

1978 Geophysical Assessment Report

Electromagnetic and Magnetic Surveys



TITLE

Tay Mountain Property
Tay Claims 1-166

AUTHOR

J.L. LeBel

DATE

December, 1978

COMMODITY

Pb-Zn

LOCATION

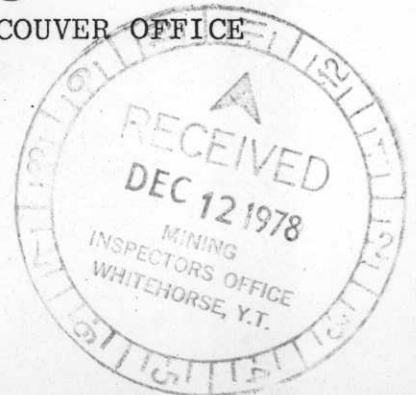
Anvil Range, Yukon Territory
Whitehorse Mining District
Latitude 62°30'N, Longitude 133°55'W
62°32'N, 133°58'W
NTS 105 K 5 and 12

PERIOD OF WORK

August 14 - 21 and August 29 - 31, 1978

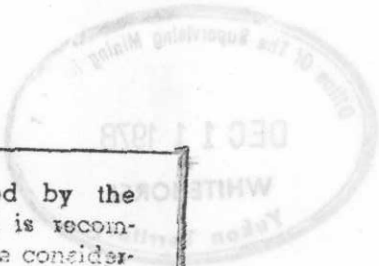
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AMAX VANCOUVER OFFICE



1978 Geophysical Assessment Report

Electromagnetic and Magnetic Surveys



This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representation work in the amount of \$234.55

[Signature]
 Resident Geologist or
 Professional Mining Engineer

Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

[Signature]
 R. BAXTER
 Supervising Mining Recorder
 Commissioner of Yukon Territory

TITLE

AUTHOR

DATE

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Avail Range, Yukon Territory
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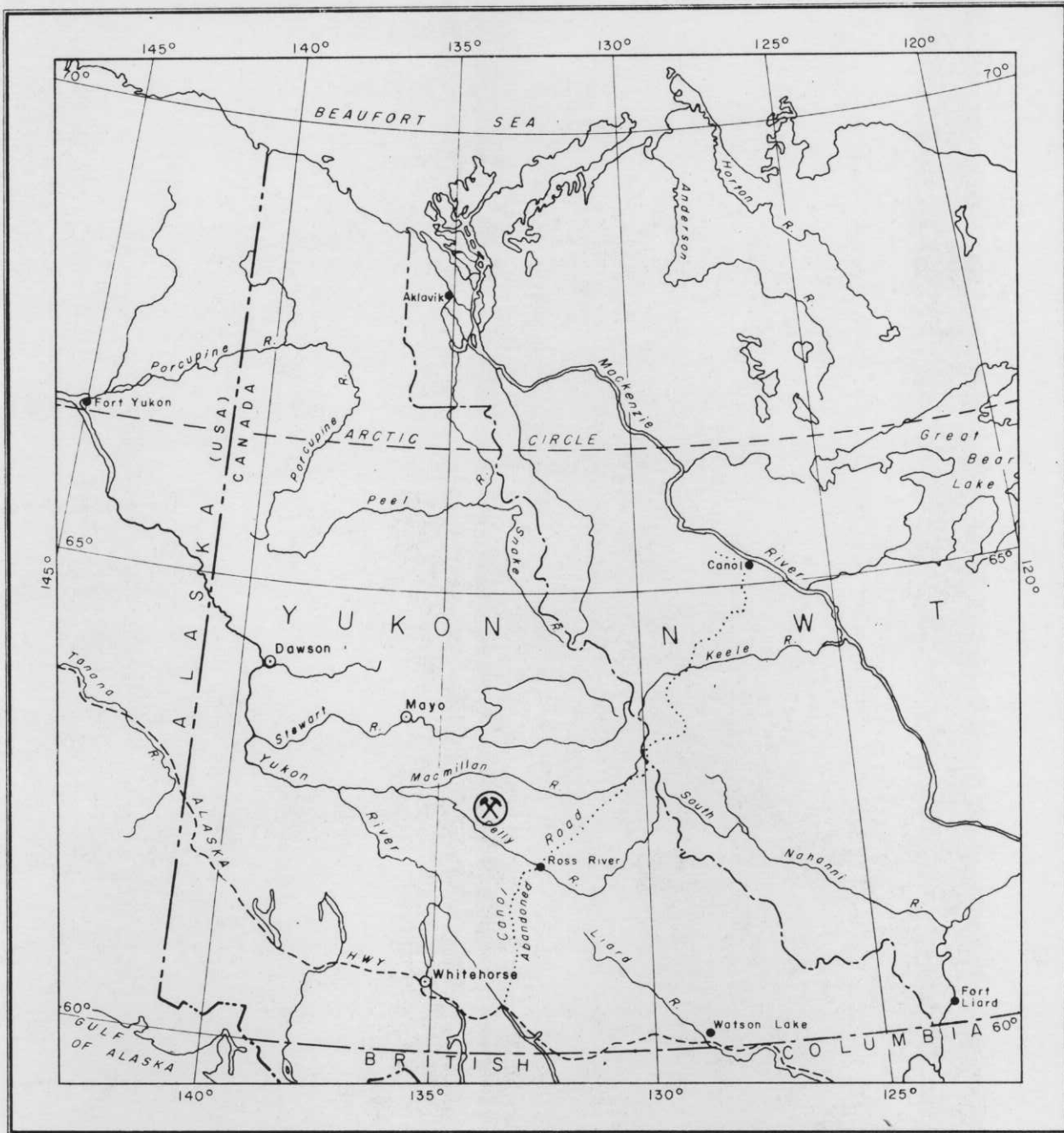
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SUMMARY

Horizontal loop electromagnetic and magnetic surveys were conducted on two grids on the Tay Mountain property.

Of the three conductors detected on Grid 1, two are explained by graphitic phyllites. A third series of conductors was not explained but probably result from weakly graphitic phyllites. Part of the third zone has a coincident magnetic anomaly of economic proportions.

