MINING RECORDER

1978 Geophysical Assessment Report

Electromagnetic and Magnetic Surveys

TITLE	Fishook Creek Property AM 1-176, BM 1-48, PM 1-8 FR.
AUTHOR	J.L. LeBel
DATE	December, 1978
COMMODITY	Pb-Zn
LOCATION	Anvil Range, Yukon Territory Whitehorse Mining District Latitude $62^{\circ}32'$N, Longitude $134^{\circ}10'$W $62^{\circ}33'$N, $134^{\circ}13'$W NTS 105 L 9
WORK PERIOD	July 28 - August 18, 1978 August 22 - August 28, 1978

AMAX VANCOUVER OFFICE

090401

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 $13 200.00

Resident Geologist or ~~Resident Mining Engineer~~

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

B. R. BAXTER
Supervising Mining Recorder

for Commissioner of Yukon Territory

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ILLUSTRATIONS

SUMMARY

Horizontal loop electromagnetic surveys and magnetic surveys were conducted on two grids on the northwest end of the Fishook Creek property to follow-up airborne electromagnetic anomalies in favourable graphitic quartz sericite schists. A weak conductor consistent with the airborne anomaly was defined on Grid 1. On Grid 2, two of the conductors located were explained by graphitic phyllite. A third, unexplained conductor on Grid 2 is probably caused by overburden.

INTRODUCTION

During the period August 22 to August 23, 1978 horizontal loop electromagnetic (HEM) surveys and magnetometer surveys were conducted on two grids on the Fishook Creek property. Two lines of very low frequency electromagnetic (VLF-EM) measurements were made on the Fishook Creek Grid 1.

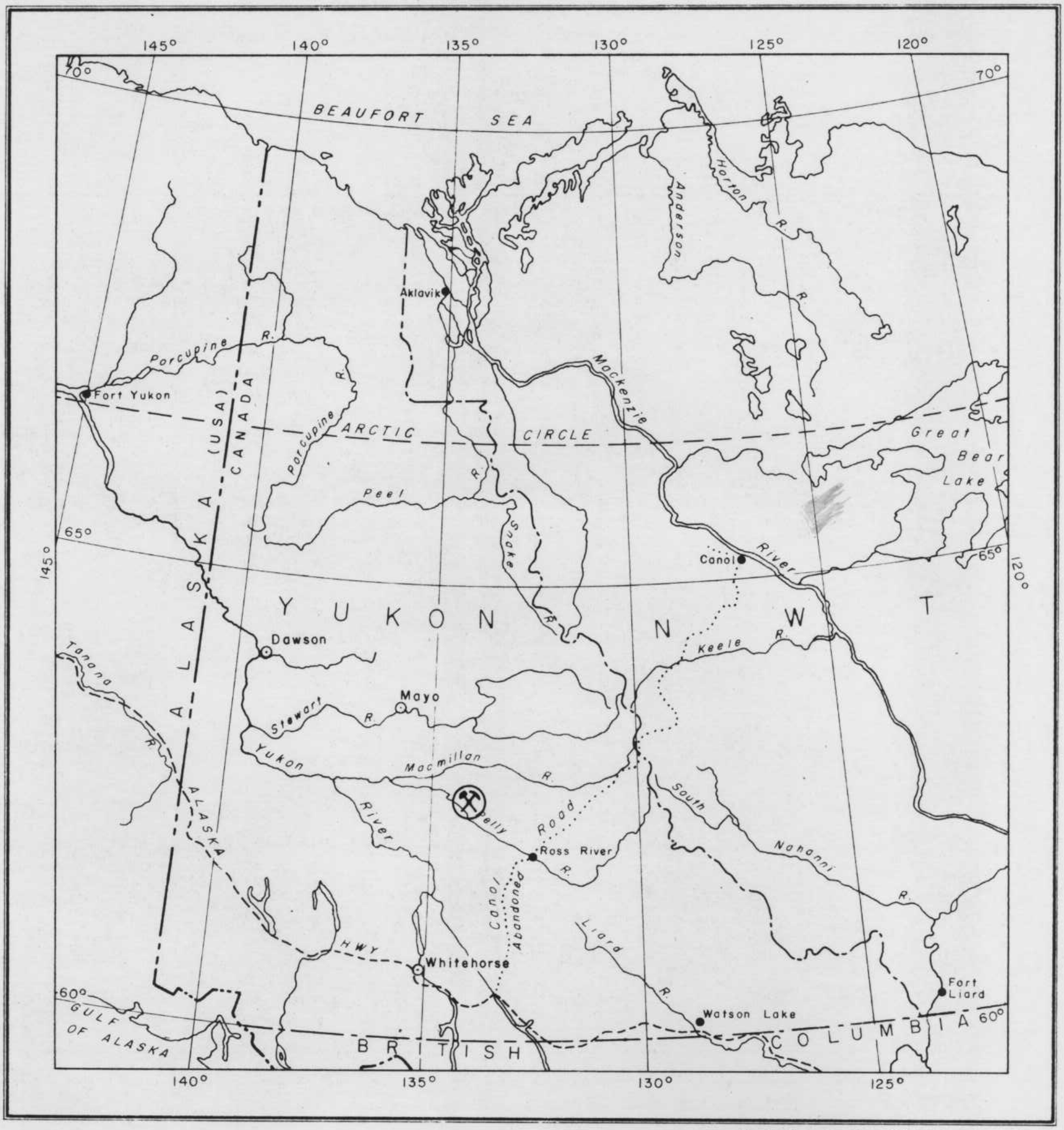
The Fishook Creek property, located about 50 km northwest of Faro, Yukon Territory, in the Whitehorse Mining District (NTS 105 L/9, Figure 1), consists of claims AM 1-176, BM 1-148, and PM 1-8 Fr (Figure 2). Access is by helicopter from Faro or Ross River.

