GEOPHYSICAL REPORT

on an

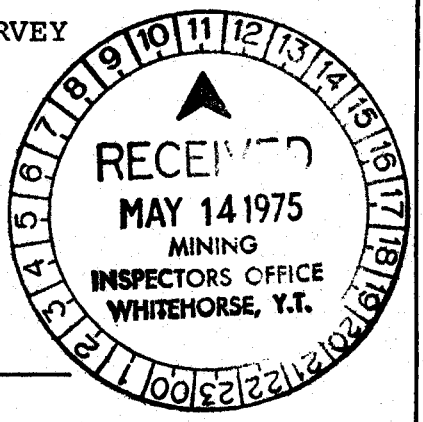
AIRBORNE MAGNETIC AND VLF-EM SURVEY

on the

MAG CLAIM GROUP

BONNET PLUME AREA

MAYO M.D., YUKON TERRITORY

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**LOCATION:** 64°26'; 133°05'

9 Miles N45E of Bonnet Plume Pass and 280 miles N12E of Whitehorse.

**CLAIM SHEET:** 106-C-6

**SURVEY DATE:** May 21 - 25, 1974

**REPORTED BY:** David G. Mark,
Geophysicist,
Geotronics Surveys Ltd.,
302 - 475 Howe Street,
Vancouver, B.C.

**FOR:** Menika Mining Ltd.,
2245 West 13th Avenue,
Vancouver, B.C.

**DATED:** April 3, 1975

Department of Indian Affairs & Northern Development
Northern Natural Resources
and
Environment Branch
MAY 6 1975
Mayo Mining District
Mining Recorder and Land Agent

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

$ 3600.00

D. B. Craig

Resident Geologist or
~~Resident Mining Engineer~~

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

Commissioner of Yukon Territory

Magni Managerial Ltd.
2245 West 13th Avenue
Vancouver, B.C.

May 30, 1974

INVOICE TO:

Menika Mining Ltd.
475 Howe Street
Vancouver, B.C.

RE: Airborne VLF-EM and Magnetic Survey
Mag Group of Claims
Bennet Plume River Area, Yukon Territory
May 21st - 25th, 1974.

| | |
|---|---|
| 1 Electronics Engineer @ $150.00/day for 3 days | $450.00 |
| 1 Navigator @ $100.00/day for 3 days | 300.00 |
| Installation charges | 200.00 |
| TOTAL | $950.00 |

# TRANS NORTH TURBO AIR (1971) LTD.

BOX 4338, WHITEHORSE, YUKON

TELEPHONE (403) 668-2177 • TELEX 036-8-290

ACCOUNT NUMBER 353

2301

INVOICE DATE 04 05 84

AREA: B.C. ☐ YUKON ☐ NWT ☐ ALTA. ☐

CHARTERER: CHARLES BOITARD

BILLING ADDRESS: 905 CLIFFMONT

VANCOUVER B.C.

A/C TYPE

AIRCRAFT REGISTRATION C-GNAL

FLIGHT DATE: DAY 12 MONTH 05 YEAR 84

PURCHASE ORDER NO.

| FUEL $ OIL-X TNTA | CUST. | TNTA FUEL USED | HRS.-GALS. | FROM |
|---|---|---|---|---|
| | | | | |

| FROM | TO | MILES | HOURS | ZONE | FREIGHT LBS. | NO. OF PASS. - REMARKS |
|---|---|---|---|---|---|---|
| [illegible] | PIC [illegible] LAKE | | | | | |
| | SURVEY [illegible] WORK [illegible] | | 2.7 | | | |

| SUB | G.L. | | AMOUNT | |
|---|---|---|---|---|
| 3/4 | ST2/2 | | 1111 | 52 |
| 3/4 | ST1/1 | | 60 | 30 |
| | | | | |
| | | | | |

3.7 @ 285.00 1111 52

@

@

@

TERMS: ONE PERCENT INTEREST PER MONTH WILL BE CHARGED ON ALL INVOICES NOT PAID WITHIN 30 DAYS OF DATE ISSUED.

| | | | | |
|---|---|---|---|---|
| WAITING TIME | | @ | /HR. | |
| FUEL: | 90 | @ 67 | /GAL. | 60 30 |
| FUEL: | | @ | /GAL. | |
| MEALS & LODGING | | | | |
| OTHER | | | | |
| OTHER | | | | |

DOMONICOS

CHARTERER'S SIGNATURE

PILOT'S SIGNATURE

ENGINEER'S NAME

TOTAL $ 1171 82

BASE COPY

A

# TRANS NORTH TURBO AIR (1971) LTD.

BOX 4338, WHITEHORSE, YUKON

TELEPHONE (403) 668-2177 • TELEX 036-8-290

NUMBER 2303

INVOICE DATE 01 04 15 74

AREA: B.C. YUKON NWT ALTA.

