METALS EXPLORATION LIMITED
MT. BISCHOFF EXPLORATION LICENCE 13/79
TASMANIA
RELINQUISHMENT REPORT

REPORT No. 232001

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JUNE 1988

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SUMMARY

The major geological work conducted on EL 13/79, but outside the proposed Retention Licence of 6 km^2, consists of:-

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(2) Aeromagnetic Survey of EL 13/79

(3) Both ground magnetic and electromagnetic surveys over the Housego Grid. Diamond drill hole MBD 62 was drilled into a magnetic and electromagnetic anomaly.

(4) Magnetic Susceptibility and remanent magnetic studies were undertaken on a rock specimen from the Tertiary Basalt located to the south of the proposed Retention Licence.

1. INTRODUCTION

This report details all known exploration work conducted within the confines of EL 13/79, but outside the 6 km^2 area, currently being sought as a Retention Licence. As such, this represents the relinquishment report for EL 13/79.

2. TENEMENTS

The Exploration Licence EL 13/79 was granted on July 1, 1979 and was converted from a larger EL (5/63) which was subject to the Mt. Bischoff Joint Venture. EL 13/79 covers 20 km^2 and is bounded by the following metric co-ordinates.

5410000N to 5415000N
and 375000E to 379000E

3. GEOLOGICAL INVESTIGATIONS

The majority of the geological studies carried out in EL 13/79 occurred within the 6 km^2 area proposed for the Retention Licence (Appendix I). The significant geological/geophysical assessments outside the proposed Retention Licence consist of:-

(1) Geological mapping and ground magnetic surveys over the Northern Dolomite Area.

(2) An aeromagnetic survey over EL 13/79

(3) The Housego Grid was created (the eastern portion of which is outside the proposed Retention Licence) and subjected to both ground magnetic and electromagnetic surveys. Diamond drill hole MBD 62 was drilled into a magnetic and electromagnetic anomaly in this grid.

(4) Magnetic Susceptibility and remanent magnetic studies were undertaken on a rock specimen of Tertiary Basalt from south of the proposed Retention Licence.

3.1 Northern Dolomite Area

A grid 400 metres long and 200 metres wide was located over the Northern Dolomite and centred about 1.5 kilometres north-east of Mt. Bischoff trig. The baseline is in 090° magnetic and north-south lines were run at 40 metre intervals. Appendix II contains the ground magnetic survey and fact geology.

A Geometrics Model G 816 proton precession magnetometer was used and readings were taken every 20 metres on 40 metre spaced lines. No significant anomalies were delineated by the study and hence no further work was undertaken in the area.

3.2 Aeromagnetic Survey

An airborne magnetic survey was flown by helicopter over the whole of the Exploration area in March 1979 by Geoex Pty. Limited. A Varian 4937A proton precession magnetometer was used with a nominal aircraft survey altitude of 90 metres (i.e. sensor clearance of about 75 metres). A diurnal base station was located at Wynyard aerodrome. Flight lines were in a north-south direction about 100 metres apart. Flight line recovery control in the north-eastern corner of the area flown was poor due to the monotonous tree cover.

The major anomalies arising from this work are described below:

1. Anomaly 1 occurs on 4 flight lines and coincides with the Mt. Bischoff orebody. Total amplitude is several hundred nanotesla (~800nT) maximum. There is a much broader, weaker anomaly extending to the west, suggesting extensions at depth. This could be mapped in more detail by extending the ground magnetic survey grid. There is no apparent extension to the east, the anomaly appears to terminate between line 250 and line 240.

2-3 Anomalies 2 and 3 appear to coincide with the SW and NE extremities of a mapped zone of basalt. These anomalies are unlikely to represent sulphide mineralization. Anomaly 3 is noted on line 180 but is not apparent on line 170, although they appear almost coincident at this point. They may have been flown at different altitudes, or flight path recovery may be unreliable.

4. Anomaly 4 occurs on only one flight line (line 70), it has an amplitude of approximately 300 nanotesla and seems to be in an area free of basalt cover. It is therefore a small but possibly significant target.

5. Anomaly 5 occurs close to the basalt contact on four flight lines. It seems likely to be due to locally thicker basalt cover and therefore is unlikely to represent an important target.

6. Anomaly 6 occurs on one (possibly two) flight lines with a maximum amplitude of approximately 100 nanotesla. It is located on the edge of mapped basalt near a creek which may have been infilled to produce a local thickening of basalt. It is unlikely to be a significant target.

7, 8 & 9. Anomalies 7, 8 and 9 are primarily negative anomalies (maximum amplitude about 600 nanotesla in anomaly 8, extending across fourteen flight lines in a roughly linear zone. The zone has been dislocated to produce three apparently separate anomalies but this may be due to faulty path recovery.

This anomaly appears to have a source within (possibly due to an infilled river valley) or beneath the basalt cover. It is the most pronounced anomaly detected by this survey with the exception of the Mt. Bischoff orebody and it may represent sulphide mineralization beneath the basalt.

10. Anomaly 10 is a low amplitude feature (approximately 50 nanotesla) on only one flight line (line 200). It is well clear of the mapped basalt and close to an old Comstaff drill hole (88). It may represent a small occurrence of sulphide mineralization.

11. Anomaly 11 has an amplitude of approximately 150 nanotesla, it occurs on only one flight line (line 270) within the Waratah town boundary, and apparently within mapped basalt. The source may be cultural or a local thickening of basalt cover. It is unlikely to represent a significant target.

12. Anomaly 12 occurs on eight flight lines with a maximum amplitude of approximately 200 nanotesla. It follows a topographic high of mapped Cambrian outcrop close to the Adelaidean contact. This may be simply an altitude effect if the aircraft failed to maintain terrain clearance across the ridge - the analogue charts should be checked for altitude. The location of this feature is possibly significant and if a subsurface source can be confirmed, then it represents a target of possible interest.

13. Anomaly 13 occurs on two or three flight lines with a maximum amplitude of about 200 nanotesla. It is well within the area of mapped basalt cover and unlikely to represent a significant target.

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Conclusions

There are no other anomalies comparable with that over Mt. Bischoff within the survey area. Anomalies 4 and 10 are low amplitude features without apparent explanation and may represent small targets. Anomalies 7, 8, 9 and 12 are larger features. Anomalies 7, 8 and 9 occur within or beneath basalt cover and may simply represent an old channel infilled by basalt. Anomaly 12 occurs in mapped Cambrian outcrop and may represent mineralization at the Cambrian-Adelaidean contact.

3.3 Housego Grid

This grid was mapped and the area subjected to both ground magnetic and electromagnetic studies (Appendix IV). In addition, 25 hand auger samples were taken from around the northern edge of the Tertiary basalt cover.

3.3.1 Geochemistry

The auger samples were taken, as far as possible, from the "C" horizon. Three of the samples contained quartz porphyry chips. They are located to the north of lines 10440E to 10560E. The other samples contained either Precambrian sediments or Tertiary basalt.

The samples were sieved to minus 80 mesh and analysed for Sn (XRF) Cu, Pb, Zn, Ni (AA). The following maximum and minimum values were obtained:

	Sn	Cu	Pb	Zn	Ni
Maximum (ppm)	210	9800	1100	250	180
Minimum (ppm)	x	4	x	x	x

(x denotes below limit of detection)

Most of the higher assays came from the vicinity of Fook's Lode which is inside the Retention Licence area and hence the results downgraded the area to the north of lines 10440E to 10560E. No further work was therefore undertaken in this area.

3.3.2 Ground Magnetic Survey

A Geometrics Model G816 proton precession magnetometer was used and readings were taken every 10 metres on 40 metre spaced lines. 5.5 kilometres of survey were covered. Appendix V contains the plan of the Housego Grid ground magnetic survey and EM lines.

The survey confirmed the existence of four major anomalies, only 3 of which occur outside the Retention Licence:-

1. An anomalous zone of about 63000nT, some 80m wide, extends some 400 metres in a north westerly direction between lines 10800E and 11000E.

2. A strong anomalous zone on the northern basalt contact centred on line 10920E with peaks above 64000 nT.

3. Still further to the north, centred on line 10920E, a 30 metre wide anomaly with values up to 63700 nT. This zone is well north of the Tertiary basalt, but some basaltic rocks have been found close by.

Anomaly 1 was interpreted as being due to a thicker sequence of Tertiary Basalt in that region and therefore not prospective.

The high on line 10920E at 10600N is indicative of a shallow body (less than 10-15 metres) and is obviously not caused by basalts. The profile is relatively clear of noise supporting this interpretation - also the high gradient at around 10400N is almost certainly the basalt's limit to the north. The anomaly should be adequately tested with a jacro hole at 10580N.

The anomaly at the end of 10920E is not defined enough to be adequately modelled, but the existence of basaltic rocks nearby downgrade the anomaly as a drill target.

3.3.3 Electromagnetic Survey

Geoterrex Pty. Limited were contracted to carry out a Crone Pulse Electromagnetic survey over the Housego grid. The work was performed between 13th January, 1981 and 2nd February, 1981. Twelve lines were traversed, each 80 metres apart, using a coil separation of 60 metres and taking readings at 20 metre stations. Three and a half lines were also covered using 100 metre coil separation.

At the conclusion of the survey, an APEX MAX-MIN II (electromagnetic system frequency domain) was used to cover two lines on the Housego grid with a coil separation of 100 metres and using three frequencies (222, 888, 3555 Hz). Appendices VI - VIII contain both the Crone Pulse EM 60m spread sections and the MAX-MIN sections.

The following is A.M. Lynch's (Geophysicist, Geoterrex Pty. Ltd.) interpretation of the EM results:

Interpretation

"The most interesting anomaly on this grid (and the only anomaly occurring outside the proposed Retention Licence) occurs on line 10920E. The PEM data indicates there is a broad conductive zone just north of the edge of the

basalt plateau. The width of this broad zone exceeds the 60 metre coil spacing. At the centre of this zone there appears to be a narrow (less than 10 metres) highly conductive zone, centred at 10370N. Its attitude is subvertical, perhaps steeply dipping southwards. The moderate 7 - channel PEM anomaly implies this narrow body at 10370N is of a "massive" type sulphide. Similarly the strong anomalous response of the MAX-MIN system at this location, particularly the high IN-PHASE/QUADRATURE ratio of the 222 Hz frequency, also confirms the existence of a body of moderate conductivity at 10370N.

The MAX-MIN system has also detected a very weak conductor at about 10670N, where the corresponding PEM data indicates a "low". The source of this anomaly may be a lithological boundary, and is not considered significant.

The best indication of a strong conductor (i.e. probably massive sulphide) on the Housego grid is on line 10920E at 10370N. This anomaly may be tested by siting a drill collar near the edge of the basalt plateau at around 10330N and drilling an angle hole northwards. Should the drilling results prove to be interesting, it is recommended that the eastward and westward extension of this zone be examined using the MAX-MIN EM system".

A second interpretation of the above data was made by Mr. M. Flis, a geophysicist from CRAE Pty. Ltd.

Line 10920E: The 8 channel PEM and Max-Min anomaly occurring at 10370mN appears to have a steep northerly dip (greater than, say, 65 degrees). The fact that this anomaly occurs on the edge of the basalt is quite puzzling. The things that could cause this anomaly are:

(i) Fault or shear zone - the width of the anomaly would indicate a shear zone rather than a fault - both can cause very high conductivities.

(ii) Weathered zone due to the presence of the creek.

