-P profiles show a strong broad decrease in potential, which is considered to originate from the graphitic slates and to be of no economic interest.

Small irregularities on the profiles are due to poor ground contacts at some stations. The cause of these poor contacts is the layer of rotting vegetation, moss, etc., which is general over the area.

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It may be as well to mention at this stage that the S-P method did not give useful results on the Grand Prize and Intermediate areas, even though definite Turam and magnetic anomalies were located there.

The strong S-P indications on traverses 23N to 21N coincide with the ore-body of the Open Cut. But from 21N to 12N there is a second line of S-P indications which follows closely the Turam indication line "B". Both the S-P and Turam indications lie within the slates but are not far from the contact with the serpentine and seem to run about parallel with the formation boundary. Although the indications are not as strong as those of 23N to 21N, the favourable geological position and the good agreement between the two methods suggest that further exploration should be done in this part of the area. Tunnels 5 and 6 driven at about 14N and 16N may not have reached the target suggested by the geophysical results.

(c) Magnetic Method

Traverses 21N to 42N were surveyed with this method and the results are shown on Plate 5 in the form of contours of magnetic vertical force.

A distinct, but not very strong, magnetic anomaly was obtained on Traverse 22N over the sulphides exposed in the Open Cut. It is practically confined to this traverse and does not appear to extend to the adjacent traverses. Anomalies of much larger amplitude and extent were observed over the serpentine but the anomaly due to the known mineralisation could be easily distinguished from these.

The writer inspected the underground workings in the area and collected some samples of sulphides from near the northern end of the main drive from the Open Cut. (Samples 383,384). Here, there is a body of compact sulphides at least 12 feet wide located almost immediately beneath Traverse 23N and covered by no more than 40-50 feet of overburden; yet this mineralisation gives very little magnetic response along Traverse 23N. This result suggests that the sulphide mineralisation has a considerable variation in magnetic properties along the line of lode.

The magnetic susceptibilities of the samples collected in the surveyed area are given in the Appendix and show large variations in the magnetic properties of ore from the Razorback Mines. The measured susceptibilities range from 0.1 x 10^{-3}c.g.s. units for gossan to 21.2 x 10^{-3}c.g.s. units for pyrrhotite from the Razorback Open Cut.

The above results suggest that the magnetic effect due to the sulphides are mostly only weak and are only detected when the sulphide body is near the surface. The pyrrhotite which has a high magnetic susceptibility does not seem to be widely distributed, while the pyritic ores show only weakly magnetic properties.

It is of interest to mention here that the susceptibilities of samples of sulphides from Renison Bell whilst showing considerable variation from one to another, are on an average much higher than the susceptibility of samples from Razorback, and that well pronounced magnetic indications were located over the mineralization at Renison Bell.

The most pronounced influence in the magnetic results originates from the belt of serpentine in the eastern portion of the grid. The change from serpentine to slates is clearly shown in the profiles and it can also be seen that this contact steepens considerably from south to north and that the strike of the contact turns sharply westwards in the northern portion of the surveyed area.

Another feature is that on the northernmost traverses, the magnetic values over the eastern portion of the serpentine are lower than readings over the serpentine further to the west. This suggests that the serpentine is thinning towards the east and north in the northern part of the Razorback grid, a conclusion which seems to fit in with geological opinion.

Whereas the highest magnetic readings obtained over known sulphides (in the Main Open Cut) was only slightly in excess of 1500 gammas, several closures in excess of 4000 gammas are located in the serpentine (see Plate 5) and it is assumed that most of these magnetic highs represent concentrations of magnetite within the serpentine. The centre of one such high is located at 23N/300W, where the magnetic results indicate a body of high magnetic susceptibility close to the surface. This anomaly could be tested by trenching.

The magnetic contour map shows that a belt of magnetic highs lies in the serpentine and in some places follows the contact of the serpentine with the sediments.

A magnetic high of similar character to the one ~~first~~ just mentioned is centred at 28N/530W. Diamond drill hole No.2 has been drilled in the area of this anomaly and should give a geological explanation of the magnetic zone in the serpentine close to the contact with the sediments.

The relation between the ~~ores~~ area of the magnetic highs in the NE corner of the Grid and Turam Indication Line "D" is not clear. However, it is recommended that the Turam indication on traverse 40N should be tested by a drill hole and it is proposed that the core from this drill hole should be examined for magnetic properties.

B. Grand Prize Area

The plan of the area on Plate 6 shows the geophysical grid, the principal survey results and the geology. The surveyed area is situated mainly to the south of the Grand Prize mine and therefore does not include the Grand Prize lode.

(a) Turam Method

Only Traverses 10S to 24S were surveyed with this method because of the very difficult terrain in the area. Frequencies of 440 and 880 c/s were used for the primary field.

The Turam results are in general of poor quality and only on Traverses 16S, 18S and 20S were indications located which are worthy of note. The ratio-phase diagrams (using a frequency of 880 c/s) for these traverses are included on Plate 7, Inset B.

The indication ~~on~~ at 20S/700E is weak and originates from a near-surface body which has a relatively low conductivity. The indications at 18S/660E and 16S/640E are more distinct but also originate from a body of relatively low conductivity. The ratio-phase diagram for traverse 12S is also included on Plate 7 and it will be seen how weak is the indication even when using the higher frequency. The remaining traverses which were surveyed are devoid of Turam indications. The Turam results on traverses 16S, 18S and 20S bear a close relationship to the results of the magnetic survey and are discussed further in (c) below.

(b) Self-potential Method

Traverses 00 to 4S and 16S to 20S were read with this method including those traverses on which Turam indications had been observed. Except for traverses 0 and 2S, which are in the vicinity of the Grand Prize mine and where a

023 weak S-P anomaly of about 100 mv. was obtained, the profiles for the most part are smooth and devoid of anomalies. These results contrast with the strong S-P anomalies obtained in the Razorback area, although it must be pointed out that the worked ~~position~~ portion of the Grand Prize lode has not been covered by the S-P survey.

(c) Magnetic Method

The results of the magnetic survey in the form of magnetic profiles are shown on Plate 7. The higher intensities in the southwestern portion of the ~~area~~ grid are due to the serpentine which is found in this area and many of the irregularities on the western portions of the traverses are probably due to segregations of magnetite within the serpentine.

The profiles show a pronounced magnetic anomaly whose axis continues from 16S/575E to 24S/850E. The position of the anomaly coincides with some sparse outcrops of cherty gossan and is not far from the contact of serpentine with conglomerates and greywackes. The anomaly is due to a narrow body with a steep westerly dip situated at a fairly shallow depth, although the depth appears to be increasing toward traverse 24S. It is possible that the anomaly is due to a segregation of magnetite near the eastern boundary of the serpentine but the length, narrow width and regular shape are points in favour of it being due to a sulphide lode. The associated Turam indications are not as pronounced as the magnetic anomaly and are distinct only on traverses 16S and 18S, while on traverses 20S and 22S the Turam results point to relatively low conductivity of the conducting zone. Geologically, a lode with the disposition suggested by the geophysical results could be a shear-zone type of deposit, similar to that at the Grand Prize.

The magnetic anomaly appears to be terminated by a fault between traverses 16S and 14S. However, if the strike of the fault is oblique to the traverse direction, it is possible that the magnetic body has been displaced to the west and this may account for the pronounced anomalies near the western ends of traverses 14S and 16S. Unfortunately time did not permit extending traverses 14S and 16S further to the west.

It is considered that the Turam and magnetic results on

014 traverses 16S and 18S offer a suitable target for testing and recommendations are made for this in Section 5.

C. INTERMEDIATE AREA

Plate 8 shows the geophysical grid, the principal survey results and the geology of the Intermediate Area.

(a) Turam Method

All traverses were surveyed with this method using a frequency of 880 cycles per second for the primary field. The use of this frequency was decided upon following the results of electromagnetic work at Razorback and Grand Prize.

It was not possible to read to the limits of the traverses with this frequency, so that after reading traverses to 1000 S with the primary cable along 00 S, the cable was relaid along 500 S and readings were repeated over about 200 feet of the first layout and continued to 1500 S. The overlapping profiles did not agree very well and had to be corrected to obtain a composite profile along each traverse. The lack of agreement between the results with the two layouts was due to the fact that a grounded cable was used to provide the primary field and also because the primary cable along 500 S was in part over or near a highly conductive and magnetic zone. Selected results from the first layout (i.e., with primary cable along 00 S) are shown as ratio-phase diagrams and profiles on Plates 9 and 10.

Several lines of Turam indications were obtained and are shown on Plate 8. The readings along traverses 46 E to 38E confirm the results on the northern traverses of the Razorback grid and show the continuation of indication line "D" as far as 40E. They also show another line "F" of broader indications from 42E to 38E. The geological environment of lines "D" and "F" is favourable as they lie close to the contact between the serpentine and the sediments. However, the area is covered by Scree which impedes geological observations.

The best indication of line "D" is on traverse 44E; the ratio-phase diagram is shown in Fig.1, Plate 9. Figs. 2 to 4 of the same plate show the indications becoming weaker to the north-west. The indications of line "F" are derived from a greater depth than that on traverse 44S, or from a wide zone of medium conductivity. There were no S-P indications associated with the Turam indications in this area and this could point to the Turam indications being caused by shearing. The magnetic contours (Plate 11) show a

325 zone of high values with a general trend similar to that of the Turam indications but there is no close correlation between the magnetic axis and the Turam indication lines.

The Turam results on traverses 36S to 30S show only weak and indistinct indications. There appear to be cross-faults between 38S and 28S.

Indication line "G" which, in general, is weakly defined, reaches its strongest development at 28E/815S (See Fig. 5, Plate 9) but deteriorates rapidly both to the east and west of this traverse. However, testing of this indication is recommended as it is in a position which is favourable geologically for sulphide occurrence.

The indications of line "H", which extends from traverse 22E to traverse 12E, appear as prominent features on the ratio and phase profiles (Plate 10) and in the ratio-phase diagrams (Plate 9, Figs. 6,7 and 8). The ratio-phase diagrams suggest a marked increase in the conductivity of the body between traverses 16E and 14E. The indications coincide with a magnetic anomaly (Plate 11) whose axis closely follows line "H". As the magnetic anomaly and Turam indications are in good agreement and occur in a geologically favourable location, it is considered that they should be tested, preferably by a drill hole on traverse 14E. From traverse 24E to 12E the northwesterly dip of the body seems to be flattening. A cross-fault west of traverse 12E, terminates line "H".

A line of indications marked "J" is found between Traverses 10E and 0. The character of the indications varies rapidly from traverse to traverse but generally the indications seem to arise from a shallow and flat lying body not only with a high conductivity but partly also with a high magnetic permeability. The indications on traverses 10E and 8E coincide approximately with a magnetic high and might be connected with magnetic bodies in the serpentine. The geological map shows there some asbestos diggings nearby and as the electrical indications arise from shallow depth, it is recommended that these diggings should be investigated for the cause of the indications, which could be due to a pronounced shear or to clayish, gossanous material of higher conductivity perhaps in connection with sulphides.

(b) Self-potential Method

Traverses 46E to 22E were surveyed with this method but no promising results were obtained and the profiles are not presented in this report. Of particular interest is the fact that no confirmation was obtained of the

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Turam indications, especially in the area where the Turam results suggest a body at fairly shallow depth. Several reasons can exist for the absence of S-P. anomalies. Either there are no sulphides or graphite present to cause an S-P. anomaly or the ore could have its oxidised portion below the water table in the area and thus the conditions for the generation of the potentials are not present. Similar conditions might have existed in the Grand Prize area. On both these areas, S-P. measurements were made during and after heavy rain, and it can be assumed that at these times the level of the water table had risen above the level of the depth of weathering.

It has been mentioned in the section dealing with S-P. measurements at Razorback that further readings made there after the work at Grand Prize and the Intermediate area showed that good indications were still obtained over the known mineralization. The explanation for this behaviour seems to be that water from the steep hillside at Razorback is drained by a series of adits and old workings to the valley below and that this allows sufficient active oxidation of the ore-body to continue. There is no such drainage on the Grand Prize or Intermediate areas, but whether improved S-P. response would be obtained, say in mid-summer, is still open to question.

(c) Magnetic Method

All traverses were surveyed with this method. The results in the form of magnetic contours are shown on Plate 11. The ~~ones~~ axes of the principal magnetic anomalies are shown on Plate 8. Values of the magnetic susceptibilities of samples collected on traverse 10E are included in Table 1 of the Appendix.

One of the clearest features of the contour plan is a line of steep magnetic gradients, extending from near the south-east corner of the grid towards the north-west corner. This line represents the boundary between serpentine (to the north-east) and sediments (to the south-west). The contours suggest that in the north-west portion of the grid the serpentine is terminated abruptly, probably by a fault striking roughly west. The presence of such a fault is supported by a change in the character of the Turam results. It will be seen from Plate 1 that the same fault may also be responsible for the displacement of the axis of the magnetic anomaly located in the Grand Prize area.

Most of the magnetic anomalies occurring over the serpentine are considered to be caused by concentrations of magnetite within the serpentine.

However, some of the magnetic anomalies appear to be associated with the Turam indications and could be due to sulphide mineralisation. Here is a magnetic anomaly associated with Turam indications "D" and "F". The axis of this anomaly changes from down-dip to up-dip and again to down-dip of the conducting body between traverses 46E and 36E. The axis of another magnetic anomaly closely follows indication "H" between 20E and 12E. The Turam results are considered to be more significant as regards sulphide mineralisation. The drill holes recommended to test Turam indications "D" and "H", should also serve to test the associated magnetic anomalies and it will be important to measure the magnetic properties of the cores from these holes.

The intense magnetic anomaly at 10E/460S is due to a highly magnetic body but the relationship between this body and the flat-lying conductor causing Turam indication "J" is not clear. As the magnetic body appears to come close to the surface, it could be tested by means of a costean.

Another intense magnetic anomaly (with readings in excess of 26,000 gamma) is centred near 850S/250E and is also due to a highly magnetic body coming close to the surface. Whilst this anomaly does not coincide with an electromagnetic indication and is not likely to be due to sulphide mineralisation, it could be easily tested by costeaning. An adit on traverse 10E leads to some old asbestos workings, where samples of relatively fresh rock were obtained for susceptibility tests. The tests showed that the rock is only weakly magnetic and did not provide any evidence as to the cause of the magnetic anomaly.

It is considered that none of the remaining magnetic anomalies are significant as regards tin-bearing sulphide ore and that they are probably due to concentrations of magnetite in the serpentine. Bands of magnetite up to 3 inches thick have been noted in this region. It is understood that trenching of some of the magnetic anomalies in the serpentine was carried out by Tio Tinto Australian Exporation Pty.Ltd., and that samples taken from trenches in this and the Grand Prize area showed relatively high nickel values (0.4%Ni) associated with magnetite. The nickel values seem to coincide with the magnetic anomalies and point to an affinity of the nickel with the magnetite. It is not known in what mineralogical form the nickel occurs, but ~~is~~ its close association with magnetite, suggests the possibility of using the magnetic method in the search for nickel.

5. CONCLUSIONS AND RECOMMENDATIONS

The geophysical work has been carried out with the aim of locating deposits of tin associated with sulphides. Therefore the geophysical methods have been applied which are mainly used in the search for sulphide bodies. However, whilst the interpretation of much of the geophysical data is fairly clear over most of the surveyed areas, the meaning of some of the results is not yet clear and it is hoped that further geological examination and some initial testing may enable the geophysical data to be more fully analysed.

For example at Razorback, distinct Turam and Self-potential indications were obtained over sulphide mineralization in the region of the Main Open Cut; the magnetic profile over the Open Cut also exhibits a definite anomaly, but away from this traverse there is in general no definite relationship between magnetic results and sulphide mineralization. In the southern part of the Grand Prize area, strong magnetic anomalies are found associated with rather weak Turam indications in a favourable geological environment. It is believed that the magnetic results are associated with sulphide mineralization. Both in the Grand Prize and the Intermediate areas, the S-P. method was not successful. In the Intermediate area some strong Turam and magnetic anomalies were obtained and it is believed that some of these could represent mineralization although no confirmation was obtained from the S-P. method. However, even in this last group of results there are several instances of a divergence in the axes of the Turam and the magnetic indications.

