COMMONWEALTH OF AUSTRALIA
DEPARTMENT OF NATIONAL DEVELOPMENT
BUREAU OF MINERAL RESOURCES,
GEOLOGY AND GEOPHYSICS

RECORDS 1953, No. 82

GEOPHYSICAL INVESTIGATION OF THE COPPER-NICKEL DEPOSITS, NORTH DUNDAS FIELD, NEAR ZEEHAN, TASMANIA

by

O. KEUNECKE

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ABSTRACT

In response to applications by the Tasmanian Department of Mines and the interested company, Eagle Metal and Industrial Products Pty. Ltd., Tasmania, a geophysical investigation, including self-potential, electromagnetic and magnetic surveys, has been made over the copper-nickel deposits of the North Dundas Field, situated about 5 miles north-east of Zeehan, Tasmania. The nickel ore occurs in the foot-wall of north-striking ultrabasic dykes. The ore shoots already worked had proved very rich but quite small.

Important results were obtained in the Cuni North Area only. Conductive indications which appear to be due to mineralization extend over a length of 800 to 1000 feet. The line of mineralization is intersected by cross faults. Drilling targets for five short diamond drillholes are given. Further exploration should be confined mainly to this area.

The geophysical results indicate that mineralization farther south is limited in extent and perhaps of no economic interest.

1. INTRODUCTION

The North Dundas copper-nickel field is situated about 5 miles north-east of Zeehan, Tasmania, and is reached via an old tram track branching to the west off the road from Zeehan to Renison Bell (see Plate 1).

Mid-way between Zeehan and Renison Bell old mine workings, consisting of shafts, pits, costeans, etc., lie in a north-south line over a distance of more than 7,000 feet, mainly north of the Emu Bay railway line. The three mining centres in the field are:-

(i) The Vaudeau shaft in the south, about 1,000 feet north of the railway.

(ii) The Cuni South shaft, about 2,000 feet north of Vaudeau shaft.

(iii) The Cuni North shaft, about 3,000 feet north of Cuni South shaft.

The area, which is fairly flat and in parts swampy, forms part of a basin surrounded by hills rising 200 to 600 feet above it. Although the southernmost part of the field is fairly open, the area north of the Vaudeau shaft is covered by dense scrub. In the extreme north, beyond traverse BN (see Plate 3), forest and thick bush cover the area. Because of the thickness of the soil cover, very few natural outcrops are visible, and even the traces of the older mining activities are often hidden.

Results of the mining and prospecting activities, which have been carried out at intervals during the past sixty years, have shown that high-grade copper-nickel ore occurs in the area, but apparently to a very limited extent both in area and depth.

As early as 1928 the central and northern parts of the area, including Cuni South and Cuni North, were surveyed by the Imperial Geophysical Experimental Survey, as part of a programme to test various geophysical methods. The satisfactory results of that work (Edge and Laby, 1931) contributed largely to the renewed activity in the northern part of the field during the succeeding years.

In 1950 Montana Silver Lead N.L. became the holder of all mining leases in the Cuni area and Eagle Metal and Industrial Products Pty.Ltd. secured an option over the field from Montana for a limited period. The renewed interest in the field resulted in the preparation by the Department of Mines, Tasmania, of a Summary Report (Dept. Mines, Tas., 1952) concerning the earlier mining activities. This was followed by an application to the Bureau of Mineral Resources, Geology and Geophysics, for a geophysical investigation over the whole area. This investigation was started in May, 1952, but was discontinued because of bad weather in June, 1952. Work resumed in December, 1952 and the survey was finally completed in March, 1953. The work done during the first of these two periods has been described by Keunecke (1952).

The survey was made by O. Keunecke (party leader), assisted during the first period by P.B. Tenni, and during the second period by M.J. O'Connor and P.R. Wilson. The area surveyed included all the old known mine workings in the copper-nickel field north of the Emu Bay railway, and extended about 7,600 feet to the north and 1,000 to 2,000 feet from west to east.

The staff of the Mines Department, Zeehan, pegged and levelled the traverses. Valuable assistance during the preliminary laying-out of traverses was rendered by a bulldozer supplied by Eagle Metal and Industrial Products Pty. Ltd., the representative in Australia of the English company. This company also provided the geophysical party with the necessary field assistants.

The Mines Department, Zeehan, compiled a geological report (including maps) on the area during the period, making use of the geophysical grid (Taylor and Burger, 1952). Plates 1 and 3 show the area surveyed and described in this report.

2. GEOLOGY

The following notes on the geology of the area are based mainly on the report by Taylor and Burger (1952).

The area consists of Cambrian argillites, shales and tuffs. The argillites predominate and are brownish red (at the surface, due to oxidation), grey and green. These rocks are intruded by north-striking basic and ultrabasic dykes of pyroxenite and gabbro, the dykes ranging in width from 10 to 50 feet. At the surface they dip steeply to the east. In general, the strike and dip of the basic intrusives conform with those of the sediments, and in the report by Taylor and Burger (1952) these intrusives are referred to as sills, not dykes. At least two sills have been mapped at the surface, but diamond drilling has shown that more exist.

The copper-nickel mineralization is associated mainly with the eastern sill, the lodes being either on the footwall (western) side of the sill, or within it. The lodes strike approximately north and dip to the east, in conformity with the basic sills.

Near the Vaudeau shaft three small faults have been observed, each displacing the northern part of the basic sill to the east, but insufficient data are available to indicate the strike of these faults. More faults exist in the field, mainly farther north in the Cuni North area, where a change in direction towards the north-east has been observed in the strike of the sills and of the sediments.

The ore is a massive sulphide consisting of pentlandite, pyrite, chalcopyrite and pyrrhotite, with high contents of copper (5 to 6 per cent) and nickel (9 to 12 per cent). In some parts of the area silver-lead-zinc mineralization is present with the copper-nickel ore, particularly in the Cuni North workings, where it is reported to exceed the copper-nickel mineralization in quantity. Silver-lead-zinc mineralization also exists in other parts of the field and is not associated with copper-nickel mineralization. In those parts it is associated with quartz veins, showing the siliceous nature of the mineralizing solutions. Although the lead-zinc ores have not so far been found of economic value in the area, they have been mined near Dundas and at Lead Blocks, about 2,000 feet east-north-east of Cuni North shaft (see Plate 1).

The nickel mineralization occurs mostly in ore-shoots of relatively short length, and in the Vaudeau shaft its length is less than 100 feet.

3. SELF-POTENTIAL SURVEY

(a) Method and equipment.

Sulphide ore-bodies, which project from the zone of groundwater-saturated rocks into the zone of weathering, are subject to oxidation processes accompanied by electro-chemical activity. This produces electric currents which pass from the ore-body into and through the surrounding rock and return to the ore-body. At the ground surface a resultant potential distribution occurs and differences in potential between any two points can be measured. The presence of a centre of negative potential is indicative of a sulphide ore-body undergoing oxidation. The self-potential method indicates only the oxidised portion of a deposit and not its possible continuation below the water table. Caution in interpretation of results is essential, because anomalies may also arise from pyritised fault and shear zones, graphitic or pyritised slates, or other causes.

(b) Work done and results obtained.

A base line 7,600 feet in length was laid out at a bearing of 172° magnetic, along the western side of the area to be surveyed. Traverses, each 1,000 feet in length, were laid out at intervals of 100 feet, perpendicular to the base-line, and observation points were pegged at intervals of 25 feet along each traverse. In all, eighty traverses were laid and observed over the whole area. The layout of the geophysical grid, topographical features such as shafts and tram tracks, and some geological information are shown on Plate 3.

Because of the existence of rain forest and dense bush in the northern part of the area, it was originally planned to terminate the survey at Traverse BN. However, as self-potential indications were still apparent on this traverse, the survey was extended another 500 feet, up to and including Traverse BS.

One observation point was maintained as a fixed rear-station and at every point on the grid a reading was taken of the potential difference between the fixed station and the observation point.

The self-potential profiles along each traverse are shown on Plate 2, and from these profiles the self-potential contour map on Plate 3 was constructed.

(c) Discussion of results.

Self-potential anomalies were obtained and are shown on Plate 3. The extent of the anomalies is limited and, except in the Cuni North area, none has a length of more than 300 feet. The intensity of the anomalies is of the order of -100 to -200 millivolts, with the exception again of the Cuni North area where values approaching -400 millivolts were recorded.

The lack of uniformity of the anomalies in both strike and shape suggests that they are caused by a variety of geological features. The anomalies could arise from -

(i) lead-zinc ore

(ii) copper-nickel ore

(iii) pyritic shales

(iv) pyritised fault or shear zones

(v) graphitic schists.

The anomalies can be divided into two definite groups, the first showing strong and distinct characteristics and the second being comparatively weak and poorly defined.

In the southern area, weak and localised anomalies arise near the old mine workings such as the Vaudeau, Mosquito and Blowfly shafts (indications 1,2 and 3). Near the Cuni South shaft there is a well-pronounced, but localised, self-potential anomaly (indication 4) with a maximum value of about -160 millivolts, on Traverse AB. The adjoining profiles show no extension of the anomaly, and this provides a typical indication of the small extent of the shoots.

In a portion of the southern area, several pronounced anomalies arise where there had been no previous indication that copper-nickel deposits occur. To determine whether or not these anomalies are due to copper-nickel deposits,,some trenching was done at several points during the course of the survey. Trenches on traverses HCA, G and E, showed that the anomalies are due to pyritised shear zones, weak lead-zinc mineralization or pyritic and graphitic shales. The trenching was particularly useful in the case of anomaly number 5 centred on Traverse G, as it was thought that this might be due to copper-nickel mineralization on a possible southern continuation of the basic dyke with which the copper-nickel ore is associated in the Vaudeau shaft. Trenching showed, however, that this is not so. It is unlikely that copper-nickel ore-shoots occur farther south in this area. The trenching on Traverse HCA, (on indication 7) near the old Nickel Reward shaft, revealed traces of galena in a shear zone.

Several small weak anomalies (numbered 8 to 12), similar to those which occur farther south, were recorded to the east and north-east of Cuni South shaft, but it is considered that they are probably due to some disseminated sulphides.

The very strong anomaly (number 13) of more than -400 millivolts centred on the eastern end of Traverse AY was shown, by trenching, to be due to strongly pyritic black shale.

In the Cuni North area a well-pronounced self-potential anomaly (number 14) between Traverses BF and BO extends over a length of about 800 feet, and is closely associated with a known basic dyke and old mine workings. The shape of this anomaly suggests that the mineralization occurs as several bodies, possibly separated by cross faults. On Traverse BM the direction of strike of the indications swings sharply from north to north-east and the indications continue in the latter direction until they end on Traverse BO.

Several small anomalies occur on the northern extension of the indication on Traverses BH to BM, the most pronounced being that on Traverse BP (number 15), with a centre of -150 millivolts. Trenching was carried out here, but revealed only a small iron-manganese lode in the shale which is probably the cap of some lead-zinc mineralization at depth. The small extent of the anomaly makes it unlikely that the suspected galena mineralization will be of any economic value.

4. ELECTROMAGNETIC SURVEY.

(a) Method and equipment.

Electromagnetic measurements make use of the fact that most sulphide minerals possess high electrical conductivity, and experience has shown that electro-magnetic methods are the most suitable for investigating ore deposits of the copper-nickel type. Although several variations of the method have been developed during the past 30 years, the basic principles underlying these methods are the same. By passing an alternating current through a long cable, an electromagnetic primary field is set up around the cable. This field induces a secondary current in any good conductor lying below the earth's surface and the secondary current in turn sets up a secondary magnetic field. By measuring, at selected points, the total magnetic field and subtracting from it the calculated value of the primary field, the residual value obtained is that of the secondary field due to the good conductor.