CHARTERER: CHARLES RUTLAND

BILLING ADDRESS: 3345 WEST 13TH AVE. VANCOUVER B.C.

A/C TYPE: BELL 206B

AIRCRAFT REGISTRATION: [illegible]

FLIGHT DATE: DAY 24 MONTH 9 YEAR 74

PURCHASE ORDER NO.

| FUEL $ OIL-X TNTA | FUEL $ OIL-X CUST. | TNTA FUEL USED | HRS.-GALS. | FROM |
|---|---|---|---|---|
| X | | 60 IMP. GAL. | | MAYO. |

| FROM | TO | MILES | HOURS | ZONE | FREIGHT LBS. | NO. OF PASS. - REMARKS |
|---|---|---|---|---|---|---|
| MAYO | TWELVE MILE LAKE | | | | | |
| TWELVE MILE LAKE | MAYO | | | | | |
| MAYO | WATER PUMPS | | 2.5 | | | |

| SUB | G.L. | | AMOUNT | |
|---|---|---|---|---|
| 31/4 | 5712 | | 712 | 50 |
| 31/4 | 5711 | | 40 | 20 |
| | | | | |
| | | | | |

2.5 @ 285 712 50

@

@

@

TERMS: ONE PERCENT INTEREST PER MONTH WILL BE CHARGED ON ALL INVOICES NOT PAID WITHIN 30 DAYS OF DATE ISSUED.

| | | | |
|---|---|---|---|
| WAITING TIME | @ | /HR. | |
| FUEL: 60 | @ 67 | /GAL. | 40 20 |
| FUEL: | @ | /GAL. | |
| MEALS & LODGING | | | |
| OTHER | | | |
| OTHER | | | |

TOTAL $ 752 70

CHARTERER'S SIGNATURE

PILOT'S SIGNATURE

ENGINEER'S NAME

BASE COPY

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MAP - AT END OF REPORT

| | | |
|---|---|---|
| LOCATION & CLAIM MAP | 1" = 2680 feet | Figure 1 |

MAPS - IN POCKET

| | | |
|---|---|---|
| AIRBORNE MAGNETIC SURVEY DATA AND CONTOURS | 1" = 500 feet | Sheet #1 |
| AIRBORNE VLF-EM SURVEY DATA AND CONTOURS | 1" = 500 feet | Sheet #2 |

SUMMARY

A combined airborne magnetic and VLF-EM survey was carried out over the Mag Claim Group located on the Bonnet Plume River about nine miles N45E of Bonnet Plume Pass and 280 miles N12E of Whitehorse. Access to the property is either by float aircraft or helicopter. The terrain of the claim group is fairly flat in otherwise rugged topography. The object of the survey was to locate potential areas for sulphide deposits.

The property is covered largely by overburden, is probably underlain by Precambrian dolomites. Extensive northerly and predominantly northwesterly faulting is indicated in the general area.

The instruments used were an Elsec nuclear free precession magnetometer and a Sabre VLF-EM instrument connected to analog recorders. The surveys were flown from a helicopter at a terrain clearance of 400 feet, and a line spacing of 425 to 525 feet. Values were picked off of the profiles, plotted on maps, and contoured.

The magnetic survey revealed no anomalies and the VLF-EM survey revealed five.

CONCLUSIONS

1. The magnetic survey revealed no anomalies and served only to verify that the property is underlain by sedimentary rocks (dolomites).

If the basement rocks have a magnetic character, than the survey also showed that the sediments are fairly thick (200 feet or more?)

2. Some of the VLF-EM anomalies may only be a result of noise. Conversely, some VLF-EM anomalies of lower intensity could be masked by noise.

3. Anomaly A is considered to be a definite anomaly and has a good chance of being caused by sulphides and/or graphite.

4. Anomaly B is considered to be a probable anomaly and likeiwse could well be caused by sulphides and/or graphite.

5. Anomalies C, D and E are small one-line anomalies and have a greater possibility of being only noise.

6. Though not likely with Anomaly A, and not much more likely with B, the VLF-EM anomalies could be caused by faults, shears, and/or underground water courses.

7. Further work is needed to assess the property's mineral potential.

RECOMMENDATIONS

1. A grid should be placed on the property with the survey lines 400 feet apart. Direction of the baseline and survey lines should be determined after careful consideration of the geology of the area.

2. The property should be geologically mapped. Because much of the property is underlain by overburden, this may entail mapping the geology outside of the property boundaries. A geological survey very much assists with interpretting geophysics.