(iii) Topographic effect - not expected to cause an anomaly of the size seen, and

(iv) Genuine mineralization

Personally, I am not convinced that we can disregard the cause as being non-mineralogenic. Perhaps an hour on the ground at the anomaly's location could prove or refute items (i) and (ii) as a cause. If no evidence can be found as to its cause, then only drilling will give the answer - the anomaly is certainly handsome enough to justify it. A target depth of 20-30m is indicated.

The six channel PEM anomaly at 10670mN indicated a flat lying body close to surface (10-20m). The anomaly does not appear to be particularly strong and may be simply a lithology response.

A further two lines of MAX-MIN survey were subsequently run on either side of the anomaly at 10370N on line 10920E. The lines were 10880E and 10960E, and the coil separation was 100m. Mr. A.M. Lynch's (Geoterrex Pty. Ltd.) interpretation of the results was:-

"It is evident from the quadrature response that the anomaly on line 10920E at about 10370N extends along strike, intersecting both lines 10880E and 10960E. The in-phase response however, though similar on lines 10960E and 10880E, is different to that on line 10920E. The response is possibly due to a single source at 10370N on both line 10960E and line 10880E.

The coincidence of the anomalies with the steep descent off the basalt plateau may explain the distortion of the in-phase anomalies. Small variations in true horizontal separation of the coils have a significantly greater effect on the in-phase response than on the less sensitive quadrature response.

In view of the information gained from these additional two lines, the anomaly on line 10920E is re-interpreted as that due to two closely spaced very conductive sources, located at about 10360N and 10390N.

On all three lines the depth of burial is less than 50 metres from surface. On line 10920E, where the anomaly is strongest, either the depth of burial of the sources is significantly shallower or the conductivity thickness product is greater than on either of the other two lines. Of the two adjacent lines the anomaly is strongest eastwards on line 10960E. Again this may be due to a shallower depth of burial or greater conductivity thickness product than on 10880E.

The dip of the source on lines 10880E and 10960E both appear to be sub-vertical, apparently dipping northward, contrary to line 10920E. As lithological change may impose a false sense of dip, the dip direction in this case is inconclusive.

At this stage it is recommended that the source of the Em anomaly be drilled. The body has a strike length of at least 80 metres, and probably extends further eastwards. The source of the anomaly on line 10920E appears to be 2 sheet-line sub-vertical bodies about 30 metres apart. One of these bodies extends eastward and westward to intersect lines 10960E and 10880E both at approximately 10370N.

As recommended in the initial report, a drill site on line 10920E at about 10330N, drilling an angle hole northwards, would test the source of this anomaly".

Mr. M. Flis' interpretation is presented below:-

"I would like to make a few comments on the additional Max-Min work that was carried out on the Housego Grid recently.

1. I do not believe that the anomaly encountered on line 10920E at 10370N on the previous Max-Min and PEM surveys extends to lines 10880E and 10960E. You will notice that on these two lines the quadrature anomalies have been significantly reduced in amplitude thus indicating either a degradation of the conductive zone along strike or the absence of such a zone altogether, in which case the observed anomalies have no or very little in-phase response associated with them. I would suggest the latter interpretation to be possibly the more correct one.

2. I am not at all clear why Geoterrex suggested a twin conductor situation. The in-phase channel may suggest it but, as is obvious, this channel is particularly noisy on these two lines and it would thus be presumptuous to make such a statement".

As a result of the above interpretational differences, a diamond hole was drilled.

3.3.4 Diamond Drilling

Diamond drill hole MBD 62 (64m vertical depth) was drilled on 10920E. The hole intersected Tertiary basalts and then went into Cambrian sediments. Appendix VIII contains the cross-section through 10920E and details the lithologies intersected by MBD-62.

M. Flis considered that MBD-62 was not drilled deep enough to test a sub-basaltic source. The possible presence of a localised thickness of (saturated?) basalt due to an old valley could cause an EM anomaly but not the amplitude seen here. In his opinion, the only way in which the situation can be resolved is to put in a steep to vertical hole drilled into basement. He drew the conclusion that the budget most probably could not afford such a hole. He was correct.

4. MAGNETIC SUSCEPTIBILITY AND NRM STUDIES

Samples considered to be representative of the various lithologies exposed at Mt. Bischoff were collected by CSIRO at 10 sites in March 1979. In addition, 4 crudely oriented block samples of Tertiary basalt from south of Mt. Bischoff were sent later by Mike Porter and were designated MB11A-D (site 11) and these are the only rock types collected outside the proposed Retention Licence.

Remanence and susceptibility anisotropy were measured on a Digico spinner magnetometer system and bulk susceptibility values were determined on a low frequence (211 Hz) transformer bridge.

The site localities are listed in Table I and the magnetic parameters in Table II and III.

It is clear that of the lithologies sampled, only the massive sulphides and the Tertiary basalt are strongly magnetic. All other rock types are non-magnetic (quartzite, quartz-feldspar porphyry) or weakly magnetic (pyrrhotite bearing dolomite). Possible sources of magnetic anomalies appear therefore to be restricted to massive pyrrhotite rocks and basalt. Of these, the massive pyrrhotites are more intensely magnetised and overall are probably of normal polarity, whereas the basalt is reversely magnetised. This gives rise the expectation that sulphide mineralization at shallow depth should be detectable underneath the basalt flows in the region.

TERTIARY BASALT (SITE II) - The samples submitted by CRA were somewhat weathered and were thought likely to produce suspect results. However, all specimens drilled from the blocks were found to have downward pointing remanence vectors with declinations, determined from the rough orientations supplied, mostly being consistent with reversed polarity. Scatter was small within samples despite variation of degree of weathering.

Thus the results indicate reversely polarised NRM with a Koenigsberger ratio of around 11, implying that the basalts should produce negative anomalies.

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The high Koenigsberger ratio, which is associated with high stability, is due to the dominance of single domain particles due either to rapid chilling or else weathering of initially larger grains leaving only a small unoxidised core. These single domain grains have very high coercive force and the remanence is extremely stable to AF cleaning, losing only half the NRM intensity in a peak field of 1,000 Oersteds.

Thermal demagnetisation confirms the observation based on AF cleaning that there is only one stable component present up to the maximum blocking temperature of 450°C.

Thermomagnetic analysis indicates the presence of a single magnetic mineral with Curie temperature approximately 570°C corresponding to nearly pure magnetite containing less than 2% ulvospinel in solid solution.

Variations of physical properties from specimen to specimen appear to reflect the degree of weathering, with the freshest specimens being most magnetic. It is believed that the unweathered basalt is fairly homogeneous and bears an average nett magnetisation of around 8,000 micro-Oersteds (800 gammas) with reverse polarity. Because the rocks are relatively young and significant overprinting is unlikely, the expected direction of magnetisation can be derived from the known palaeopole position at the time of formation.

Assuming an age of 20-25 million years B.P., the pole position (75°S, 99°E) gives direction (197°, + 67°) which is within 5° of the present field if reversed.

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TABLE I

	Locality	Grid Co-Ordinates	Rock Type
Site 1	Gossan Face	1980 N, 960 E	Dolomite/Massive sulphide contact
Site 2	Track to Slaughter-yard Face	2050 N, 860 E	Quartzite
Site 3	Slaughteryard Face	2110 N, 1040 E	Massive pyrrhotite
Site 4	Slaughteryard Face adjacent to porphyry	2120 N, 1070 E	Massive pyrrhotite partly enclosed by porphyry
Site 5	Western dyke, Slaughter-yard Face	2060 N, 1100 E	Quartz-feldspar porphyry
Site 6	Western dyke, Slaughter-yard Face	2060 N, 1115 E	Quartz-feldspar prophyry
Site 7	Stanhope dyke	2040 N, 1300 E	Quartz-feldspar porphyry
Site 8	Adjacent to Desert Face and Brown Face	2120 N, 1260 E	Quartzite
Site 9	Between Pig Flat and Happy Valley	1840 N, 1160 E	Dolomite
Site 10	Allen's workings	1775 N, 1015 E	Dolomite
Site 11	South of Mt Bischoff	-	Tertiary basalt

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TABLE II

Samples	Rock type	No. of specimens	Average susceptibility (emu x 10^{-6})	Susceptibility range (emu x 10^{-6})	Average NRM intensity (Oe x 10^{-6})	NRM intensity range (Oe x 10^{-6})	Average Koenigsberger ratio (H = 0.63 Oe)	Koenig ger ra rang
*MB1A-B	Mineralized dolomite	3	490	290-890	5,010	390-14,070	10.1	2.1-2
*MB1C-D	Massive pyrrhotite	4	5,900	2,990-8,040	5,390	4,420-6,450	1.7	1.2-2.
*MB2A-B	Quartzite	2	5.5	3-8	2	1-3	0.8	0.2-1.
*MB3A-D	Massive pyrrhotite	8	8,730	6,640-9,930	17,480	14,140-20,950	3.2	2.9-3
*MB4A-D	Massive pyrrhotite	8	23,070	12,950-30,120	41,160	16,670-64,220	2.8	1.9-3.
*MB5A-B	Quartz-feldspar porphyry	4	2	0-3	2	1-3	-	-
*MB6A-B	Quartz-feldspar porphyry	3	0	0	2	2-3	-	-
*MB7A-F	Quartz-feldspar porphyry	12	0	0	10	1-32	-	-
*MB8A-E	Quartzite	9	2	0-4	1	0-2	-	-
*MB9A-B	Dolomite	3	194	193-195	3	2-6	0	0
*MB10A-E	Dolomite	6	9	7-11	2	0-6	0.3	0-1.
*MB11A-D	Basalt	12	600	380-990	3,740	2,890-7,030	10.9	5.3-1

Notes:

(i) Susceptibility and remanent intensity values have been corrected for demagnetisation assuming emu demagnetising factors $N_x = N_y = N_z = 4\pi/3$ for the pseudo-spherical specimens.

(ii) Koenigsberger ratio = Remanent magnetisation/Induced magnetisation = NRM/(Susceptibility x Earth's field)

TABLE III

Locality	Site 1	Site 3	Site 4
Sun-compass orientation	MB1A-B Yes MB1C-D No	Yes	No
Mean NRM Direction α_{95}	(265°, -12°) 44°	(36°, -41°) 7°	(176°, -23°) 11°
Mean AF Cleaned Direction α_{95}	(249°, -13°) 55°	(31°, -49°) 11°	(18°, -61°) 14°
Bedding Pole	(290°, $+45^\circ$)	-	-
Magnetic Foliation Pole α_{95}	(301°, $+31^\circ$) 35°	(339°, $+67^\circ$) 15°	(285°, $+60^\circ$) 38°
Mean NRM Direction Corrected to Palaeohorizontal	(265°, $+13^\circ$)	(19°, $+7^\circ$)	(207°, -27°)
Mean AF Cleaned Direction corrected to Palaeohorizontal	(250°, $+7^\circ$)	(10°, $+4^\circ$)	(318°, -27°)

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Notes:

(i) Directions are expressed (declination, inclination) with inclination defined positive downwards.

(ii) α_{95} is the half-angle of the 95% cone of confidence, i.e. the true mean direction has 95% probability of lying closer than α_{95} to the sample mean direction.

(iii) The bedding and magnetic foliation poles are defined as the downward directed normals to the bedding and magnetic foliation planes respectively. For the purpose of correcting remanence directions for post-acquisition tilting or folding, the magnetic foliation plane is interpreted as corresponding to the palaeohorizontal.