On Grid 2 anomalies distorted by the flat stratigraphy made selection of conductor axes difficult. Most of the conductors assigned were found to be caused by graphitic schists or phyllites. No anomalies consistent with a large massive sulphide deposit similar to the Anvil Mine were found.



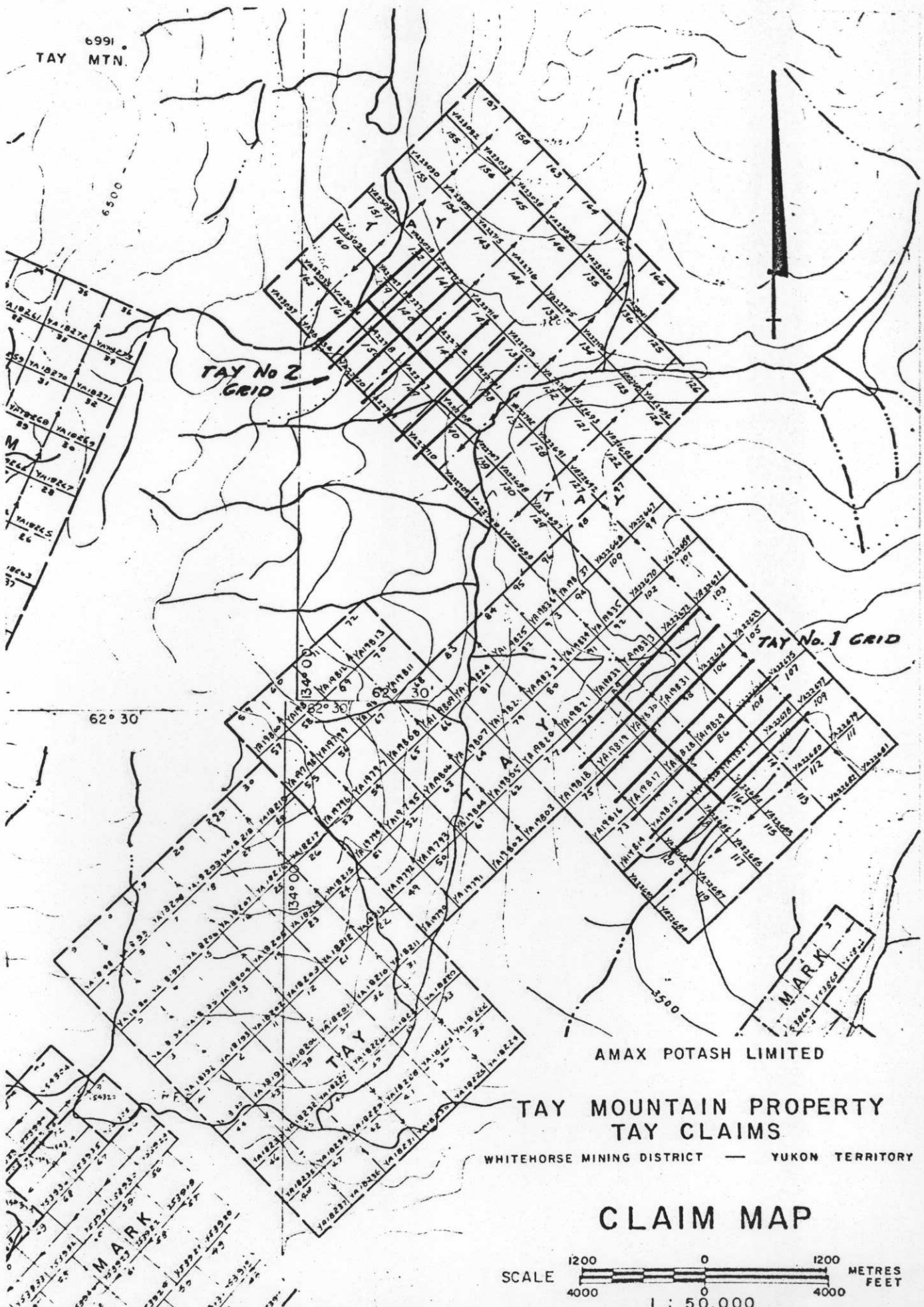
N. T. S. Ref. 105 K 5, 12; L 8, 9

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TAY MOUNTAIN PROPERTY
TAY CLAIMS
 WHITEHORSE MINING DISTRICT — YUKON TERRITORY

LOCATION MAP

SCALE 1" = 120 MILES

6991
TAY MTN.



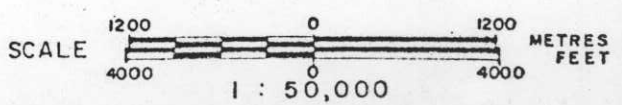
62° 30'

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TAY MOUNTAIN PROPERTY TAY CLAIMS

WHITEHORSE MINING DISTRICT — YUKON TERRITORY

CLAIM MAP



Vancouver — H.P.
N T S. Ref 105 K 5, 12, L 8, 9
FIG. 2

INTRODUCTION

During the periods August 14-21 and August 29-30 horizontal loop electromagnetic (HEM) surveys and magnetometer surveys were completed on the Tay 1 and Tay 2 Grid of the Tay Mountain property. Limited very low frequency electromagnetic (VLF-EM) surveys were completed on the Tay 1 Grid.

The property is located about 43 km northwest of Faro, Yukon Territory in the Whitehorse Mining District, NTS 105K/5, 12 as shown in Figure 1. Figure 2 shows the Tay 1-166 claims which comprise the property. Access is by helicopter from Faro or Ross River.

Tay 1 Grid consists of 15.1 km of picket lines centred at coordinates $62^{\circ}30'N$ latitude and $133^{\circ}55'W$ longitude. Tay 2 grid consists of 11.9 km of lines centred at coordinates $62^{\circ}32'N$ latitude and $133^{\circ}58'W$ longitude.

Line cutting was done by Eastman Associates of Whitehorse. Pickets were placed at 30 m true horizontal distances along lines spaced at 240 m intervals. Slope and slope lengths for the chaining were determined with a Suunto model PM-5 inclinometer.

The HEM surveys (13.6 and 10.4 km on Grids 1 and 2 respectively) were conducted by a two-man crew from Geoterrex Limited of Ottawa, Ontario. The magnetometer survey (15.1 km) on the Tay 1 Grid and VLF - EM survey (1.4 km) were conducted by AMAX personnel. The magnetometer survey (11.9 km) on Tay 2 Grid was conducted by Geoterrex personnel.