3. A ground VLF-EM survey should be run over the property's grid with stations at 100-foot intervals.

4. A soil geochemistry survey should be conducted with the samples being picked up at 100-foot intervals over the 400-foot spaced lines.

5. Since the property is located in a river valley, two or three 500 to 1000 foot seismic refraction profiles should be run to determine the thickness of the overburden.

Respectfully submitted,
GEOTRONICS SURVEYS LTD.,

David G. Mark
Geophysicist

April 3, 1975

GEOPHYSICAL REPORT

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AIRBORNE MAGNETIC AND VLF-EM SURVEY

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MAG CLAIM GROUP

BONNET PLUME AREA

MAYO M.D., YUKON TERRITORY

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## INTRODUCTION AND GENERAL REMARKS

This report discusses the procedure, compilation and interpretation of a combined airborne magnetometer and very low frequency electromagnetic (VLF-EM) survey carried out over the Mag Claim Group during May 21-25, 1974.

The field work was carried out be Stanley Mauer, instrument operator, and Charles Boitard, navigator. The total number of survey miles flown was 30.3.

The object of the survey was to search for economic sulphide mineralization. The purpose of the magnetometer was to search for mineral bodies associated with magnetite and/or pyrrhotite. That of the VLF-EM instrument was to search for sulphides in massive form. A secondary object of both instruments was to obtain information on the structural geology of the property.

## FIELD PERSONNEL

| Name | Capacity | Address |
|---|---|---|
| Stanley Mauer | Instrument Operator and Field Supervisor | 4245 E. Hastings St. Burnaby, B.C. |
| Charles Boitard | Navigator | 2245 W. 13th Avenue Vancouver, B.C. |

Mr. Stanley Mauer is an electronics engineer who specializes in the designing of geophysical instruments. He is the proprietor of Sabre Electronic Instruments Ltd. at 4245 East Hastings Street, Burnaby, British Columbia. He designed and built the airborne VLF-EM instrument of this survey and put together the components of the airborne system. He has carried out numerous airborne surveys throughout Western Canada.

## LOCATION AND ACCESS

The property is located on the Bonnet Plume River about 9 miles N45E of Bonnet Plume Pass and 42 miles S30E of Fairchild Lake. It is also 80 miles N50E of Keno Hill and 280 miles N12E of Whitehorse.

The geographical co-ordinates are 64°26' N latitude and 133° 05'W longitude.

Access is best by helicopter or fixed-wing float aircraft (which can be landed on Bonnet Plume River) for which there is a base at Mayo 105 miles to the southwest.

## PROPERTY AND OWNERSHIP

The property is comprised of 36 contiguous mineral claims described below and shown on fig. 1.

| Claim Name | Record No. | Expiry Date |
|---|---|---|
| Mag 1-28<br>Mag 33-40 | Y87304-'39 | March 12/75 |

The above expiry date does not take into account the assessment credits that may be gained from the airborne magnetic and VLF-EM survey. One year on each claim has been applied for and if it is accepted, then the expiry date will be March 12, 1976.

## PHYSIOGRAPHY

The property is found in the Bonnet Plume Valley between the Bonnet Plume Range and the Rackla Range of mountains which form part of the physiographic division known as the Selwyn Mountains. The general area is quite rugged with steep slopes and elevations varying from less than 3000 feet in the valleys to over 6500 feet on the mountain peaks.

Over most of the claims area the terrain is fairly flat with the elevation ranging only from 2800 feet to 3000 feet asl. However, on the southern part of the group, the claims cover the side of the valley and therefore reach over 3500 feet asl.

The main source of water in and around the claims area is the Bonnet Plume River which flows eastsoutheasterly through the northern portion of the claims group. Also two or three of its tributaries are found within the group.

## HISTORY OF PREVIOUS WORK

No other work is known to have been carried out over the Mag Claim Group.

## GEOLOGY

The following is quoted from Mr. Sookochoff's report:

> "The property lies in the Bonnet Plume Valley which separates the Bonnet Plume Range to the northeast and the Rackla Range to the southwest. The property is enveloped mainly by Precambrian rocks of grey-weathering, medium to thick bedded,

fine-grained dolomite to the south and east, brown shale, siltstone and conglomerate with minor dolomite to the north, and possibly Cambrian slates, quartzites and carbonates to the east."

"Although the property is predominantly covered by overburden, the Precambrian dolomites which are favorable hosts for stratabound zinc mineralization can be projected to underlay the claim group. Extensive northerly and predominantly northwesterly faulting is indicated in the general area.

"Barrier Reef, on the property 16 miles to the west, has announced a near surface deposit of about 1.6 million tons of 10% zinc in sulphides and 3% zinc in oxides and carbonates as well as minor but significant silver and cadmium values. The mineralized zone occurs in dolomite beds, dipping $5^{o}$-$10^{o}$ southward. Its core consists of an elongated, steep walled collapse breccia mass about 100 feet wide having stratiform "wings" with an average thickness of about 20 feet surrounded by an irregular zone of disseminated zinc minerals."