(iv) Present Earth's field direction is (13°, -72°). Dipole field direction is (0°, -60.4°).

5. CONCLUSION

The above studies represent the major geological work conducted within EL 13/79, but outside the proposed Retention Licence area of 6 km^2.

E.L. 13/79

AREA APPLIED FOR

MOUNT BISCHOFF TRIG
RL 783.80

WARATAH

To MURCHISON HIGHWAY

AIRSTRIP

HOUSEGO GRID

N BROOKS GRID

373,000m E
375,000m E
1000m W
377,000m E
5000m E
379,000m E
5000m E
381,000m E
6000 m N
5,414,000 m N
4000 m N
3000 m W
5,412,000 m N
2000 m N
5,410,000 m N
0.0

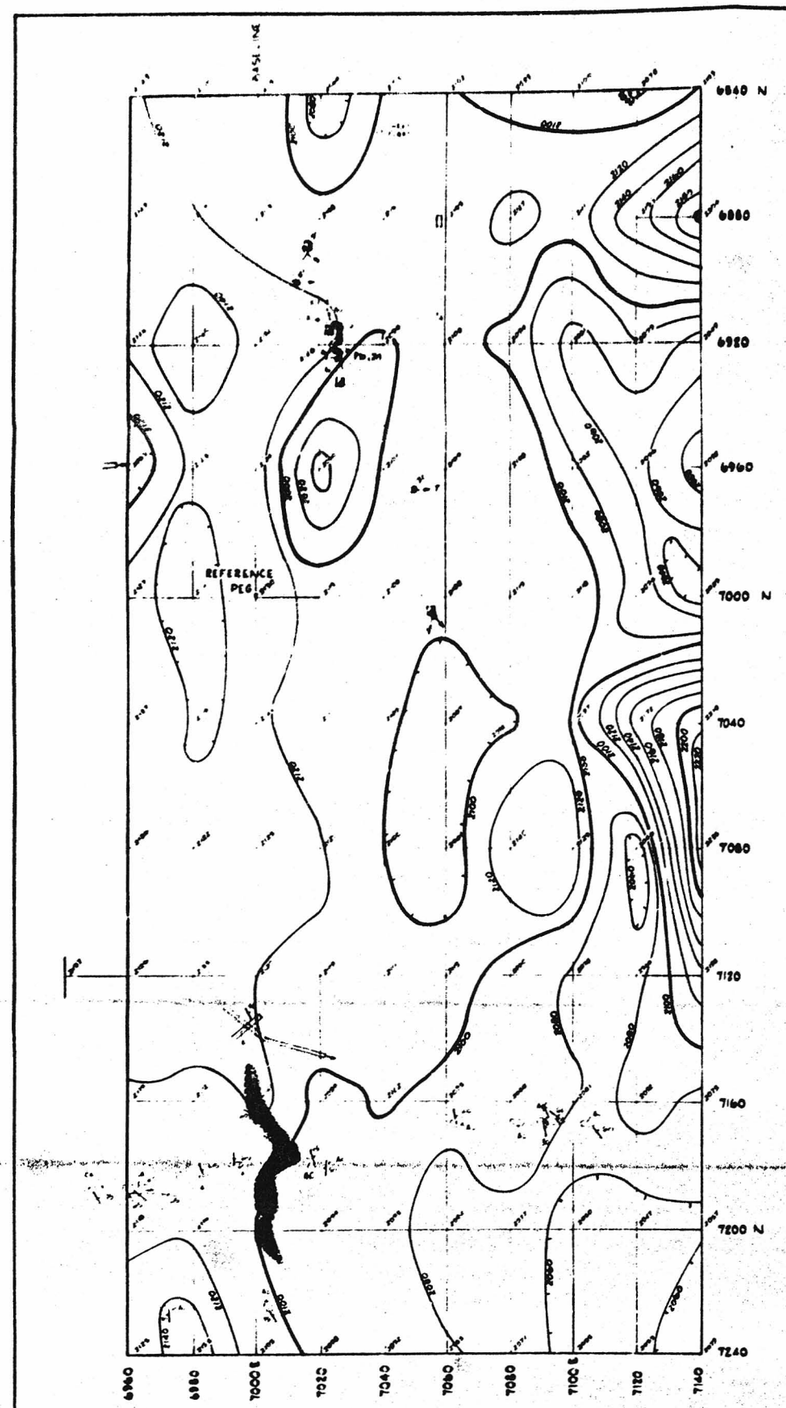
5 cm

88-2827

764035

METALS EXPLORATION LTD.				MOUNT BISCHOFF		7750
REVISIONS				DATE- 18-6-82	RETENTION LICENSE AREA APPLIED FOR	DRAWING NUMBER
DRAWN	DATE	DRAWN	DATE	SCALE- 1:10,000		MI-004-LA
				DRAWN- R.J.R.		

764018

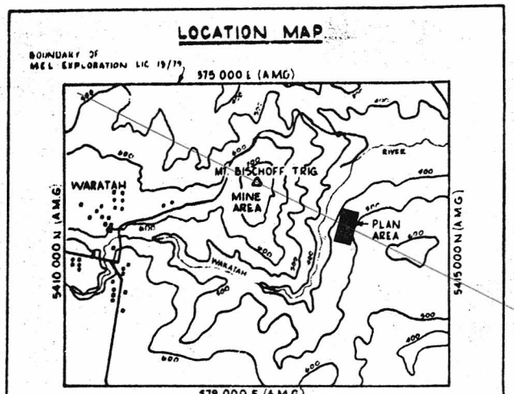


GRID NORTH FOR NTH DOLOMITE AREA IS MAGNETIC NORTH. GN

5 cm

DRAWN - M.W

LOCATION MAP



CONTOURS OF TOTAL MAGNETIC INTENSITY.
CONTOUR INTERVAL 20 GAMMAS. ADD 60,000 GAMMAS TO ALL READINGS TO OBTAIN MEASURED VALUE OF TOTAL MAGNETIC INTENSITY

DOLOMITE

QUARTZITE

ARGILLITE

CARBONACEOUS ARGILLITE

ARGILLITE AND CARBONACEOUS ARGILLITE

ARGILLITE AND QUARTZITE

BC BLUE AND BLACK CHERT

STRIKE AND DIP OF BEDDING

TUNNEL PORTAL AND DIRECTION

SHAFT

GEOLOGICAL BOUNDARY

THE LOCATION OF REFERENCE PEG IS FROM COMSTAFF PLAN SHEET 7, DRG No TAS-7-67, IT HAS APPROX A.M.G CO-ORDINATES OF 5415 726 m N AND 376 945 m E

NORTHERN DOLOMITE AREA GRID IS DIFFERENT FROM MEL GRID (MINE AREA)

METALS EXPLORATION LIMITED

MT. BISCHOFF TIN PROSPECT

"NORTHERN DOLOMITE" AREA

(7)

GROUND MAGNETIC SURVEY AND FACT GEOLOGY

MAGNETIC SURVEY BY D BARREL USING GEOMETRICS G-816, PROTON MAGNETOMETER, LATE AUGUST 1979.