The surveys were conducted to follow-up airborne electromagnetic (AEM) conductors recorded in 1976 over known or anticipated graphitic sericite schists similar to the rocks which host the lead-zinc deposits in the Faro area.

PROPERTY GEOLOGY

The Lower Cambrian twomica-quartz schists and calc-silicates with overlying Ordovician calcareous chlorite phyllites strike north-westerly and dip gently to the northeast on the Tay property.

The calc-silicate exposed in the north-south trending creek valley is stratigraphically the lowest unit exposed on the property although regional work indicates that the calc-silicate is a horizon of variable thickness enclosed by the two mica-quartz schist. West of the creek the contact between the calc-silicate and overlying mica-schists is gradational but east of the creek the calc-silicate may be in sharp contact with overlying graphitic schists. Minor rock types within the calc-silicate include coarse grained garnet-diopside skarns, spatially associated with the Cretaceous quartz monzonite, and narrow graphitic bands of no economic significance.

The mica schists overlying the calc-silicate consist of a rusty purplish brown quartz-biotite-sericite±andalusite schist, and its facies equivalent a quartz-sericite and/or sericite-quartz schist to phyllite. Generally the biotitic schist predominates at the base of the section whereas the sericitic phyllite caps the section. Scattered through the mica schist sequence are cherty and/or sericitic graphitic horizons that vary in strike length from 800 m to several thousand metres. Since these conductive graphitic horizons are believed to be equivalent to the ore bearing units at Faro the gravity surveys were designed to cover as many of these conductors as possible. Local bands of grey crystalline marble are exposed near these graphitic horizons but are at least 400 m above the main calc-silicate unit.

The youngest meta-sedimentary rock on the property is a chloritic phyllite to metabasite unit exposed on a ridge on the eastern portion of the claim block. At least three

narrow cherty and/or calcareous slightly graphitic bands which may represent interruptions in the volcanic activity were noted in the chlorite phyllite.

Small Cretaceous quartz monzonite intrusions on the property are apophyses of stocks west and north of the property.

The depositional environment of the mica schists is probably best interpreted as a thick clastic turbidite sequence interrupted by an influx of carbonate debris. Periods of low clastic deposition are represented by the graphitic horizons. Chloritic phyllites are a mixture of both volcanoclastic sediments and basic pyroclastic deposits. A volcanic component to the clastic sequence becomes noticeable towards the top of the quartz-sericite phyllite and narrow amphibolitic bands within the calc-silicate may represent brief basic volcanic events.

A more detailed description of the geology is contained in the report; 1978 Geological and Geochemical Assessment Report Tay Mountain Report, Tay 1-166 Claims, by A.C. Hitchins and R.G. Kidlark, October, 1978.

EQUIPMENT AND PROCEDURE

The HEM surveys were conducted with an Apex Parametrics Max-Min II system using frequencies of 444 and 1777 hertz. Station separation and reading interval were 180 m and 30 m respectively. Coil co-planarity was maintained by using average slopes taken from records kept by the line cutters during chaining. The slope data were subsequently used to correct the in-phase results for changes in coil separation caused by changes in slope.

The magnetic survey was conducted with a Geometrics G-816 magnetometer which measures the total magnetic field. The sensor was carried in a backpack harness thereby limiting measuring accuracy to ± 5 gammas. Readings were taken every 30 m. Accurate base stations were established along the base line so that diurnal variations in the magnetic field could be monitored (and subsequently removed) each time the base line was crossed during the survey.

VLF-EM measurements on Grid 1 were done with a Phoenix Geophysics VLF-2 receiver using the transmitter station at Seattle. Dip angle and relative field strength of the electromagnetic field were recorded at 30 m intervals. The direction (dip) of the long axis of the receiver was adopted as the convention to record the dip angles.

PRESENTATION OF RESULTS

Results of the HEM survey are plotted in profile at a 1:5,000 horizontal scale (Figures 3 and 5). The vertical scale of the in-phase and out-of-phase profiles is 1 cm = 33%.

Conductor axes are indicated by heavy dashed lines and labelled alphabetically. The width of the conductor is indicated by cross-hatching. Conductors at high and low frequencies are shown separately to emphasize any differences in position and length that may exist.

Results of the magnetometer survey are shown on a 1:5,000 scale plan contoured at 50 and/or 100 gamma intervals (Figures 4 and 6). For convenience in plotting a value of 58,000 gammas has been subtracted from each reading. Negative values (i.e. readings less than 58,000) are indicated by a bar over the number.

The results of the VLF-EM survey on Grid 1 are also shown in profile with scales 1 cm = 10^0 and 1 cm = 50% for dip angle and field strength respectively (Figure 3).

RESULTS

Grid 1

Three systems of conductors labelled A to C consistent with pattern of AEM anomalies were detected by the HEM survey. Each conductor will be assessed according to its electromagnetic merits followed by consideration of any magnet correlation.

Conductor A

Conductor A trends across the north end of the grid. The best response (high frequency in-phase and out-of-phase of 45% and 40% respectively) at 930N on Line 240E defines a relatively poor and shallow conductor. The low frequency results on Line 240E define a discrete conductor about 60 m wide while the high frequency results indicate a wider weakly conductive zone extending north of conductor A's axis. Conductor A seems to trend off the grid between Lines 480E and 720E. The change in strike required is supported by similar bends in the other conductors on the grid. Northwest from Line 420E the conductor gradually diminishes in strength to Line 720W where a predominantly out-of-phase anomaly was recorded.

Conductor A was traversed by the two VLF-EM lines. Modest VLF anomalies were recorded at 930N and 1050N on Lines 0 and 240E. The VLF conductors appear to occur on the edges

of the HEM anomalies but the distance between them (120 m) is 60 m greater than the width of the conductor defined by the HEM results.

Conductor A flanks a series of weak magnetic highs. According to the magnetic trends the southeast end of the conductor does not trend off the grid to the west.