## INSTRUMENTATION AND THEORY

### 1. Magnetometer

The magnetic data was detected using an ELSEC nuclear free precession magnetometer, type 592. This measures the absolute value of the earth's magnetic field intensity. The sensitivity is one gamma and the absolute calibration is governed by a crystal-controlled oscillator so that it cannot drift.

Data was then recorded on a Bausch and Lomb 6" strip chart recorder.

Only two commonly occurring minerals are strongly magnetic; magnetite and pyrrhotite. Hence, magnetic surveys, both ground and airborne, are used to detect the presence of these minerals in varying concentrations. Magnetic data are also useful as a reconnaissance tool for mapping geologic lithology and structure since different rock types have different background amounts of magnetite and/or pyrrhotite.

### 2. VLF-EM

A VLF-EM receiver manufactured by Sabre Electronics of Vancouver, B.C. and an Esterline Angus Port-a-graph T171B recorder were used for the VLF-EM survey. This instrument is designed to measure the current induced, in a vertical coil, by the primary and secondary fields of the very low frequency electromagnetic field (VLF-EM) transmitted at 18.6 KHz from Seattle, Washington. Both the dip angle and field strength are measured by this instrument.

In all electromagnetic prospecting, a transmitter produces an alternating magnetic field (primary) by a strong alternating current usually through a coil of wire. If a conductive mass such as a sulphide body is within this magnetic

field, a secondary alternating current is induced within it which in turn induces a secondary magnetic field that distorts the primary magnetic field. It is this distortion that the EM receiver measures. The VLF-EM uses a frequency range from 16 to 24 KHz. whereas most EM instruments use frequencies ranging from a few hundred to a few thousand Hz. Because of its relatively high frequency, the VLF-EM can pick up bodies of a much lower conductivity and therefore it is more susceptible to clay beds, electrolyte-filling fault or shear zones and porous horizons, graphite, carbonaceous sediments, lithological contacts as well as sulphide bodies of too low a conductivity for other EM methods to pick up. Consequently, the VLF-EM has additional uses in mapping structure and in picking up sulphide bodies of too low a conductivity for conventional EM methods and too small for induced polarization (in places it can be used instead of IP). However, its susceptibility to lower conductive bodies results in a number of anomalies, many of them difficult to explain and, thus, VLF-EM preferably should not be interpreted without a good geological knowledge of the property and/or other geophysical and geochemical surveys.

## SURVEY PROCEDURE

A Bell Jet-Ranger helicopter was used to fly the survey. The survey was carried out by following pre-established lines drawn on a blown up photograph of the area. Lines were on an average 600 feet apart and flown in a northeast-southwest direction. The terrain clearance was kept at approximately 400 feet. Tie points were made over prominent topographic features, were numbered, recorded and plotted on the maps.

The magnetic readings were taken with the magnetometer set on a 1.7 second recycling period which, considering the helicopter speed corresponds to readings taken at intervals of about 150 feet. The VLF-EM equipment provided for a continuous plotting of the dip angle and of the field strength.

## COMPILATION OF DATA

### 1. Magnetic Survey

Values were picked off of the strip charts at intervals of 200 feet and plotted on sheet No. 1. It was not contoured since its variation was within the noise level.

### 2. VLF-EM Survey

Only the anomalies were plotted, and these on sheet 2 as follows: 0% was plotted on the edge of each anomaly; the highest magnitude of each anomaly was plotted in the center along with the dip angle (the range from positive peak to negative peak); and the field strength of each anomaly was contoured at an interval of 2%.

## DISCUSSION OF RESULTS

### 1. Magnetic Survey

The magnetic data is extremely flat with its variation being only 70 gammas varying from 58,510 gammas to 58,580 gammas. Much of this variation undoubtedly, or perhaps all, is within the noise level of the survey. For example, part of the variation is flight line oriented. That is, magnetic lows or highs follow the flight lines. This could be caused by diurnal variation (which was not monitored), or variation in the terrain clearance.

The flat magnetics verify that all of the property is underlain by sedimentary rocks. It is probable that the sedimentary rocks are fairly thick. This is based on the flat magnetics and the assumption that the underlying basement rock is magnetic in character.

In the northeast and southeast parts of the survey area, the magnetics increase slightly in intensity. That is, these areas are characterized by values ranging from 58,550 to 58,580 gammas. This may be within the noise envelope and caused by a lower terrain clearance. However, the higher values in the southeast area continue from the mountainside to across the river. Or, the cause may be a thinner succession of sedimentary layers with the basement rock being closer to the surface.