GEOLOGY FROM COMSTAFF PLAN, SHEET 7 AND 10

DATE 21-9-79 SCALE 1:1200 DRG. No. 79-295

88-2827

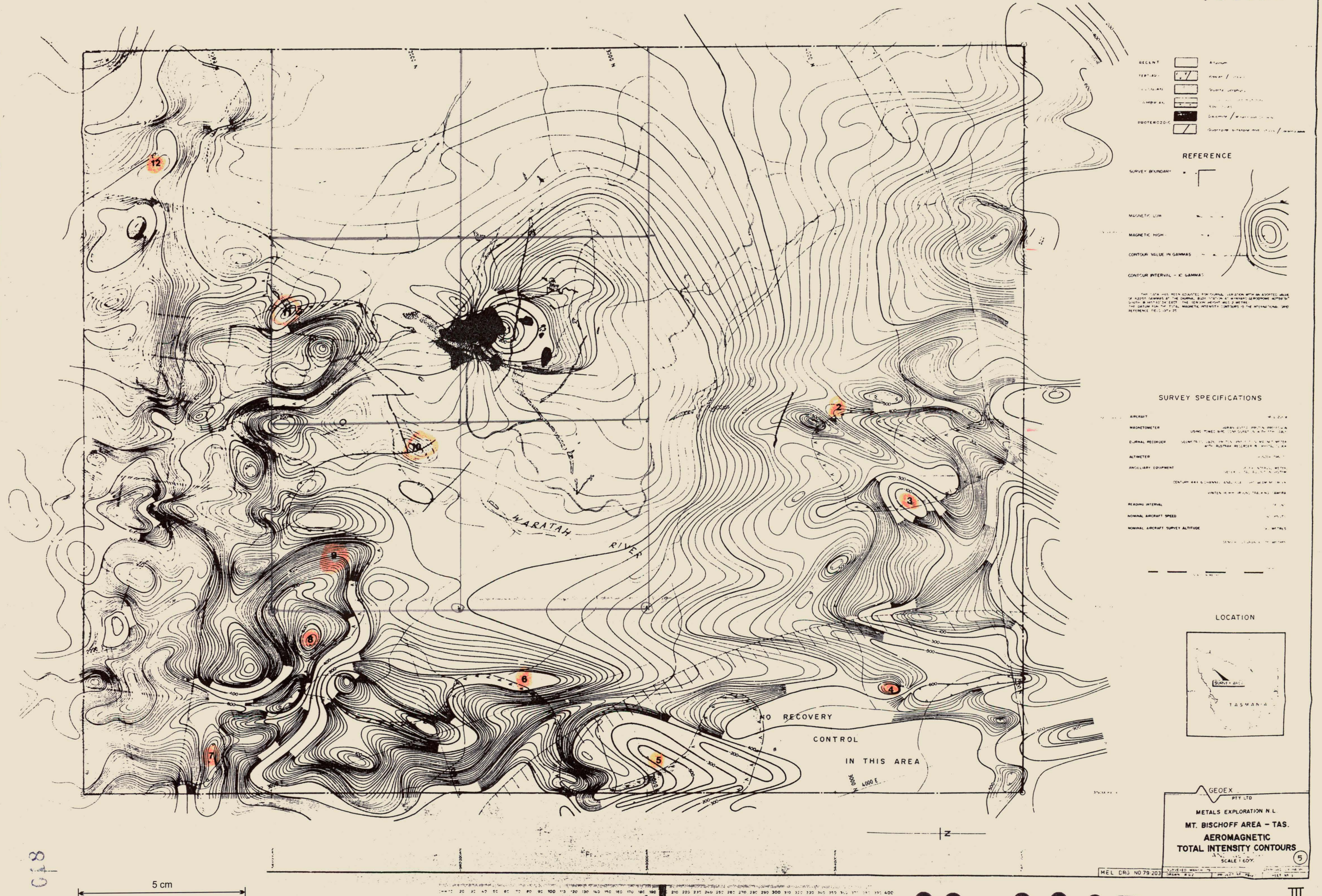
II

017

0mm 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400

Radian METRIC GERMANY

764019



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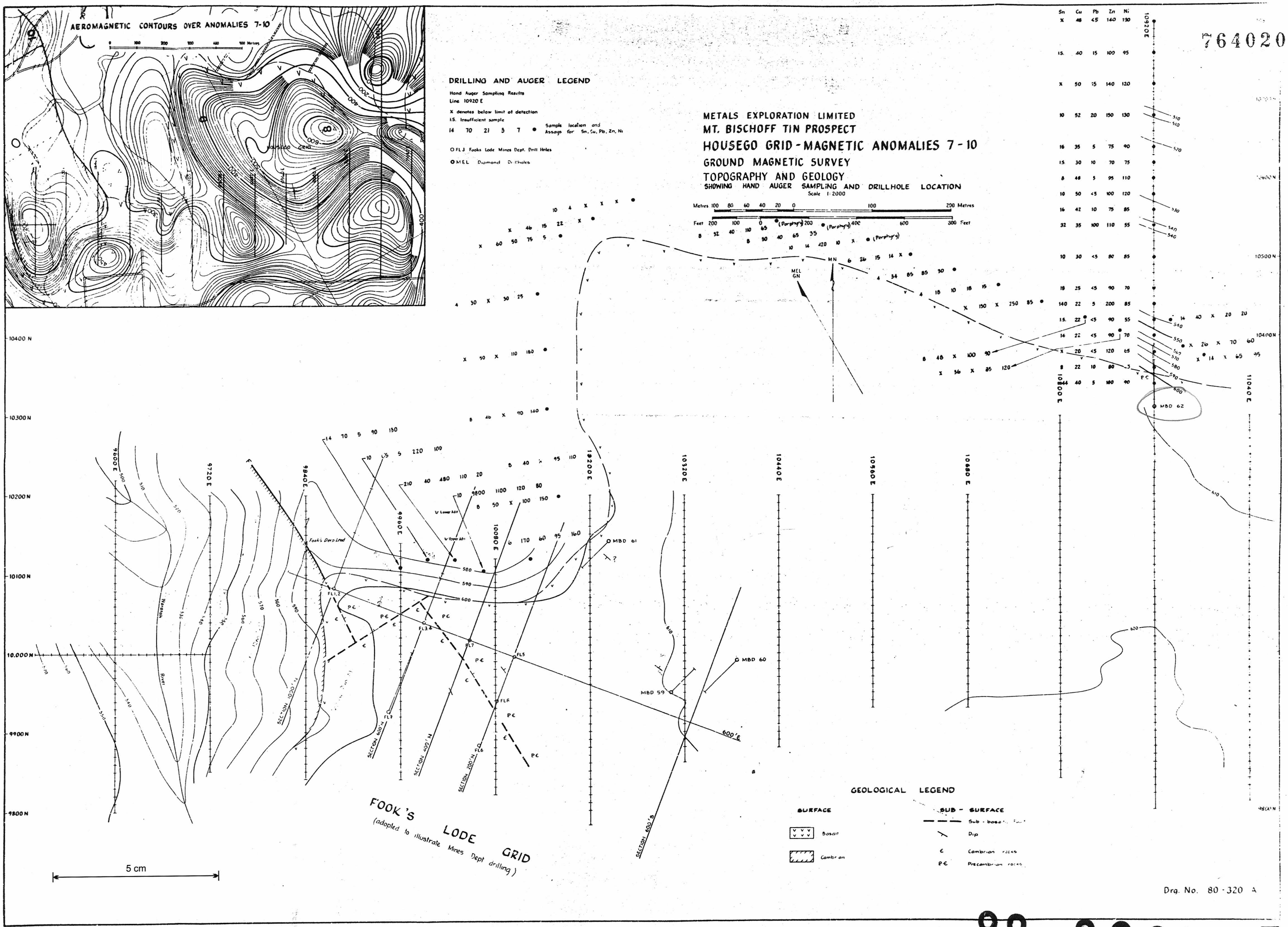
III

764020



619

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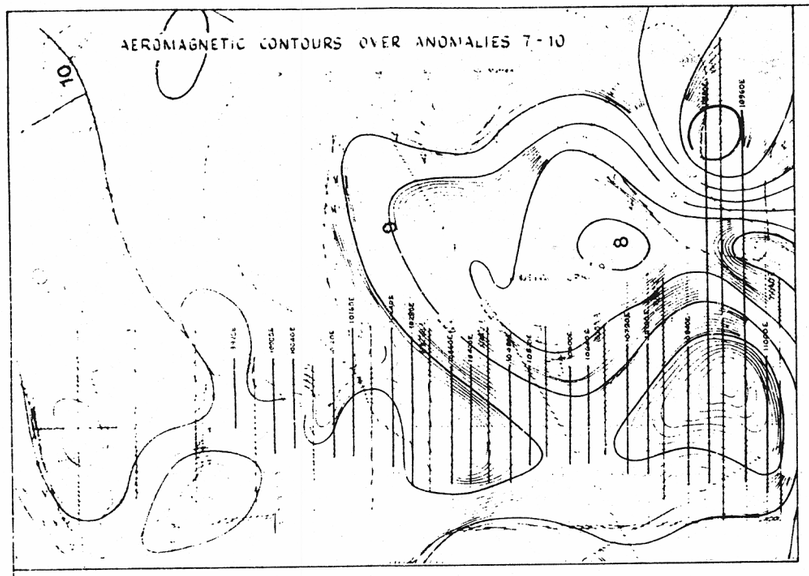
IV

542(2) 1095 FR2 [illegible] V



Survey by R. de Cesare using G-816 Magnetometer SN 6264
Readings every 10m on 120m spaced lines.

V - Variable - not repeatable within 20-30γ so readings averaged.
NR - no reading, dangerous ground, or steep slopes, or near scrap iron.

To all values add 60 000γ.

Fill in lines - Dec 60
for previous results see dwg no. 80-321

Covered by survey

1000 E

Lines covered by Crone Pulse E.M (and/or max./min)

5 cm

METALS EXPLORATION LIMITED
MT. BISCHOFF TIN PROSPECT
HOUSEGO GRID - MAGNETIC ANOMALIES 7, 8 & 9
GROUND MAGNETIC SURVEY
TOTAL MAGNETIC INTENSITY READINGS

Scale 1:2000

Metres 100 80 60 40 20 0 100 200 Metres
Feet 200 100 0 200 400 600 800 Feet

MILLIGN

10300 N
10200 N
10100 N
10000 N
9900 N
9800 N

9600 E 9720 E 9840 E 9960 E 10000 E 10080 E 10120 E 10160 E 10200 E 10240 E 10280 E 10320 E 10400 E 10440 E 10480 E 10520 E 10560 E 10600 E 10640 E 10680 E 10720 E 10760 E 10840 E 10880 E 10920 E 10960 E 11000 E

7640021

620

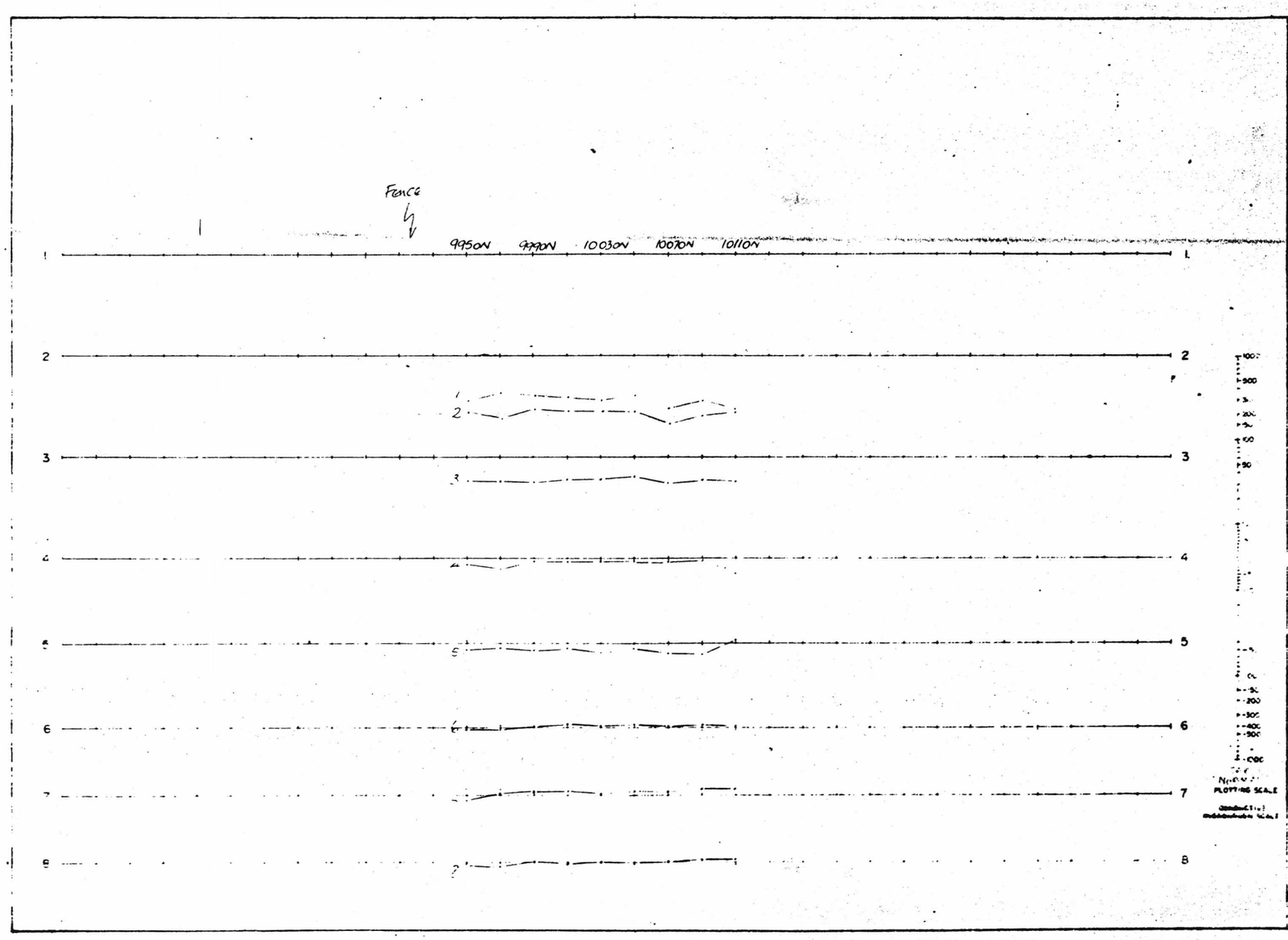
Date Feb '81 Dwg No 81-[illegible]

88-2827

V

542 (2) 3 of 5
FR 3.