Throughout the work most reliance has been placed on the Turam method of investigation. The S-P. method whilst working well in the vicinity of the Razorback Open Cut, has not been regarded as more than an ancillary method of investigation.

Bearing in mind the results over similar mineralization at Renison Bell, it was thought that the magnetic method would provide a convenient means of locating the sulphide mineralization. The magnetic results in the region of the known mineralization at Razorback were not regarded as conclusive. Laboratory tests of several samples of sulphide from the Razorback area showed that the ore has a fairly low magnetic susceptibility, and that there is a considerable variation in susceptibility within the sulphides.

Where the axes of the two types of indication (Turam and magnetic) are not closely related and the magnetic anomalies occur in serpentine

019 it can be assumed that most of these are due to concentrations of magnetite within the serpentine, whereas elsewhere (e.g. on the N-W portion of the Intermediate grid) the magnetic results seem to be associated with structural features within the serpentine. It is considered that in general, the Turam results are more likely to indicate the type of mineralization being sought.

In the Razorback area, the results show that the orebody of indication "A" is limited in extent and is probably terminated at both ends by cross faults. Tunnels Nos. 1 and 2 and drillholes Nos. 1 and 3 should have tested this indication sufficiently. The drill holes intersected tin bearing sulphide ore, mainly pyrrhotite but detailed logs of the holes are not available for comparison with the geophysical results.

Tunnels Nos. 3,4,5 and 6 have been driven in the area of indication "B", but with the exception of tunnels Nos. 3 and 4 have probably not reached the proper target. The information available from these workings would need to be considered before drilling of indication "B" could be recommended. Drill holes might be warranted in order to reach the target at a greater depth.

The northern end of indication "C" should be examined geologically to see if there is any sign of mineralisation in this section where the conducting body narrows considerably. A recommendation for testing indication "D" is made in a later paragraph. Drill hole No.2 has tested the magnetic and Turam indications near 28N/500W. This hole is reported to have intersected tin bearing sulphides.

In the Grand Prize area one drill hole is recommended to test the magnetic and Turam indications at 18S/650E. Although the Turam results point to a steep easterly dip of the conductor, the selected collar site is on the western side of the indication as this is downhill from the target. The hole should be sited at 18S/500E or 18S/550E, drilled in the direction of the traverse, with a depression of 45° and length at least 200 to 250 feet in order to test the ground at a depth of 150 to 200 feet below the axis of the Turam indication. The magnetic and Turam indications extend to Traverse 16 at 625E and the drill site could be moved to that traverse if it is found more convenient although the site on Traverse 18S would be preferable.

For the Intermediate area three drill holes are recommended to test the zones of Turam indications. The holes should be drilled from the northern side of the indications, and in the azimuth of the traverse and each should be depressed at 45 degrees. The holes are planned to test the ground at a depth of about 100 to 150 feet below the Turam indications. The holes should be drilled to about 200 feet in length. It is considered that with a depression of 45 or 50 degrees and taking into account the dip of the conductor and the topography, the holes should intersect the target. The holes should be collared at 44E/850S, 28E/750S and 14E/540S. Two costeans are recommended to test magnetic indications. One costean on Traverse 8E between 270S and 330S would investigate the near surface body which is responsible for the intense magnetic anomaly there. The other costean on Traverse 10E between 425S and 550S would investigate the Turam and magnetic results which point to a shallow, flat lying good conductor of high electrical conductivity and high magnetic susceptibility. In addition, it is recommended that the zone associated with Turam indication "J" be examined geologically and special attention should be paid to the old asbestos diggings.

The testing which has been recommended is now summarised.

Area	Test	Coordinates	True Azimuth	Length	Inclination
Grand Prize	D.D.H. 1	18S/500 E or 16S/500 E	70° 70°	250 feet 250 feet	45° 45°
Intermediate	D.D.H. 2	44E/850S	208° 30'	150 feet	45°
	D.D.H. 3	28E/750S	" "	150 feet	45°
	D.D.H. 4	14E/540S	" "	150 feet	45°
	Costean T3	8E/270S - 8E/330S	" "	60 feet	
	Costean T4	10E/425S - 10E/550S	" "	100 feet	

6. REFERENCES

CONDOR, HARTWELL — 1918 — The tin field of North Dundas Geological Survey Bulletin No.26 Department of Mines, Tasmania.

DAVIDSON, R.J. WILLIAMS, L.W., LOH, R.P. HORVATH, J. AND KEUNECKE, O. — 1957 — Geophysical survey of the Renison Bell Tin Field Tasmania. Bur. Min. Resour. Aust. Bulletin No.43

MONTGOMERY, A. — 1890 — Report on the state of the Mining Industry on the West Coast. Report to the Secretary for Mines, Tasmania.

1896 — Report on the Zeehan-Dundas Mineral Fields. Report to the Secretary for Mines, Tasmania.

REID, A.M. — 1921 — Osmiridium in Tasmania. Geological Survey Bulletin No.32. Department of Mines, Tasmania.

REID, A.M. — 1925 — The Dundas Mineral Field. Geological Survey Bulletin No.36. Department of Mines, Tasmania.

ROWSTON, D.L. — 1957 — Geophysical Survey at Mt. Lyell (Corridor and Glen Lyell areas) Queenstown, Tasmania. Bur. Min. Resour. Aust. Records 1957 No.50

TAYLOR, B.L. — 1955 — Asbestos in Tasmania. Geological Survey Mineral Resources No.9. Department of Mines, Tasmania.

TWELVETREES, W.H. — 1900 — Report on the Mineral Districts of Zeehan and Neighbourhood. Report to the Secretary for Mines, Tasmania.

WAIT, J.R. — 1951 — A Conducting Sphere in a Time Varying Magnetic Field. Geophysics Vol.16, p.666

WARD, L.K., — 1909 — Tin Field of North Dundas. Geological Survey Bulletin No.6, Department of Mines, Tasmania.

322023

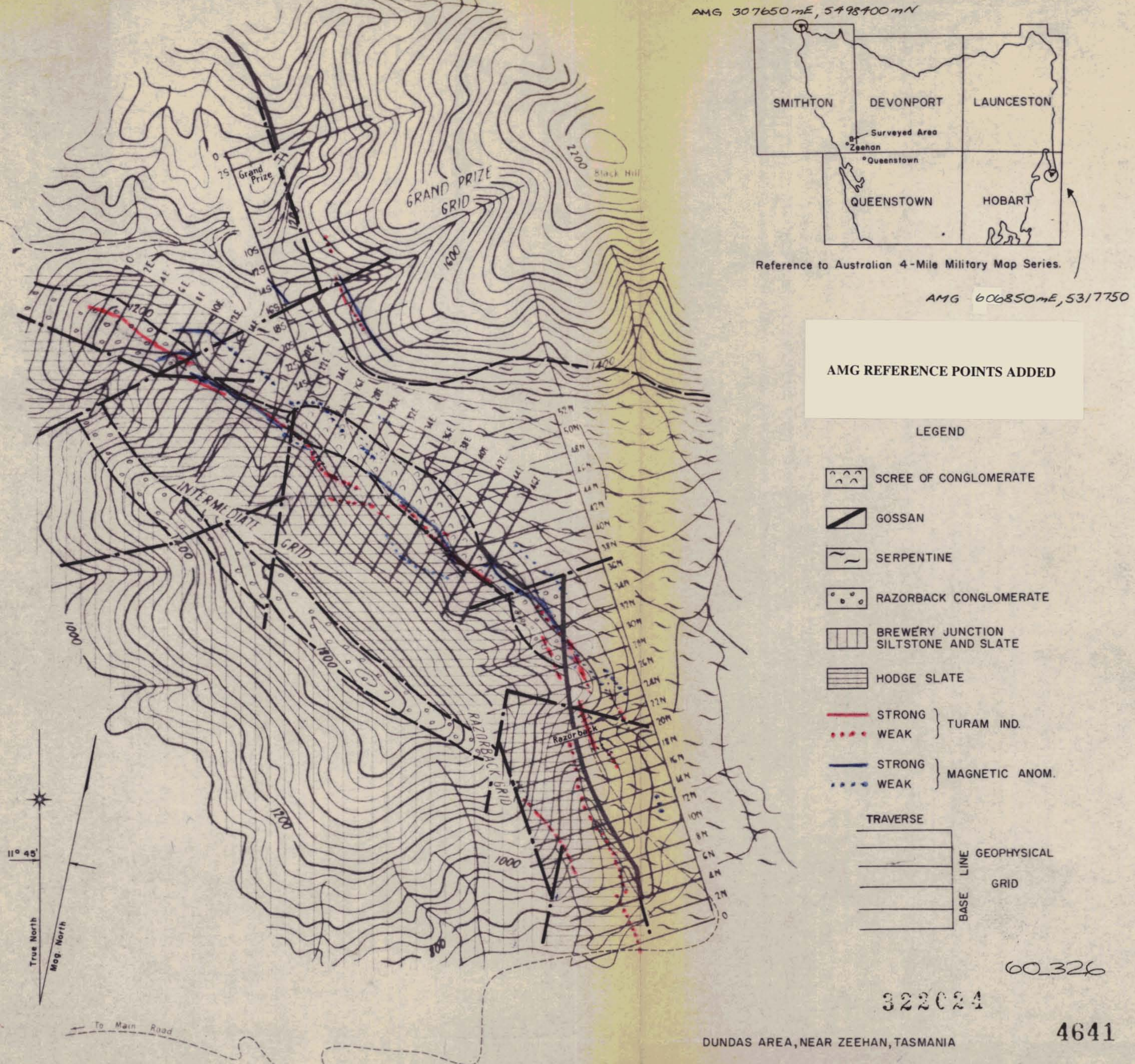
022

SUSCEPTIBILITIES OF ROCK SAMPLES FROM THE DUNDAS AREA

determined by J. Horvath

Sample	Locality	Geological Description	K in c.g.s. units x 10^{-3}
379	Razorback Open Cut	Pyrrhotite partly oxidised	5.10
380	Hodges tunnel 60' from entrance	Ironstone	0.254
381	Razorback	Gossan	0.154
382	Razorback Brocks tunnel	Gossan	0.100
383	Open Cut	Pyritic ore	1.22
384	Razorback in cross cut from Open Cut	"	0.205
385	Razorback shaft at southend of Open Cut	Pyrrhotite	21.2
386	Razorback Brocks tunnel	Gossan	0.216
387	Razorback	Gossan	0.236
388	Razorback	"	0.112
389	Grand Prize Bottom tunnel	"	0.130
390	Grand Prize Main tunnel dump	tin ore	0.140
486	Intermediate Grid 1000E/400S	Serpentine	0.680
487	" 1000E/430S	Serpentinized Pyroxenite	1.05
488	" 1000E/450S	Sheared Serpentine	5.42
489	" 1000E/475S	"	0.680
490	" 1000E/500S	Serpentinized Pyroxenite	0.515
491	" 993E/550S	Serpentine	5.78

PLATE I



60_326

322024

4641

DUNDAS AREA, NEAR ZEEHAN, TASMANIA

TOPOGRAPHY, GEOLOGY AND LOCATION OF RAZORBACK, GRAND PRIZE AND INTERMEDIATE GRIDS

SCALE IN FEET

1000 0 1000 2000 3000

5 cm

GEOLOGY AFTER DEPT. OF MINES, TASMANIA

TOPOGRAPHY AND GRIDS AFTER DEPT. OF INTERIOR, A.C.T. SURVEY SECTION, PLAN MISC. 119

TOPOGRAPHIC CONTOURS REFER TO AN ASSUMED LEVEL DATUM

Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics. G32-82


PLATE 2
INDICATION "C"
INDICATION "B"
INDICATION "A"
INDICATION
Dundas
Old Adit
Old Mill Site
Footbridge
Tramline
Access
Track
Hodges Mill
No 6 Tunnel
No 5 Tunnel
No 4 Tunnel
No 2 Tunnel
No 1 Tunnel
Open Cut
D.D.H. No 1
D.D.H. No 2
D.D.H. No 3
Brecker Tunnel
Hodges Tunnel
Trench
Pathway
Creek
Recommended D.D.H. No 2
BASE LINE DUNDAS GRID
BASE LINE INTERMEDIATE GRID VIDE MISC. 121
INDICATION AXES
STRONG
MEDIUM
WEAK
VERY WEAK
TURAM
STRONG
MEDIUM
WEAK
MAGNETIC
STRONG
MEDIUM TO WEAK
SELF POTENTIAL
LEGEND
RECENT ALLUVIUM
TALUS, DOWNWASH
BREWERY JUNCTION SLATE (SILTSTONES & GREYWACKES)
HODGE SLATE (SILTSTONES & SHALES)
GREYWACKE CONGLOMERATE AND CHERT CONGLOMERATE
SERPENTINE AND PYROXENITE (MAGNETITE, ASBESTOS, SOME NICKEL)
MANGANIFEROUS IRONSTONE "GOSSAN"
RECENT IRONSTONE BRECCIA
MAIN MINERALIZED ZONE
FAULT
FAULT INFERRED FROM GEOPHYSICAL DATA
DRILLHOLES BY TASM. MINES DEPT.
TOPOGRAPHIC CONTOURS REFER TO AN ASSUMED LEVEL DATUM
True North
Mag North
RAZORBACK GRID
GEOLOGY, TRAVERSES, GEOPHYSICAL INDICATIONS AND PHYSICAL FEATURES
SCALE IN FEET
200 0 200 400 600
AFTER DEPT. OF THE INTERIOR, A.C.T. SURVEY SEC., MISC 120
GEOLOGY AFTER H. BLISSET REGIONAL GEOLOGIST, MINES DEPT., TAS.
322025
4642
5 cm
Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics. G32-99