The method now in most common use is to pass the primary current through a large rectangular coil of wire laid out on the ground. At observation points on traverses at right angles to the longer side of the coil, a search coil is first set up vertically (with the plane of the coil perpendicular to the traverses) to measure the horizontal component of the electromagnetic field, and then horizontally to measure the vertical component. The E.M.F. produced in the search coil in each of the two positions is then measured on an alternating-current potentiometer. This determines the value both of the component in-phase with the primary current (real component) and of the component 90° out-of-phase with the primary current (imaginary component). In all, therefore, four components are measured at each observation point, namely the real and imaginary horizontal components and the real and imaginary vertical components. The theoretical values of the components due to the primary field are subtracted from the measured values of the total field, the residuals representing the magnetic effect due to any good conductors existing below the surface.

(b) Work done and results obtained.

Because of the dense bush in the area it was found more convenient to use a long straight cable 2,500 feet in length laid parallel to the base line, instead of a rectangular loop. The cable was earthed at both ends by line electrodes, i.e. long bare copper wires perpendicular to the base line and extending more than 1,000 feet along the traverses nearest to each end of the cable. An alternating current of 500 c/s from a portable generator was passed through the cable and electrodes, completing the circuit through the ground. The cable was laid out at first 200 feet to the west of the base line and readings with the search coil and compensator were taken starting from 0, along the traverses laid out for the self-potential survey. For some profiles the cable was laid out 400 feet west of the base line, and for others it was moved to the east of the lodes and laid out 550 feet east and then 1,000 feet east of the base line. Measurements in the last two instances were started at 350E and 800E respectively.

The electromagnetic work was carried out mainly in the Cuni North area, as the self-potential work had shown this to be the most important part of the field.

Plate 4 (Sheets 1, 2 and 3) shows some electromagnetic vector diagrams of the Cuni North area.

Plate 6 shows the horizontal electromagnetic components obtained in the Cuni South area.

(c) Discussion of results.

The following table gives a brief summary of the electromagnetic indications in the Cuni North area:-

Traverse	Position of indication	Strength	Remarks
BB	160E	very weak	
BC	155E		
BD	150E		
BE	175E	weak	
BF	155E	good	
BG	160E		
BH	125E		
BJ	145E	medium	
BK	170E	weak	
BL	200E	good	
BM	190E		
BN	330		c.f. drilling result in D.D.H.2; ore
BO	410E	weak	c.f. drilling result in D.D.H.3; no ore
BP	480E	very weak	
BR	225E	weak	Not caused by Cu-Ni mineralization
BS	260E		

The intensity of an indication depends on the depth from which it arises, the dimensions and shape of the mineralized body and its electrical conductivity, which in turn depends mainly on the amount of sulphide mineral in the ore.

By connecting the centres of the indications on the traverses, a general picture of the strike and extent of the mineralization is obtained. Where the line of strike shows a break it is reasonable to suspect that zones of disturbance, such as faults, exist. However, the suggestion that faults exist is not based on direct geophysical evidence and is indicated only as a possibility.

There is a marked decrease in the strength of the indications south of Traverse BF. On Traverses BD, BC and BB they are very weak and they disappear altogether farther south.

At the northern end, the electromagnetic results suggest that the mineralization terminates between Traverses BO and BP.

As can be seen from the profiles on Plate 6, the electromagnetic indications in the Cuni South area are much weaker than those obtained farther north, the only ones worthy of comment being on Traverses AA and AB, between 250 and 300 east. These coincide with the position of the basic dyke at the Cuni South shaft. Mining showed no ore of economic value on Traverses AA and AB, and therefore the conclusion can be drawn that no further copper-nickel ore of economic value exists in the southern part of the area.

No electromagnetic work was done near the Vaudeau shaft in the southern area, because of the absence of electromagnetic indications in the Cuni South area, and because no promising self-potential anomalies were recorded in the Vaudeau area.

5. MAGNETIC SURVEY

(a) Method and equipment.

Variations in the strength of the Earth's magnetic field are caused by the presence of ferromagnetic minerals such as magnetite, pyrrhotite, ilmenite, etc., and of ores and rocks containing these minerals. Some igneous rocks are more magnetic than sediments, and of the igneous rocks the more basic types often have a greater magnetic effect than the acid types.

Although it is possible to measure both the horizontal and vertical components of the Earth's field, the measurement of the vertical component is adequate in a survey of this type, and this method was used in the present survey.

The geology of the field justified the use of the magnetic method as there was a possibility of locating the basic sills, and even of indicating the copper-nickel ore, assuming the pyrrhotite content to be large enough to cause anomalies.

The instrument used was a Watts vertical field magnetometer.

(b) Work done and results obtained.

It was intended that the traverses and observation points laid out for the self-potential survey would also be used for the magnetic survey but, because of the absence of self-potential or electromagnetic indications on many traverses, the magnetic method was confined to a few traverses only.

(c) Discussion of results.

Magnetic observations failed to detect any of the basic sills, nor were magnetic anomalies of any significance recorded elsewhere in the area. These observations agree with those made by the I.G.E.S. (Edge and Laby, 1931), who also found that the basic sills gave no amomalous magnetic readings.

Because of the above, magnetic profiles and contours are not presented.

6. CORRELATION OF RESULTS.

An attempt is made here to correlate the results of the self-potential and electromagnetic surveys, and also taking into account any evidence obtained from previous drilling and mining activities. The positions of the indications from self-potential and electromagnetic work and the positions of the relevant drillholes are shown on Plates 7 and 8 for the Cuni North and Cuni South areas respectively.

In the Cuni North area, the centres of the electromagnetic indications correspond fairly well with those of the self-potential anomalies. As the dykes dip to the east, the self-potential anomalies can be expected to occur a short distance to the west of the electromagnetic indications, because the former are related to the oxidised upper part of the ore-body, while the latter are caused mainly by the primary sulphides at, or below, groundwater level. This difference in the position of the indications is shown on traverses BG, BG, BL and BM. Possible reasons are a change in dip of the mineralized lode, or the extension of the sulphide mineralization itself to a considerable depth, resulting in the electromagnetic indication appearing farther to the east.

Previous drilling in the Cuni North area intersected high-grade copper-nickel ore in D.D.H. No. 2, between traverses BM and BN. This coincides approximately with a fairly strong electromagnetic indication centred on traverse BN.

The geophysical results in the Cuni South area gave no indication of mineralization of any importance thus confirming the negative results obtained from D.D.Hs. Nos. 1, 7 and 8B.

7. RECOMMENDATIONS.

The Cuni North area is the only one where further exploration work can be recommended, and results there are so encouraging that drilling is warranted.

As the basic dyke and copper-nickel mineralization both have an easterly dip, the locations for future drilling must be situated east of the line of electromagnetic indications shown on Plate 7 since these indications represent the approximate position of the upper part of the primary sulphide body. The distance between the target and the drillhole position can be selected to provide a suitable inclination for the drill.

To facilitate the development of the area and to assist in the early lay-out of a drilling programme, the suggested drilling targets shown on Plate 7 have already been conveyed to the Department of Mines, Hobart, and to the interested mining company. The positions of these targets are:-

Traverse	BM,	point	200E;	drillhole	EM1
"	BL,	"	190E;	"	EM2
"	BH,	"	130E;	"	EM3
"	BF,	"	160E;	"	EM4
"	BE,	"	175E;	"	EM5

8. REFERENCES.

Dept. Mines, Tas., 1952 - Summary report on the copper-nickel deposits of the Five-mile District, Zeehan, Tasmania. Dept. Mines. Tas.