Grid 1 consists of 11.7 km of picket lines centred at coordinates 62°32'N latitude and 134°10'W longitude. Grid 2 consists of 12.5 km of lines centred at 62°33'N latitude and 134°13'W longitude.

The grids consist of lines spaced at 240 m intervals with pickets placed at 30 m true horizontal distances. Slopes and slope lengths required for the "secant chaining" were determined with a Suunto Model PM-5 inclinometer. Line cutting and chaining was done by Eastman Associates of Whitehorse, Y.T.

The HEM surveys (10.2 and 10.6 km on Grids 1 and 2 respectively) was conducted by a two-man crew from Geoterrex Limited of Ottawa, Ontario. The magnetometer survey (12.5 km) on Grid 2 was done by an operator subcontracted by C.A. Ager and Associates, Vancouver, B.C. The magnetometer survey (11.7 km) and VLF-EM survey (2.8 km) on Grid 1 were conducted by AMAX personnel.

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



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AMAX POTASH LIMITED

FISHOOK CREEK PROPERTY
AM, PM AND BM CLAIMS

WHITEHORSE MINING DISTRICT — YUKON TERRITORY

LOCATION MAP

SCALE 1" = 120 MILES

Vancouver - H.P.

FIG. 1

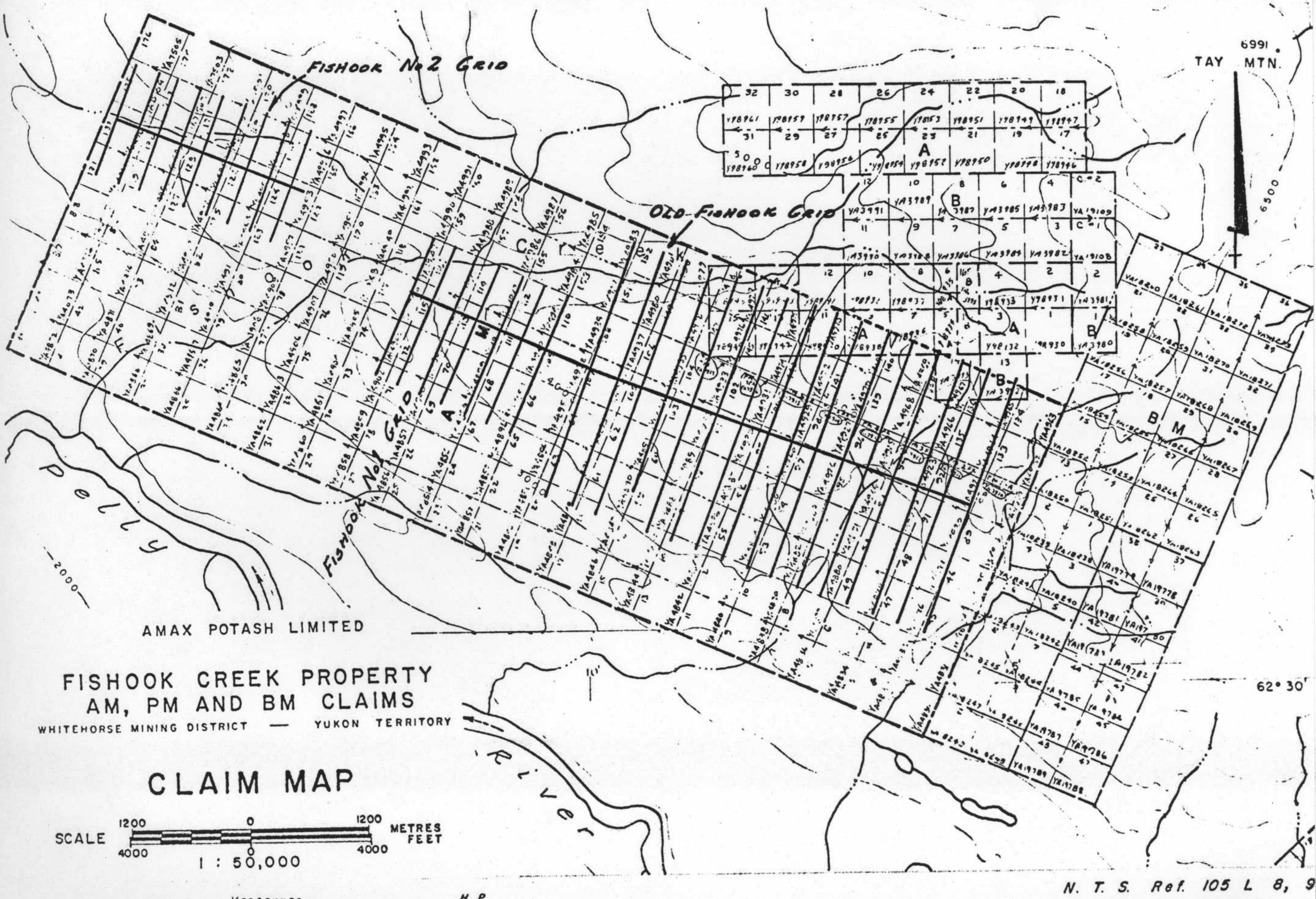
FISHOOK No 2 GRID
OLD FISHOOK GRID
FISHOOK No 1 GRID
6991
TAY MTN.
6500
2000
62° 30'
Pelly River
AMAX POTASH LIMITED
FISHOOK CREEK PROPERTY
AM, PM AND BM CLAIMS
WHITEHORSE MINING DISTRICT — YUKON TERRITORY
CLAIM MAP
SCALE
1200 0 1200 METRES
4000 0 4000 FEET
1 : 50,000
Vancouver —
H. P.
N. T. S. Ref. 105 L 8, 9

FIG. 2

PROPERTY GEOLOGY