PLATE 3

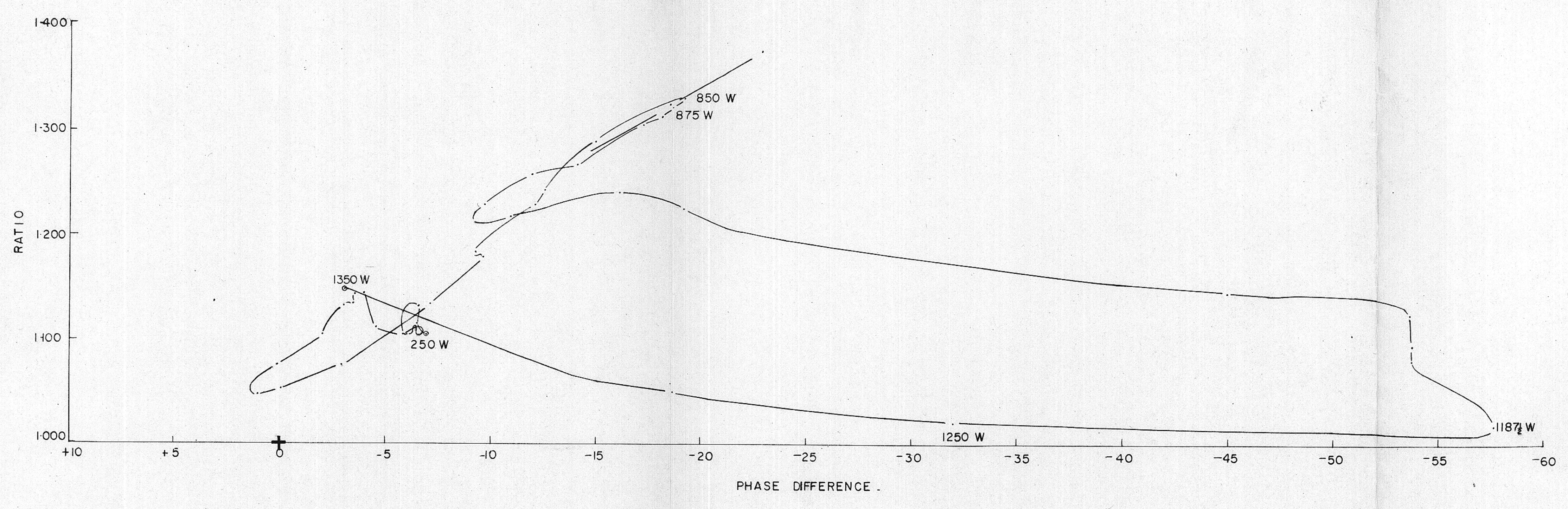


FIGURE 1. 4 N 440 c/s

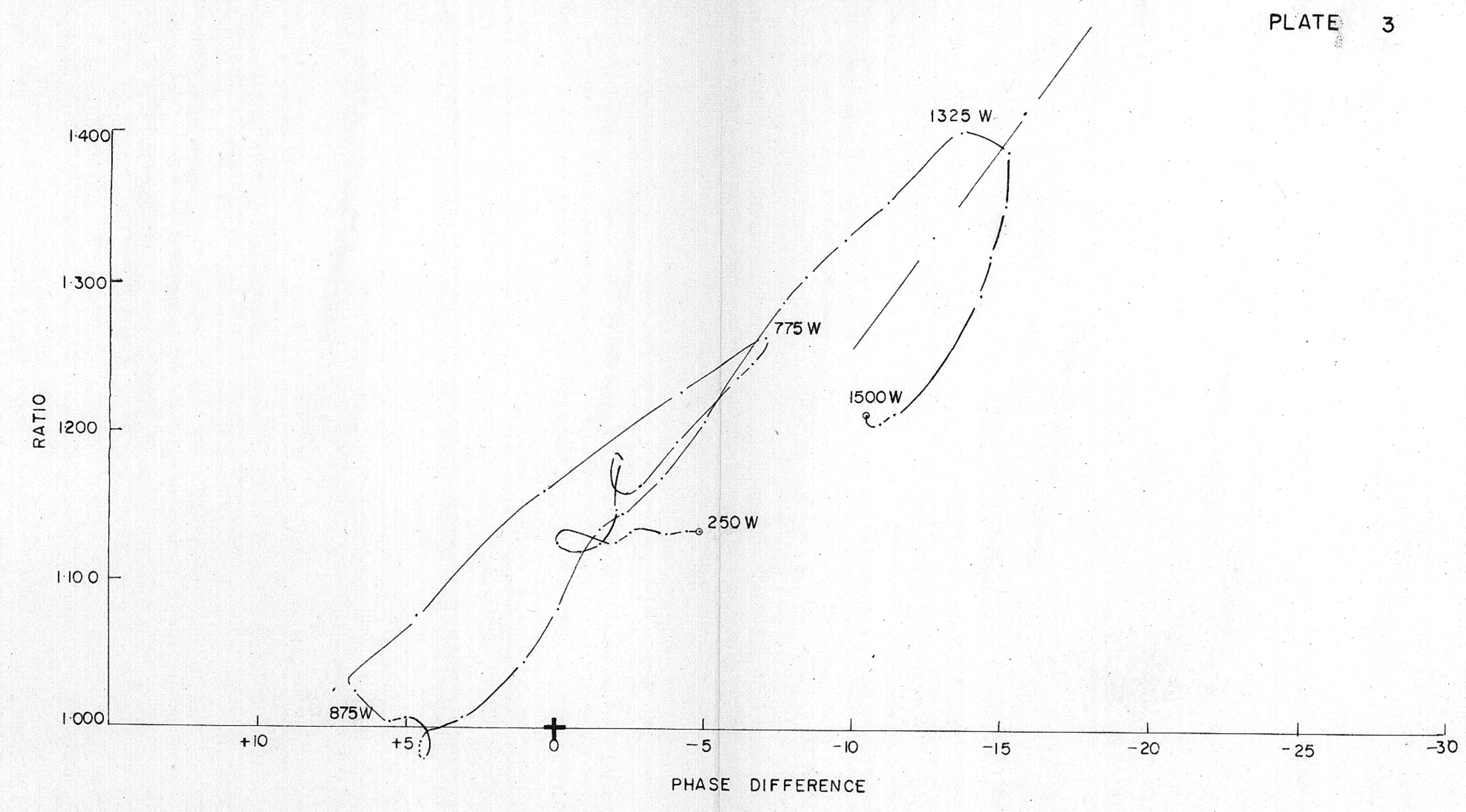


FIGURE 2. 12N 440 c/s

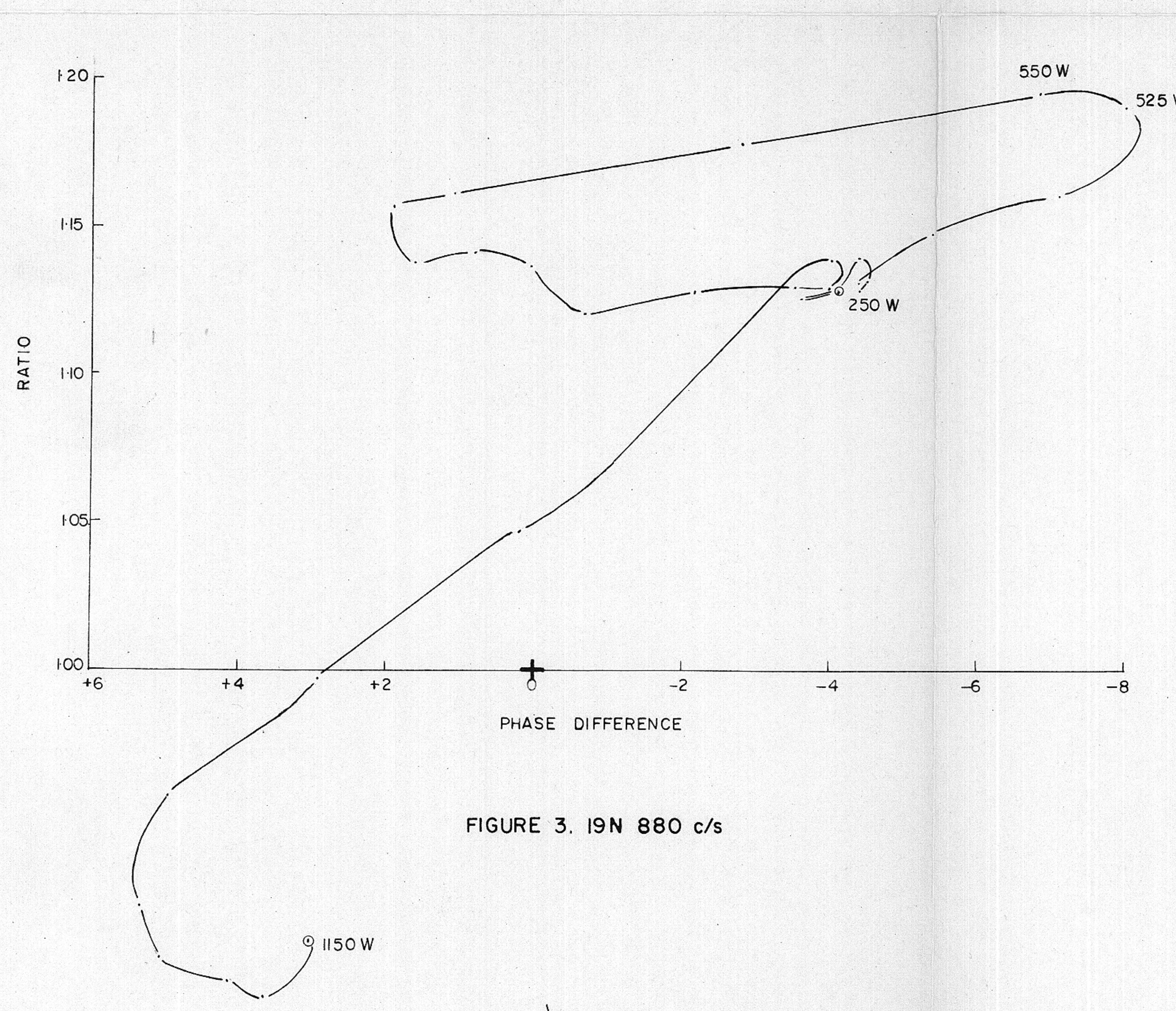


FIGURE 3. 19N 880 c/s

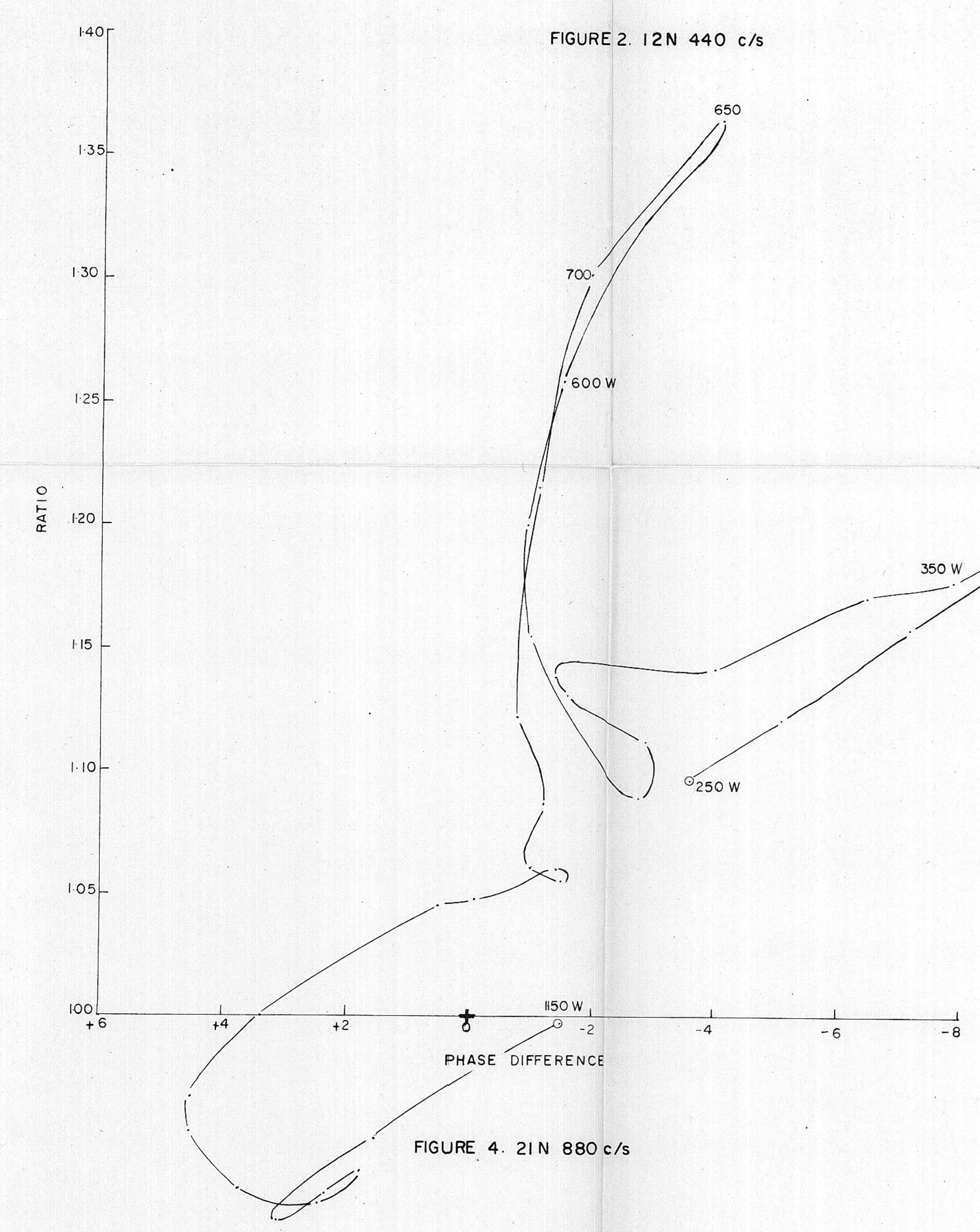


FIGURE 4. 21 N 880 c/s

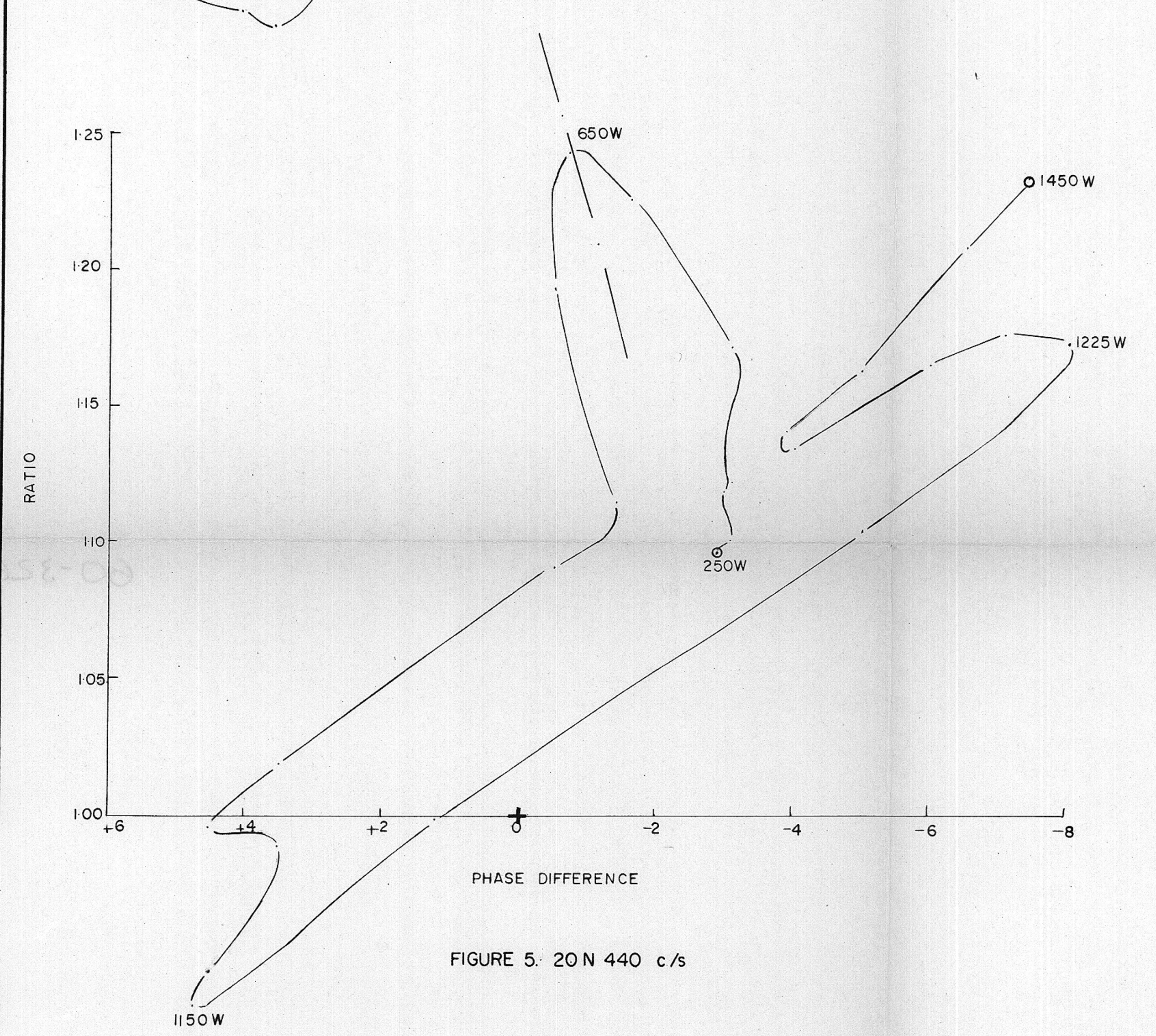


FIGURE 5. 20 N 440 c/s

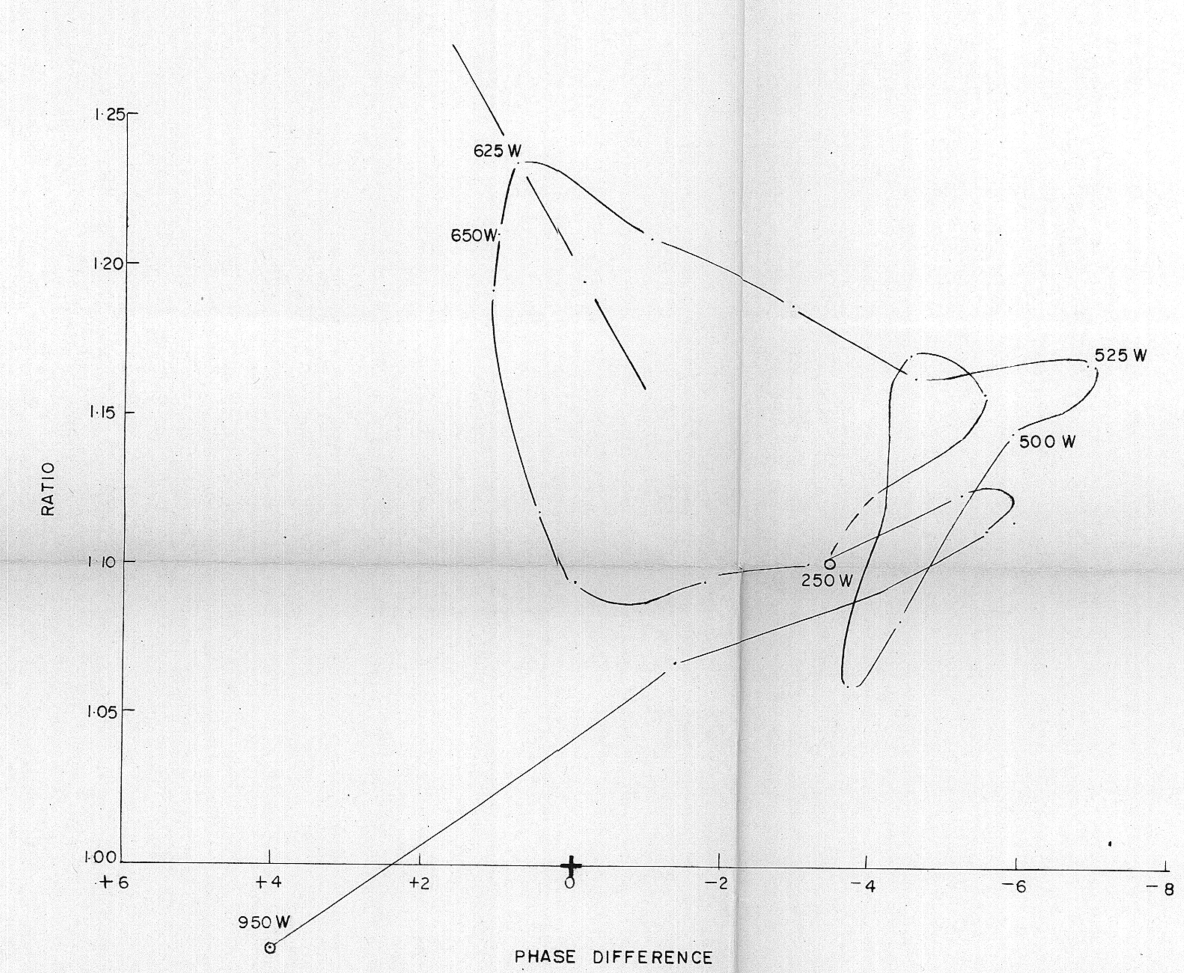


FIGURE 6. 20 N 880 c/s

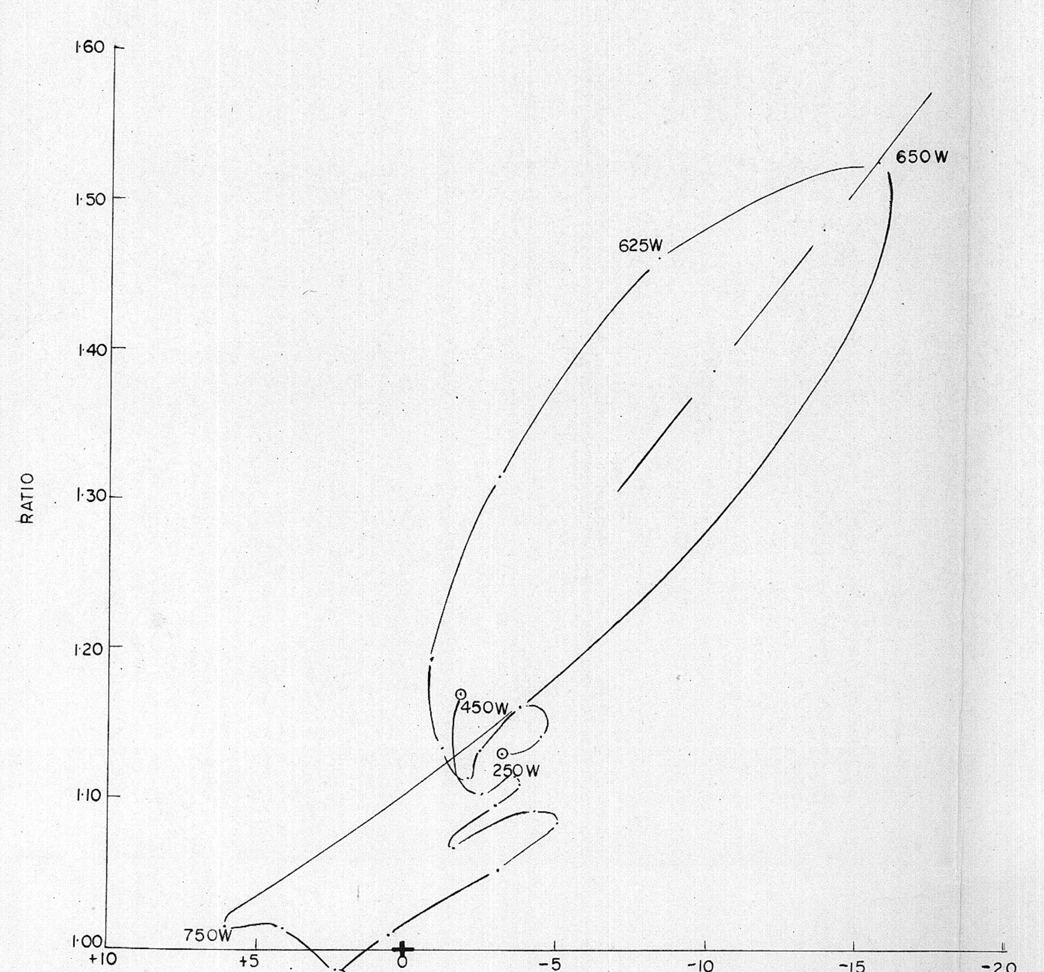