Conductor B

The anomalies which form conductor B cover most of the grid south of the base line. Conductor B is weak but achieves widths of up to 200 m. On Line 720E the conductor is composed of two separate features rather than a broad zone that is evident on the other lines. The northwest end of the conductor branches in a similar way to form a discrete conductor at 720W, 150S. High frequency in-phase-out-of-phase ratios are consistently less than one through conductor B. Anomalies on Line 480W at 180S and at 240E, 240S with in-phase/out-of-phase ratios greater than 1 indicate a slight increase in conductance along parts of the north edge of the conductor. Anomalous high frequency out-of-phase results at the south end of some of the lines suggest weakly conductive conditions outside of the indicated boundaries of conductor B. The low frequency version of conductor B is narrower than the high frequency counterpart.

Conductor B straddles a broad zone of magnetic high but because of its width also encompasses an area of magnetic low lying south of the high. A single station 150 gamma anomaly correlates directly with the conductor located at 240W, 240S.

Conductor C

Conductor C consists of a series of conductors which cross the centre of the grid lumped together because they correlate with a single AEM conductor. Conductor C' is separated to emphasize an increase in the apparent width of the

conductor on Lines 480E and 720E and an increase in conductance shown by a high frequency in-phase amplitude of 70% and in-phase/out-of-phase ratio greater than 2 at 720N on Line 720E. The anomalies recorded on Line 720W at 300N and 720N are consistent with a double peaked AEM anomaly. The central part of conductor C is composed of relatively weak anomalies on Lines 240W, 0 and 240E which are not evident in the low frequency results.

The VLF-EM survey covered a portion of the central part of conductor C. The HEM anomaly at 330N on Line 0 is confirmed by a broad VLF dip angle cross-over. Coverage was suspended before the HEM conductor at 150N on Line 0 was crossed but persistence of the field strength anomaly supports a broad conductor between 150N and 330N rather than two separate conductors interpreted from the HEM results.

The components of conductor C occur in an area of low magnetic relief which varies between 58,350 and 58,400 gammas. Conductor C' however coincides with a 250 gamma magnetic high. The broad anomaly is distinctly different from the narrow single station anomalies recorded elsewhere on the property.

Grid 2

Vague and unusually shaped anomalies and inconsistencies between in-phase and out-of-phase responses especially northeast of the base line make selection of conductor axes on Grid 2 difficult.

Conductors A and A'

Conductors A and A' are discussed jointly because on Line 0 the in-phase results define two separate features at 060N and 300N whereas the out-of-phase response indicates a continuous conductive horizon. Persistence of the out-of-phase anomaly on Line 0 extends the weak conductor 180 m south of the

axis of conductor A'. On Line 240E the conductors are only 120 m apart and not well resolved by the 180 m coil separation survey. Conductors A and A' are only vaguely evident on Line 480E. The large positive anomaly at 150N on Line 480E between the two conductors may be caused by shallow dip of the conductors although a similar feature does not occur elsewhere on the grid. Some large out-of-phase responses and inconsistencies between high and low frequency anomalies disrupt the extensions of the conductors on Lines 240W and 480W. Conductor A' may reappear at the base line on Line 720W where a large amplitude asymmetric anomaly and large positive shoulder suggest shallow dip to the north. Conductor A is tenuously re-established between 300N and 420N on Line 720W by the high frequency in-phase results. The out-of-phase results suggest that the weak conductor persists and merges with conductor D to the north.

The southeast end of conductor A occurs on a weak positive magnetic anomaly which extends to 720E one line beyond the end of the conductor. The northwest end of conductor A on Line 720W encompasses a narrow magnetic anomaly at 390N. The relative magnetic low at 450N on Line 720W is a geometric effect. The trace of conductor A as located on Line 480W falls along an isolated magnetic low which is probably a geometric effect of the body which produces the magnetic high just to the north.

Conductor B

The width of conductor B increases from narrow at 240E, 300S to 90 m at 480E, 360S. The track of conductor B is uncertain but the AEM results suggest that it joins with the partially defined anomaly (designated conductor B') at the south end of Line 720E. The change in strike required to join B with B' would account for the increase in width of conductor B on Line 480E. The conductance of conductor B-B' increases from 2 mhos on Line 480E to 25 mhos on Line 720E.

Conductor B coincides with a broad weak magnetic high on Lines 240E and 480E but the anomaly flanks conductor B' on Line 720E.

Conductor C

Conductor C is a weak one line anomaly on Line 0 at 540S. Conductors B and C occur on the same AEM trend. The axis of the conductor coincides with a narrow magnetic low.

Conductor D

Conductor D consists of incompletely defined anomalies at the north ends of Lines 480W, 240W and 0 which reflect a series of weak AEM anomalies not targeted for ground follow-up. The location of the conductor is difficult to define because background levels are not well established.

Conductor D encompasses a series of narrow intense magnetic highs which occur in the north corner of the grid. The intensity and high relief of the anomalies contrasts with the subtle low relief magnetic anomalies recorded elsewhere on the grid.

DISCUSSION OF RESULTS

Grid 1

Conductors A and B reflect mapped zones of graphitic sediments. On Line 0 the effect of the north dip of graphitic horizon causes a slight shift in the position of conductor B to overlap the mapped northern limit of the graphitic zone. A slight increase in the in-phase/out-of-phase ratios at 240E, 240S and 480W, 180S at the edge of conductor B indicate a slight increase in conductivity. Depths to the conductors at these locations is estimated at 20 m.

Conductor system C occurs in an area of poor outcrop exposures. Conductor C anomalies are poor and indicate shallow low conductance sources. The large amplitude of the conductor C' anomaly on Line 720E is attributed to shallow depth, flat dip and large width of the conductor. Reduction in the out-of-phase component in the centre of the anomaly is an effect of the width of the conductor. The large magnetic anomaly associated with conductor C' reflects an increase in pyrrhotite content of the graphitic horizon.

Grid 2

The oddly shaped anomalies on Grid 2 are probably caused by the flat dip of the formations. The large positive anomalies on Lines 720W and 480E suggest shallow dip although the direction of dip on Line 480E is not clear.

Conductor A on Lines 0, 240E, and 480E is essentially unexplained although pyrrhotite occurs near the conductor on Line 0. The conductor is extremely weak and may not be disclosed by a casual examination of the outcrops. A band of graphite corresponds to conductor A on Line 480W but no explanation for the conductor on Line 720W was found in the outcrops. On Lines 0 and 720W conductor A' corresponds to a weak graphitic horizon but the weak high frequency out-of-phase

responses on Lines 240W and 480W are unconvincing evidence of connection between the two segments.