764022



PULSE ELECTROMAGNETIC SURVEY

AT

HOUSEGO GRID

WARATAH, TASMANIA

FOR

METALS EXP[illegible] LTD

Line No. 10600 E

SURVEY SPECIFICATIONS

Mode of operation Separated loops (Fixed)
Transmitter receiver separation 50 metres
Station spacing 20 metres
Component plotted VERTICAL
Receiver coil orientation HORIZONTAL - L
Transmitter oriental on HORIZ - L
Horizontal scale 1:20
Surveyed by T.LYNCH
Time base 10 [illegible]

geoterrex

SURVEYED IN JANUARY 19[illegible]

JOB No 85-1276

MEL DRG N° 81-086

VI

5 cm

88-2827

VI

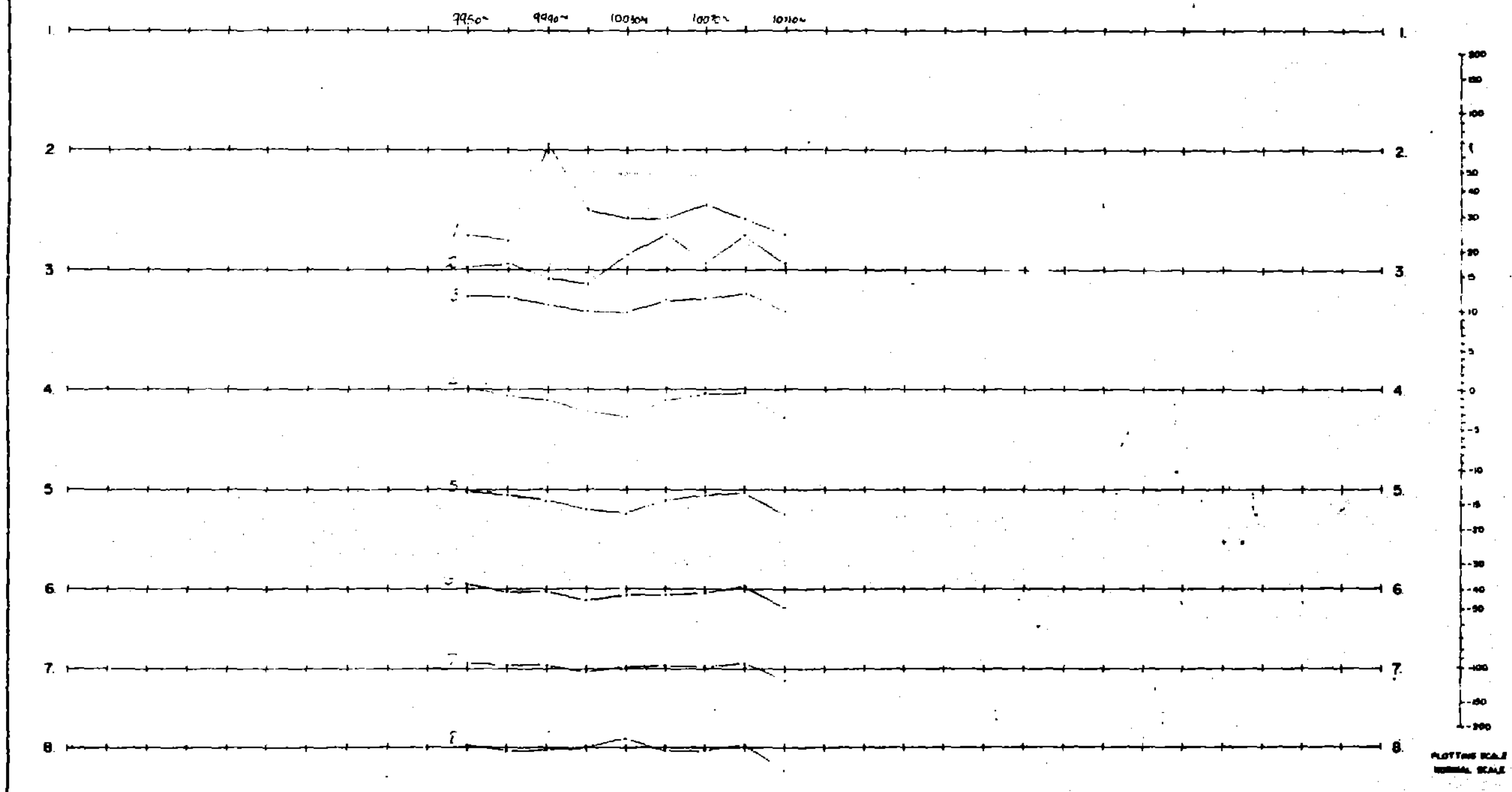
T21

VOL 5/2 VOL 2 3 of 5

FRAME 2

5 cm

764023



PULSE ELECTROMAGNETIC SURVEY

AT

HOUSEGO GRID

WARATAH TASMANIA

FOR

METALS EXPLOR...

Line No. 10520 E

SURVEY SPECIFICATIONS

Mode of operation Separated Moving Coil

Transmitter receiver separation 60 metres

Station spacing 20 metres

Component plotted VERTICAL

Receiver coil orientation HORIZONTAL

Transmitter orientation HORIZONTAL

Horizontal scale 1:2000

Surveyed by T. LYNCH, G. PIPER

Time base 10 msec

geoterrex PTY LTD SYDNEY

SURVEYED IN JANUARY 198[illegible]

JOB No 85-1276

MEL DRG No 81-087

VI

0 mm 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400

Radiometric GERMANY

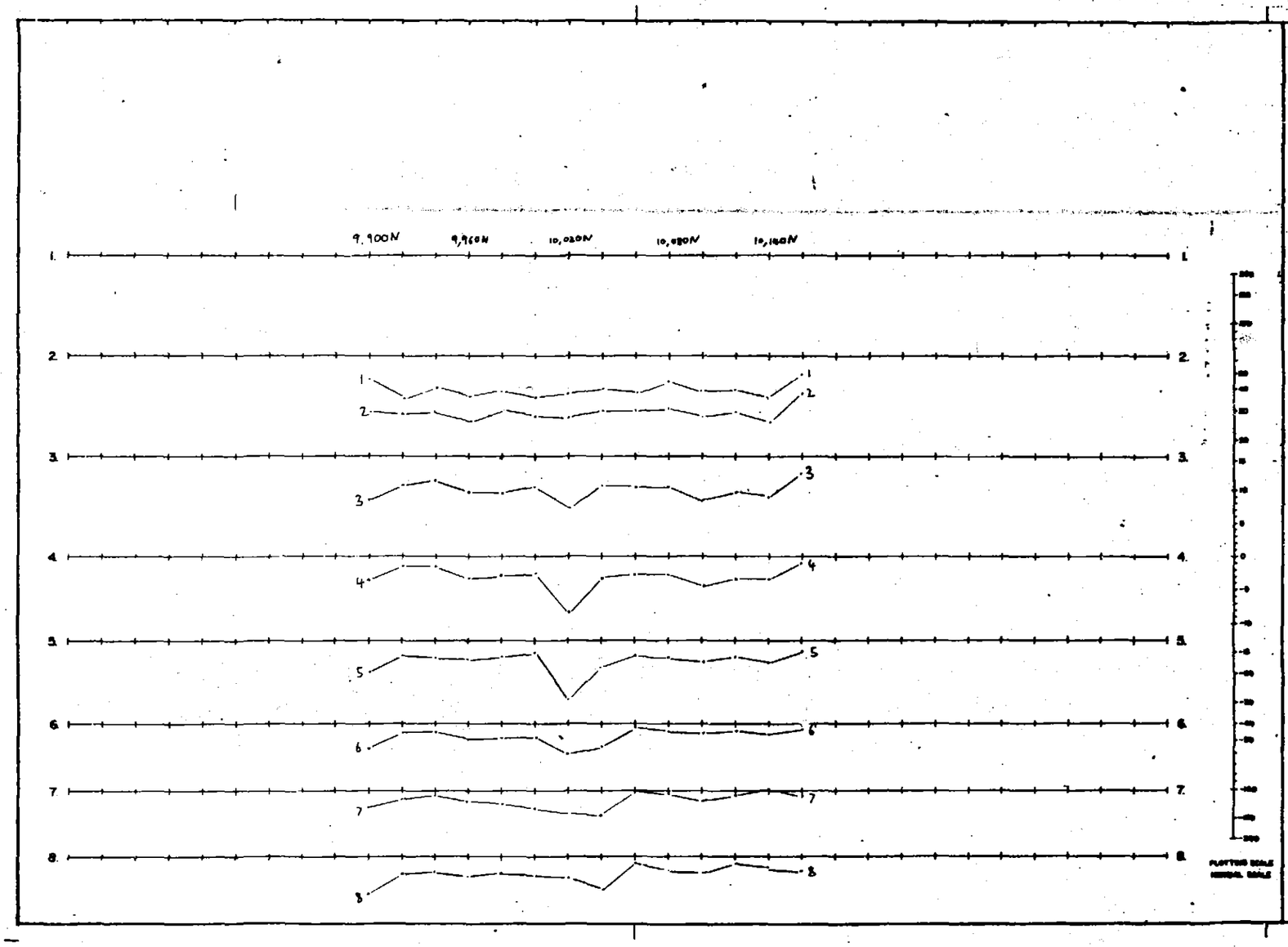
88-2827

622

542(2) 3.085

fr 4

5 cm



PULSE ELECTROMAGNETIC SURVEY

AT

HOUSEGO GRID

WARATAH, TASMANIA

FOR

METALS EXPLORATION PTY. LTD.

Line No. 10,840E

SURVEY SPECIFICATIONS

Mode of operation SEPARATED LOOPING COILS
Transmitter receiver separation 60 metres
Station spacing 20 metres
Component plotted VERTICAL
Receiver coil orientation HORIZONTAL
Transmitter orientation HORIZONTAL
Horizontal scale 1:2000
Surveyed by G. HAER, A. FLATER
Time base 10 msec

SURVEYED IN JANUARY 1981

JOB No 85-1276

M.E.L. DRG N° 81-091

764024

VI

88-2827

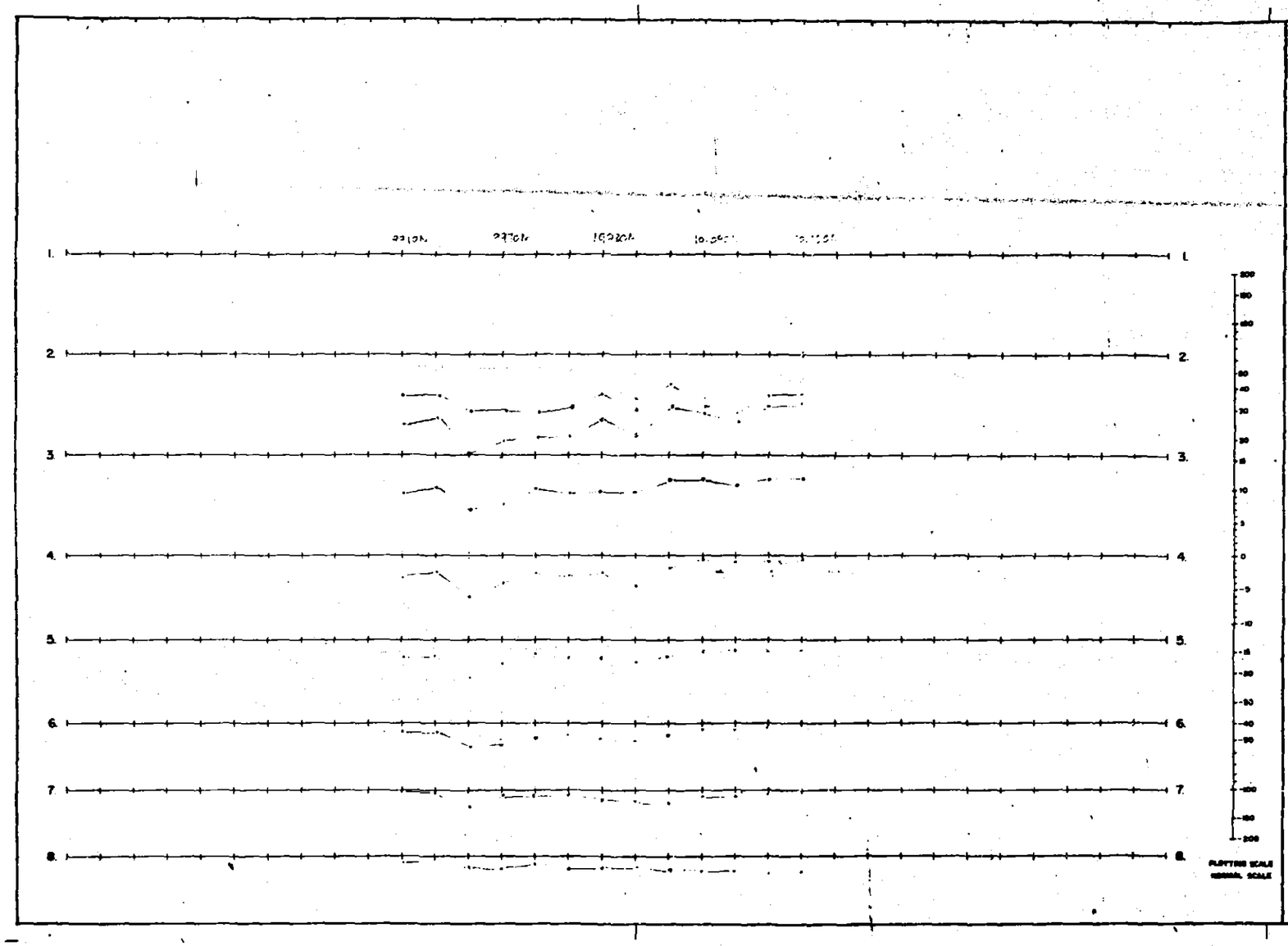
633

542(2) 3 of 5

FRAME 5

7640025

5 cm



PULSE ELECTROMAGNETIC SURVEY

AT

FOR

Line No.

