

84-1278-13403

11/85

ASSESSMENT REPORT  
ON  
GEOPHYSICAL WORK  
ON THE FOLLOWING CLAIMS:

KNIP ..... #2559(9)  
  
ALPHA ..... #3619(11)  
BETA ..... #3620(11)  
GAMMA ..... #3621(11)  
DELTA ..... #3622(11)  
EPICURUS .... #4109(9)  
  
GERMANICUS .. #4106(9)  
AUGUSTUS .... #4107(9)  
  
CORNFLAKES .. #4118(9)

TENNYSON 1 ..... #4102(9)  
TENNYSON 2 ..... #4103(9)  
TENNYSON 3 ..... #4104(9)  
TENNYSON 4 ..... #4105(9)  
  
EMPEDOCLES ..... #4112(9)  
ARMINIUS ..... #4116(9)  
SENECA ..... #4115(9)  
  
DRUSUS ..... #4110(9)  
TIBERIUS ..... #4111(9)

REGIONAL BRANCH  
ASSESSMENT REPORT

*Skeena R.D.  
104 B/1E, 8E  
56°15', 130°05'*

LOCATED

45 TO 60 KM NORTH-NORTHWEST OF  
STEWART, BRITISH COLUMBIA

13,403

PROJECT PERIOD: SEPTEMBER 15-21, 1984

ON BEHALF OF  
TEUTON RESOURCES CORP.  
VANCOUVER, BRITISH COLUMBIA

REPORT BY:

W.D. GROVES, PH.D., P.ENG.  
ARCHAEAN RESOURCES CORP.  
200 - 675 WEST HASTINGS STREET  
VANCOUVER, BRITISH COLUMBIA

AND

R.F. SHELDRAKE, B.SC.  
APEX AIRBORNE SURVEYS LTD.  
514 - 615 HOWE STREET  
VANCOUVER, BRITISH COLUMBIA

DATE: DECEMBER 19, 1984

*WDG*

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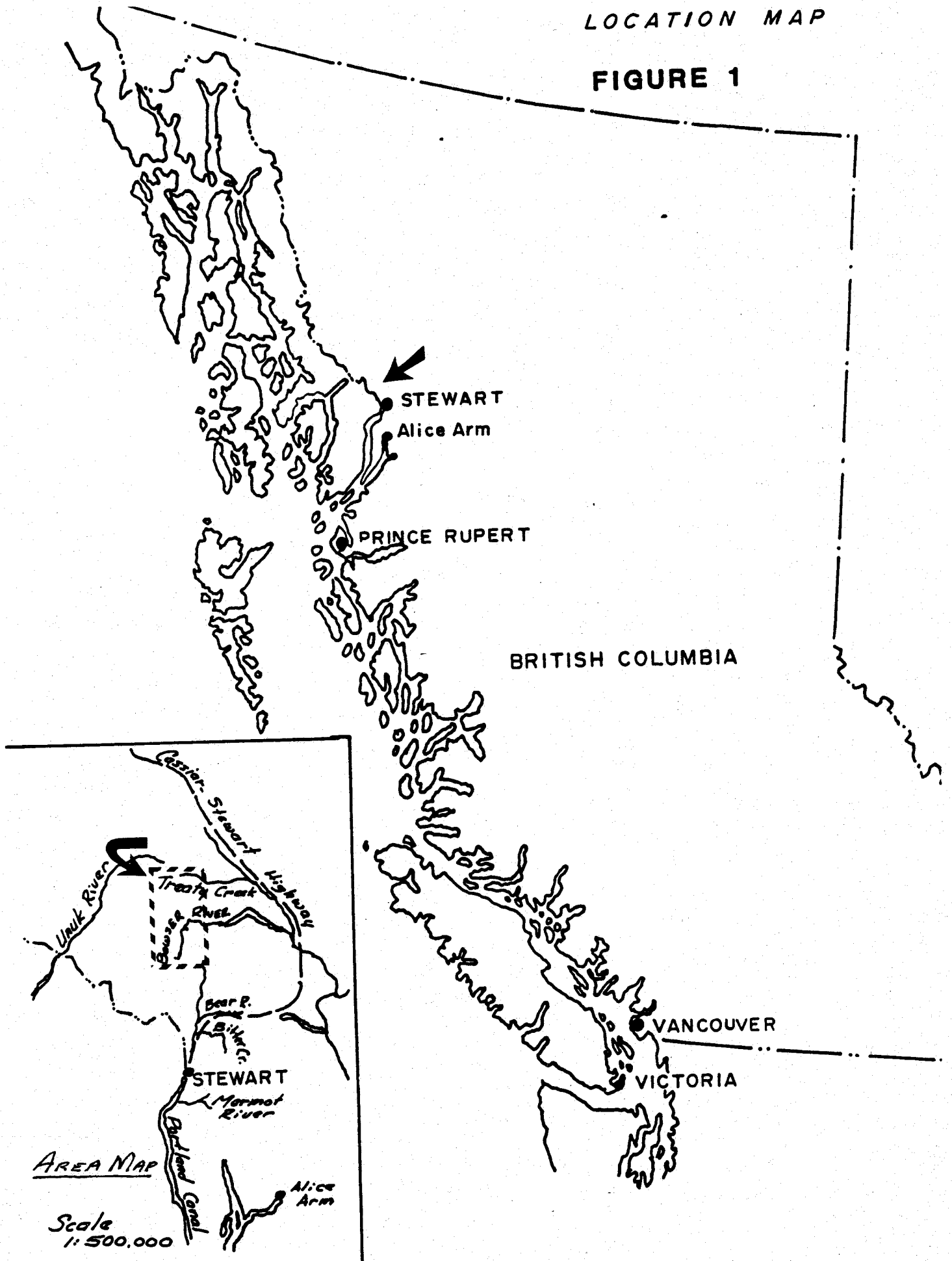
## ILLUSTRATIONS