FIGURE 7. 22 N 440 c/s

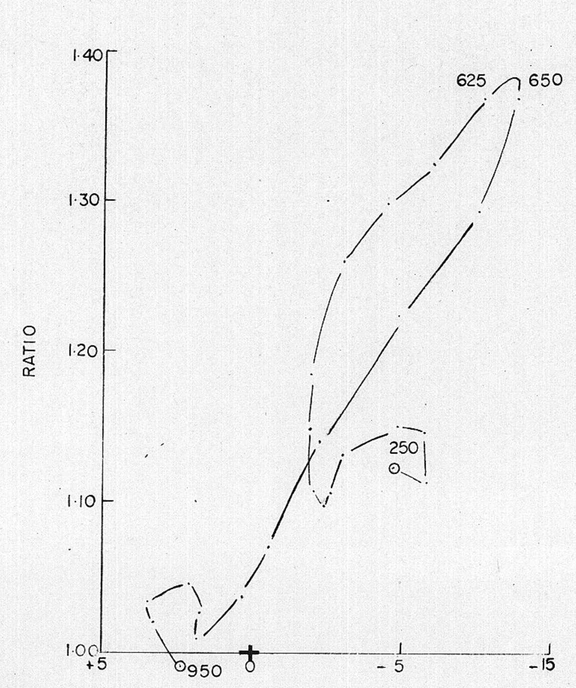


FIGURE 8. 23 N 880 c/s

RAZORBACK GRID

SELECTED TURAM RATIO-PHASE DIAGRAMS

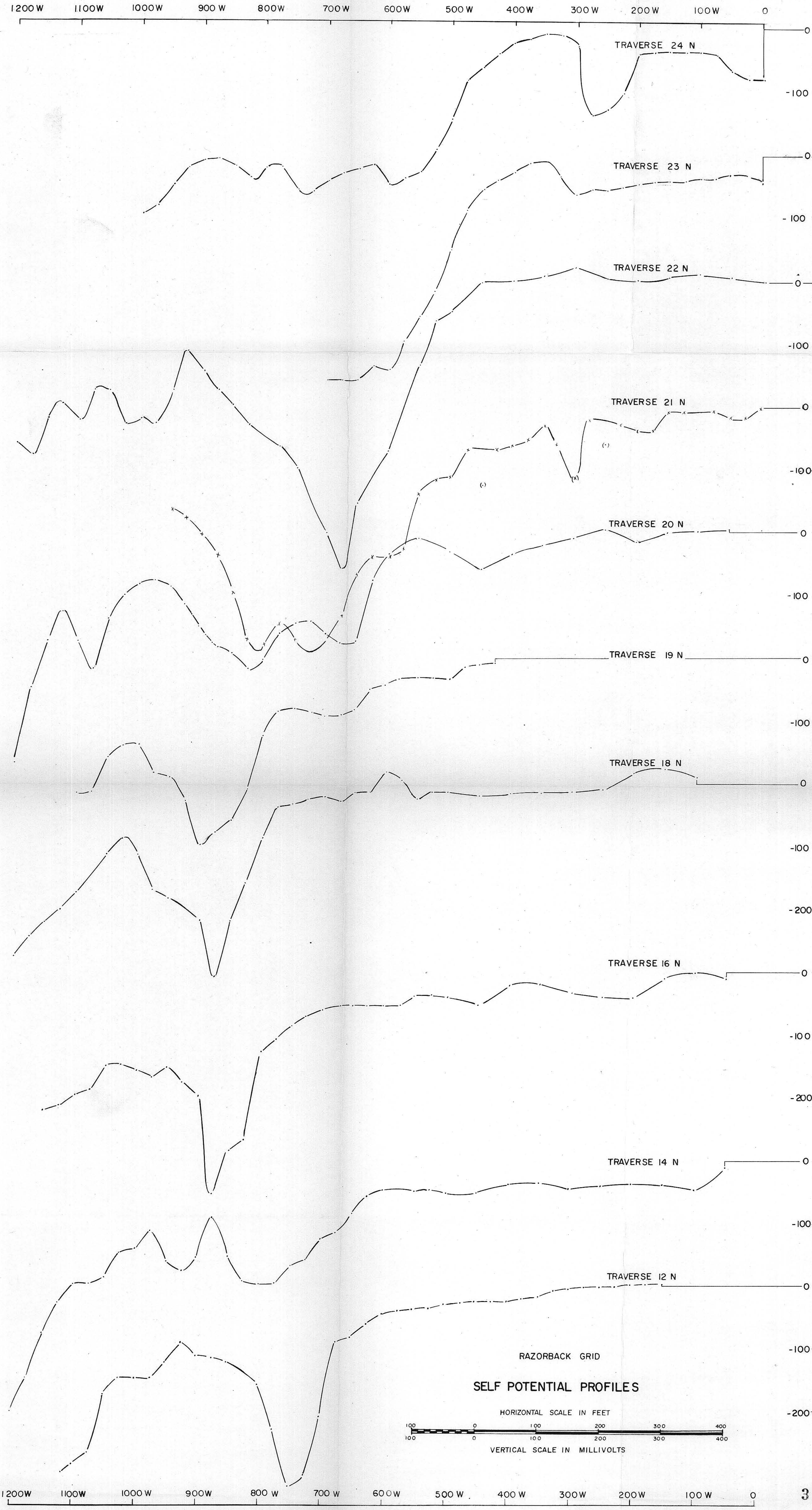
SCALES: AS SHOWN

5 cm

4643
322026

GEOPHYSICAL BRANCH, BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS G 32-106

PLATE 4

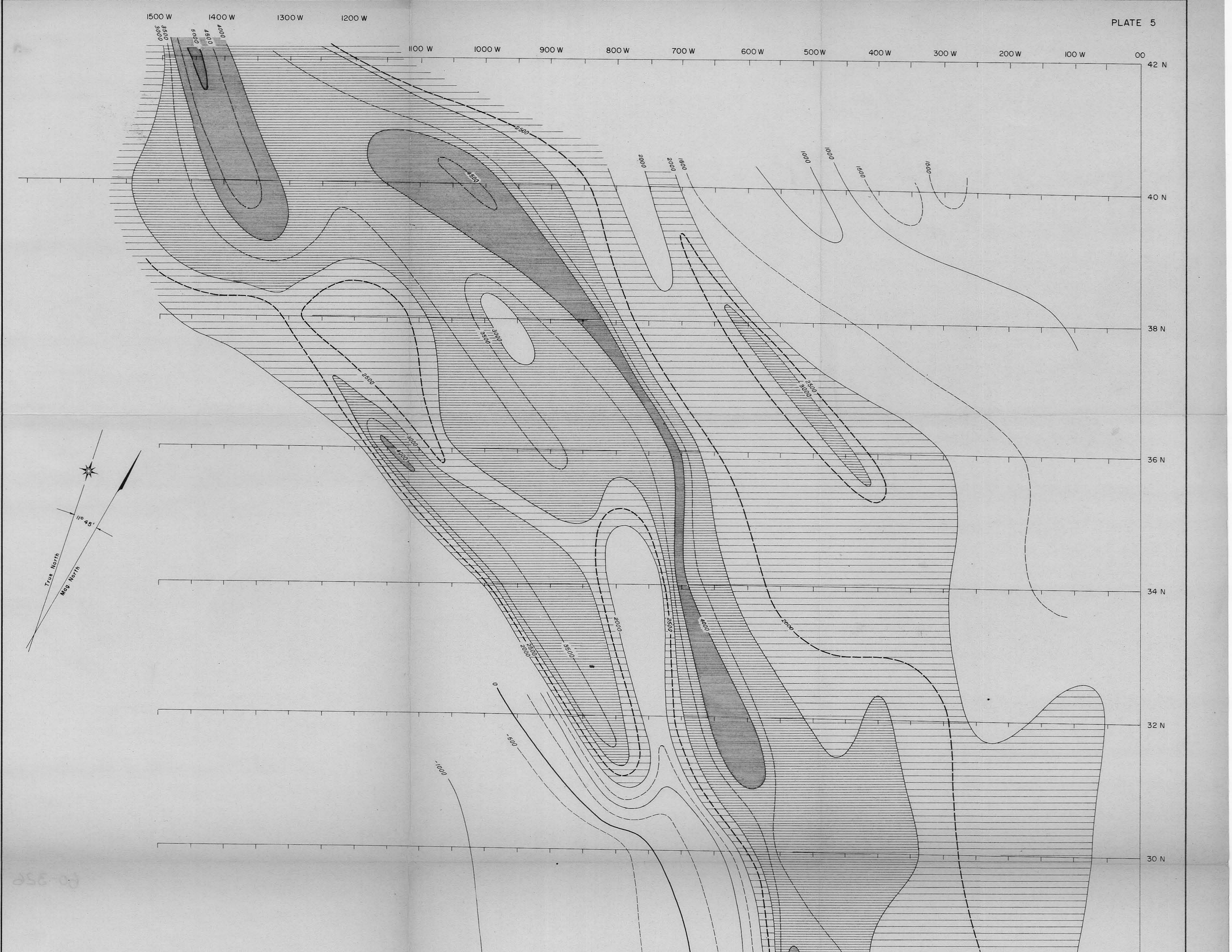


322027

4644

GEOPHYSICAL BRANCH, BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS G 32-101