Northeast striking Cambro-Ordovician phyllites and metabasites underlie most of the Fishook Creek property. The phyllites dip generally to the southwest off the flanks of a Cretaceous quartz-monzonite intrusion which occupies the core of the northwest trending Anvil Arch. Small folds parallel to the axis of the Arch cross the northern claims and have increased the exposure of graphitic units within the phyllite.

The youngest lithology of the property consists of massive metabasites with associated calc-silicate exposed along the southern half of the AM claims. The contact of the calc-silicate-metabasite unit with the underlying chloritic and sericitic phyllites may be a thrust fault. The underlying chloritic phyllites are generally calcareous and locally weakly graphitic. The sericitic phyllite varies from a laminated quartz-sericite phyllite to a papery weathering sericite phyllite. Most of the quartz-graphite and sericite-graphite units are hosted by the sericitic phyllite and are particularly abundant in the northeastern portion of the claim block. Visible sulphide content in graphitic outcrops rarely exceeds 3% combined pyrite and pyrrhotite.

Economic interest is centred on the graphitic units in the sericitic phyllite. Geophysical surveys have attempted to outline the surface expression and down dip extension of these graphitic units.

A more detailed discussion of the geology is presented in Geological and Geochemical Assessment Report of the Fishook Creek Property, November, 1978 by A.C. Hitchins and R.G. Kidlark.