2. VLF-EM Survey

Considerable noise is shown on both the dip angle and the field strength profiles. The noise is caused by wind and/or variation in the terrain clearance. From the profiles, however, five anomalies have been picked and have been labelled A to E respectively. Four of these anomalies may be no more than noise. Conversely, some anomalies may have been missed because they were masked by noise or were wrongly thought to be noise. In essence, it is quite difficult to adequately interpret airborne EM in a mountainous terrain.

Anomaly A is considered to be a definite anomaly and is very unlikely caused by noise. It strikes north-northwest, has a length of up to 1200 feet and reaches a field strength high of 10% with a dip angle change of $5^{o}$. Its causitive source is quite likely sulphides and/or graphite. A causitive source of faults, shears, or underground water courses is a possibility but the chances are reduced by the likely presence of permafrost.

Anomaly B is considered to be a probable anomaly by reason of its shape on the field profiles. However, the fact that it occurs on two consecutive lines increases its probability of being an anomaly. It strikes north, has a minimum length of 600 feet being open on the north end, and reaches a field strength high of 8% with a dip angle change of $3^{o}$. Like anomaly A, a strongly possible cause is graphite and/or sulphides.

Anomalies C, D and E are considered to be anomalies less strongly, mainly because respectively they occur only on one consecutive line. Their highs are each 5 or 6% with the dip angle varying $3^{o}$ to $5^{o}$. Though their causitive sources could well be sulphides and/or graphite, faults or shears should be more strongly considered than with Anomalies A and B, largely because of their lower intensity.

It is interesting to note that all five anomalies occur near the edges of the Mag claim group. If a sulphide body occurs within the centre of the claim group, then this fact could be very significant. For example, the EM anomalies may be reflecting faults of structural importance to a sulphide body.

Respectfully submitted,
GEOTRONICS SURVEYS LTD.,

David G. Mark
Geophysicist

April 3, 1975.

# SELECTED BIBLIOGRAPHY

Geology Map, Nadaleen River, Yukon Territory - Northwest Territories, Geol. Surv. of Can. Open File 205, June 1974.

Ricker, Karl E., Surficial Geology of the Nadaleen River Map area, Yukon Territory - Northwest Territories (106C), Geol. Surv. of Can., Unedited Manuscript, April, 1974.

Sookochoff, Larry, Geological Report on the Mag Group (Bonnet Plume Area) of Menika Mining Ltd (NPL)., Mayo, M.D., T. R. Tough & Associates Ltd., Vancouver, B.C. February 20,1975.

# GEOPHYSICIST'S CERTIFICATE

I, DAVID G. MARK, of the City of Vancouver, in the Province of British Columbia, do hereby certify;

That I am a Consulting Geophysicist of Geotronics Surveys Ltd., with offices at 302-475 Howe Street, Vancouver, B.C.

I further certify that:

1. I am a graduate of the University of British Columbia (1968) and hold a B.Sc. degree in Geophysics.

2. I have been practising in my profession for the past seven years and have been active in the mining industry for the past ten years.