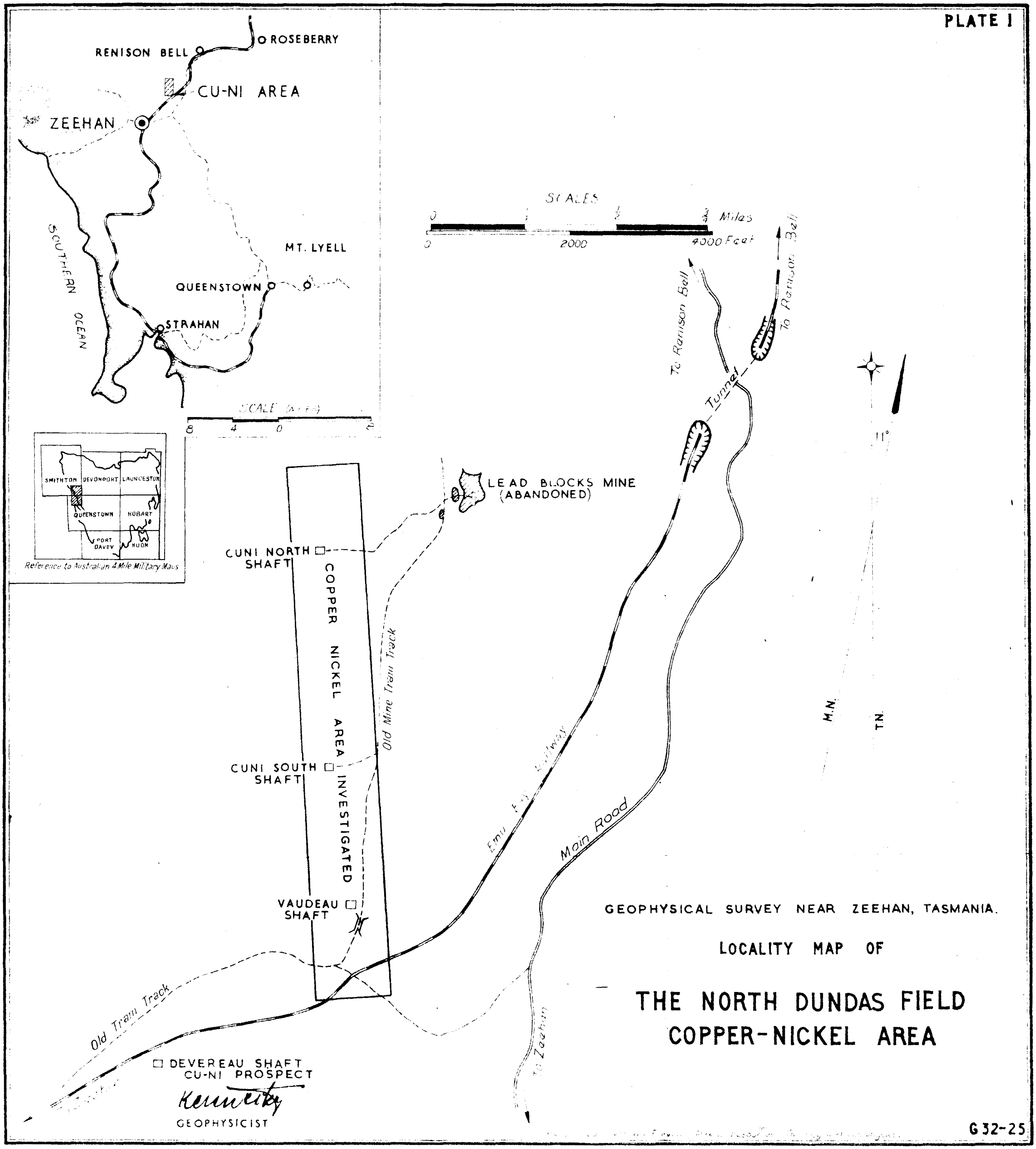
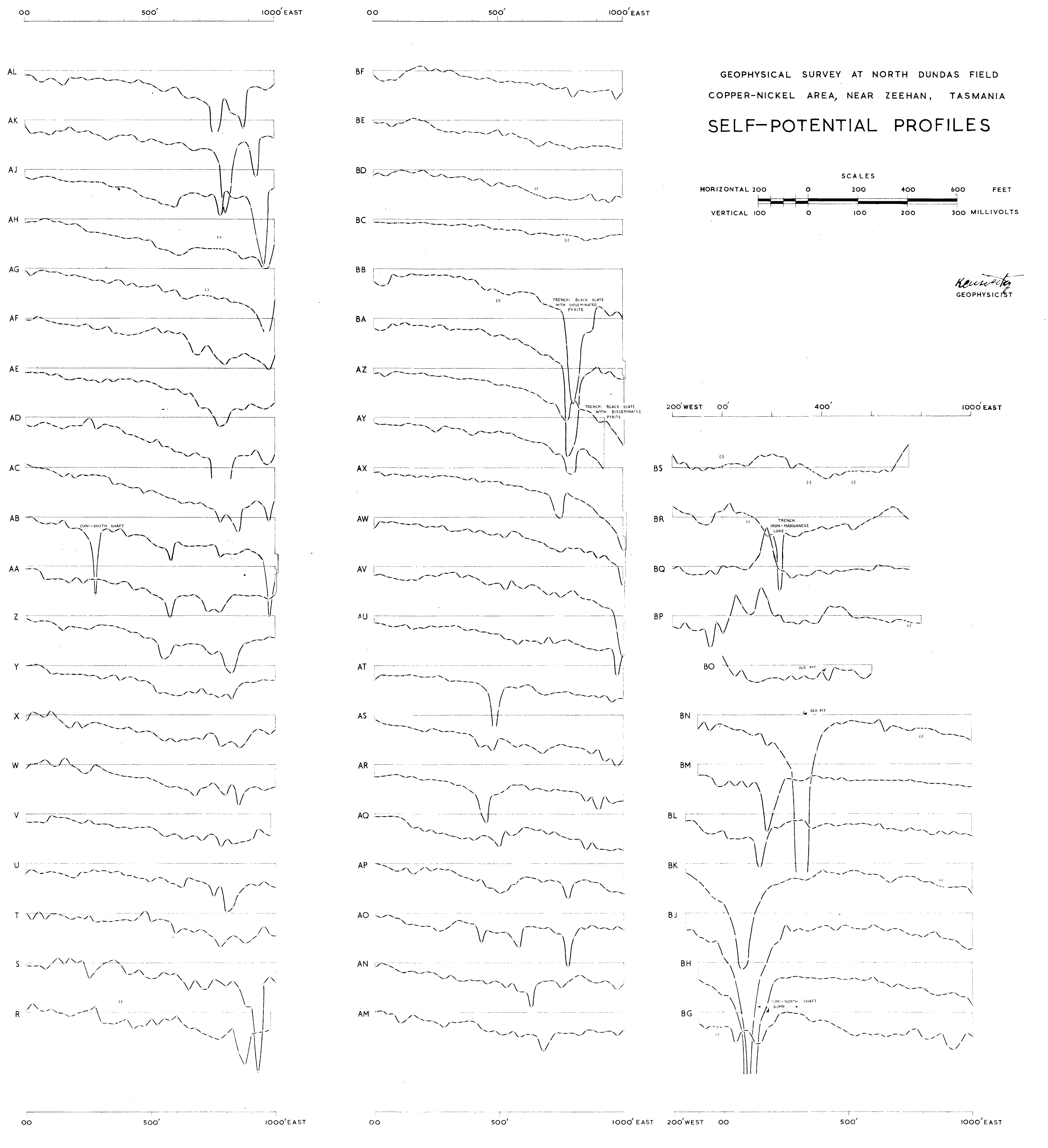
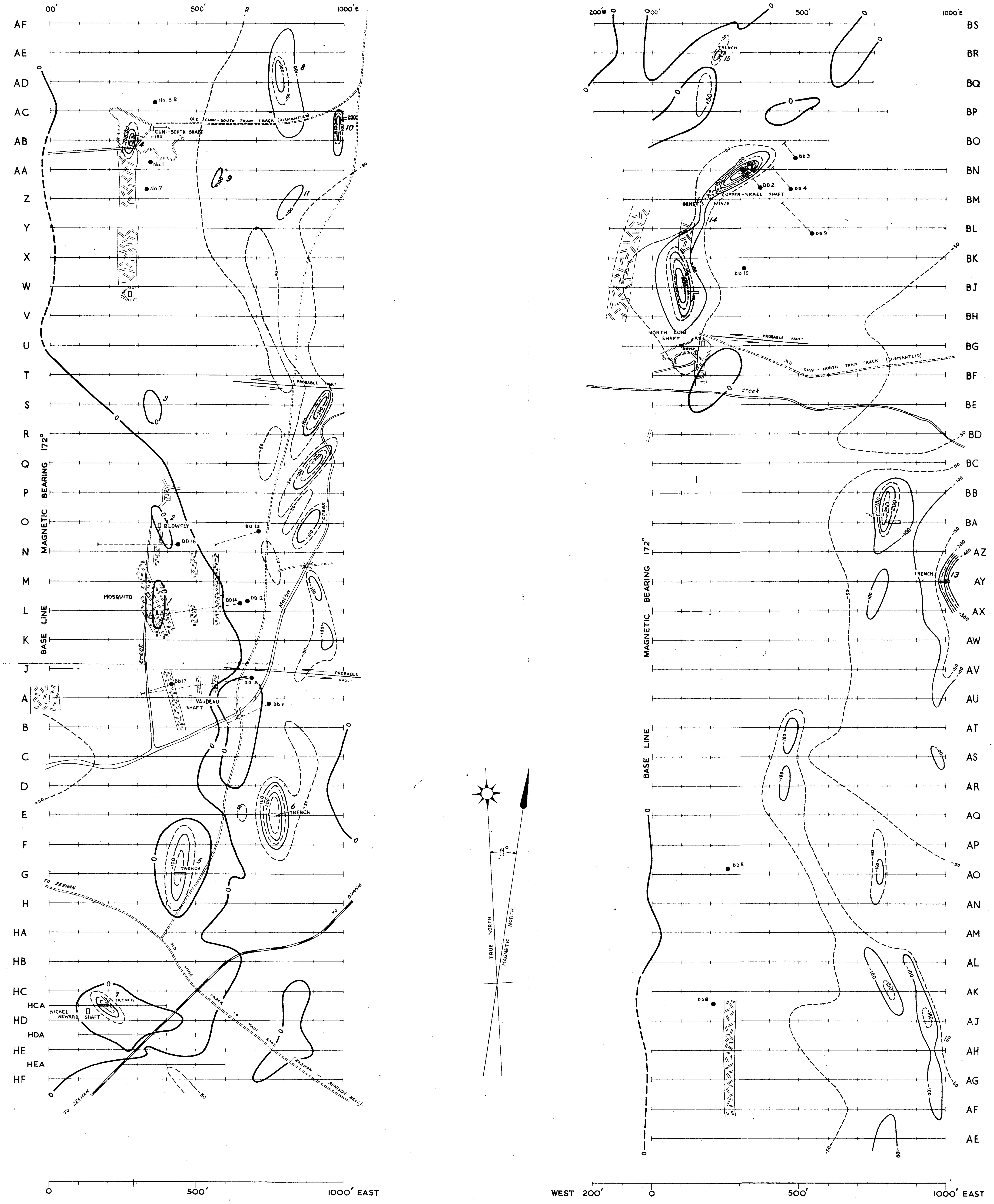


PLATE I
ROSEBERRY
RENISON BELL
CU-NI AREA
ZEEHAN
SOUTHERN OCEAN
MT. LYELL
QUEENSTOWN
STRAHAN
SCALE
8 4 0 8
SMITHTON
DEVONPORT
LAUNCESTON
QUEENSTOWN
HOBART
PORT DAVEY
HUON
Reference to Australian 4 Mile Military Maps
SCALES
0 1/4 1/2 3/4 Miles
0 2000 4000 Feet
To Renison Bell
To Renison Bell
Tunnel
11°
M.N.
T.N.
LEAD BLOCKS MINE (ABANDONED)
CUNI NORTH SHAFT
CUNI SOUTH SHAFT
VAUDEAU SHAFT
COPPER NICKEL AREA INVESTIGATED
Old Mine Tram Track
Emu Bay Railway
Main Road
Old Tram Track
To Zeehan
DEVEREAU SHAFT CU-NI PROSPECT
Kennedy
GEOPHYSICIST
GEOPHYSICAL SURVEY NEAR ZEEHAN, TASMANIA.
LOCALITY MAP OF
THE NORTH DUNDAS FIELD
COPPER-NICKEL AREA
G32-25


GEOPHYSICAL SURVEY AT NORTH DUNDAS FIELD
COPPER-NICKEL AREA, NEAR ZEEHAN, TASMANIA
SELF-POTENTIAL PROFILES
SCALES
HORIZONTAL 200 0 200 400 600 FEET
VERTICAL 100 0 100 200 300 MILLIVOLTS
GEOPHYSICIST
00 500' 1000' EAST
AL
AK
AJ
AH
AG
AF
AE
AD
AC
AB
CUNI-SOUTH SHAFT
AA
Z
Y
X
W
V
U
T
S
R
BF
BE
BD
BC
BB
TRENCH: BLACK SLATE WITH DISSEMINATED PYRITE
BA
AZ
AY
AX
AW
AV
AU
AT
AS
AR
AQ
AP
AO
AN
AM
200' WEST 00' 400' 1000' EAST
BS
BR
TRENCH: IRON-MANGANESE LODE
BQ
BP
BO
OLD PIT
BN
BM
BL
BK
BJ
BH
BG
CUNI-NORTH SHAFT DUMP
200' WEST 00 500' 1000' EAST



LEGEND

- SELF POTENTIAL CONTOURS
- BASIC DYKE
- TRENCH
- MINE SHAFT (ABANDONED)
- OLD BORE HOLE
- RAILWAY
- TRACK

GRID, GEOLOGY, SHAFTS, OLD BORE HOLES ETC., AFTER THE GEOLOGICAL REPORT OF THE TASMANIAN DEPARTMENT OF MINES, ZEEHAN BRANCH 1952, AND THE I.G.E.S. (IMPERIAL GEOPHYSICAL EXPERIMENTAL SURVEY) REPORT 1931.