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**PART I**

LOCATION MAP

FIGURE 1



## INTRODUCTION

### A. Property, Location, Access and Physiography

The property, consisting of eighteen modified grid claims, occupies large portions of both flanks of the Bowser River valley in the area north of Scottie Gold Mines. Access from Stewart, 45 to 60 kilometers to the south, is by helicopter; alternate access is by the Granduc road system from Stewart to the airstrip east of Scottie Gold Mines, thence by helicopter to the property (a saving of 40 plus kilometers of flying time).

Relief is steep throughout most of the claims area, with extensive ice and snow cover at higher elevation. Sharply incised creek courses cut the property at regular intervals, draining ultimately into the Bowser River. Vegetation, consisting of mountain balsam and hemlock, thickens gradually downslope from the 4,000 foot level. At higher elevations, bare moraines and eskers are interspersed with grassy patches.

### B. Status of Property

Relevant claim information is summarized below, broken down into groups (where applicable).

Claim Name	Record No.	No. of Units	Group Name
Knip	#2559(9)	20	(Not Applicable)
Alpha	#3619(11)	20	New Alphabet
Beta	#3620(11)	15	New Alphabet
Gamma	#3621(11)	20	New Alphabet
Delta	#3622(11)	16	New Alphabet
Epicurus	#4109(9)	18	New Alphabet
Tennyson 1	#4102(9)	4	Tennyson
Tennyson 2	#4103(9)	12	Tennyson
Tennyson 3	#4104(9)	10	Tennyson
Tennyson 4	#4105(9)	10	Tennyson