EQUIPMENT AND PROCEDURE

The HEM surveys were conducted with an Apex Parametrics Max-Min II system using frequencies of 444 and 1777 hertz and a station separation and reading interval of 180 and 30 m, respectively. On Grid 1, two lines were surveyed with 150 m station separation because in places the slopes were too steep to maintain the 180 m separation even with a 200 m cable. The in-phase and out-of-phase components of the resultant electromagnetic field referenced in percent of the primary field were recorded. Coil co-planarity was maintained by using average intercoil slopes determined from slope records kept by the line cutters. These data were also used to subsequently 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 back-pack harness thereby limiting measuring accuracy to ±5 gammas. Readings were taken every 30 m. Accurate base stations were established along the base line of each grid so that diurnal variations in the magnetic field could be monitored (and subsequently removed) each time the base line was crossed during the survey.

The VLF-EM measurements on Grid 1 were taken with a Phoenix Geophysics Ltd. VLF-2 receiver using the transmitter station at Seattle. Dip angle and relative field strength of the electromagnetic field were measured 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

The results of the HEM survey are presented in profile sections at 1:5,000 horizontal scale (Figures 3 and 5). The scale of the profiles shown on each map is approximately 1 cm = 33%.

Conductor axes are indicated by heavy dashed lines and labelled alphabetically. Width of the conductor is indicated by cross-hatching. Conductors are picked separately from high and low frequency results to emphasize any differences in length and position that may be present.

The results of the magnetometer survey are shown in 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 gammas) are identified by a bar over the number.

The results of the VLF-EM survey from Grid 1 are also shown in profile superimposed on the low frequency HEM results (Figure 3) with scales 1 cm = 10^{0} and 1 cm = 50% for dip angle and field strength respectively. According to the convention adopted for recording dip angles the direction of dip indicates the direction to the axis of the conductor.

RESULTS

Grid 1

One significant conductor consistent with the results from the AEM survey was detected on Grid 1. The AEM results indicate that a weak high frequency anomaly on Line 720W at 360S forms the southeastern limit of conductor A from Grid 2.

Conductor A

Conductor A consists of anomalies at the north ends of all the lines. At its widest part on Line 240E the conductor agrees in position and width with a 3 peak AEM anomaly.

Conductor A tapers from 180 m wide on Line 240E to a narrow width on Line 720W. East of Line 240E, progressively weaker high frequency anomalies and absence of low frequency anomalies suggest the conductor ends near the east limit of the grid as indicated by the AEM results. On the centre 3 lines of the grid high frequency out-of-phase anomalies extend south from the axis of the conductor. Anomaly amplitudes (up to 80%) are larger than expected from a subvertical narrow half plane conductor. Foliation dips about 50^0-60^0 relative the steep slope on which the conductor outcrops but no consistent pattern of dip is indicated by the HEM results. The positive shoulder south of the conductor on Line 240E suggests a south dip but the character of the north shoulder for comparison is not disclosed because of abbreviated coverage.

The VLF-EM conductors located at 240W,300N and 0,330N coincide with the axis of the HEM conductor. Although there is no change in character of the HEM anomalies the VLF-EM dip angle anomaly is better on Line 240W than on Line 0. VLF anomalies at 0,240N and 240W,150N on the edge of the HEM anomaly define a conductor which may account for the wide width of the HEM conductor. Another VLF-EM conductor near the base line on Lines 0 and 240W occurs within the weak HEM high frequency out-of-phase anomaly. Two VLF-EM conductors are present on Line 0 and three conductors occur on Line 240W southwest of the base line where no HEM anomalies were recorded. The effects of topography are evident in the VLF-EM survey. The steep slope in the north half of the grid causes the predominent south dip angles and reduced horizontal field strength while the south facing slope south of the base line produces predominantly north dip angles.

Conductor A, in part, follows a magnetic low but at its widest section on Line 240E, also encompasses a narrow 300 gamma high. The narrow low on the north side of the anomaly is a geometric effect.

Grid 2

Three conductors were defined by the HEM survey. The main feature defined by conductors A and A' correspond to the primary AEM target. Conductor B is also reflected in the AEM survey but an airborne response over conductor C was not recognized until after the conductor was identified by the HEM survey.