GEOPHYSICAL SURVEY AT NORTH DUNDAS FIELD

COPPER-NICKEL AREA, NEAR ZEEHAN, TASMANIA

SELF - POTENTIAL CONTOURS

SCALE IN FEET

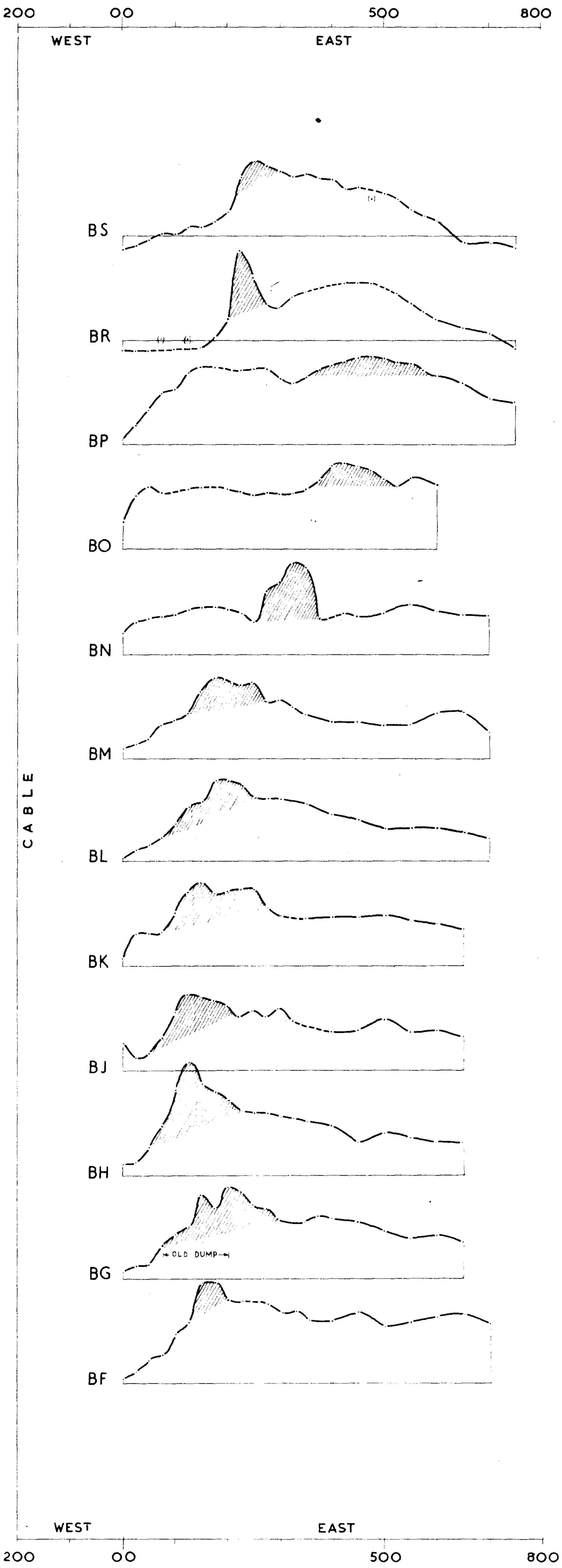
200 0 200 400 600 800

CONTOUR INTERVAL 50 MILLIVOLTS

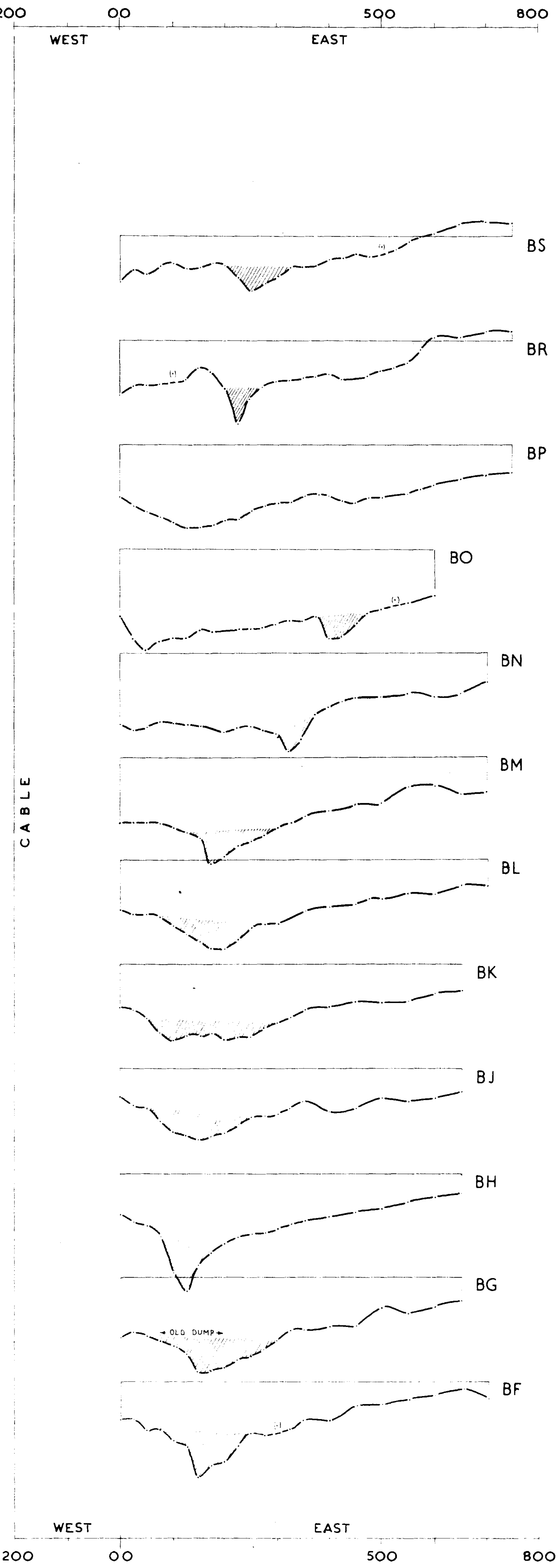
GEOPHYSICIST: [signature]

Geophysical Section, Bureau of Mineral Resources, Geology & Geophysics

PLATE 4
(SHEET 1)

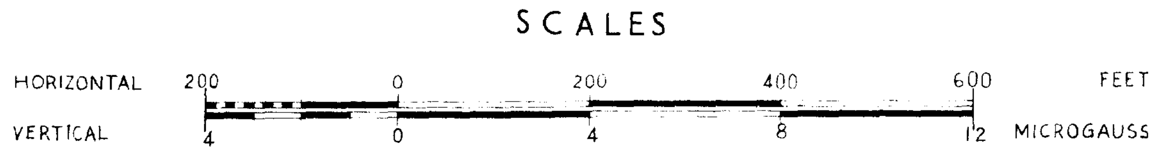


REAL HORIZONTAL COMPONENT
DATUM FOR PROFILES 5·0 MICROGAUSS



IMAGINARY HORIZONTAL COMPONENT
DATUM FOR PROFILES -1·0 MICROGAUSS

SCALES



GEOPHYSICAL SURVEY AT NORTH DUNDAS FIELD,
COPPER-NICKEL AREA, NEAR ZEEHAN, TASMANIA.

HORIZONTAL COMPONENT

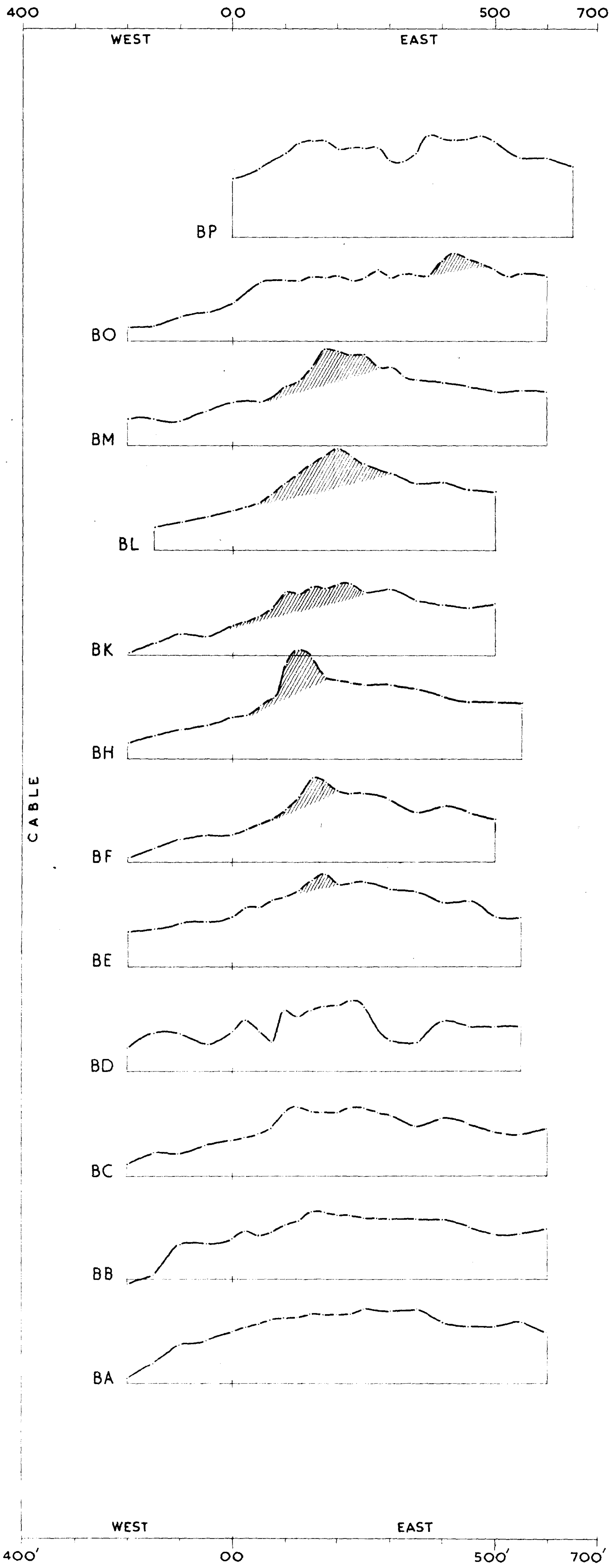
ELECTROMAGNETIC PROFILES

CUNI-NORTH AREA

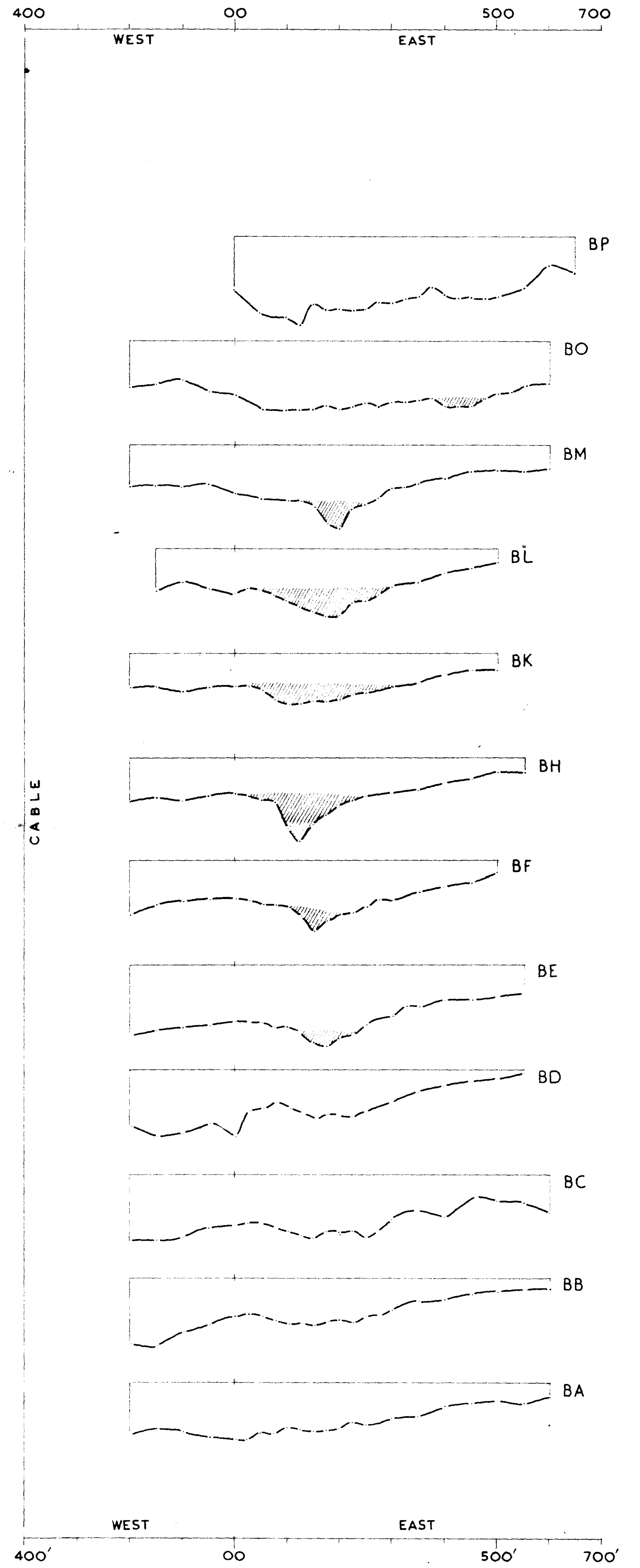
Kennedy
GEOPHYSICIST

Geophysical Section Bureau of Mineral Resources Geology and Geophysics **G32-32**

PLATE 4
(SHEET 2)



REAL HORIZONTAL COMPONENT
DATUM FOR PROFILES +4.0 MICROGAUSS



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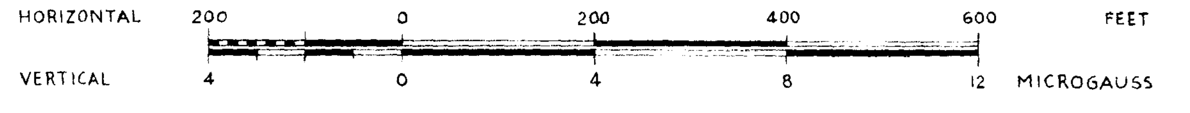
DATUM FOR PROFILES -1.0 MICROGAUSS

SCALES



GEOPHYSICAL SURVEY AT NORTH DUNDAS FIELD,
COPPER-NICKEL AREA, NEAR ZEEHAN, TASMANIA.