No outcrops were found in the vicinity of conductor B but conductor B' corresponds to a zone of graphitic phyllite. The accompanying magnetic anomaly indicates a diffuse zone with modest pyrrhotite content.

Conductor C probably reflects an isolated band of graphite which differs from conductor B because of an absence of pyrrhotite.

Conductor D reflects a broad zone of graphitic schist which crosses the northern part of the grid. As mapped, the graphitic zone extends south of the edge of the conductor although the limits of the conductor are not well defined by the results. The graphitic zone dips shallowly north and it is possible that the thin leading edge of the graphite did not respond to the HEM survey. The sources of the magnetic anomalies associated with conductor D are shallow and probably reflect narrow bands of pyrrhotite.

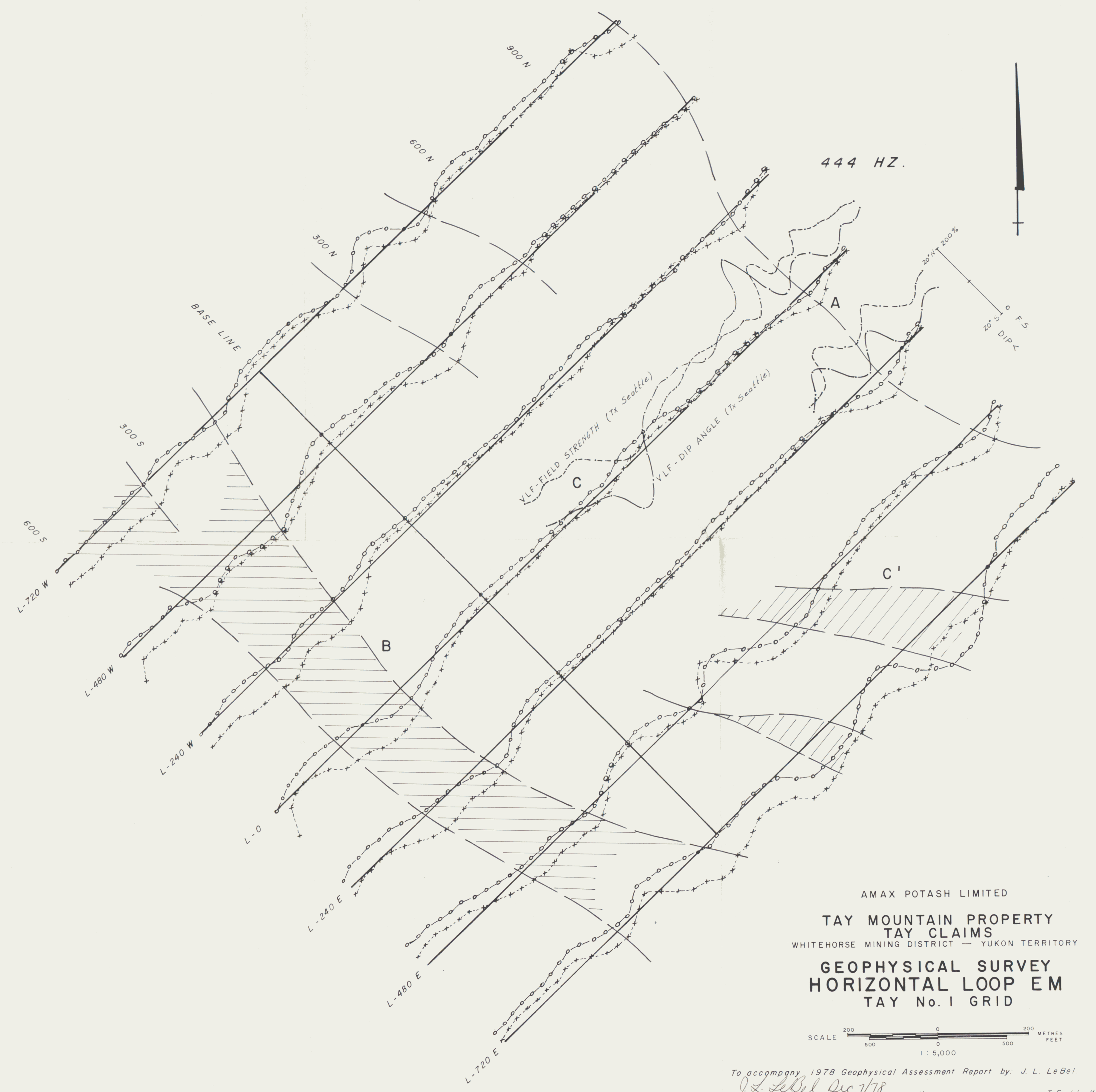
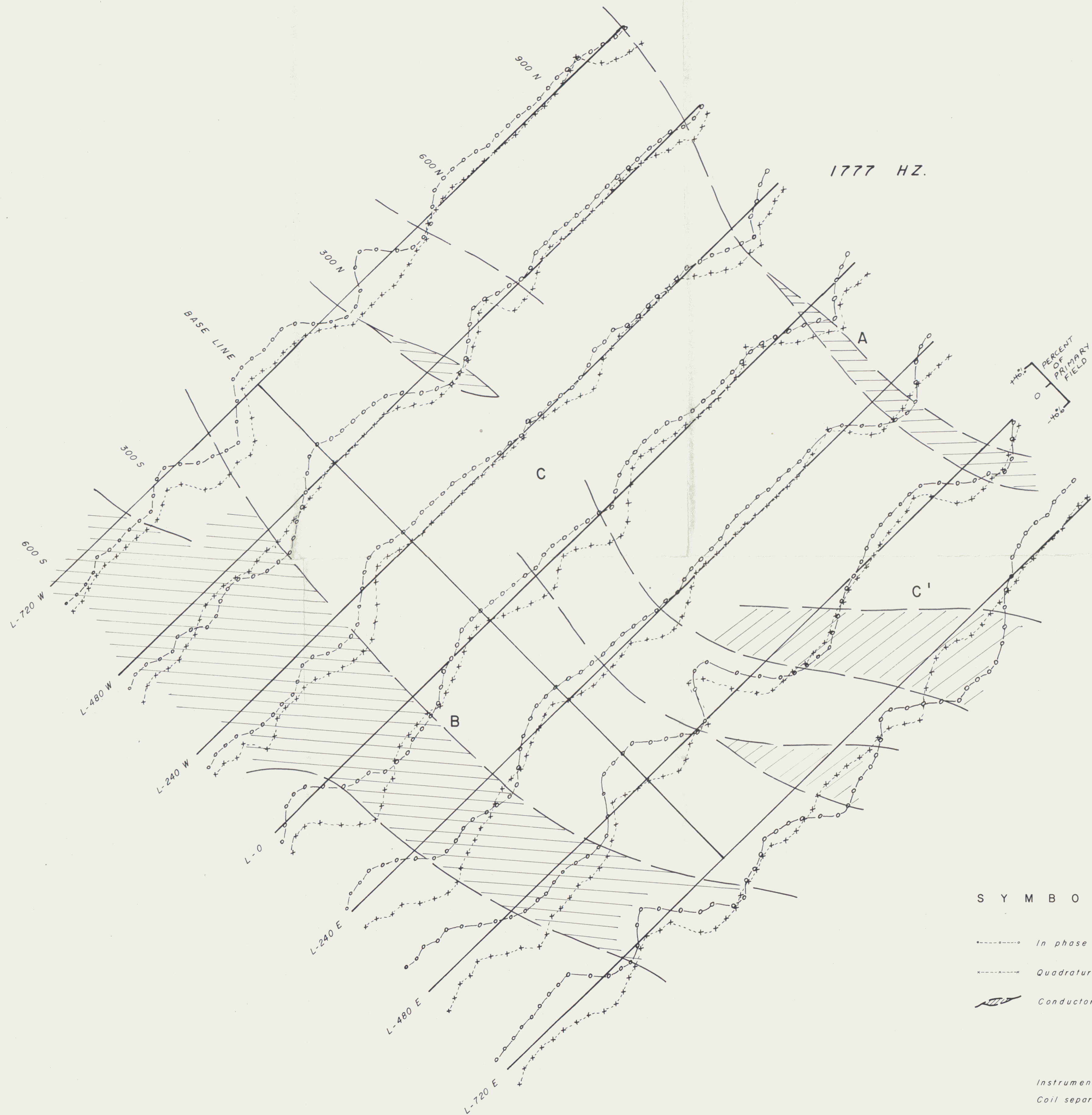
CONCLUSIONSGrid 1