Conductor A and A'

Although conductor A-A' is continuous, two segments are designated because a broad out-of-phase anomaly between 090N and 150S on Line 240E reflects a reduction in the conductance of the conductor from adjacent lines. The maximum width (150 m) of conductor A is achieved on Line 960W, however, the low frequency results indicate two narrow parallel conductors rather than a single wide one. The out-of-phase lobes on the anomalies on Lines 240W and 480W are characteristic of a wide conductor.

Conductor A associates with a variety of magnetic responses. The west end occupies a broad magnetic low while the eastern end (conductor A'), in part, coincides directly with a modest zone of magnetic highs which includes a narrow 450 gamma peak at 480E, 150S.

Conductor B

Conductor B is defined by incomplete anomalies at the south end of Lines 240E and 480E. The AEM results indicate that the conductor ends between Lines 0 and 240W.

Conductor B occurs in an area with moderate magnetic relief. The axis of the conductor, as defined, crosses the magnetic grain arbitrarily selected for contouring.

Conductor C

Conductor C is a weak and narrow feature defined for a length of 1500 m. The conductor parallels a creek bed discordant to stratigraphic foliation.

Conductor C occurs on a series of modest intermittent magnetic highs which mark the north edge of a broad region of low magnetic relief which bisects the grid.

DISCUSSION OF RESULTS

Grid 1

Conductor A is explained by graphite within the chlorite phyllite assemblage on Lines 0, 240W, and 480W and clearly indicates that the graphite extends beyond its mapped limits. The dramatic increase in width of the conductor on Line 240E is artificially caused by a simultaneous decrease in topographic slope and stratigraphic dip. The conductor is relatively poor. The VLF survey suggest two conductors rather than a single wide one.

The VLF anomalies southwest of the base line appear to reflect bands of marble accompanied by minor graphite.

Grid 2

Graphite mapped between 270S and 300S on Line 0 explains conductor A. Elsewhere conductors A and A' are unexplained but outcrops are widely scattered and it is possible for the cause of the conductor to go undetected.

An outcrop containing graphite was mapped at the projected position of conductor B on Line 0.

Conductor C is not explained but low interpreted conductance (2 mhos) strike direction discordant to the foliation and proximity to a creek support an overburden cause but a correlating magnetic anomaly suggests a bedrock source.

CONCLUSIONS

On Grid 1 the HEM conductor outlined was explained by the presence of graphite. No favourable anomalies were detected in the down-dip extension of the conductor.

On Grid 2 conductors A and A' represent the principal AEM target but grid location allowed limited down-dip coverage of the feature.

Geologic evidence suggests conductors A, A' and B are caused by graphite although not all individual anomalies are specifically explained. It is not clear from the evidence whether conductor C is caused by overburden or is a valid bed-rock feature. All electromagnetic and magnetic anomalies detected on Grid 2 are caused by shallow sources.

J L LeBel Dec 7/78

J.L. LeBel

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FISHOOK CREEK PROPERTY
AM, PM AND BM CLAIMS
WHITEHORSE MINING DISTRICT — YUKON TERRITORY

GEOPHYSICAL SURVEY
HORIZONTAL LOOP EM
FISHOOK No I GRID

SCALE 200 0 200 METRES
500 0 500 FEET
1:5,000

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

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FIG. 3

SYMBOLS

Magnetometer survey readings (base value 58,000 gammas).

50 gammas } Isomagnetic contour.

100 gammas } Isomagnetic contour.

Magnetic low.

Instrument G-816

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FISHOOK CREEK PROPERTY
AM, PM AND BM CLAIMS

WHITEHORSE MINING DISTRICT — YUKON TERRITORY

GEOPHYSICAL SURVEY
MAGNETOMETER
FISHOOK No. I GRID

SCALE 200 0 200 METRES
500 0 500 FEET
1 : 5,000

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FIG. 4

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FISHOOK CREEK PROPERTY
AM, PM AND BM CLAIMS