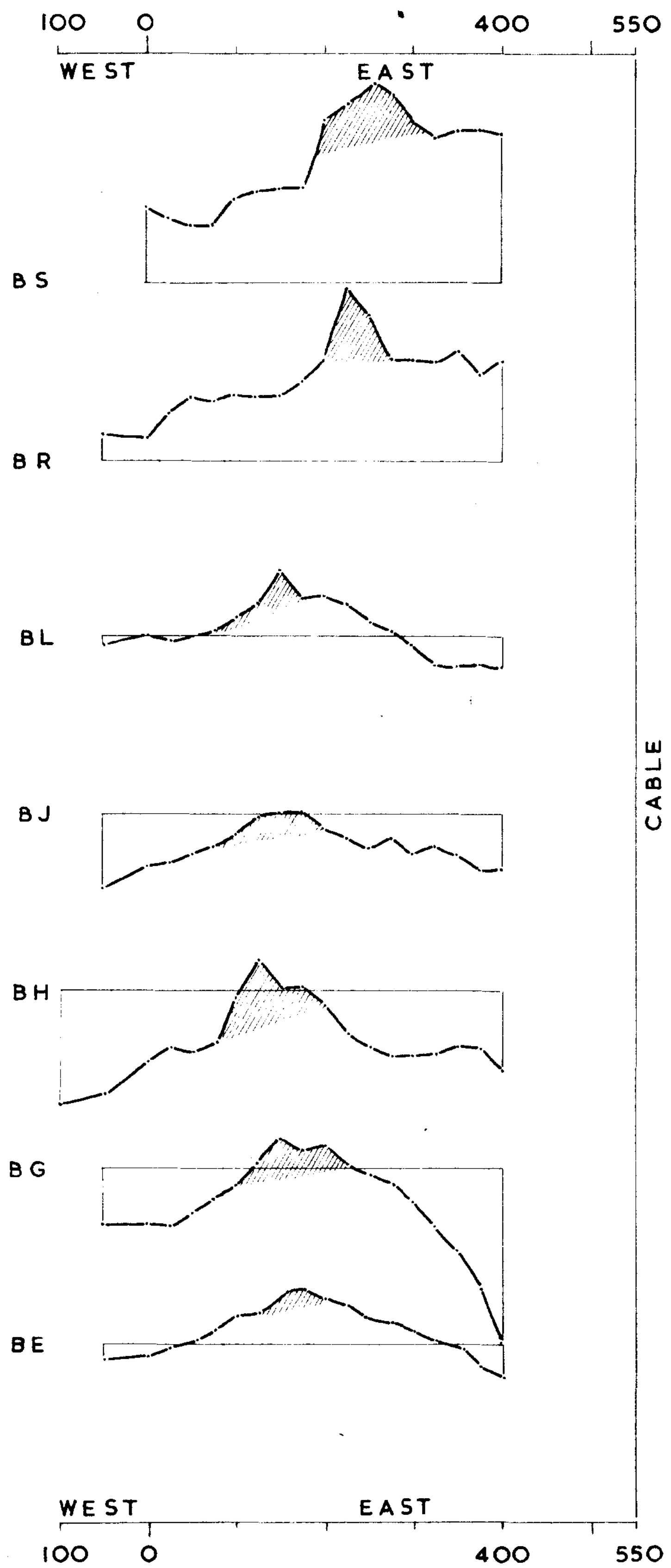
HORIZONTAL COMPONENT

ELECTROMAGNETIC PROFILES

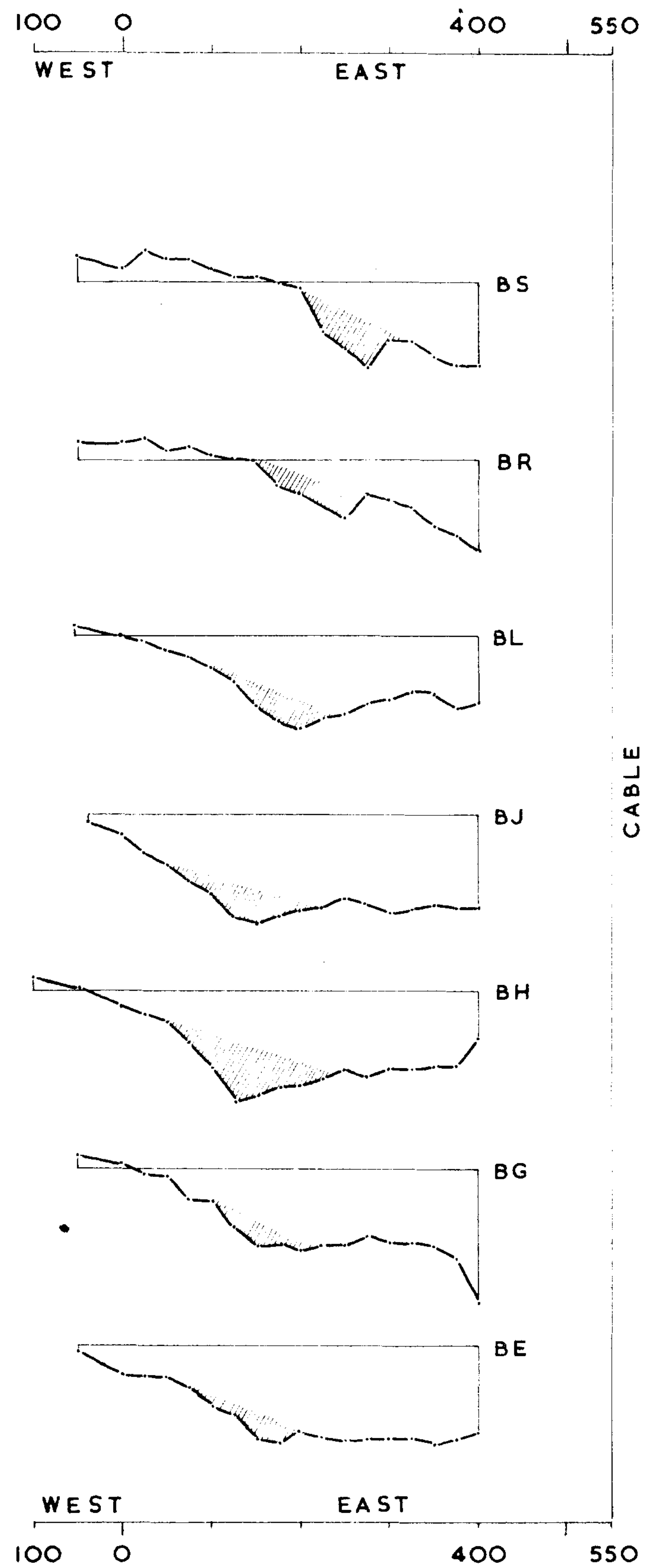
CUNI NORTH AREA

Kennedy
GEOPHYSICIST

PLATE 4
(SHEET 3)

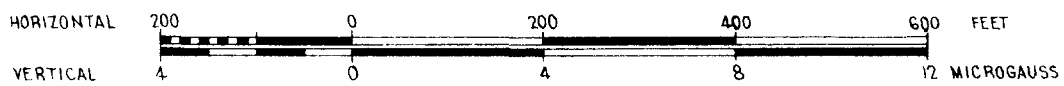


REAL HORIZONTAL COMPONENT
DATUM FOR PROFILES +5·0 MICROGAUSS



IMAGINARY HORIZONTAL COMPONENT
DATUM FOR PROFILES -1·0 MICROGAUSS

SCALES



GEOPHYSICAL SURVEY AT NORTH DUNDAS FIELD,
COPPER-NICKEL AREA, NEAR ZEEHAN TASMANIA.

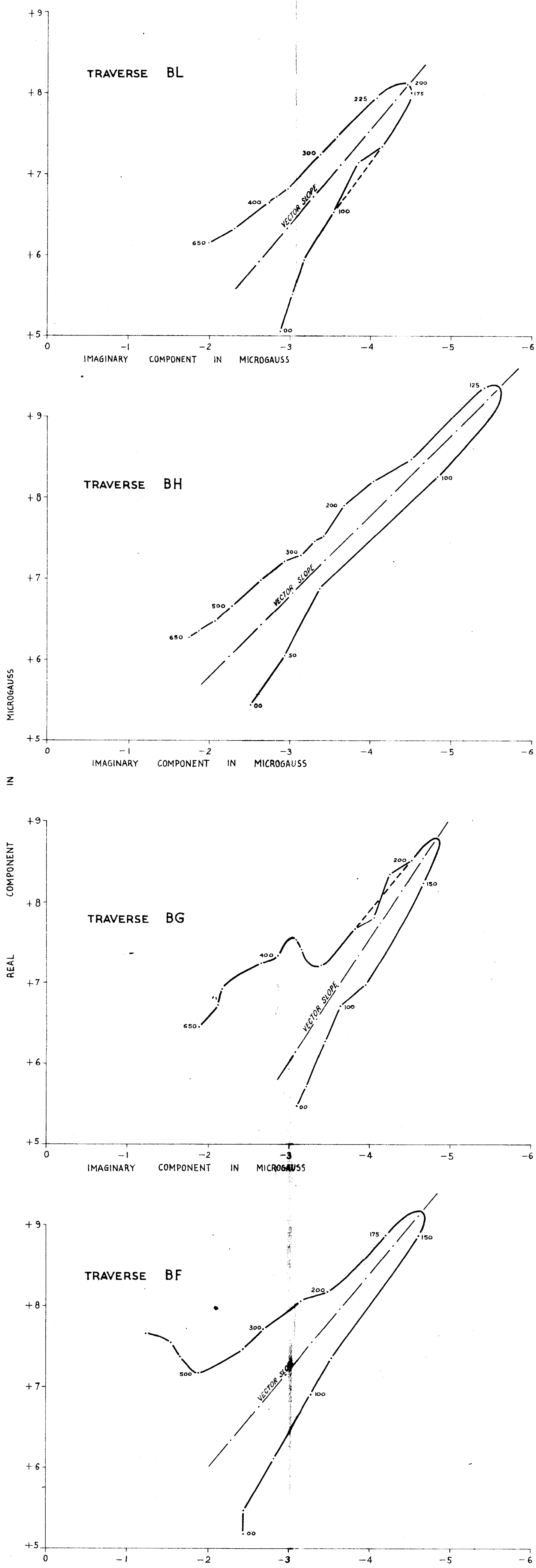
HORIZONTAL COMPONENT ELECTROMAGNETIC PROFILES
CUNI-NORTH AREA

Geophysicist

Geophysical Section, Bureau of Mineral Resources Geology & Geophysics. G32-34

PLATE 5
(SHEET 1)

CABLE AT 200′ WEST



SCALE: 1 INCH = 1 MICROGAUSS

GEOPHYSICAL SURVEY AT NORTH DUNDAS FIELD,
COPPER-NICKEL AREA, NEAR ZEEHAN, TASMANIA.