SURVEY SPECIFICATIONS

Mode of operation

Transmitter receiver separation — metres

Station spacing — metres

Component plotted

Receiver coil orientation

Transmitter orientation

Horizontal scale

Surveyed by

Time base — msec

Geoterrex pty ltd SYDNEY

M.E.L. Dwg No 31-040

SURVEYED IN

JOB No

VI

Radiometric GERMANY

624

88-2827

542(2) 3 of 5
Fk 6

764026

PULSE ELECTROMAGNETIC SURVEY

AT

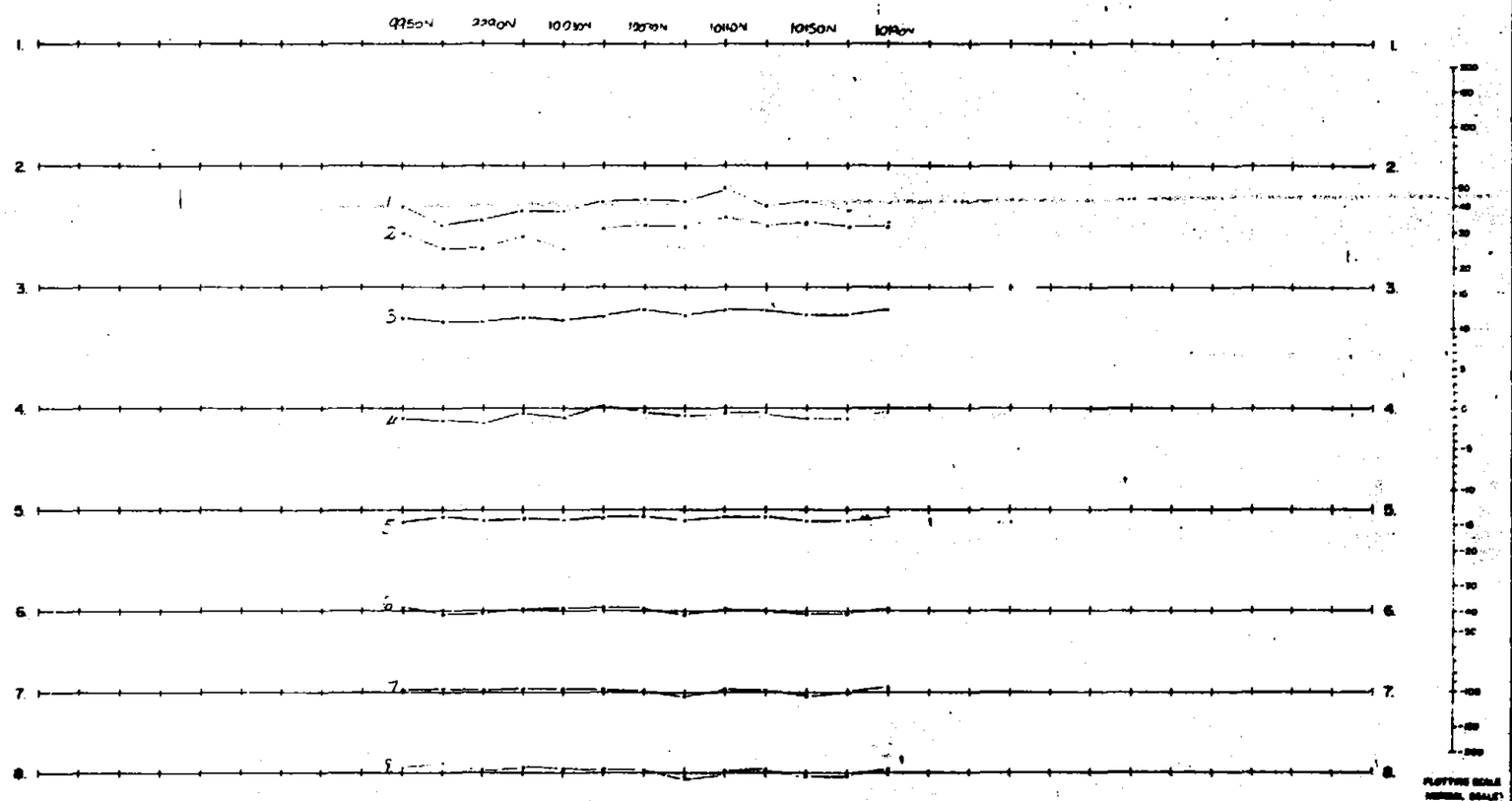
HOUSEGO GRID

WARATAH TASMANIA

FOR

METALS EXPLORATION LTD

Line No. 10680 E



PLOTTING SCALE
VERTICAL SCALE

SURVEY SPECIFICATIONS

Mode of operation Separated Moving Loop
Transmitter receiver separation 100 metres
Station spacing 20 metres
Component plotted VERTICAL
Receiver coil orientation HORIZONTAL
Transmitter orientation HORIZONTAL
Horizontal scale 1:2000
Surveyed by TLYNCH G. PIPER
Time Base 10 m. sec

geoterrex pty ltd sydney

SURVEYED IN JANUARY 19

JOB No

M.E.L. DRG Nº 81-064

VI

88-2827

5 cm

025

764027

Hic

PULSE ELECTROMAGNETIC SURVEY

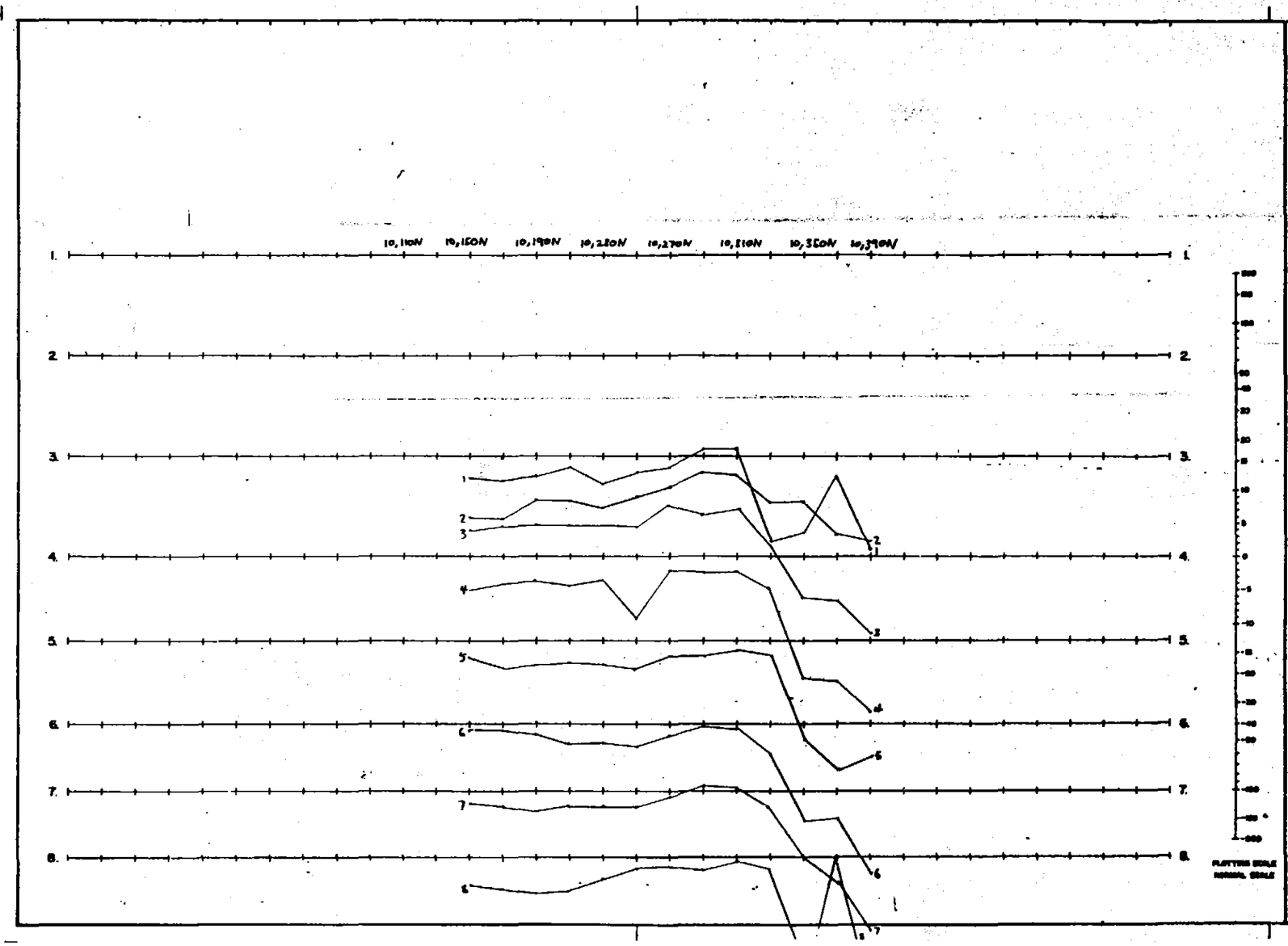
AT

HOUSEGO GRID

WARATAH, TASMANIA

FOR

METALS EXPLORATION PTY. LTD.