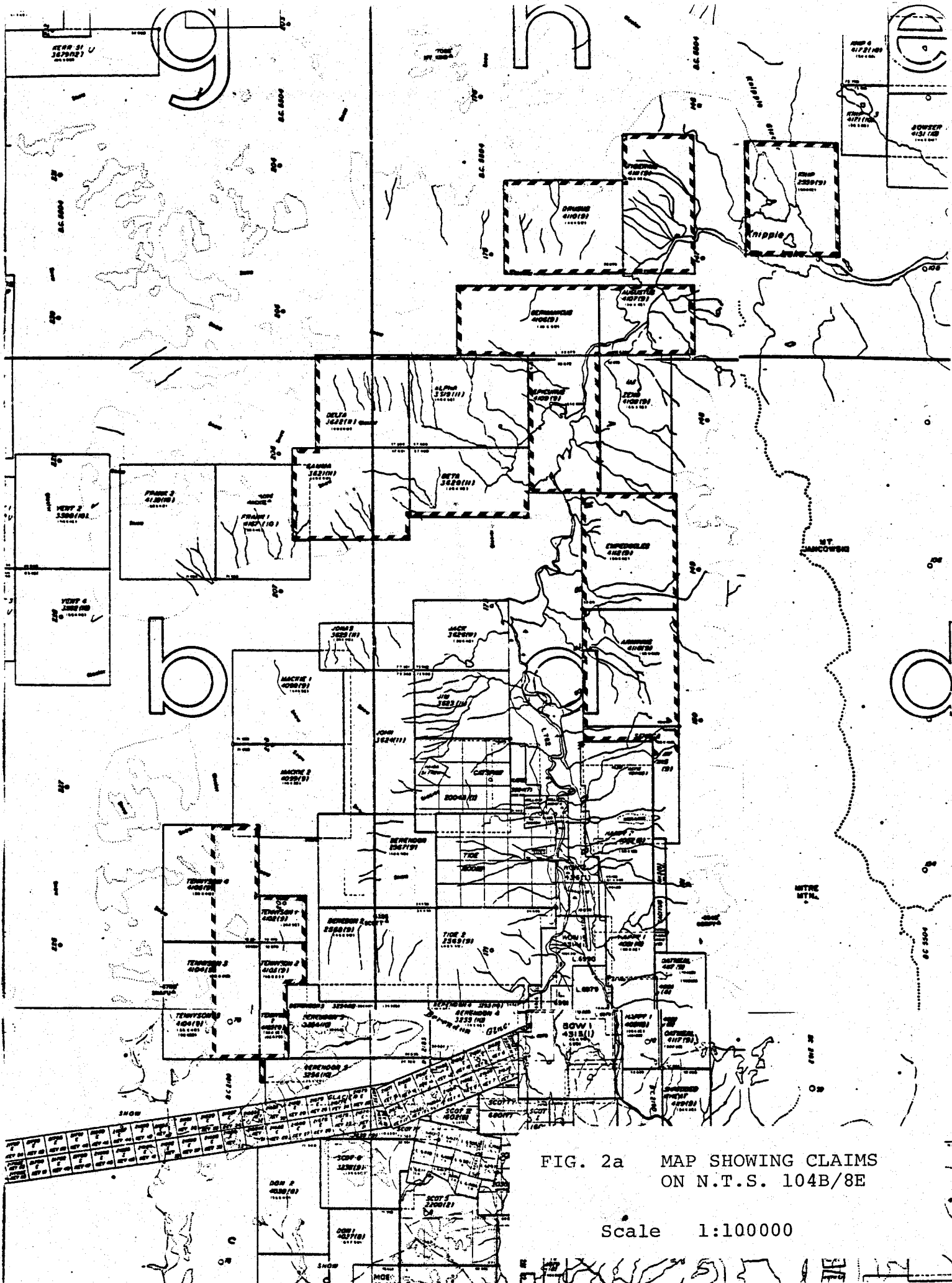


FIG. 2a MAP SHOWING CLAIMS ON N.T.S. 104B/8E

Scale 1:100000

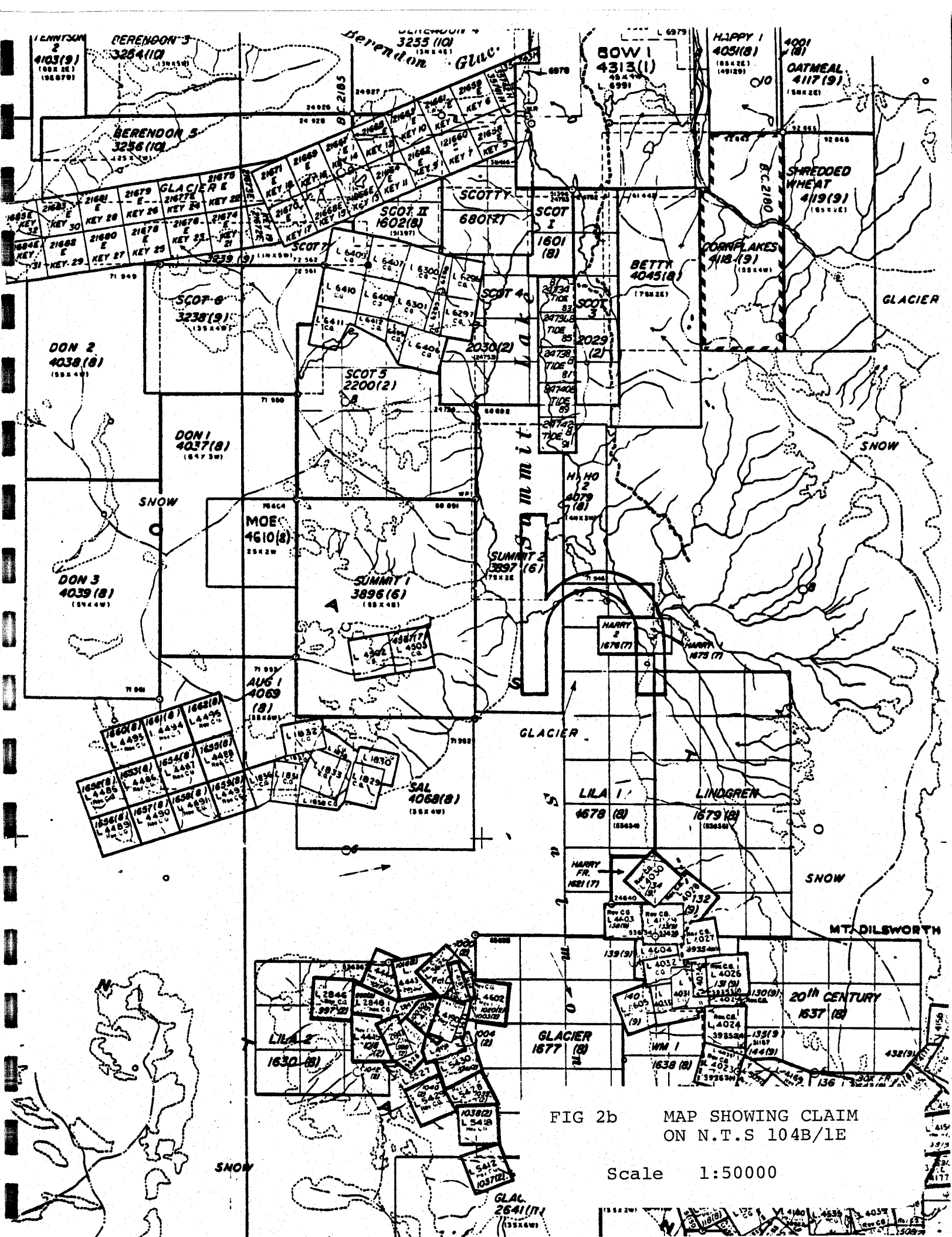


FIG 2b MAP SHOWING CLAIM ON N.T.S 104B/1E

Scale 1:50000

Germanicus	#4106(9)	18	Germanicus
Augustus	#4107(9)	12	Germanicus
Drusus	#4110(9)	20	Drusus
Tiberius	#4111(9)	18	Drusus
Empodocles	#4112(9)	20	Classics
Arminius	#4116(9)	20	Classics
Seneca	#4115(9)	4	Classics
Cornflakes	#4118(9)	10	(Not Applicable)

The claims are shown on Figure 2.

### C. History

Very little is known of the early history of the claims area. A review of the standard references shows that the Bowser River section of the Stewart Complex did not receive the attention given to the Salmon River area to the south, which was heavily prospected during the 1920's and 1930's in the aftermath of the discovery of the Premier mine. Increased road access due to the development of the Granduc mine, a helicopter base at Stewart, and rapid ice ablation have recently opened up the Bowser River area to grass-roots exploration.

In 1966/67, the claims area formed part of a regional study by the B.C. Department of Mines under the direction of E.W. Grove, P.Eng. Geological maps were not released until 1982 (Ref. 2).

E and B Explorations examined portions of the claim area during 1980, uncovering high-grade silver/lead mineralization associated with a feldspar porphyry stock on what is now the Knip claim (Ref. 3). Work by Teuton Resources personnel in 1983 resulted in the location of seven high-grade silver/lead/zinc veins just west of a prominent rock knob on the northern side of Knipple Lake. Teuton personnel also uncovered new showings of zinc/lead/silver mineralization in the northwestern portion of the Delta claim, also associated with a feldspar porphyry stock.



Recent work on a property just outside the claim area has resulted in a significant discovery of what appears to be "black-smoker mud"-type, fine-grained, lead/zinc mineralization (minor silver and gold) in a black argillite. The find, which is novel to the Stewart area, is located near the ice edge on the John claim (Frank Mackie Ice Field). A separate survey over this claim, also completed in September 1984 by Apex Airborne Surveys Ltd., disclosed a major conductor in the vicinity of the known mineralization.