ELECTROMAGNETIC VECTOR DIAGRAMS

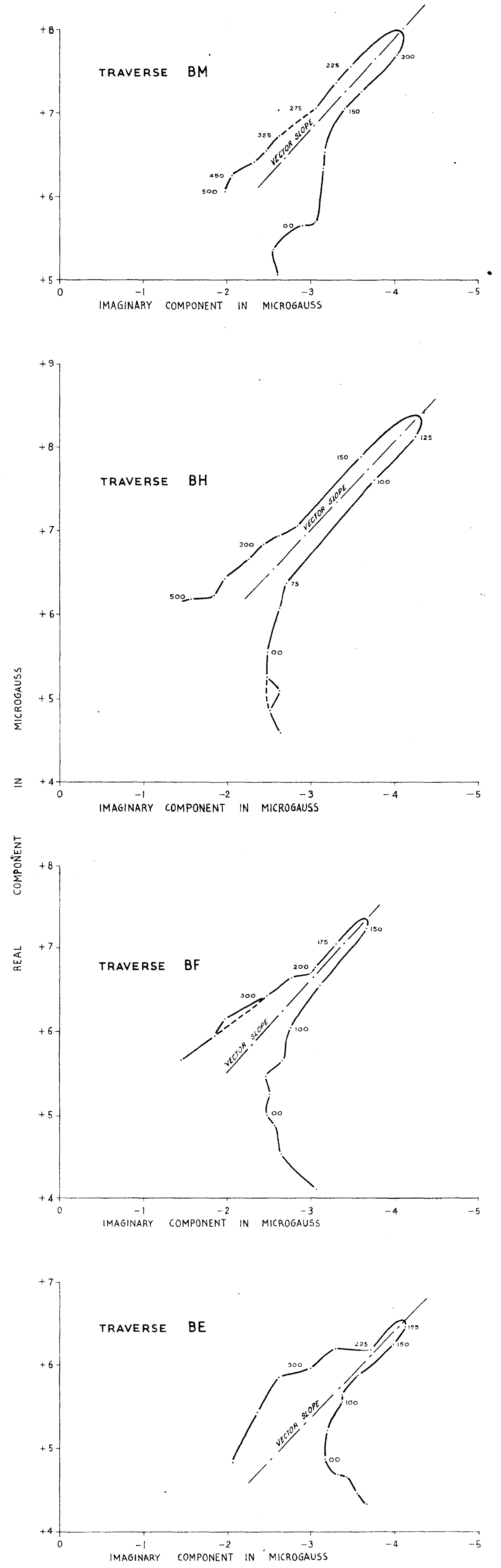
CUNI-NORTH AREA

GEOPHYSICIST: *Kenscetky*

Geophysical Section, Bureau of Mineral Resources, Geology & Geophysics G32-35

PLATE 5
(SHEET 2)

CABLE AT 400′ WEST



SCALE: 1 INCH = 1 MICROGAUSS

GEOPHYSICAL SURVEY AT NORTH DUNDAS FIELD,
COPPER-NICKEL AREA, NEAR ZEEHAN, TASMANIA.

ELECTROMAGNETIC VECTOR DIAGRAMS

CUNI-NORTH AREA

GEOPHYSICIST: *Keunecke* [signature]

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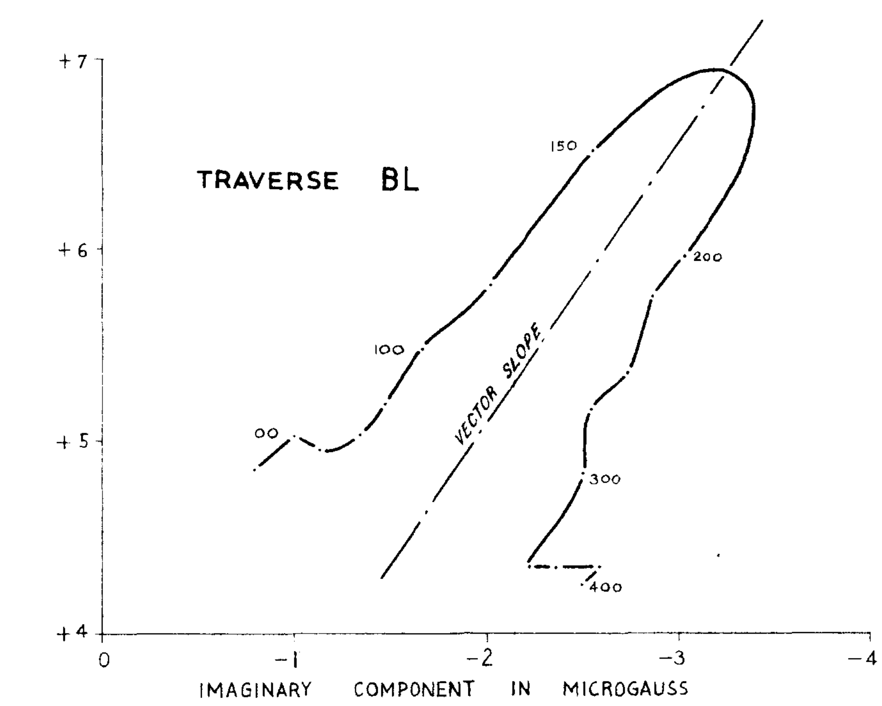
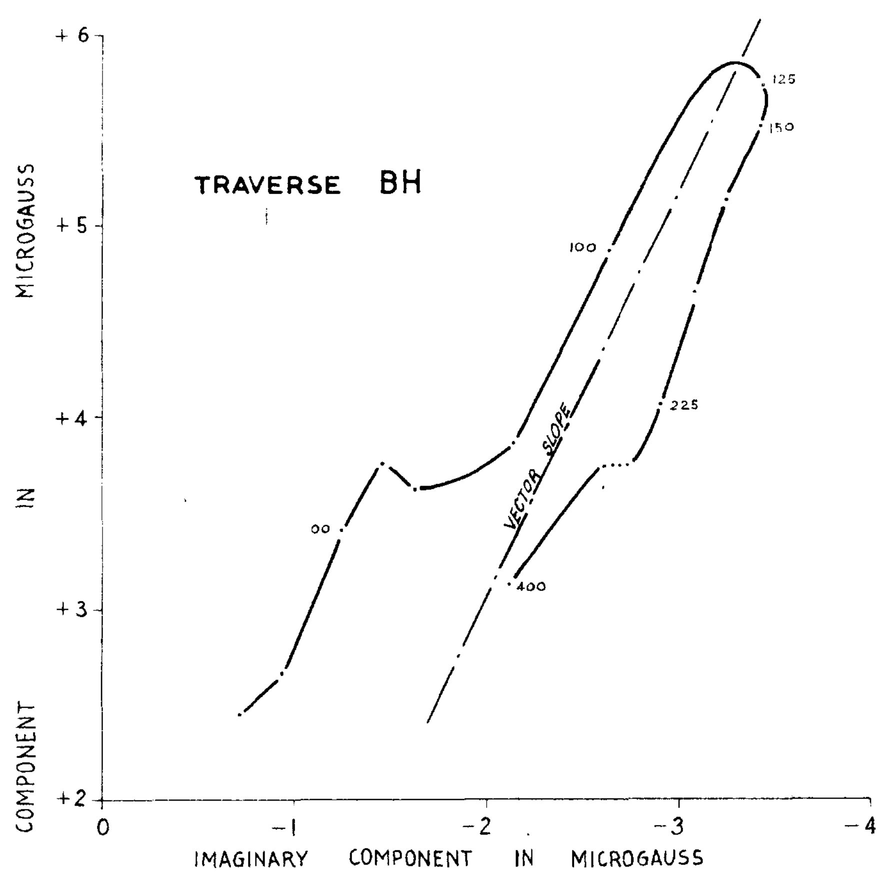
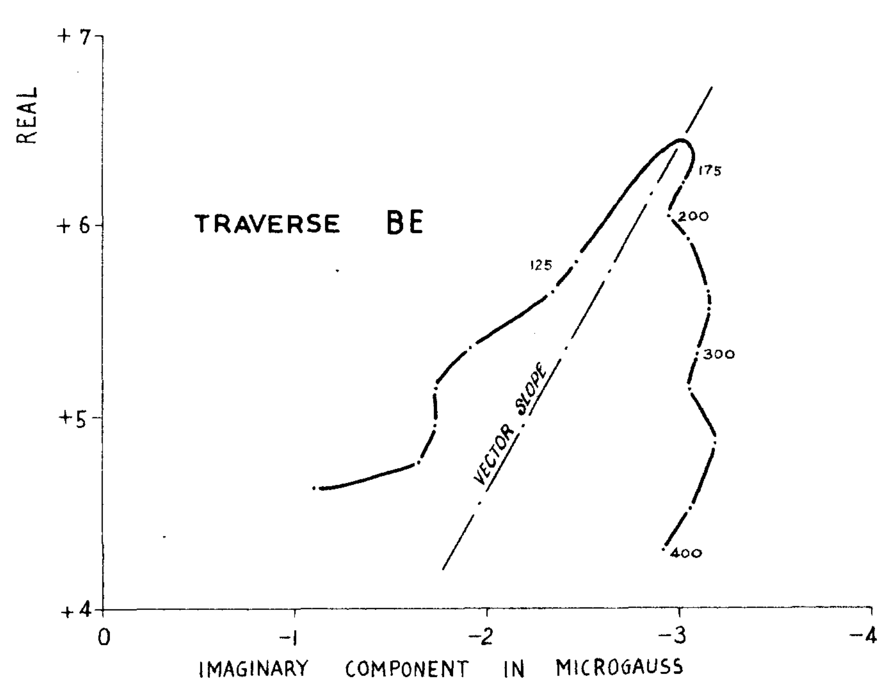
PLATE 5
(SHEET 3)