PLATE 5



RAZORBACK GRID

MAGNETIC VERTICAL FORCE CONTOURS

LEGEND

- 2000 γ - 3000 γ
- 3000 γ - 4000 γ
- 4000 γ - 5000 γ
- > 5000 γ

SCALE IN FEET

100 0 100 200 300

CONTOUR INTERVAL 500 γ

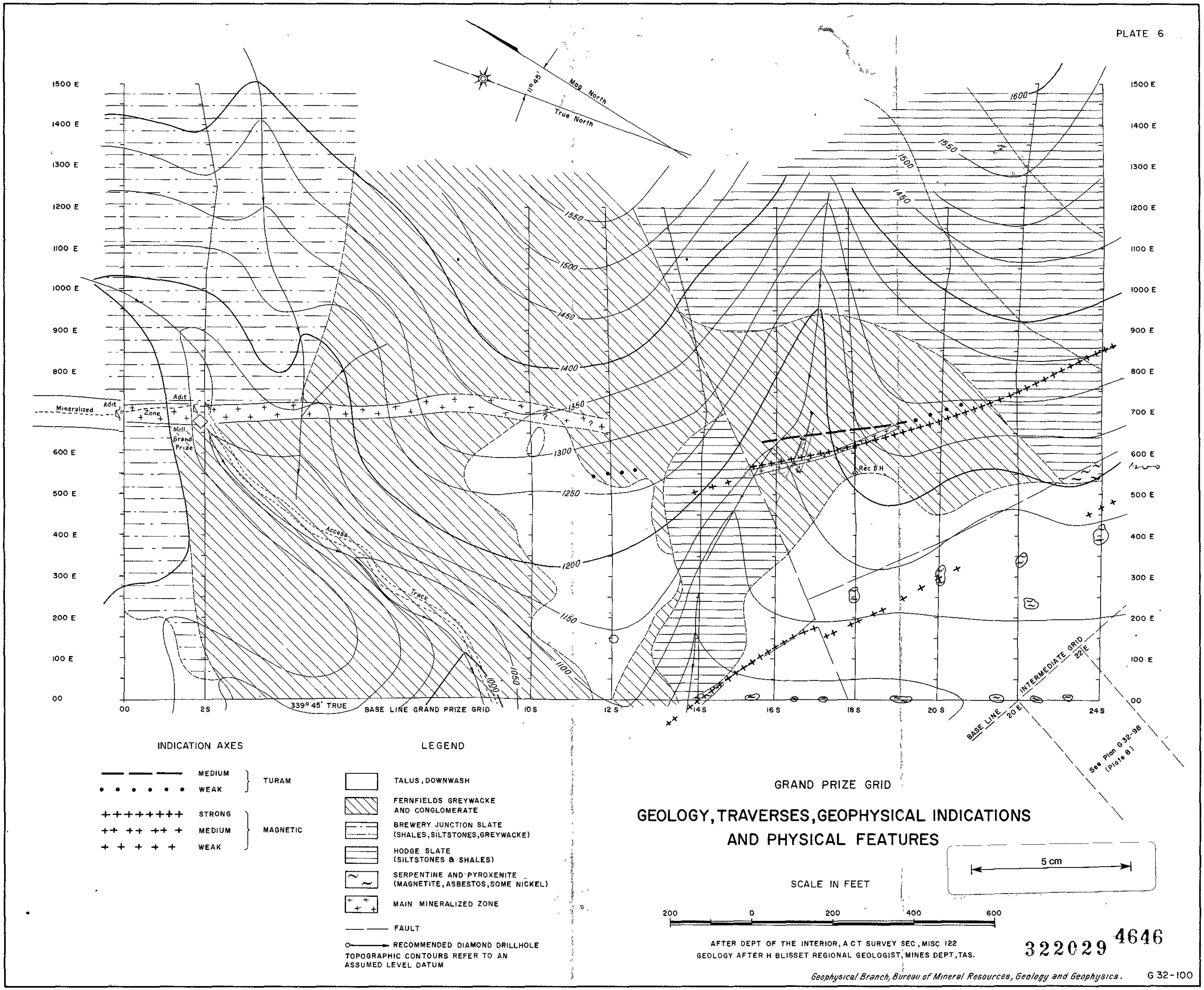
5 cm

222028 4645

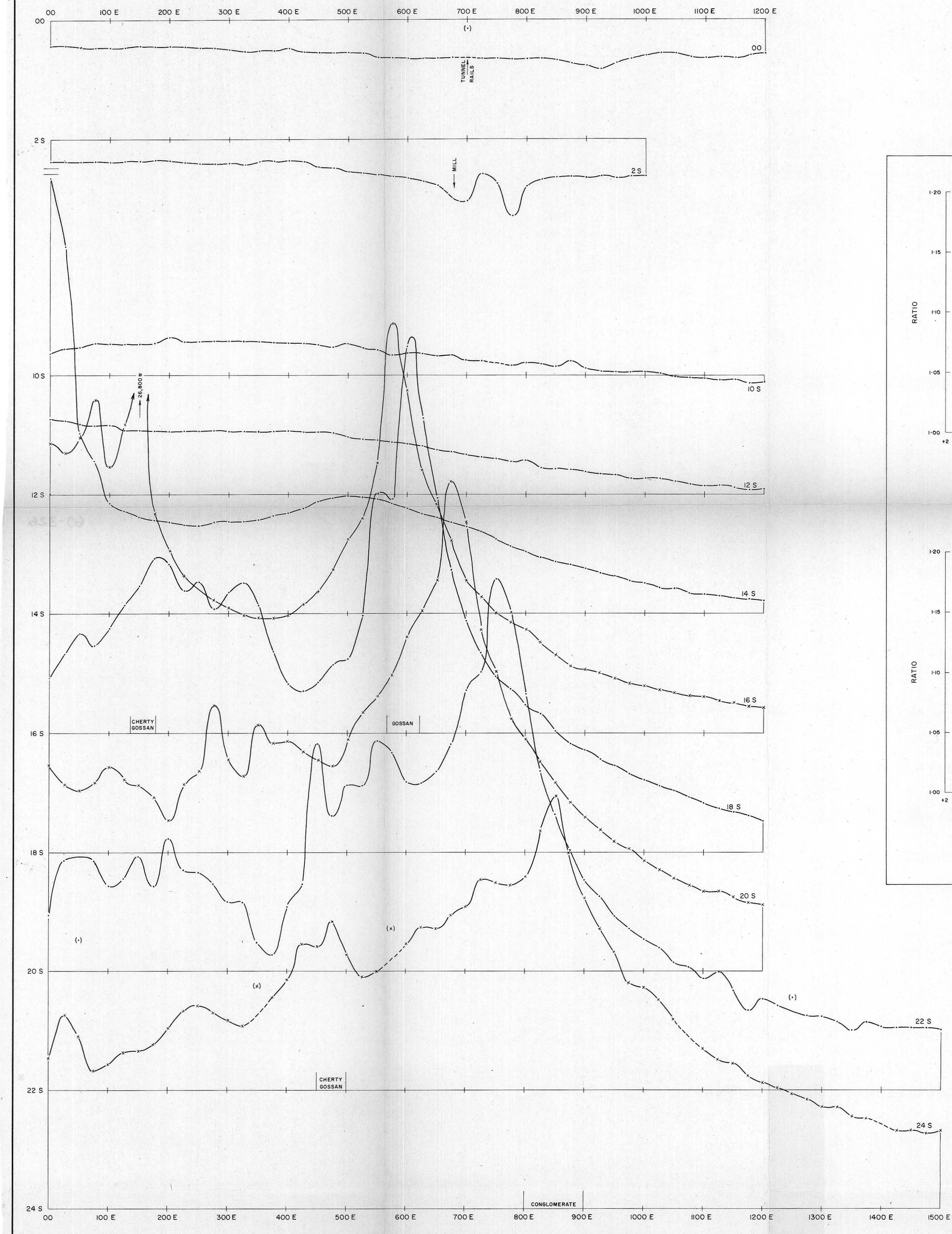
Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics. G32-105

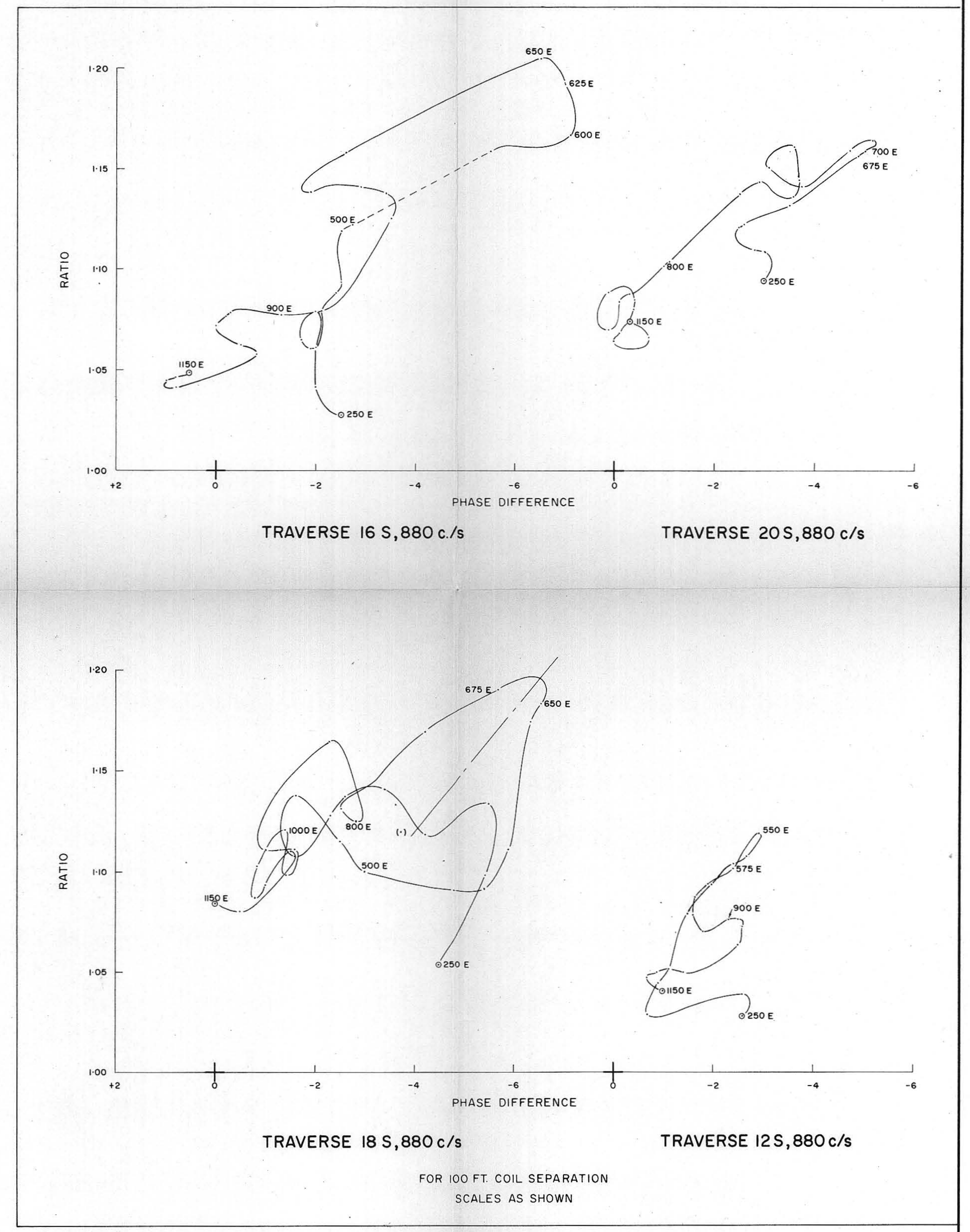
60_326

60-326



DUNDAS AREA, NEAR ZEEHAN, TAS.





GRAND PRIZE GRID

MAGNETIC VERTICAL FORCE PROFILES AND TURAM RATIO-PHASE PROFILES (INSET)

HORIZONTAL SCALE IN FEET

100 0 100 200 300

1000 0 1000 2000 3000

VERTICAL SCALE IN GAMMAS

322030

4647

Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics. G32-107

60_326


PLATE 8
INDICATION "D"
INDICATION "F"
INDICATION "G"
INDICATION "H"
INDICATION "J"
DDH No 3
DDH No 4
Old Trench
Rocky Outcrop
Old Adit Asbestos Digging
Walking Track
Pathway
Creek
BASE LINE INTERMEDIATE GRID
BASE LINE GRAND PRIZE GRID
BASE LINE RAZORBACK GRID
See Plan G 32-99
See Plan G 32-100
118° 30' TRUE
True North
Mag North
11° 45'
INDICATION AXES
STRONG
MEDIUM
WEAK
VERY WEAK
TURAM
STRONG
MEDIUM
WEAK
MAGNETIC
LEGEND
BREWERY JUNCTION SLATE (SILTSTONES & GREYWACKES)
RECENT ALLUVIUM
TALUS, DOWNWASH
RAZORBACK CONGLOMERATE
HODGE SLATE (SILTSTONE AND SHALES)
GREYWACKE CONGLOMERATE, CHERT CONGLOMERATE
SERPENTINE AND PYROXENITE (MAGNETITE, ASBESTOS, SOME NICKEL)
FAULT
INFERRED FAULT
RECOMMENDED DRILLHOLE
RECOMMENDED TRENCH
INTERMEDIATE GRID
GEOLOGY, TRAVERSES, GEOPHYSICAL INDICATIONS AND PHYSICAL FEATURES
5 cm
SCALE IN FEET
200 0 200 400 600
AFTER DEPT OF THE INTERIOR, A.C.T SURVEY SEC., MISC 121
GEOLOGY AFTER H BLISSET REGIONAL GEOLOGIST, MINES DEPT., TAS
TOPOGRAPHIC CONTOURS REFER TO AN ASSUMED LEVEL DATUM
4648
Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics
G32-98