#### D. References

1. GROVE, E.W., (1972): Geology and Mineral Deposits of the Stewart Area; B.C. Dept. of Mines, Bull. 58.
2. GROVE, E.W., (1982): Unuk River, Salmon River, Anyox Map Areas; Min. of Energy, Mines and Petrol. Resources.
3. ARNOLD, R., (1980): Prospecting Report, Bowser-Unuk Project, Knipple Lake Area, 1980, for E & B Explorations Ltd., by Can-Lake Explorations Ltd.
4. GROVE, E.W., (1983): Geological Report and Work Proposal on the Teuton Resources Corp. Mineral Properties in the Bowser River Area.
5. GROVE, E.W., (1983): Geological Report and Work Proposal on the Teuton Resources Corp., Knip Property in the Bowser River Area.
6. ALLDRICK, D.J., (1984): Geologic Setting of the Precious Metal Deposits in the Stewart Area, Paper 1984-1, Ministry of Energy, Mines and Petroleum Resources.
7. KRUSCHKOWSKI, E., (1984): Private Report on the Four J's Property, Bowser River Area, Skeena M.D.

#### E. Summary of Work Done

The field crew, consisting of Mr. Ron Sheldrake and Robert Langsdon of Apex Airborne Surveys Ltd., and field supervisor, D. Cremonese. P.Eng., was mobilized

from Vancouver on September 14, 1984. Equipment set-up, testing and survey logistics were carried out in Stewart from September 15 - 17. Airborne survey dates cover the period September 18 to 20 inclusive. A follow-up ground survey on the Tennyson 1 claim took place on September 21, 1984.

Details as to instrumentation (function and theory), survey areas, survey data, and comments/conclusions on anomalous data, are presented in Part II of this report entitled: "Report on Helicopter Borne Multi-flying Electromagnetic, and Magnetometer Survey on Five Areas in the Bowser River Area, British Columbia", by R.H. Sheldrake, B.Sc., of Apex Airborne Surveys Ltd.

Part III of the assessment report contains the author's conclusions, certificate of qualifications and a statement covering assessment and program costs. Costs have been apportioned on a claim or group basis (where applicable) per individual Statements of Exploration filed in September and November, 1984. Exact apportionment of costs was difficult due to a multiplicity of variables: survey air-kilometers, re-flights due to equipment failure, helicopter-time (survey and ferrying), and ground follow-up survey (where applicable: cf Part II, Tennyson claims). In the author's opinion, the apportionments used represent a fair division of costs.

**PART II**

REPORT ON A HELICOPTER BORNE  
MULTIFREQUENCY ELECTROMAGNETIC, AND MAGNETOMETER SURVEY  
ON FIVE AREAS IN  
THE BOWSER RIVER AREA, BRITISH COLUMBIA.

SKEENA MINING DIVISION

KNIPPLE LAKE AREA  $52^{\circ} 24'30''$  N.,  $129^{\circ} 59'20''$  W.  
104 A/5 BOWSER LAKE MAPSHEET

HED LAKE AREA  $56^{\circ} 19'$  N.,  $130^{\circ} 02'$  W.  
104 B/8 FRANK MACKIE GLACIER MAPSHEET

BERENDON GLACIER AREA  $56^{\circ}16'$  N.,  $130^{\circ}09'30''$  W.  
104 B/8 FRANK MACKIE GLACIER MAPSHEET

TOE LAKE AREA  $56^{\circ}22'$  N.,  $130^{\circ}04'30''$  W.  
104 B/8 FRANK MACKIE GLACIER MAPSHEET

SUMMIT LAKE AREA  $56^{\circ}14'$  N.,  $130^{\circ}02'30''$  W.  
104 B/1 LEDUC GLACIER MAPSHEET

FOR

TEUTON RESOURCES CORP.

VANCOUVER, BRITISH COLUMBIA

SURVEY DATES: September 18, 1984 to September 20, 1984

December 5, 1984  
Vancouver, B.C.

Apex Airborne Surveys Ltd.  
Ronald F. Shel Drake, B.Sc.

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## 1. SUMMARY

Knipple Lake, Berendon Glacier, Hed Lake, Toe Lake, and Summit Lake Survey Areas in the Bowser River Basin were tested with a Helicopter-borne Electromagnetometer-Magnetometer System.