WHITEHORSE MINING DISTRICT — YUKON TERRITORY

GEOPHYSICAL SURVEY
HORIZONTAL LOOP EM
FISHOOK No. 2 GRID

SCALE 200 0 200 METRES
500 0 500 FEET
1 : 5,000

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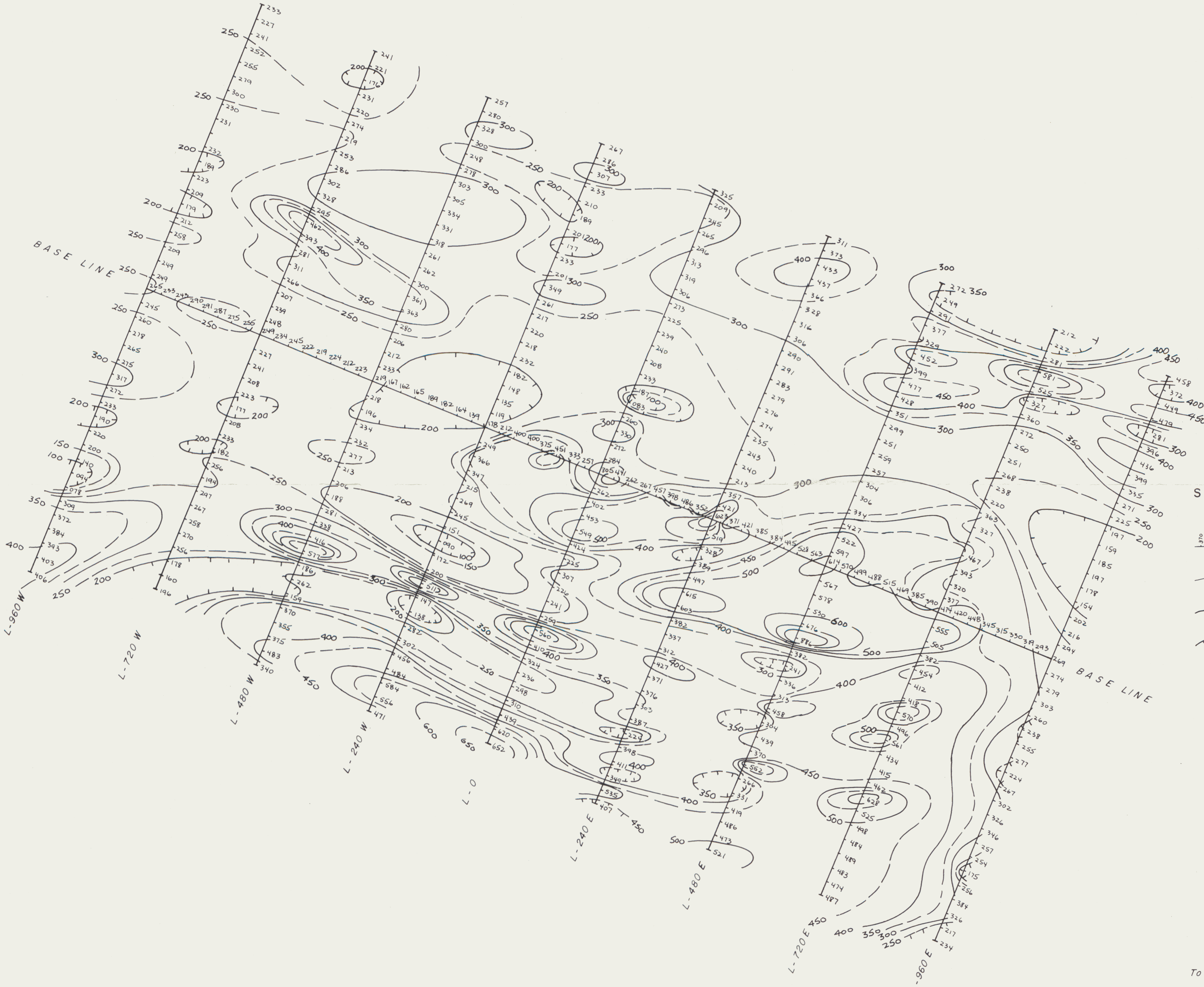
FIG. 5



S Y M B O L S

Magnetometer survey readings (base value 58,000 gammas).

50 gammas } Isomagnetic contour.

100 gammas

Magnetic low.

Instrument G-816

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FISHOOK CREEK PROPERTY
AM, PM AND BM CLAIMS
WHITEHORSE MINING DISTRICT — YUKON TERRITORY

GEOPHYSICAL SURVEY
MAGNETOMETER
FISHOOK No. 2 GRID

SCALE 200 0 200 METRES
500 0 500 FEET
1 : 5,000

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FIG. 6