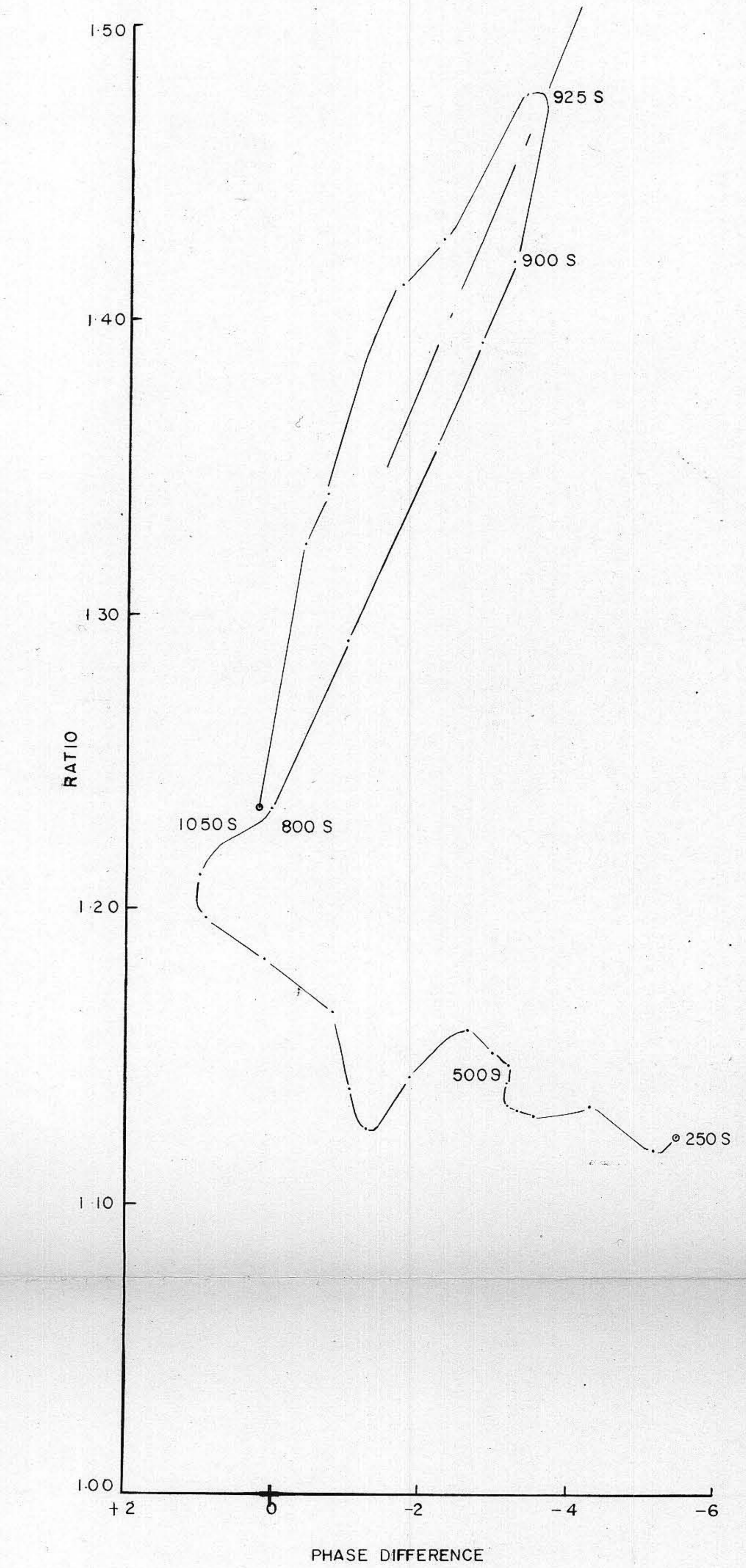


fig.1— TRAVERSE 44 E, 880 c/s

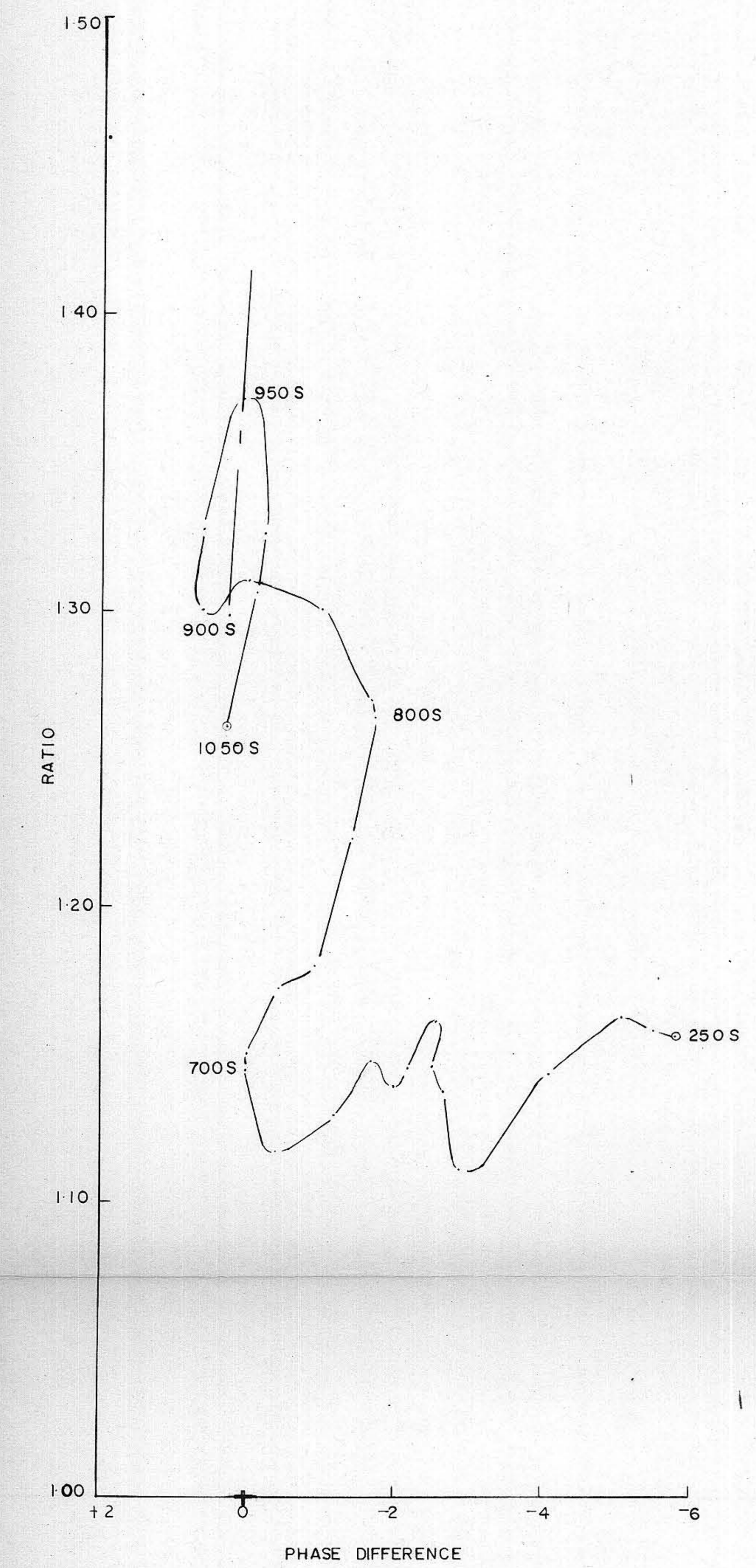


fig. 2 —TRAVERSE 42 E, 880 c/s

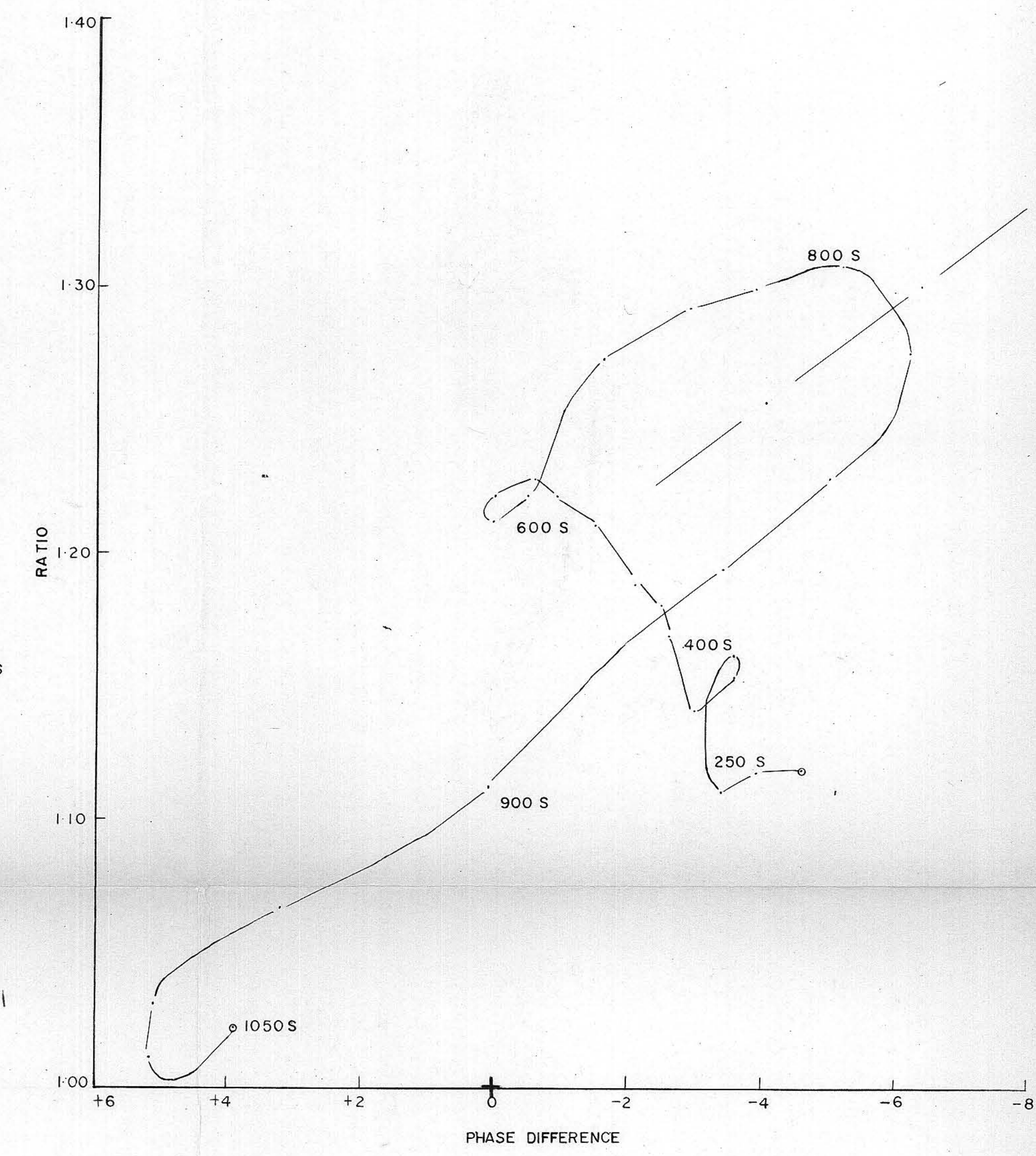


fig. 5— TRAVERSE 28 E, 880 c/s

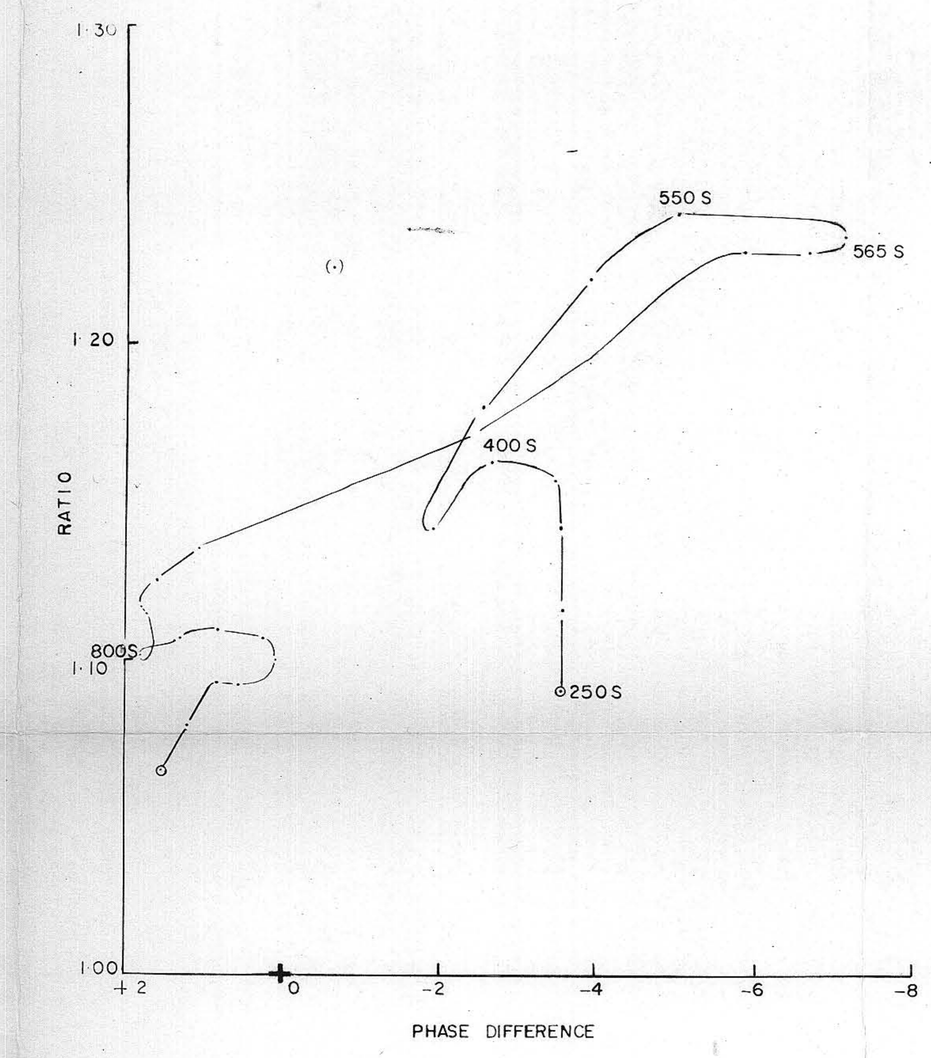


fig. 6— TRAVERSE 16 E, 880 c/s

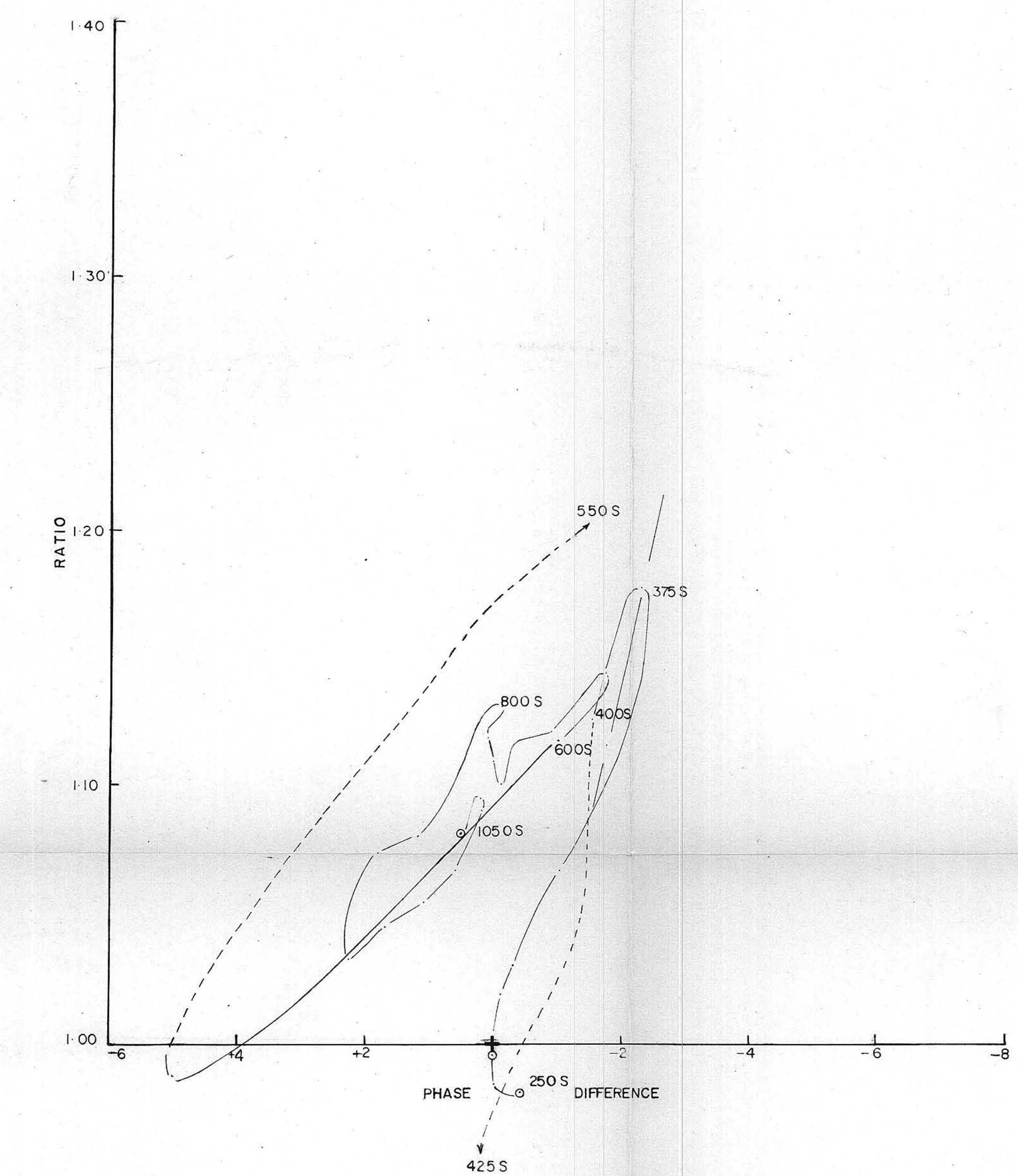


fig.9— TRAVERSE 10 E, 880 c/s

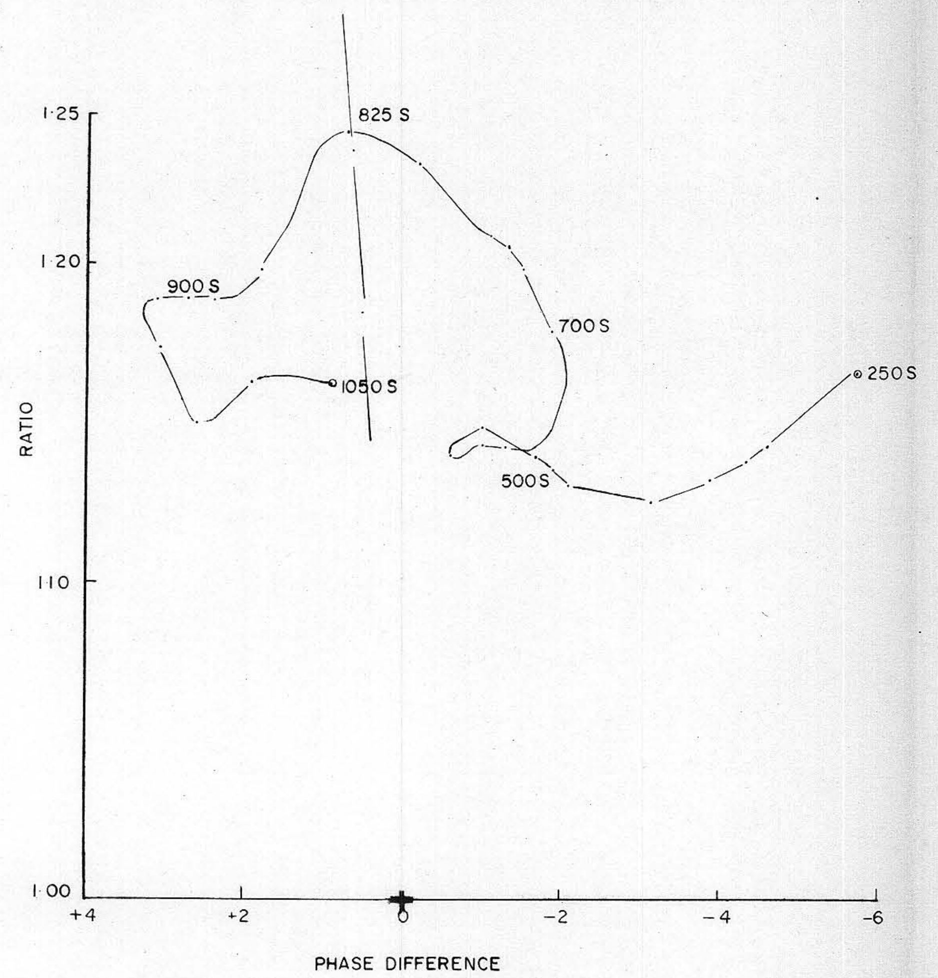


fig. 3— TRAVERSE 38 E, 880 c/s