Line No. 10,920E

SURVEY SPECIFICATIONS

Mode of operation	SEPARATED MOVING COILS
Transmitter-receiver separation	100 metres
Station spacing	20 metres
Component plotted	VERTICAL
Receiver coil orientation	HORIZONTAL
Transmitter orientation	HORIZONTAL
Horizontal scale	1:2000
Surveyed by	G. RIMER, A. FLINTER
Time base	19 msec

SURVEYED IN JANUARY 1981

JOB No 85-127S

MEL DRG. NO. 81-093

VI

88-2827

626

5 cm

027

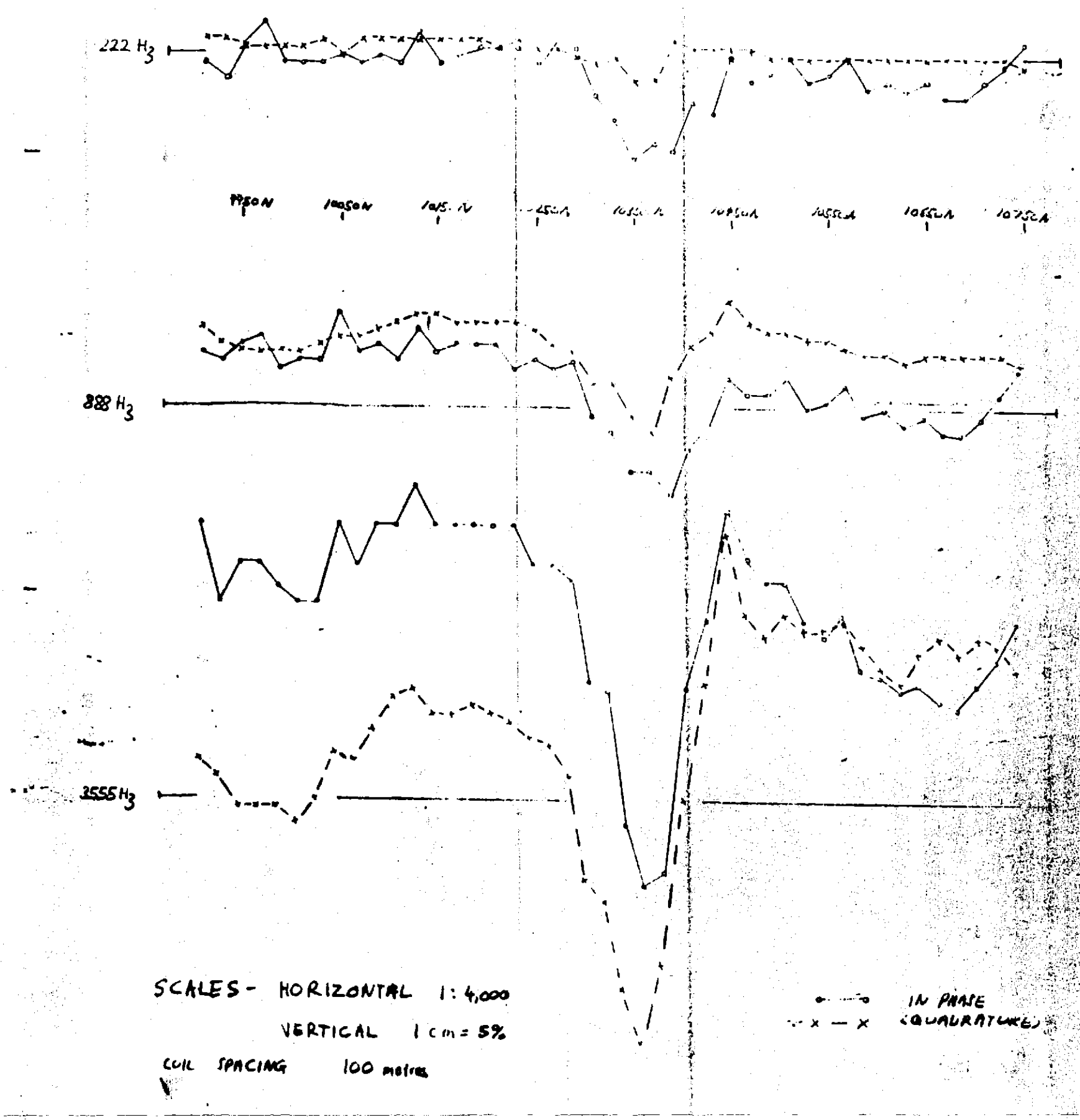
METALS EXPLORATION PTY. LTD.

HOUSEGO GRID

WARATAH, TASMANIA

LINE 10,450E

FEB. 4TH, 1987



SCALES - HORIZONTAL 1:4,000

VERTICAL 1 cm = 5%

COIL SPACING 100 metres

88-2827

5 cm

764028

MEL DRG No 81-095

Sec (2) 4 of 5

628

MAX-MIN SURVEY - TIME DOMAIN (TAU) 4/3/6

100 EGG GRID LINE 10880 E

FOR METALS EX. LTO

COIL SEPARATION: 100 m.

DIP: RE-130/

FREQ 222 Hz

FREQ 888 Hz

FREQ 1777 Hz

NORTH (metres)

SCALE (HOR.): 1cm = 20m

LEGEND: —o—o— I.P

QUAD.

7640029

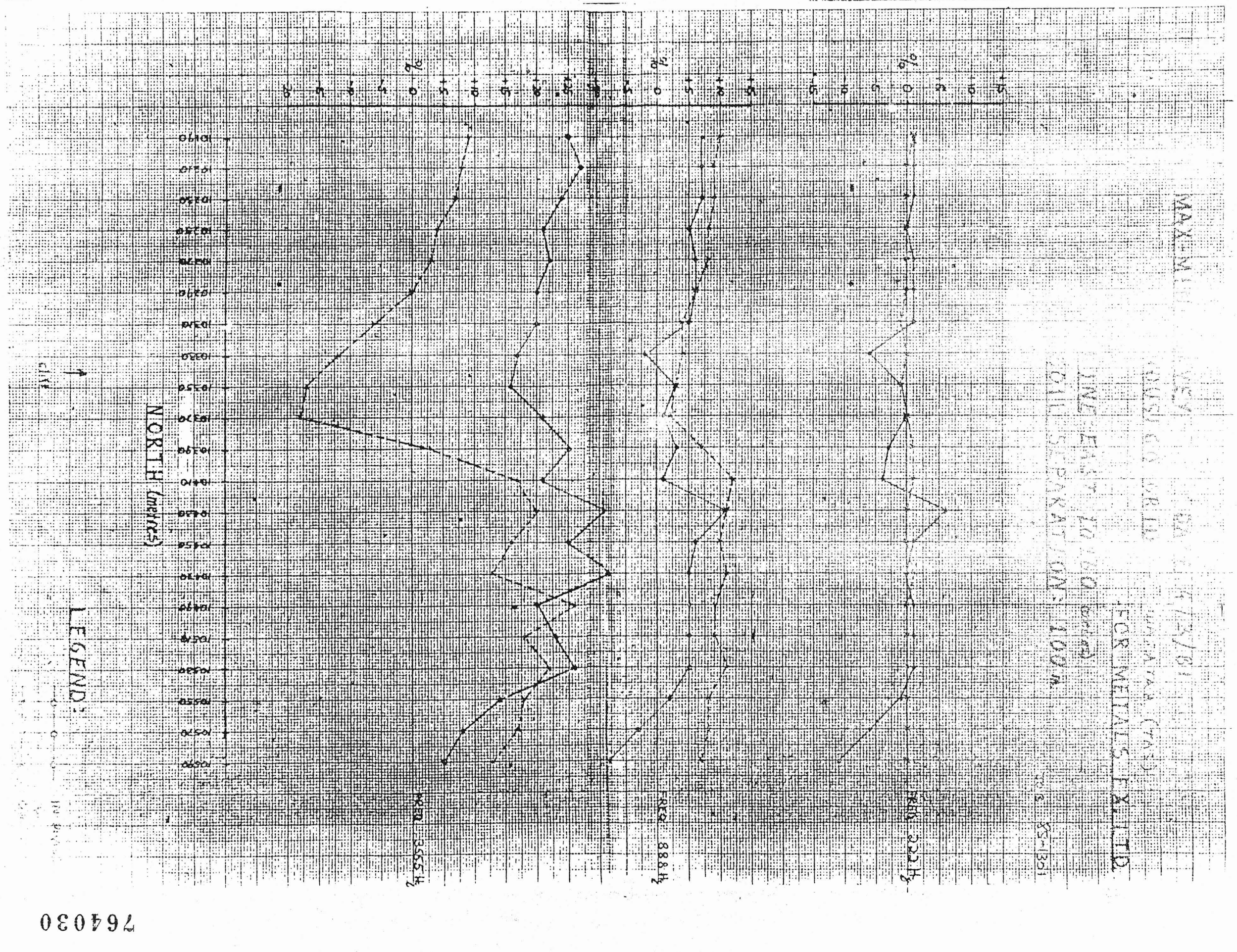
VII

88-2827

5 cm

88-28827

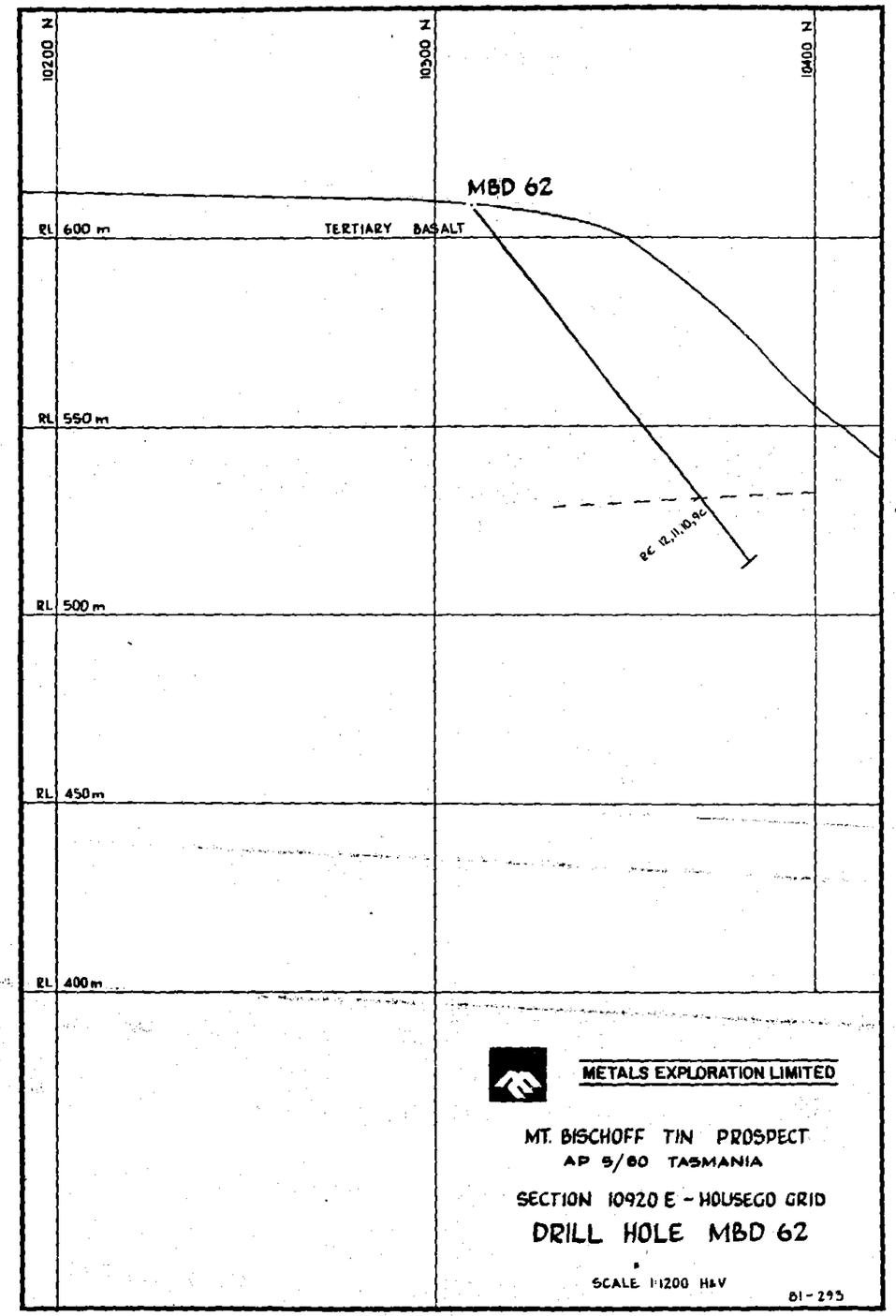
VII



764030

029

764032



88-2827

5 cm

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. MBD 62

COLLAR LOCATION

Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1)	N	E	
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	m A.H.D.