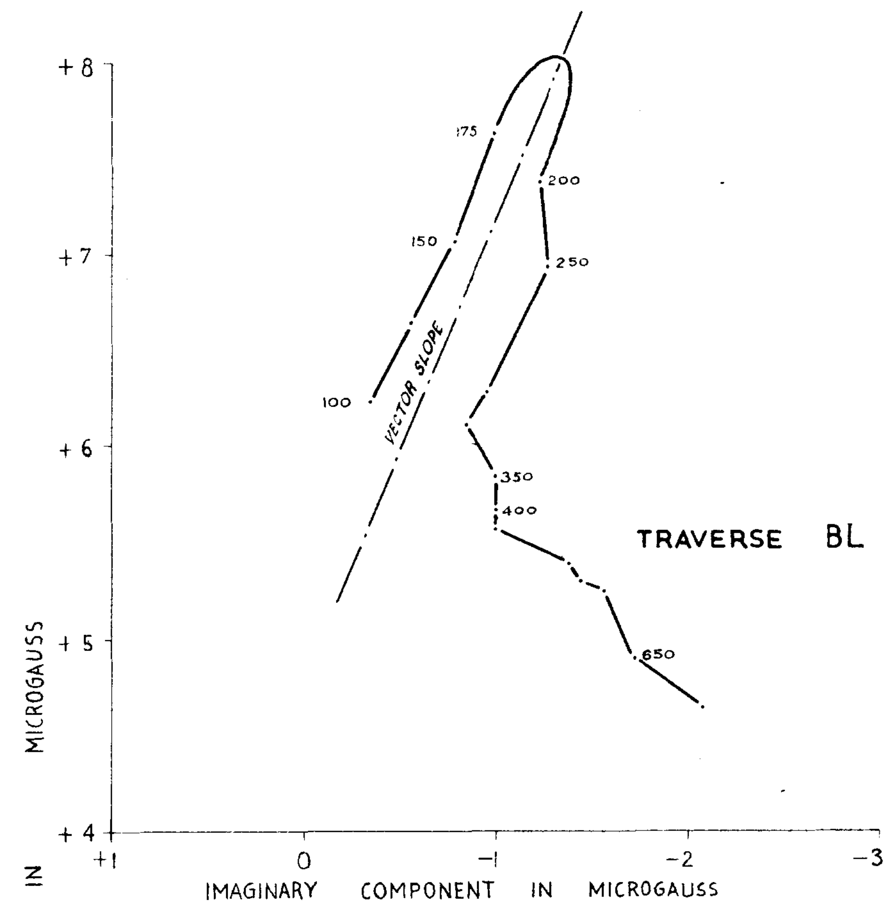
CABLE AT 550' EAST

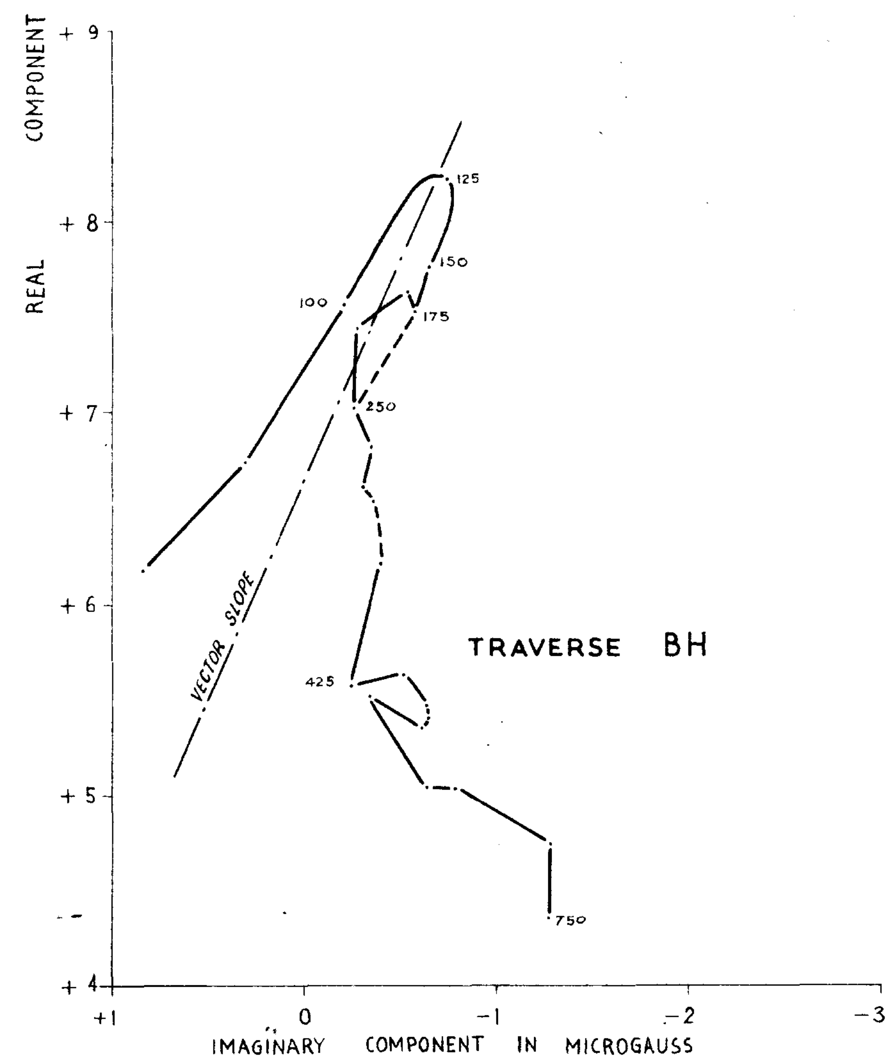






CABLE AT 1000' EAST





SCALE: 1 INCH = 1 MICROGAUSS

GEOPHYSICAL SURVEY AT NORTH DUNDAS FIELD,
COPPER-NICKEL AREA, NEAR ZEEHAN, TASMANIA.

ELECTROMAGNETIC VECTOR DIAGRAMS

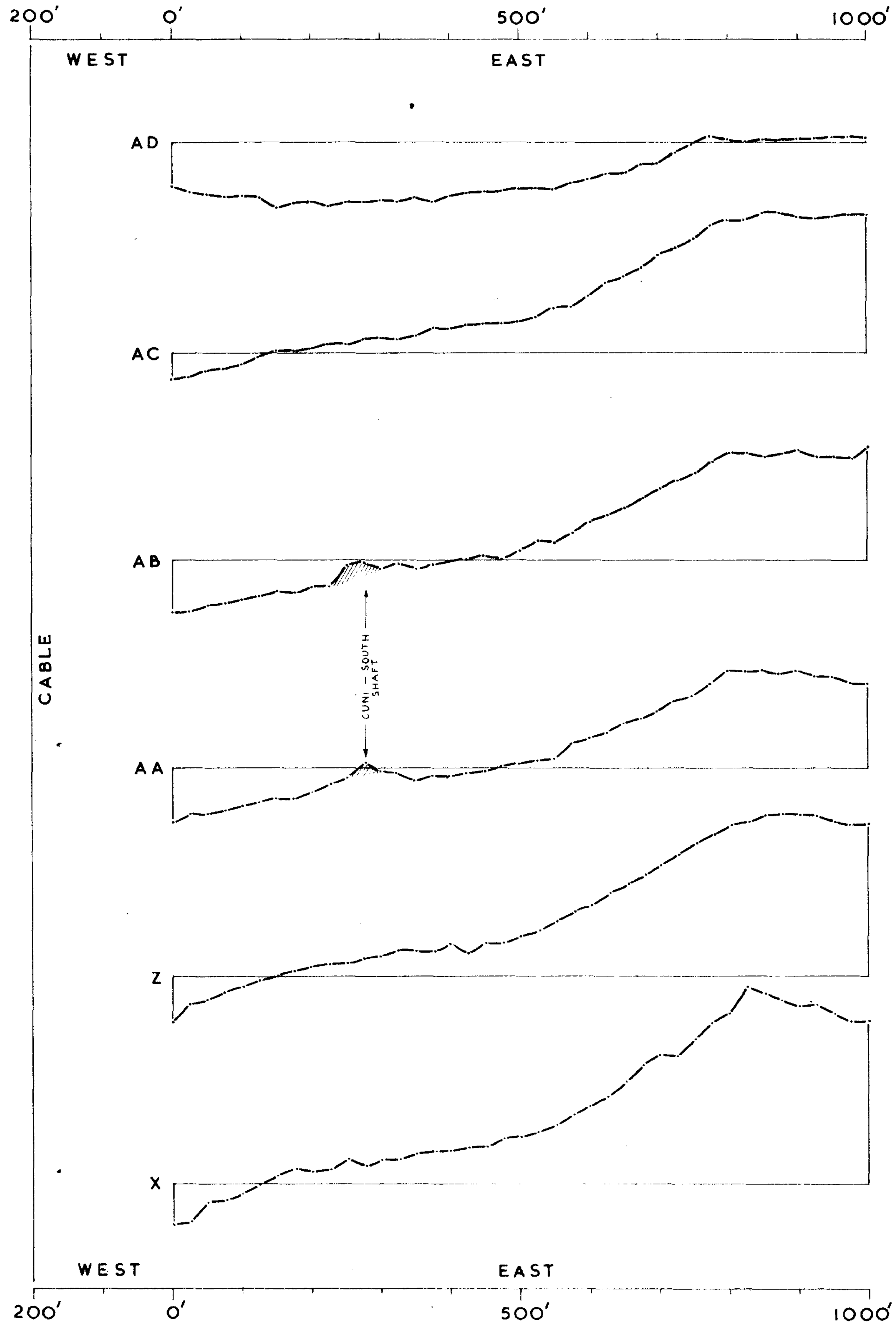
CUNI–NORTH AREA

GEOPHYSICIST: *Keith Vetter* [signature]

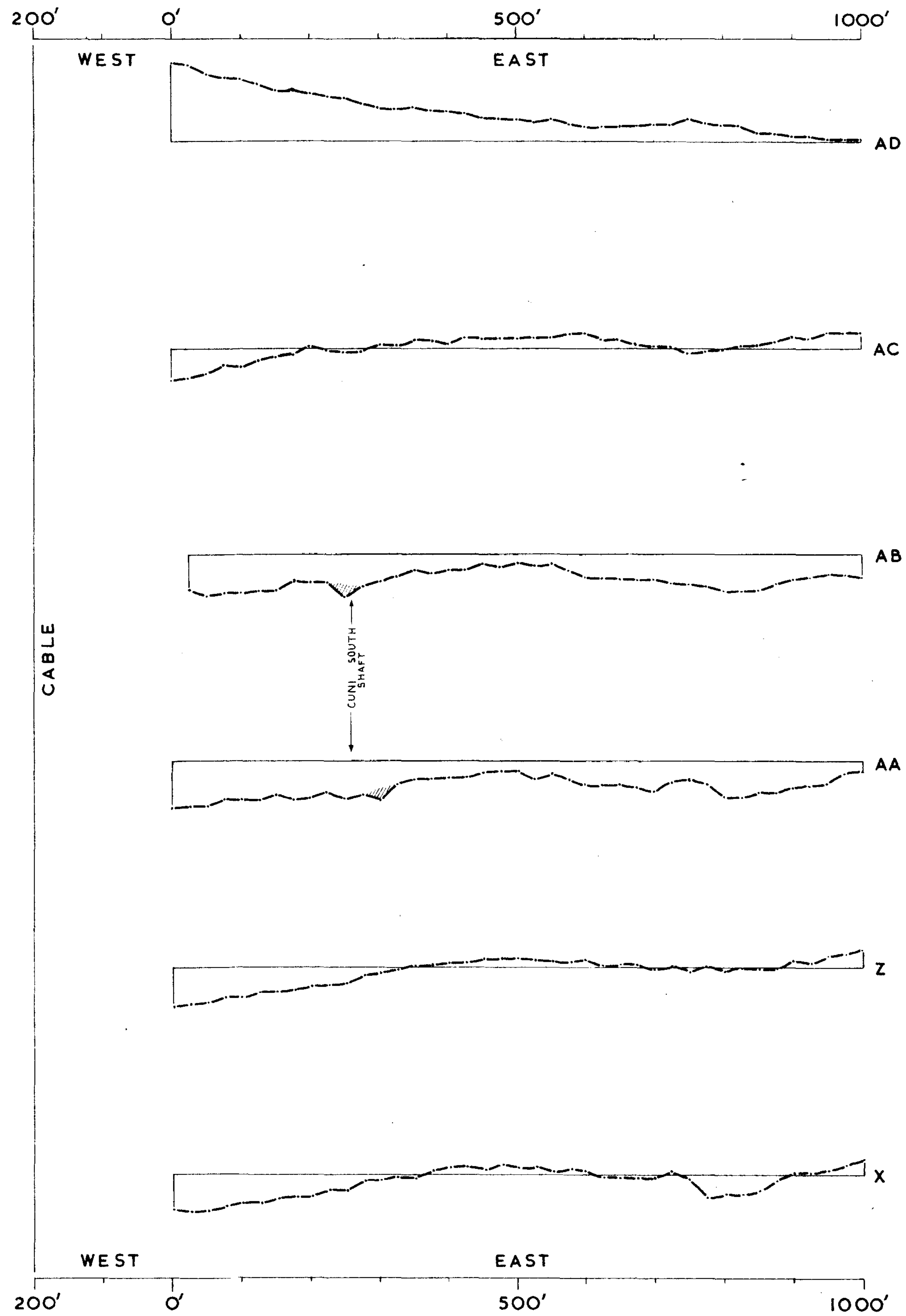
Geophysical Section, Bureau of Mineral Resources, Geology & Geophysics.