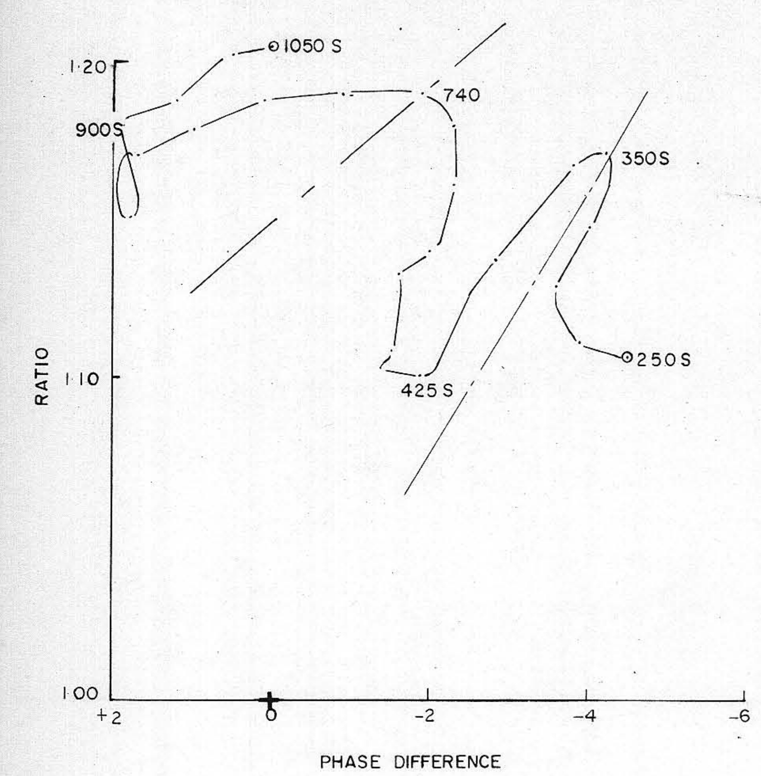


fig. 4—TRAVERSE 36 E, 880 c/s

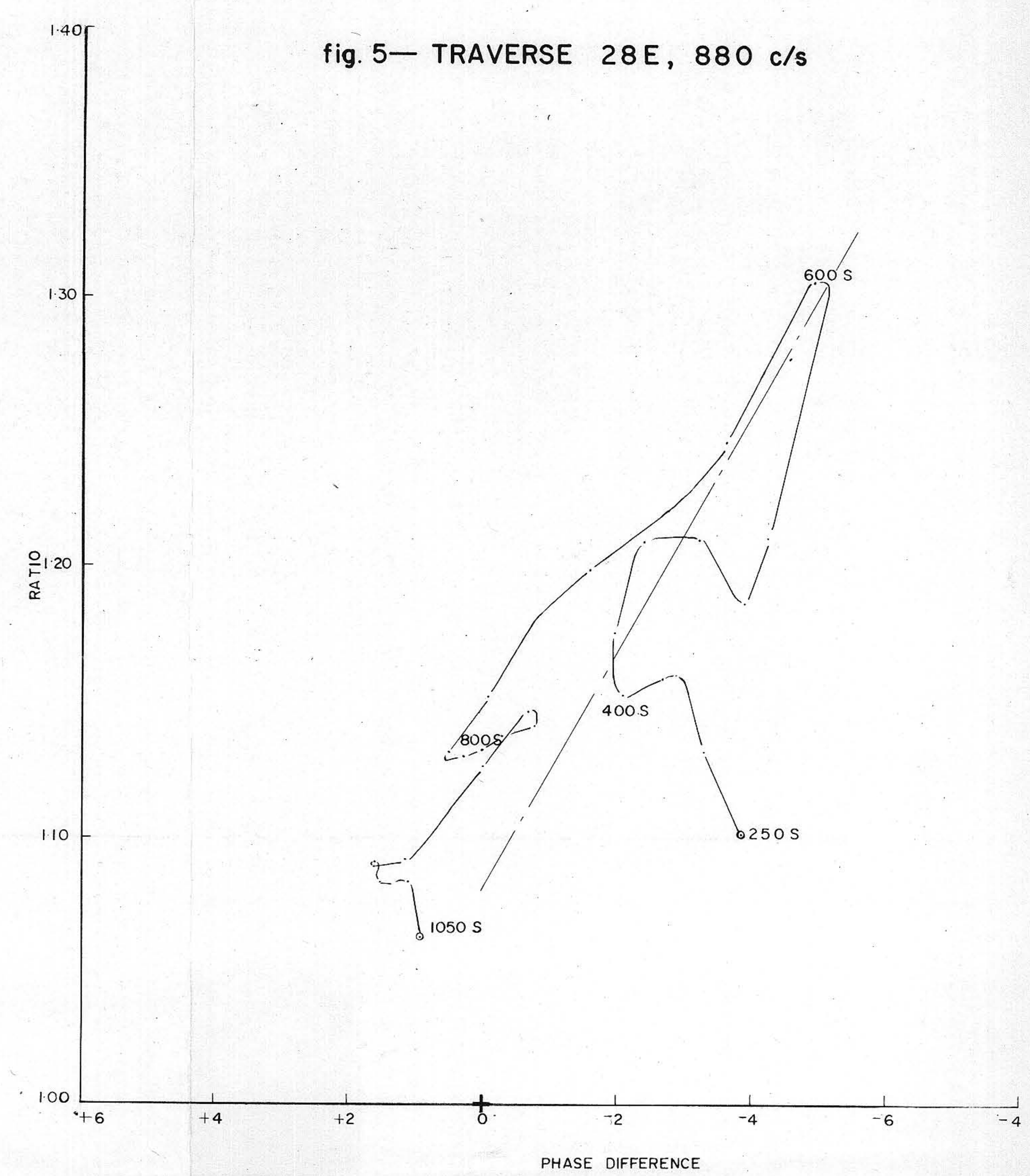


fig. 7— TRAVERSE 14 E, 880 c/s

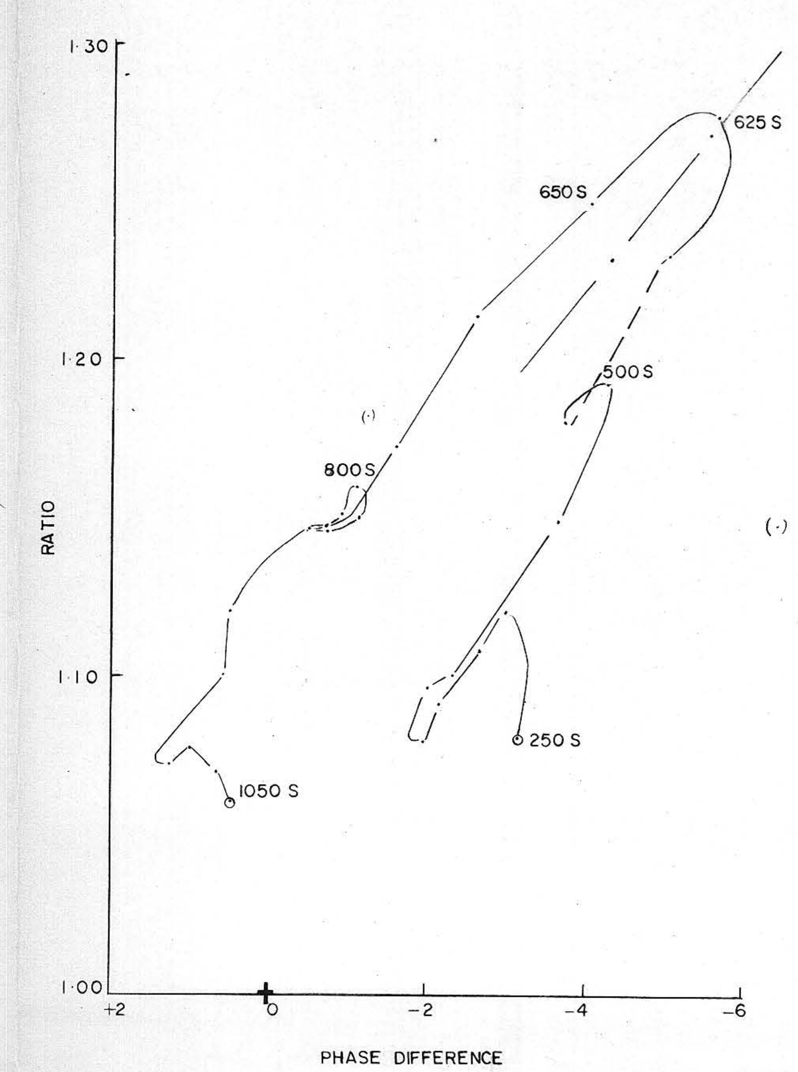


fig. 8— TRAVERSE 12 E, 880 c/s

INTERMEDIATE GRID

SELECTED TURAM RATIO-PHASE DIAGRAMS

SCALES: AS SHOWN

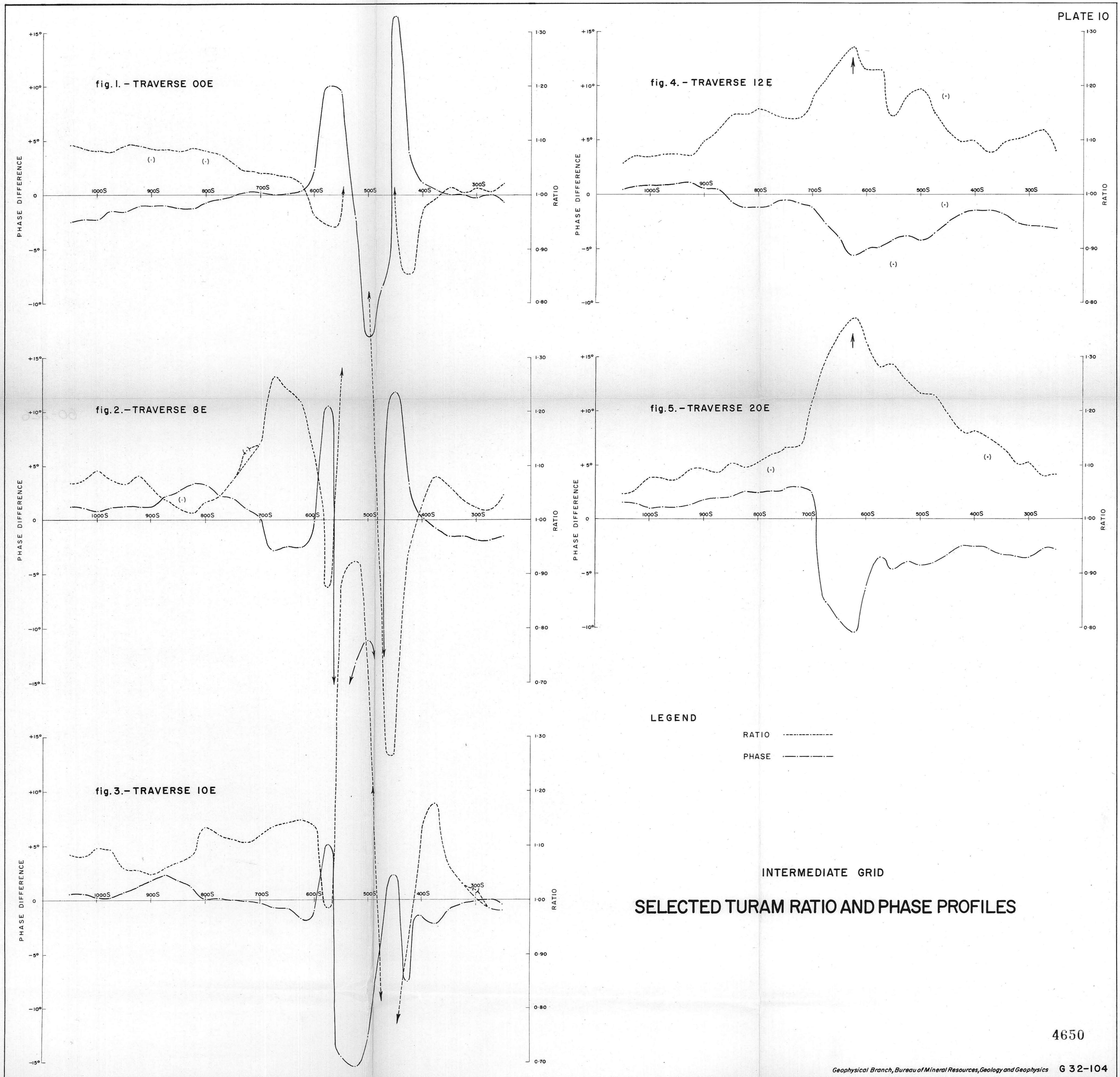
5 cm

322032

4649

GEOPHYSICAL BRANCH, BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS G 32-102