Magnetic bearing of true and grid norths at collar (* = observed)

G.N.(1) mag
G.N.(2) mag
G.N.(3) mag
T.N. mag

1:250 000 Sheet No. SK55-3
1:100 000 Sheet No. 8015
State Tasmania

Mineral Tenement E.U. 13/79 Holder Metals Exploration Ltd.

Cadastral location and details: Mt. Bischoff mine area, on crown land northerly of Waratah.

Inclination at collar -50°
Total length 120.0 m
Commenced: 24 / 3 / 81
Completed: 27 / 3 / 81
Drilling contractor: LONGYEAR AUST PTY. LTD.
Rig type: LONGYEAR HC 150

Details of down hole location-survey methods: Eastman Single Shot Camera

Purpose of drilling and anticipated lengths to targets: Investigation of magnetic and EM anomalies.

Core size and non-coring (NC)

TRICONE	0	TO	3.5 m
NQ	3.5	TO	120.0 m
		TO	
		TO	
		TO	
		TO	

Results of down hole location-survey.

LENGTH FROM COLLAR	MAGNETIC BEARING (Whole Circle)	DIP
AT COLLAR		
30 m	354°	51°
60 m	002°	51°
90 m	358°	51° 30
120 m	357°	52°

Comments on drilling.

Legend for graphic log column — FIELD ROCK NAME, ETC.

1	Porphyry.
2	Dolomite
3	Recrystallised dolomite
4	Dolomite sulphide lode - pyrrhotite rich.
5	Dolomite sulphide lode - pyrite rich.
6	Dolomite sulphide lode - talc rich.
7	Dolomite sulphide lode - serpentinite rich.
8	Dolomite sulphide lode - quartz/carbonate rich.
9 / c	Shale / carbonaceous.
10	Siltstone.
11 / s	Quartzite / sandstone.
12	Tuff.

Symbols and abbreviations

LOGGED BY D. COMPSTON FROM 0 TO 120.0 DATE 29/3/81
LOGGED BY ____ FROM ____ TO ____ DATE ____
LOGGED BY ____ FROM ____ TO ____ DATE ____

Company managing exploration programme: Metals Exploration Ltd.

SUMMARY LOG
HOLE No. MBD 62
Log sheet 1 of 2

764031

DEPTH (length from collar)	INTERVAL	DEPTH from - to : ROCK IIT (capital letters, underlined) Depth: Description and notes, veins over 50mm. INDENTED ABOUT 10mm	POINTER CODE	GRAPHIC LOG	POINTER CC	MINERALISATION Excluding veins over 50mm visual estimate of % mineralisation in brackets
0	(3.5m)	0-3.5m TRICONE DRILLING - NO CORE				
	(104.9m)	3.5-108.4m BASALT 3.5-26.7: Fine grained, dark grey basalt, vesicular in parts. Weakly magnetic. Vesicles filled with zeolites and prehnite. Common clino-pyroxene (?augite) phenocrysts to 1mm in matrix of plag-cpx.				No apparent sulphides
20		26.7-31.1: Fine grained, pinkish maroon basalt, vesicular in parts. Cpx phenocrysts 31.1-42.9: Fine grained, dark grey basalt, vesicular in parts. Occasional cpx phenocrysts.				
40		42.9-49.5: Maroon basalt, fine-grained and vesicular in parts. Common cpx phenocrysts.				
		49.5-72.8: Coarse grained basalt - plag lathes up to 3mm, cpx phenocrysts rare. Vesicular in parts.				
60						
80		72.8-94.8: Fine grained, dark grey basalt, vesicular in parts. No apparent phenocrysts.				
		94.8-108.4: Fine grained dark grey basalt, vesicular in parts. Very abundant (10%) clino-pyroxene phenocrysts.				
110						
	(11.6m)	108.4-120.0m TUFFACEOUS QUARTZITE, SILTSTONE and CARBONACEOUS SHALE Strongly disrupted and sheared-fragments of siltstone, quartzite and soft greenish white clay in matrix of foliated black, carbonaceous shale. Common carbonate veins and stringers parallel to the foliation (~45° to core axis)		12/ 11/ 10/9/ c		No apparent sulphides
120		END OF HOLE 120.0m				

NOTES: 1. FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.H. RYALL (ED.), MONOGRAPH NO. 5 AUSTRALASIAN INST. MIN. METALL. 1976
2. ATTITUDE OF BEDDING, VEIN, ETC IS ANGLE BETWEEN PLANAR STRUCTURE AND LONG AXIS OF CORE 3. LENGTH IS GIVEN AS METRES OR CM

5 cm

88-2827

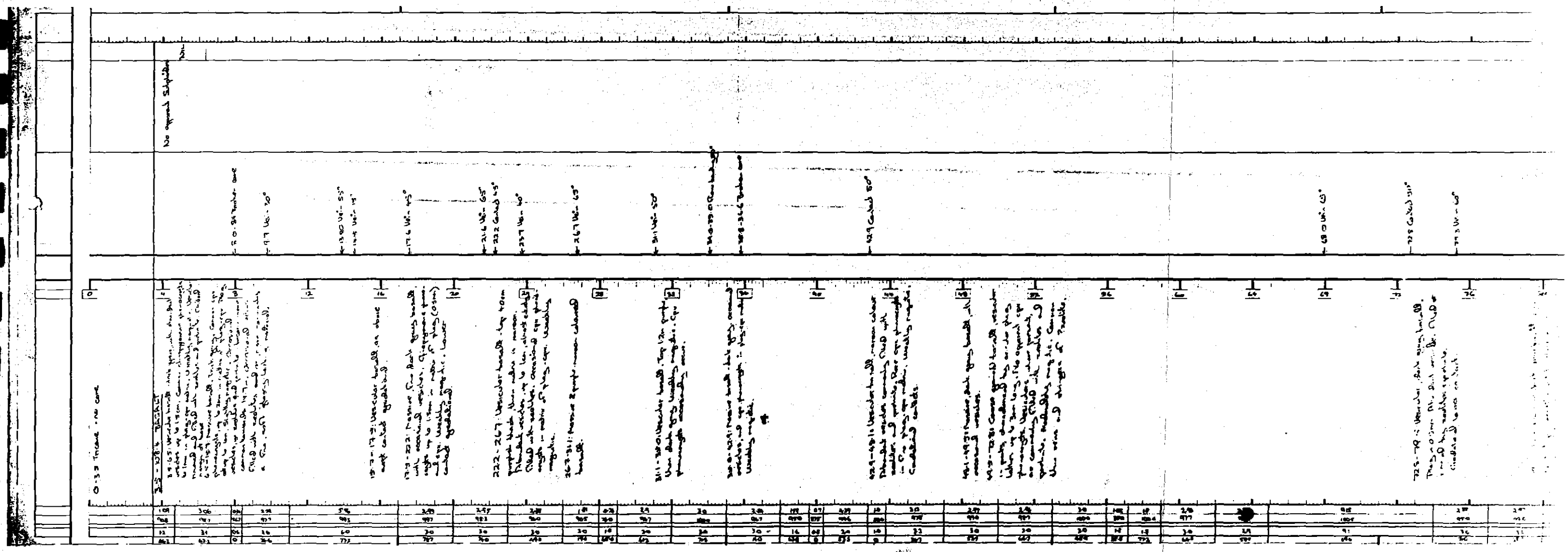
FOR LEGEND SEE DRAWING NO

METALS EXPLORATION LIMITED — SUMMARY DRILL LOG Scale — Prospect or Project: MT BISCHOFF TIN — HOLE No. MBD 62

0mm 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400
METRIC

IX

764033



88-2827

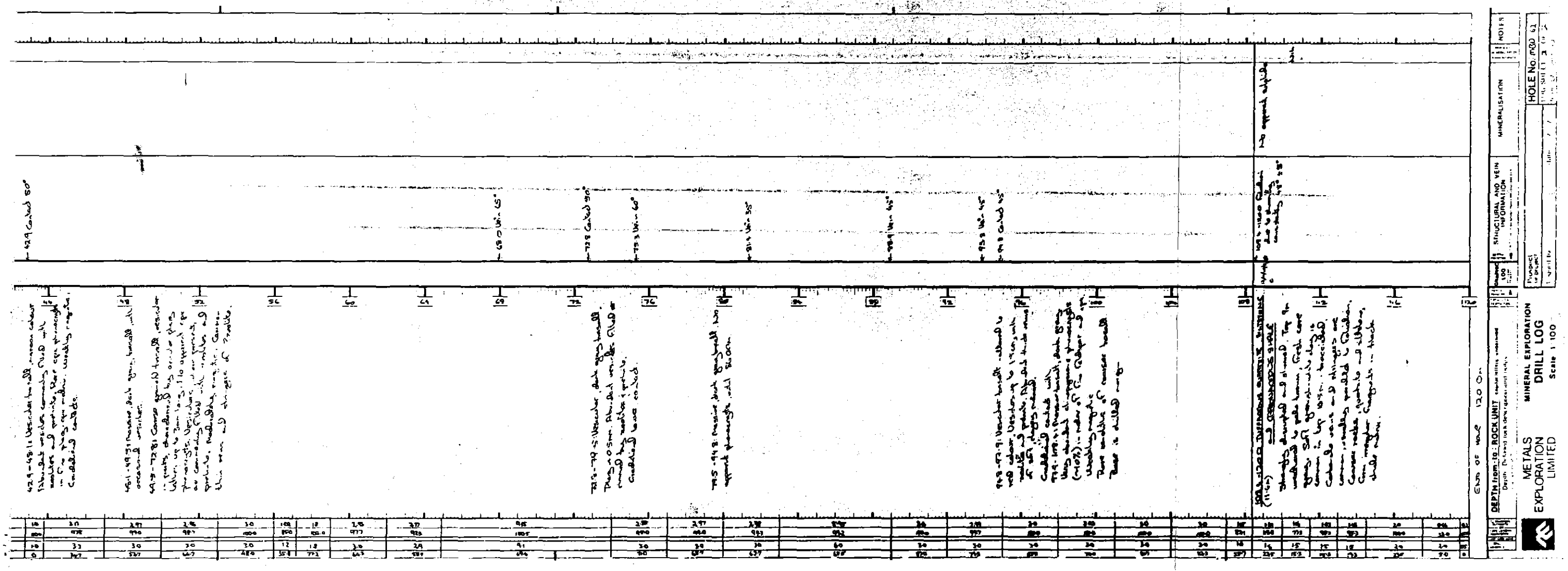
5 cm

632

FRAME 1

IX

764034



88-2827

5 cm

G33

FRAME 2

IX