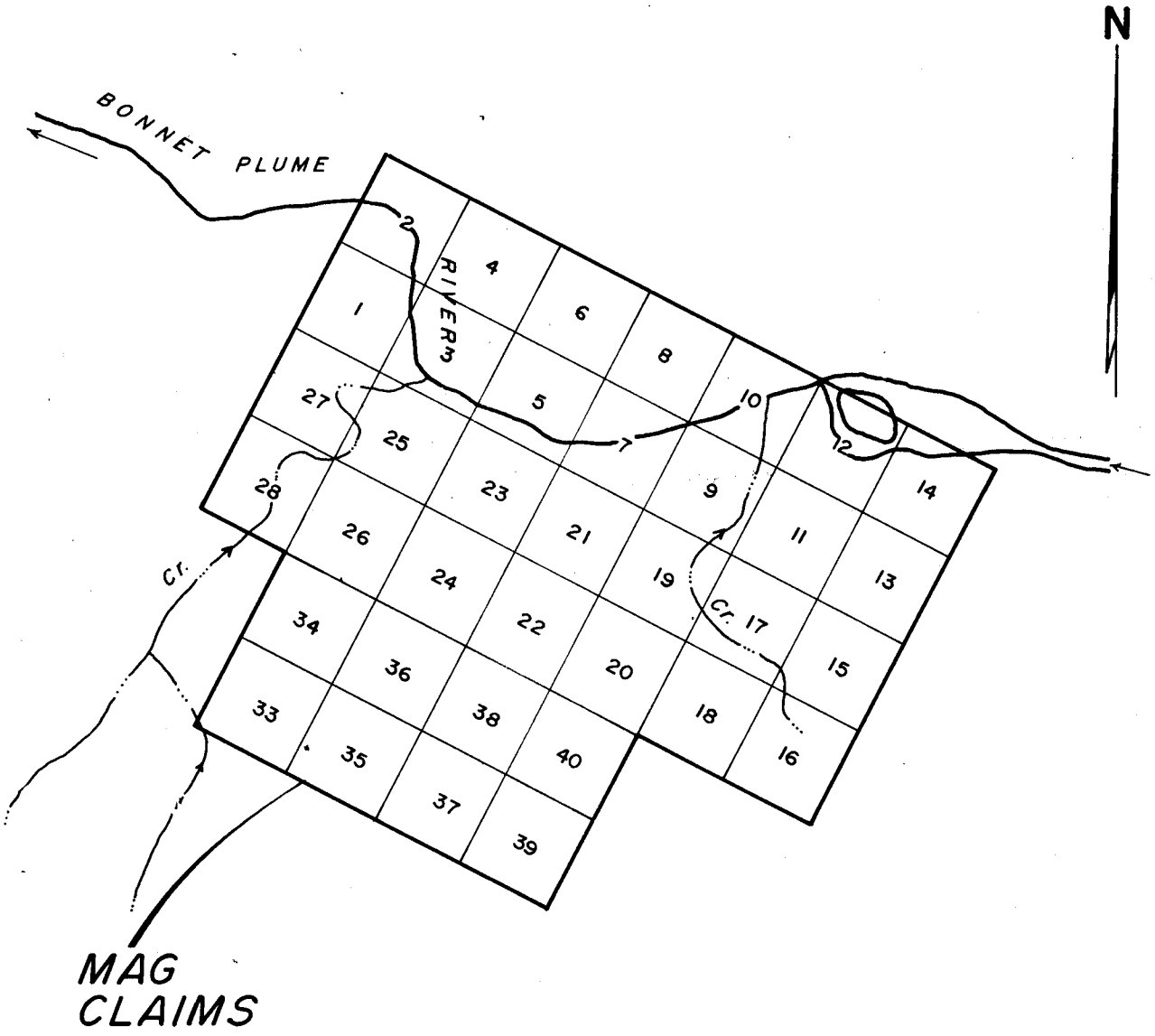
3. I am an active member of the Society of Exploration Geophysicists and a member of the European Association of Exploration Geophysicists.

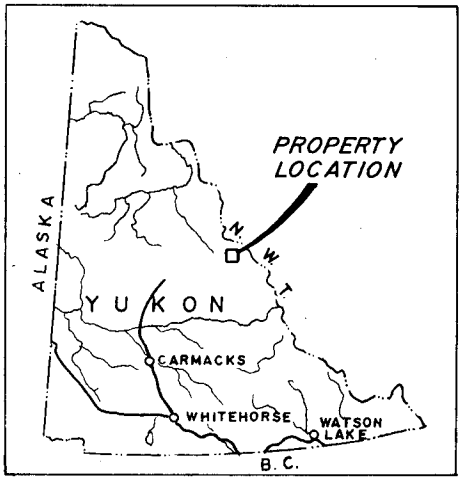
4. This report is compiled from data obtained from Airborne Magnetic and VLF-EM survey carried out under the supervision of Stanley Mauer in May, 1974, on the MAG Claim Group, Mayo Mining Division, Yukon Territory.

5. I have no direct or indirect interest in the properties or securities of Menika Mining Ltd., Vancouver, B.C. nor do I expect to receive any interest therein.