PLATE 10



INTERMEDIATE GRID

SELECTED TURAM RATIO AND PHASE PROFILES

4650

Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics G 32-104

60-326

4651

INTERMEDIATE GRID

MAGNETIC VERTICAL FORCE CONTOURS

LEGEND

- 2000 γ – 4000 γ
- 4000 γ – 6000 γ
- 6000 γ – 8000 γ
- > 8000 γ

SCALE IN FEET

100 0 100 200 300

CONTOUR INTERVAL 500 γ

322034

5 cm

Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics. G32-103

60-0826

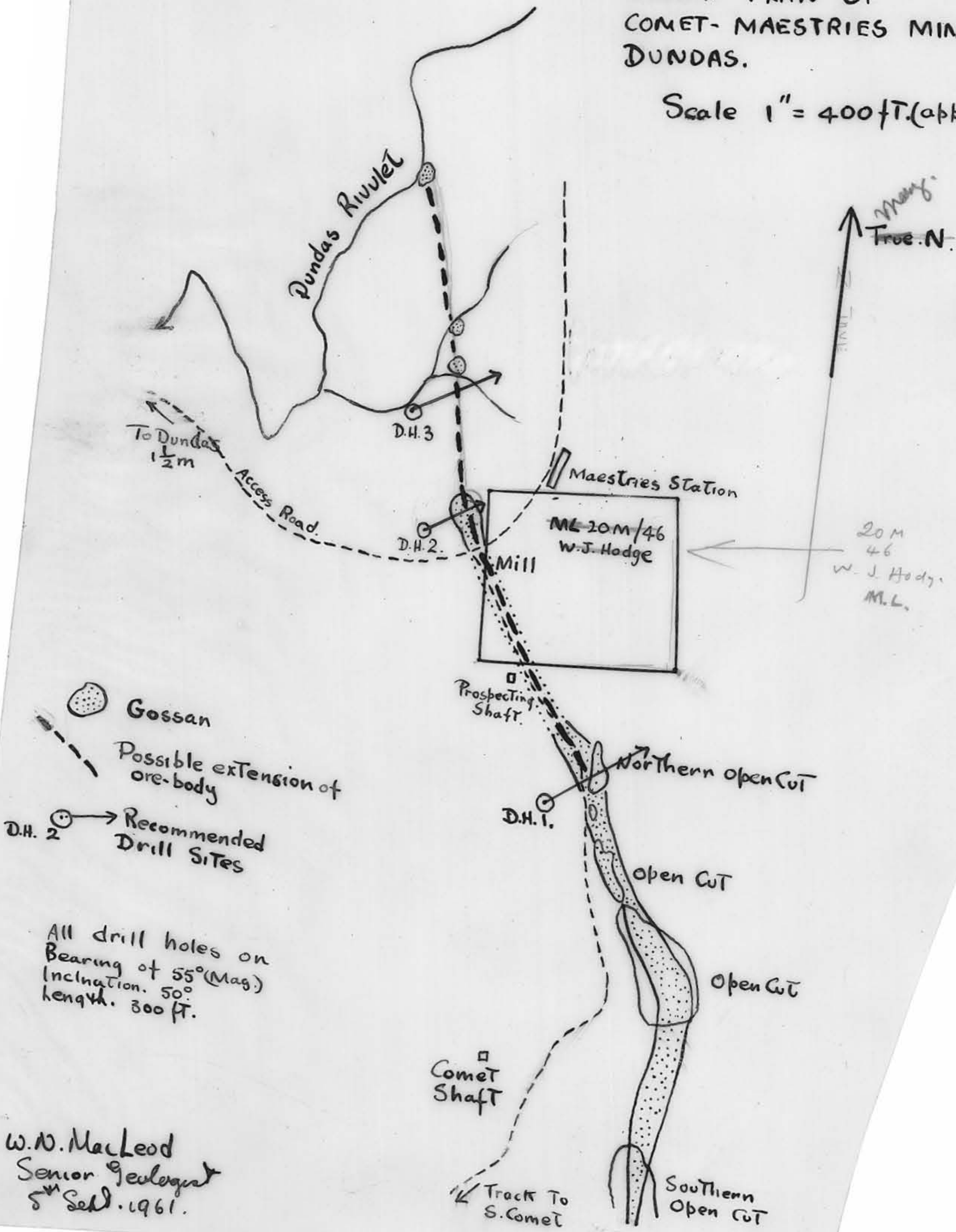

GEOLOGICAL MAP
RAZORBACK GRID.
LEGEND
QUATERNARY
Qt RECENT DOWNWASH OF MANGANIFEROUS ("BLACK") GOSSAN.
Qb RECENT IRONSTONE - BRECCIA.
Qra RECENT ALLUVIUM.
Q OLDER ALLUVIUM AND DOWNWASH.
MIDDLE CAMBRIAN DUNDAS GROUP
Ɛf FERNFLOW CONGLOMERATE
Ɛca COMET SLATE
Ɛfe FERNFIELDS CONGLOMERATE.
Ɛb BREWERY JUNCTION SLATE. TUFF.
Ɛra RAZORBACK CONGLOMERATE
Ɛh HODGE SLATE.
Ɛc GREYWACKE - CONGLOMERATE.
? UPPER CAMBRIAN.
Ɛs SERPENTINE AND PYROXENITE.
STRIKE AND DIP OF BEDDING.
OVERTURNED BED.
STRIKE AND DIP OF JOINTS
STRIKE AND DIP OF SHEARING
FAULTS.
DIAMOND DRILL HOLE.
CAMBRIAN FOSSIL LOCALITIES
EVIDENCE OF MINERALISATION (LIMONITIC & QUARTZOSE GOSSN, ALSO CHERT.)
TRENCHES.
0 200 400 FT.
True North
MANGANIFEROUS ("BLACK") GOSSAN
CHERT
HODGES TUNNEL
BROCKS TUNNEL
OLD MILL SITE
HODGES MILL
ACCESS
TRACK
Dundas
CHERT BLOCKS.
LUMPS OF CHERTY QZITE.
BLOCKS OF CHERT; SOME QUARTZ STRINGERS.
BASE LINE INTERMEDIATE GRID
00 2N 4N 6N 8N 10N 12N 14N 16N 18N 19N 20N 21N 22N 23N 24N 26N 28N 30N 32N 34N 36N 38N 40N 42N 44N 46N 48N 50N 52N
BASE LINE DUNDAS GRID
GEOLOGY BY
A.H. BLISSETT & A.B. GULLINE
1960.
DEPT. OF MINES.
1811 - 50.
5 cm

60-0326 (36)

5 cm

SKETCH PLAN OF COMET- MAESTRIES MINE. DUNDAS.

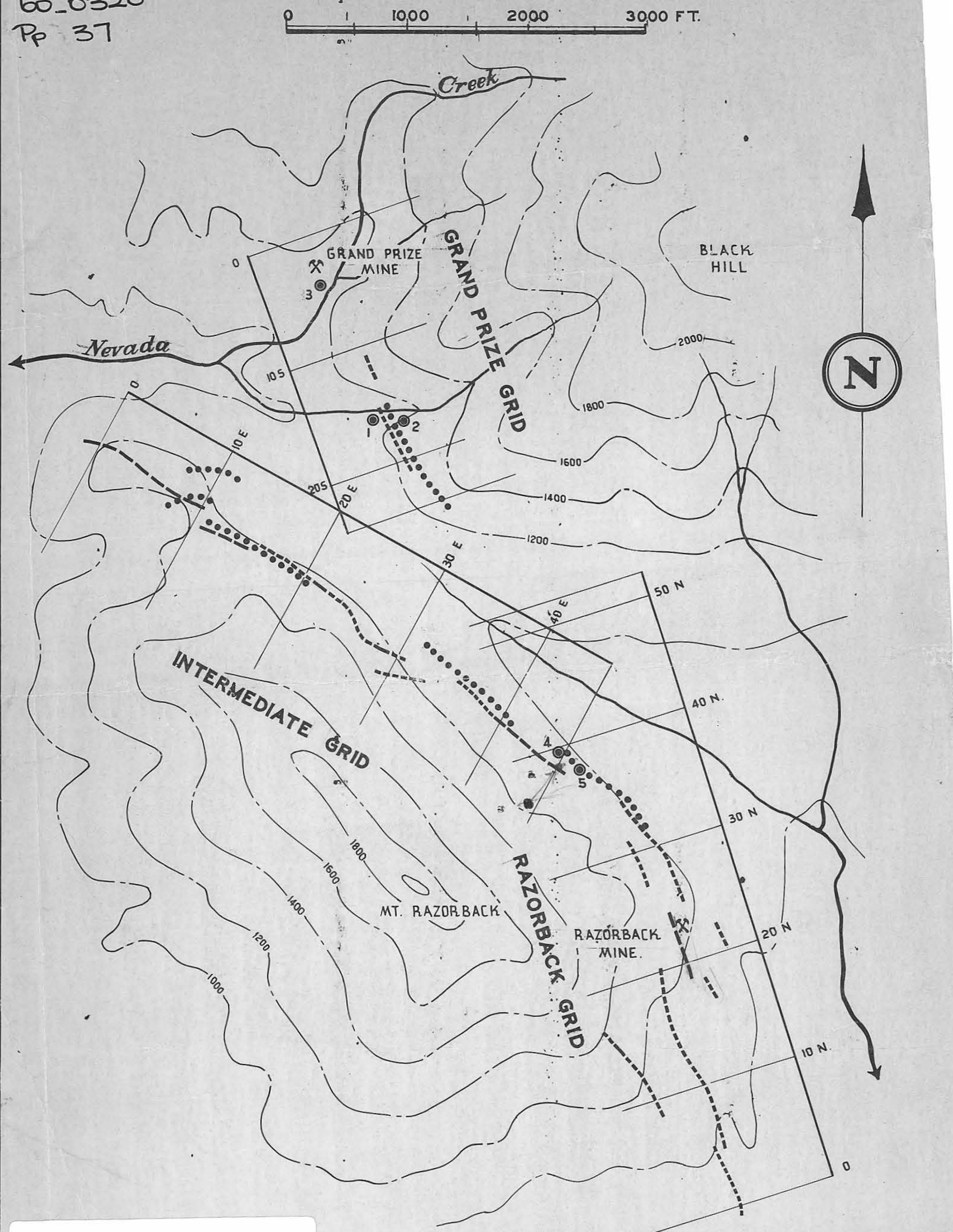
Scale 1" = 400 fT. (approx)



W. N. MacLeod
Senior Geologist
5th Sept. 1961.

GEOPHYSICAL ANOMALIES & DRILL SITES
DUNDAS AREA

60_0326
Pp 37



5 cm

LEGEND

- STRONG TURAM INDICATION.
- WEAK TURAM INDICATION.
- MAGNETIC ANOMALY.
- DIAMOND DRILL HOLE.

60-326

W.N. MACLEOD
SEN. GEOLOGIST 1961

DEPT. OF MINES
1928 - 50

RAZORBACK - GRAND PRIZE AREA

SHOWING GEOPHYSICAL GRIDS

0 20 40 60 CHS.

5 cm

N

DEPT. OF MINES

1828 - 50

AFTER B. LYNCH

1960

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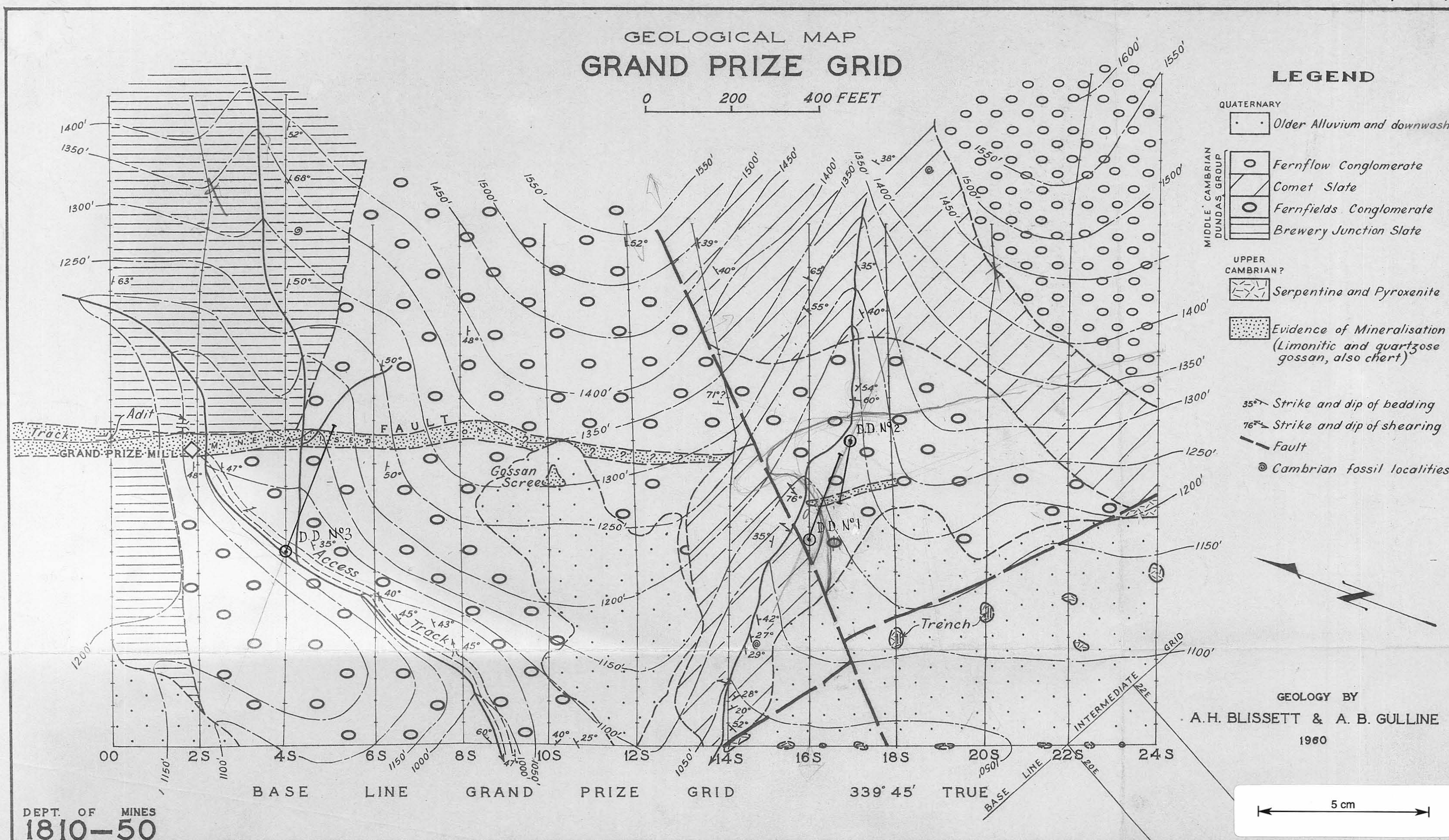

GEOLOGICAL MAP
GRAND PRIZE GRID
0 200 400 FEET
LEGEND
QUATERNARY
Older Alluvium and downwash
MIDDLE CAMBRIAN DUNDAS GROUP
Fernflow Conglomerate
Comet Slate
Fernfields Conglomerate
Brewery Junction Slate
UPPER CAMBRIAN?
Serpentine and Pyroxenite
Evidence of Mineralisation (Limonitic and quartzose gossan, also chert)
35° Strike and dip of bedding
76° Strike and dip of shearing
Fault
Cambrian fossil localities
GEOLOGY BY
A.H. BLISSETT & A. B. GULLINE
1960
Adit
Track
GRAND PRIZE MILL
MINERALISED FAULT ZONE
Gossan Scree
D.D. Nº3
D.D. Nº2
D.D. Nº1
Access Track
Trench
INTERMEDIATE GRID 22E
BASE LINE 20E
00 2S 4S 6S 8S 10S 12S 14S 16S 18S 20S 22S 24S
BASE LINE GRAND PRIZE GRID 339° 45′ TRUE
DEPT. OF MINES
1810–50
5 cm