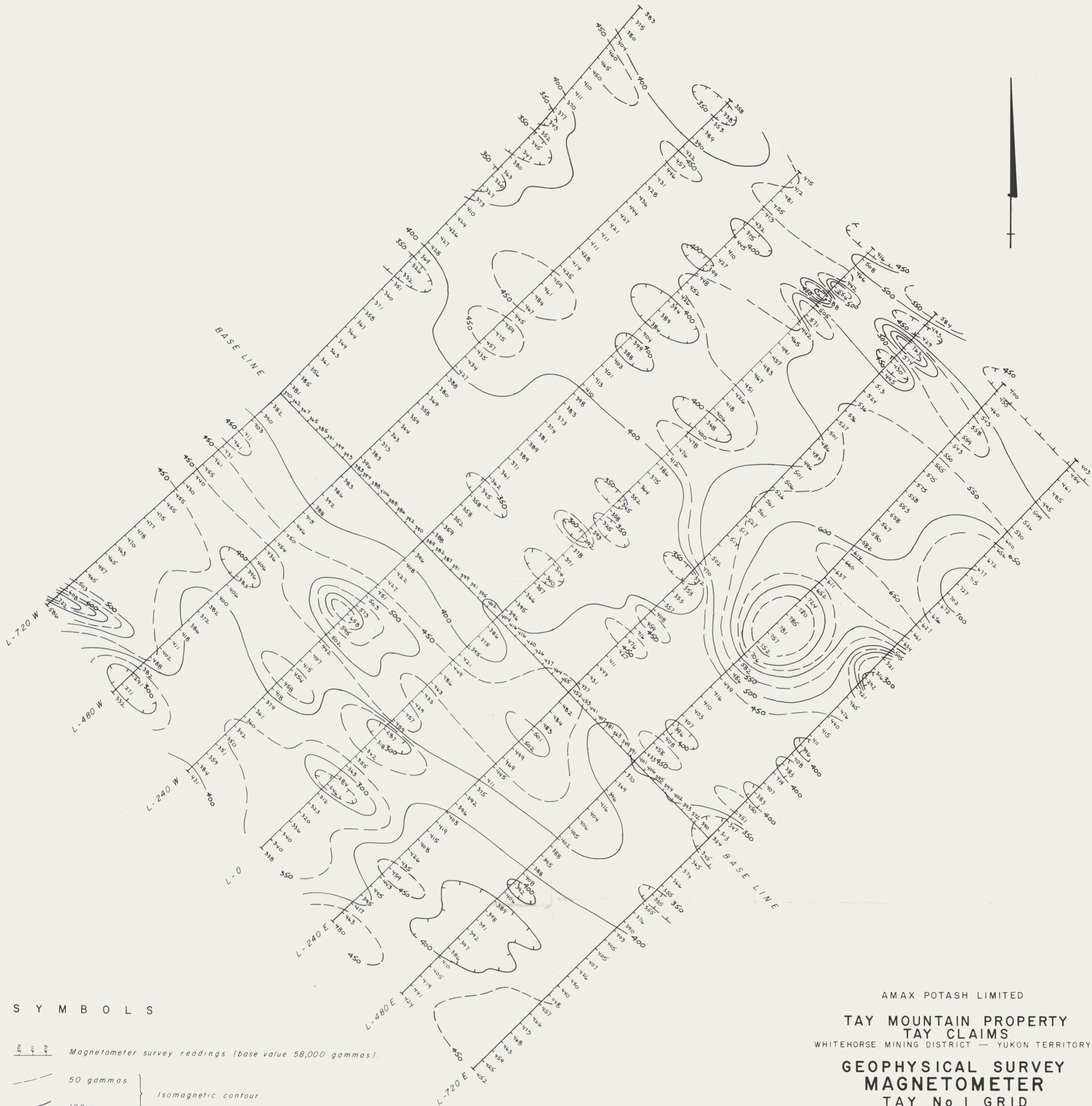
Three conductors or conductive systems were detected by the HEM survey. Two conductors (A and B) are explained by the presence of graphite. Conductor B is a broad zone characterized by low conductance. Two zones of slightly higher conductance were detected along the north edge of conductor B but shallow interpreted depth places them within range of other exploration techniques. Conductor system C was not explained but probably reflects weak graphitic horizons in an area of relatively poor outcrop exposure. A substantial magnetic anomaly suggests conductor C' is characterized by widespread pyrrhotite as opposed to the narrow and restricted occurrences of pyrrhotite sporadically associated with other conductors. Although conductor C' has favourable properties; its economic potential is limited because geology and/or geochemistry should have revealed more at the relatively shallow depth of the conductor.