David G. Mark
Geophysicist

April 3, 1975




MILES

1/2 0 1/2

# MENIKA MINING LIMITED

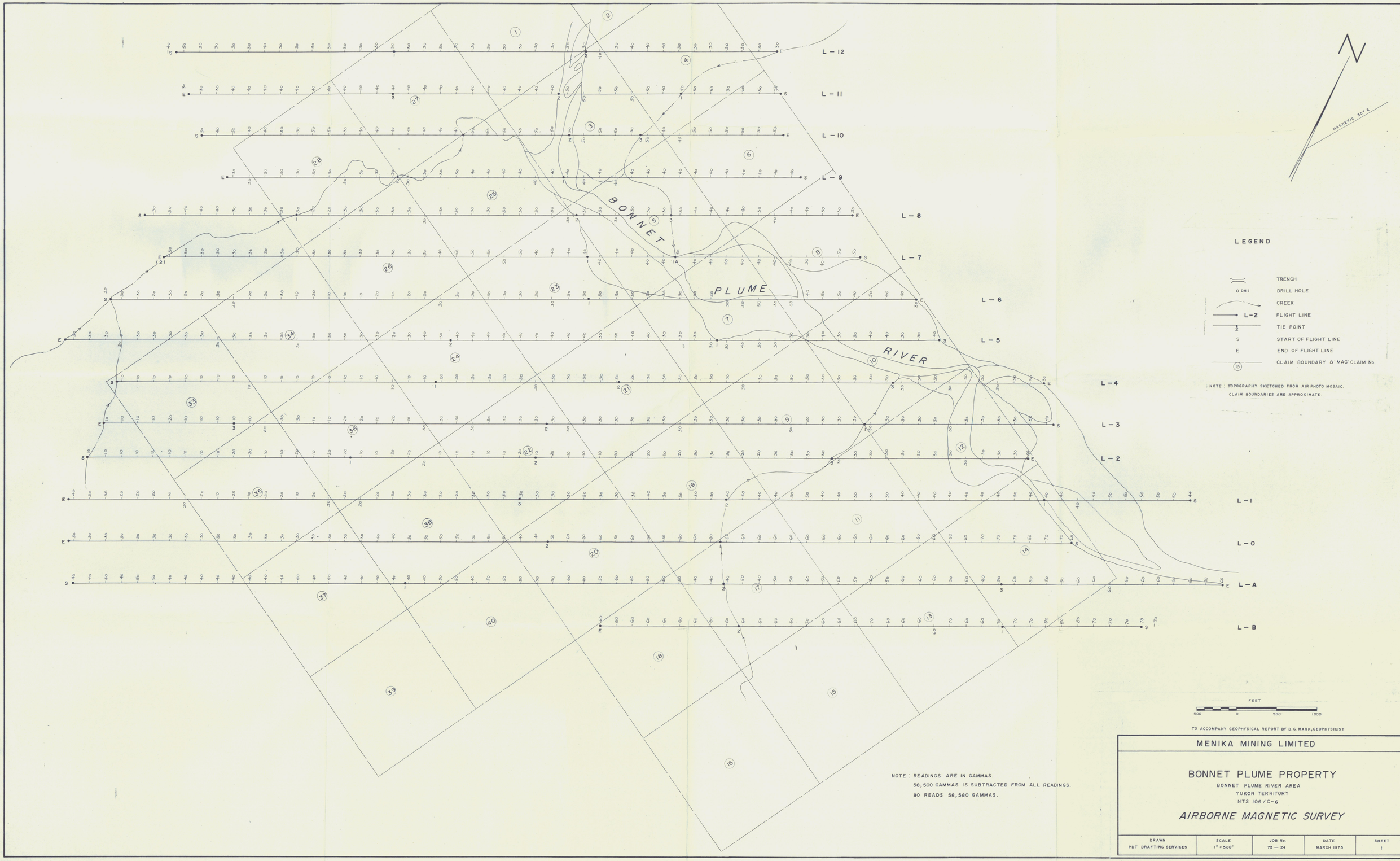
## BONNET PLUME PROPERTY

YUKON TERRITORY

## CLAIM MAP & LOCATION

NTS 106 C/6

MARCH 1975




## LEGEND

- TRENCH
- ODH 1 — DRILL HOLE
- CREEK
- L-2 — FLIGHT LINE
- 2 — TIE POINT
- S — START OF FLIGHT LINE
- E — END OF FLIGHT LINE
- (13) — CLAIM BOUNDARY & MAG' CLAIM No.

NOTE : TOPOGRAPHY SKETCHED FROM AIR PHOTO MOSAIC.
CLAIM BOUNDARIES ARE APPROXIMATE.

NOTE : READINGS ARE IN GAMMAS.
58,500 GAMMAS IS SUBTRACTED FROM ALL READINGS.
80 READS 58,580 GAMMAS.