G32-37

PLATE 6



REAL HORIZONTAL COMPONENT
DATUM FOR PROFILES +5·0 MICROGAUSS



IMAGINARY HORIZONTAL COMPONENT
DATUM FOR PROFILES −1·0 MICROGAUSS

SCALES

HORIZONTAL 200 0 200 400 600 FEET
VERTICAL 4 0 4 8 12 MICROGAUSS

Kennedy
Geophysicist.

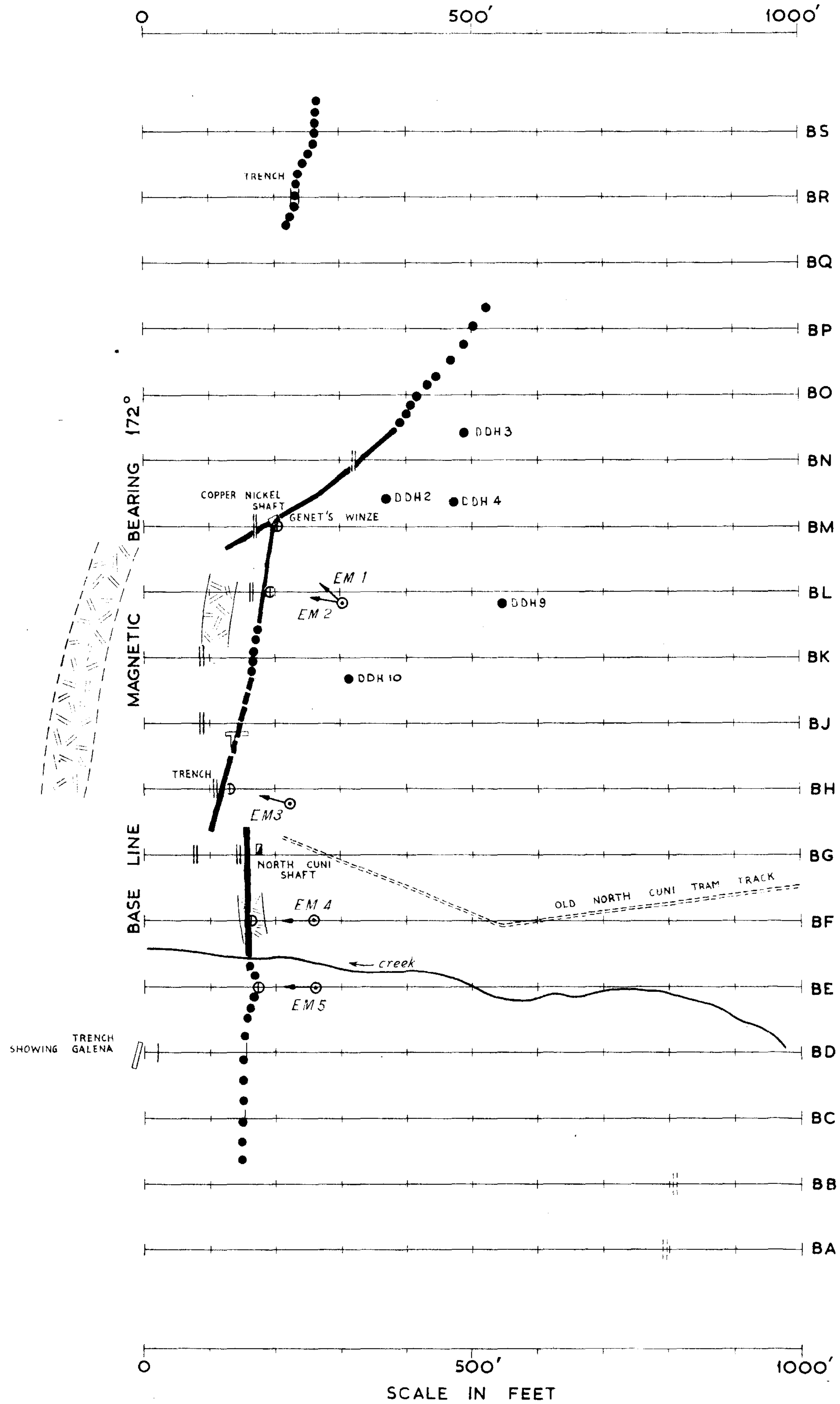
GEOPHYSICAL SURVEY AT NORTH DUNDAS FIELD,
COPPER-NICKEL AREA, NEAR ZEEHAN, TASMANIA.

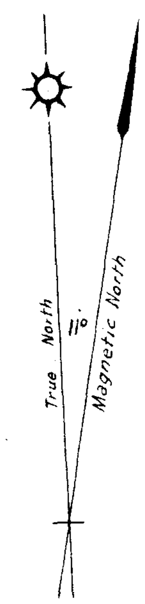
PROFILES OF THE ELECTROMAGNETIC HORIZONTAL COMPONENTS, CUNI SOUTH AREA

Geophysical Section, Bureau of Mineral Resources Geology & Geophysics G32-39

GEOPHYSICAL SURVEY AT NORTH DUNDAS FIELD,
COPPER–NICKEL AREA NEAR ZEEHAN, TASMANIA.

ELECTROMAGNETIC AND SELF-POTENTIAL RESULTS AND DRILLING TARGETS, CUNI NORTH AREA.



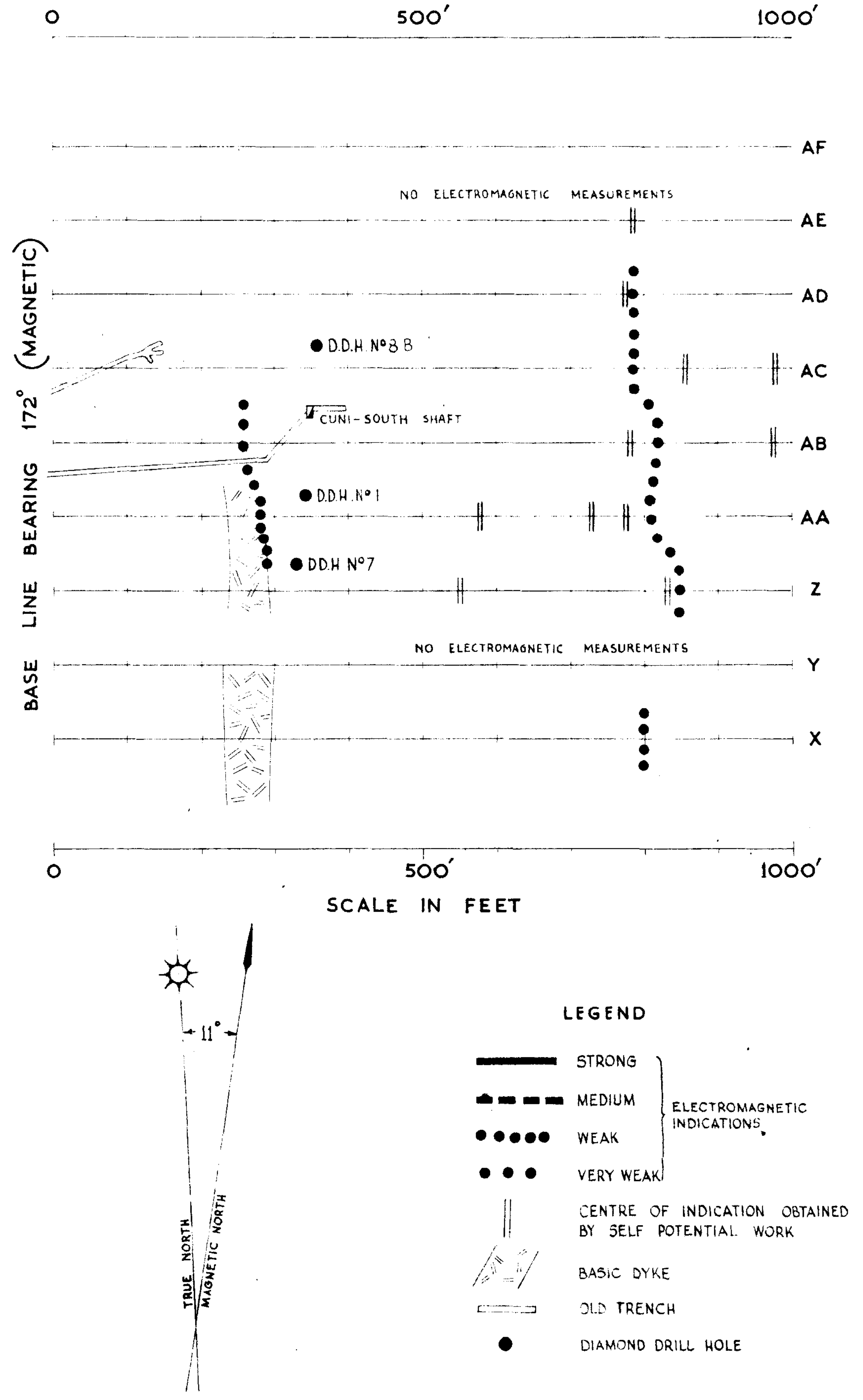


LEGEND

▬▬▬	STRONG	ELECTROMAGNETIC INDICATIONS
▬ ▬ ▬	MEDIUM	
●●●●●	WEAK	
● ● ● ●	VERY WEAK	
‖	CENTRE OF INDICATION OBTAINED BY SELF POTENTIAL WORK	
	BASIC DYKE, POSITION APPROXIMATE	
	OLD TRENCH	
●DDH	OLD DIAMOND DRILL HOLE	
⊕	TARGET POSITION	RECOMMENDATIONS
⊙	PROPOSED DIAMOND DRILL SITE	

GRID, GEOLOGY, SHAFTS, OLD BORE HOLE POSITIONS ETC., AFTER THE GEOLOGICAL REPORT OF THE TASMANIAN DEPARTMENT OF MINES, ZEEHAN BRANCH 1952, AND THE I.G.E.S. (IMPERIAL GEOPHYSICAL EXPERIMENTAL SURVEY) REPORT 1931.

J. Horvath
GEOPHYSICIST:



GEOPHYSICAL SURVEY AT NORTH DUNDAS FIELD,
COPPER-NICKEL AREA NEAR ZEEHAN, TASMANIA

ELECTROMAGNETIC AND SELF POTENTIAL RESULTS, CUNI SOUTH AREA

GEOPHYSICIST *Kennedy* [signature]

Geophysical Section, Bureau of Mineral Resources, Geology & Geophysics.

G 32-38