Grid 2

The normal shape of anomalies associated with EM conductors has been disrupted because of the flat lying stratigraphy. Most of the conductors detected are explained by known graphitic zones. There are no anomalies present that are indicative of the existence of a large massive sulphide deposit.

J.L. LeBel Dec. 7/78
J.L. LeBel





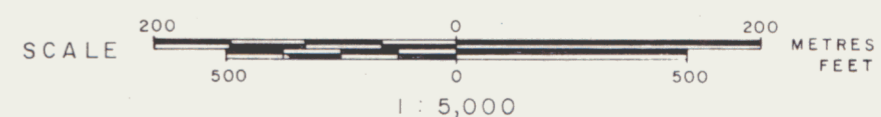
S Y M B O L S

- Magnetometer survey readings (base value 58,000 gammas).
 - 50 gammas
 - 100 gammas
 - Magnetic low.
- } Isomagnetic contour.

Instrument G-816

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TAY MOUNTAIN PROPERTY
TAY CLAIMS
 WHITEHORSE MINING DISTRICT — YUKON TERRITORY

GEOPHYSICAL SURVEY
MAGNETOMETER
TAY No 1 GRID



To accompany 1978 Geophysical Assessment Report by J. L. LeBel.

J. L. LeBel Dec 7/78

Vancouver —

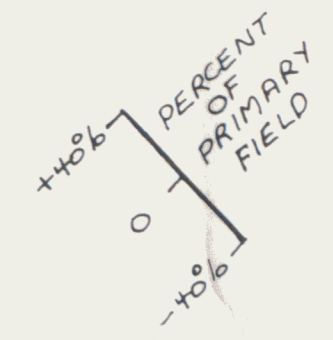
J. L., H. P.

N.T.S. Ref 5 and 12

FIG. 4



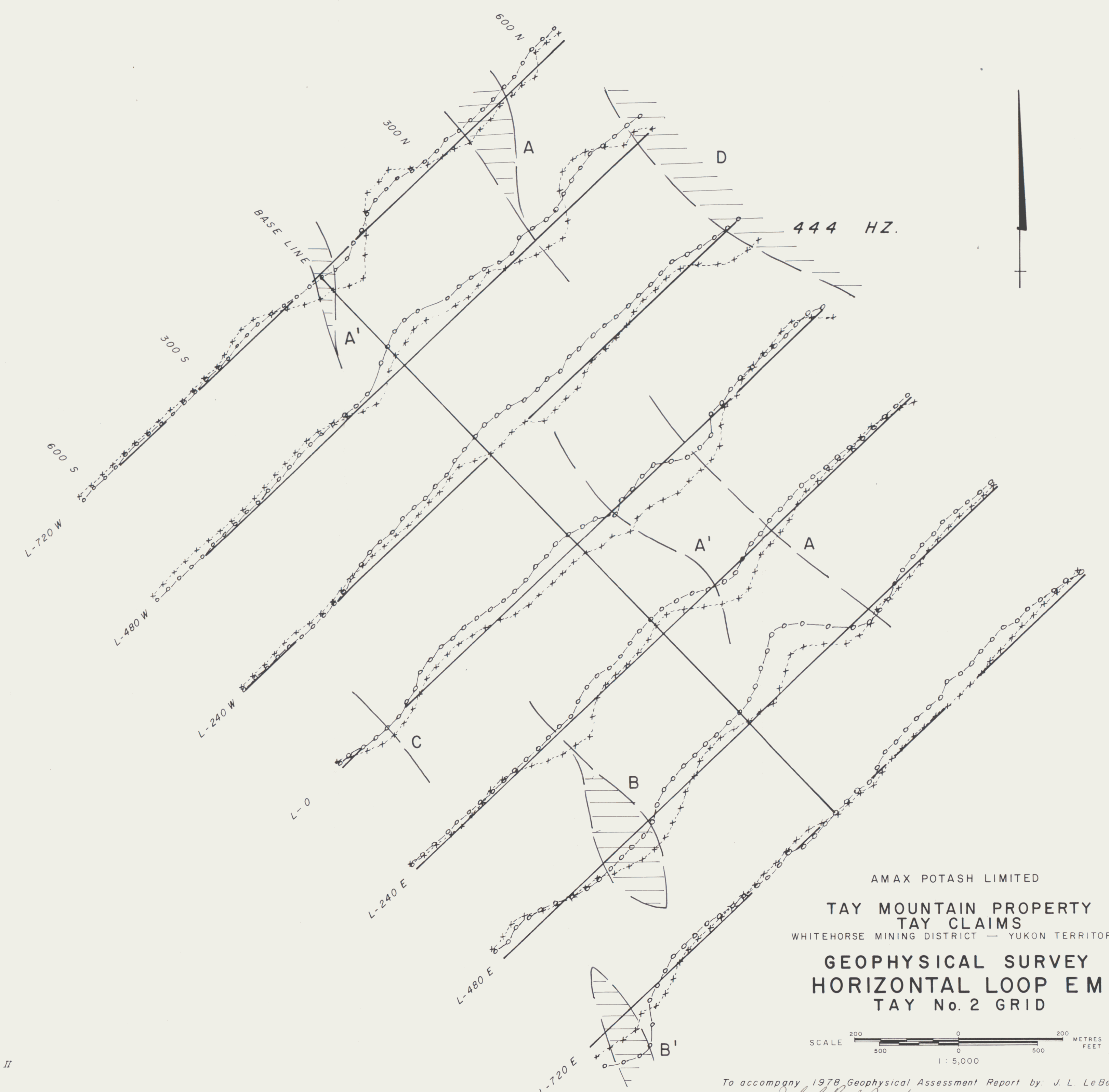
1777 HZ.