FEET
500 0 500 1000

TO ACCOMPANY GEOPHYSICAL REPORT BY D.G. MARK, GEOPHYSICIST

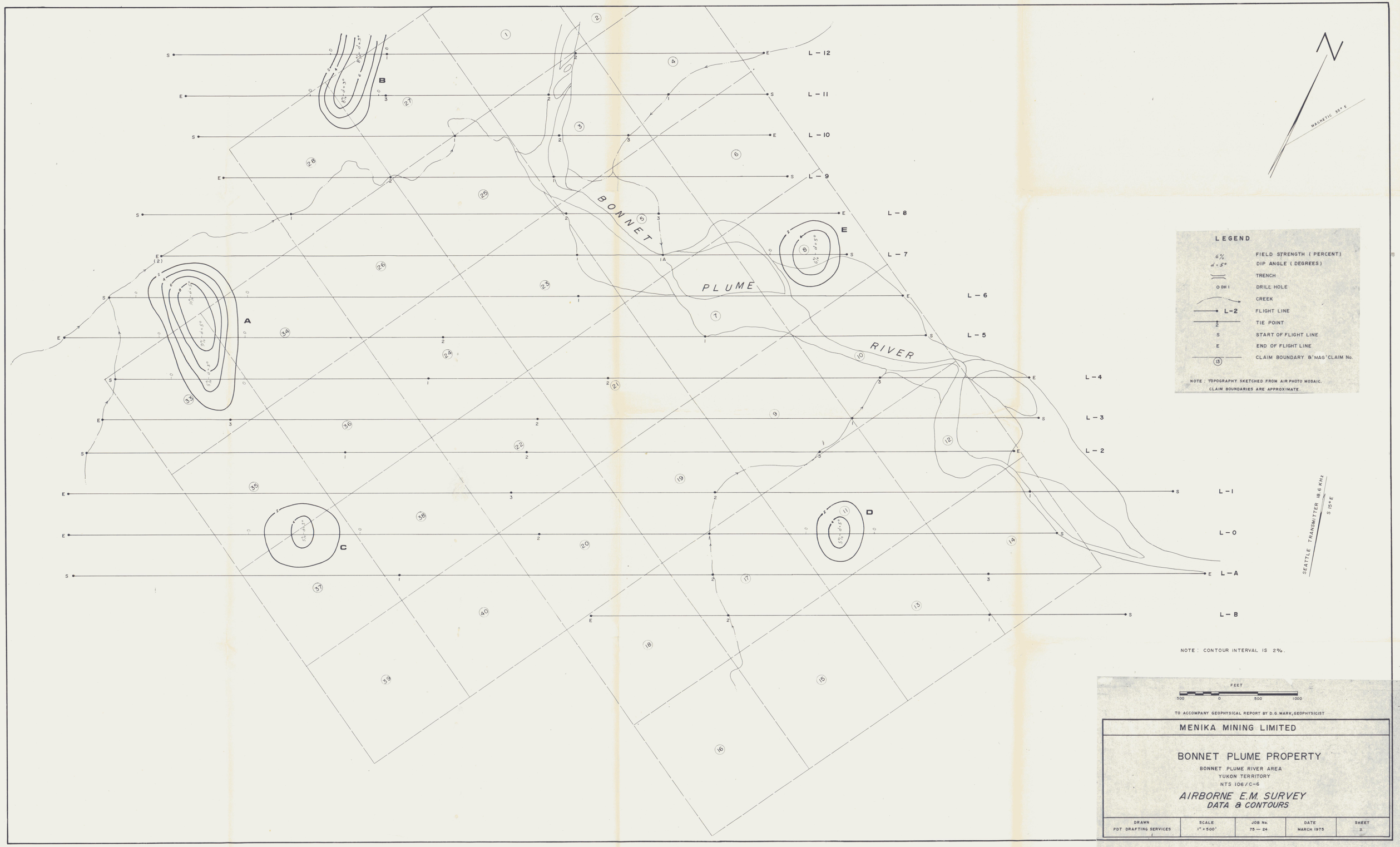
# MENIKA MINING LIMITED

## BONNET PLUME PROPERTY

BONNET PLUME RIVER AREA
YUKON TERRITORY
NTS 106/C-6

## *AIRBORNE MAGNETIC SURVEY*

| DRAWN | SCALE | JOB No. | DATE | SHEET |
|---|---|---|---|---|
| PDT DRAFTING SERVICES | 1" = 500' | 75 — 24 | MARCH 1975 | 1 |




## LEGEND

- 6% — FIELD STRENGTH ( PERCENT)
- d = 5° — DIP ANGLE ( DEGREES)
- TRENCH
- O DH 1 — DRILL HOLE
- CREEK
- L-2 — FLIGHT LINE
- 2 — TIE POINT
- S — START OF FLIGHT LINE
- E — END OF FLIGHT LINE
- (13) — CLAIM BOUNDARY & 'MAG' CLAIM No.

NOTE : TOPOGRAPHY SKETCHED FROM AIR PHOTO MOSAIC.
CLAIM BOUNDARIES ARE APPROXIMATE.

NOTE : CONTOUR INTERVAL IS 2%.

FEET
500 0 500 1000

TO ACCOMPANY GEOPHYSICAL REPORT BY D.G. MARK, GEOPHYSICIST

MENIKA MINING LIMITED

# BONNET PLUME PROPERTY

BONNET PLUME RIVER AREA
YUKON TERRITORY
NTS 106/C-6

## AIRBORNE E.M. SURVEY
## DATA & CONTOURS

| DRAWN | SCALE | JOB No. | DATE | SHEET |
|---|---|---|---|---|
| PDT DRAFTING SERVICES | 1" = 500' | 75 – 24 | MARCH 1975 | 2 |