S Y M B O L S

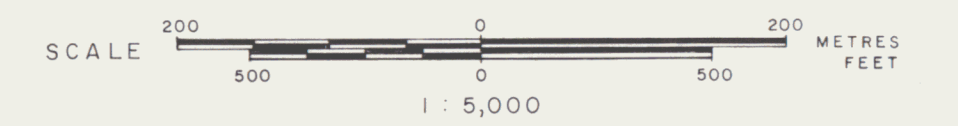
- In phase profile.
- ×--- Quadrature profile.
- /--- Conductor axis.

Instrument Max Min II
Coil separation 180 m.



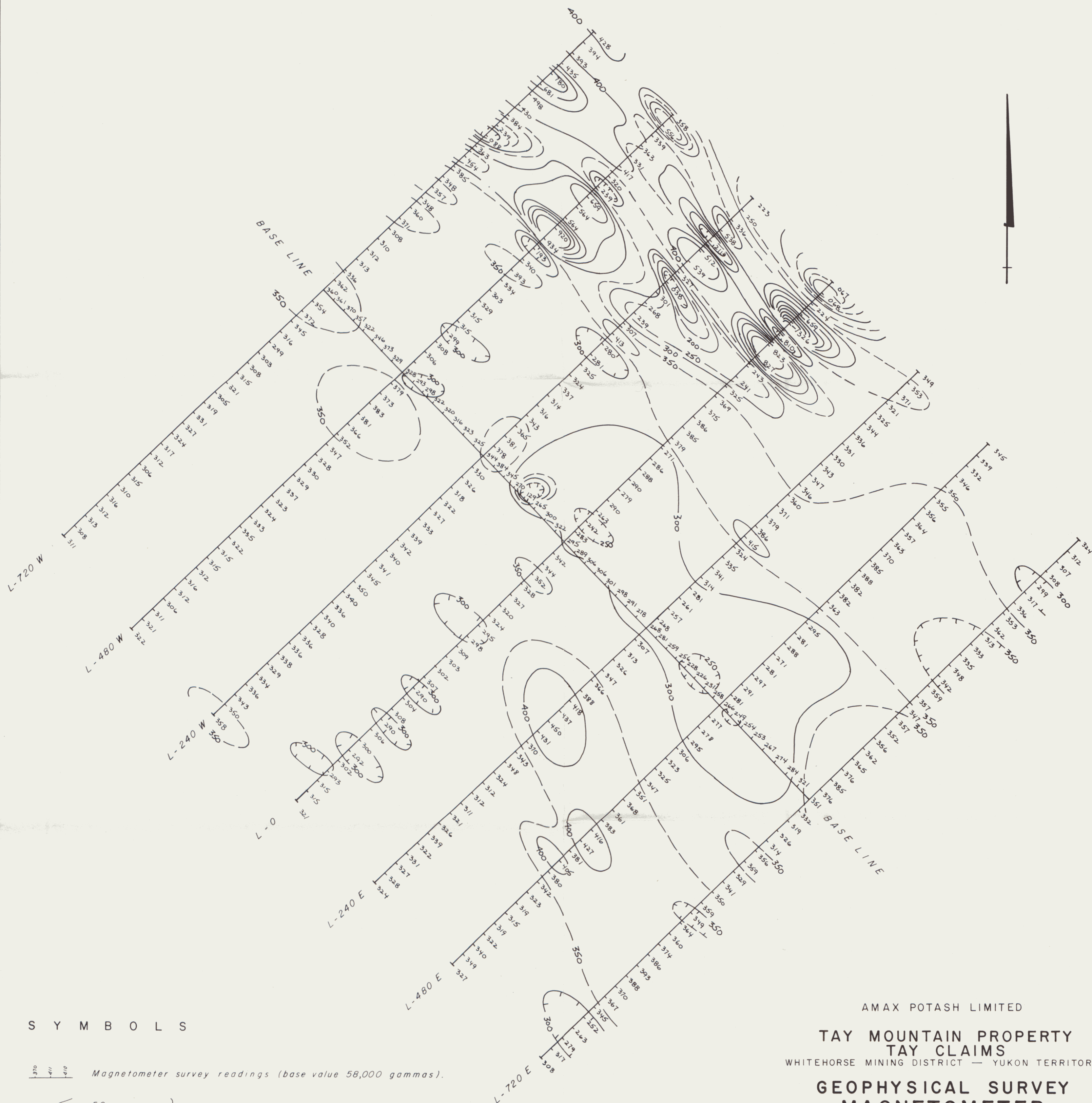
444 HZ.

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TAY MOUNTAIN PROPERTY
TAY CLAIMS
WHITEHORSE MINING DISTRICT — YUKON TERRITORY
GEOPHYSICAL SURVEY
HORIZONTAL LOOP EM
TAY No. 2 GRID



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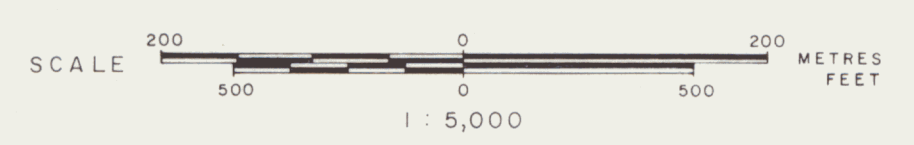
S Y M B O L S

- Magnetometer survey readings (base value 58,000 gammas).
- 50 gammas
- 100 gammas
- Magnetic low.

Instrument G-816

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 TAY MOUNTAIN PROPERTY
 TAY CLAIMS
 WHITEHORSE MINING DISTRICT — YUKON TERRITORY

**GEOPHYSICAL SURVEY
 MAGNETOMETER
 TAY No. 2 GRID**



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J. L., H. P.

N.T.S. Ref 105 K 12

FIG. 6