All of the five claim groups that were surveyed have significant mineral occurrences, and in this area, each offers good prospects for the discovery of economic mineralization.

The geophysical results over two of the areas, the Berendon Glacier and Hed Lake Areas, display anomalous geophysical responses that could indicate concentrations of metallic mineralization.

Recommendations for follow-up of these areas, based on the geophysical results, have been made.

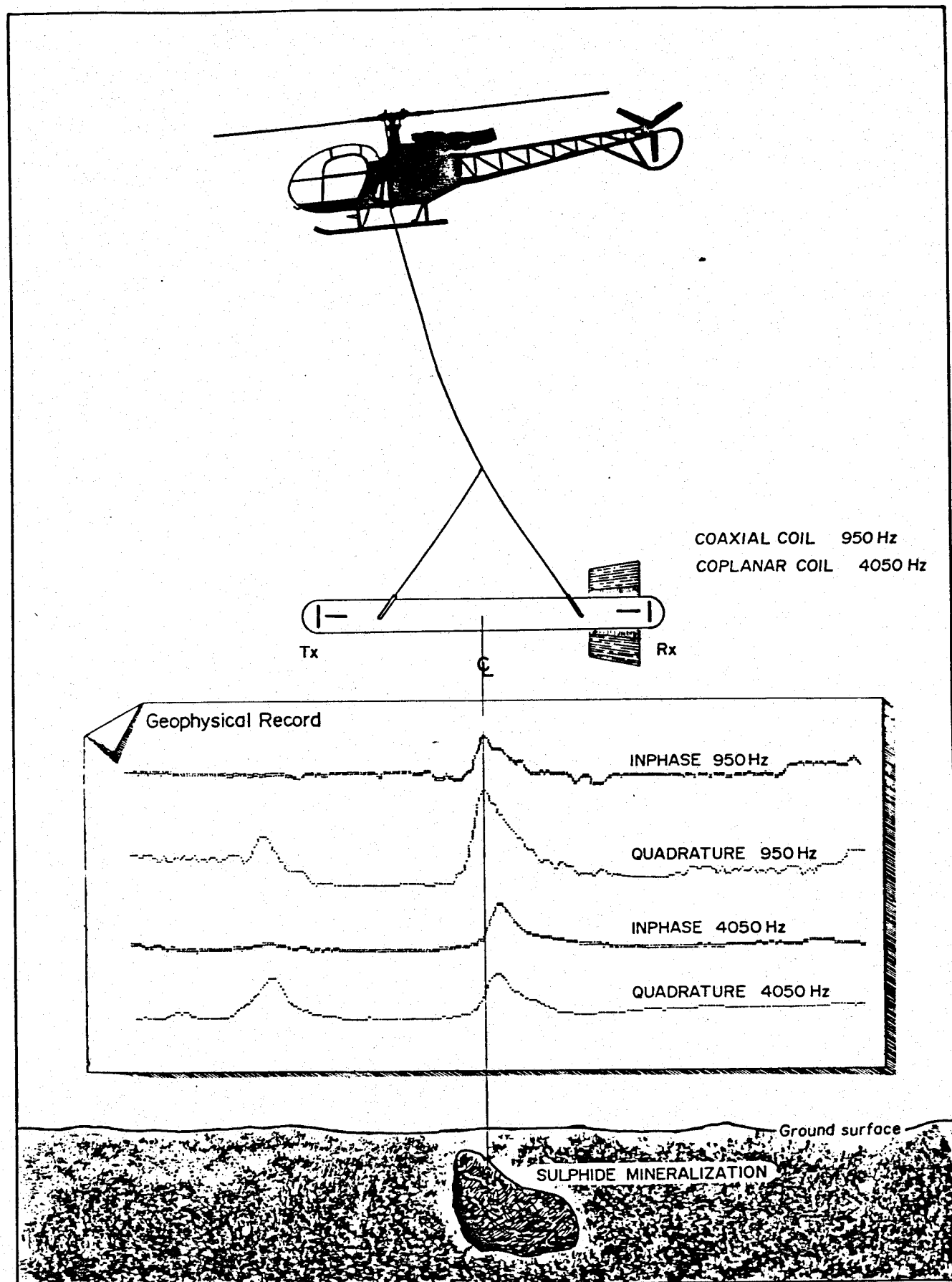
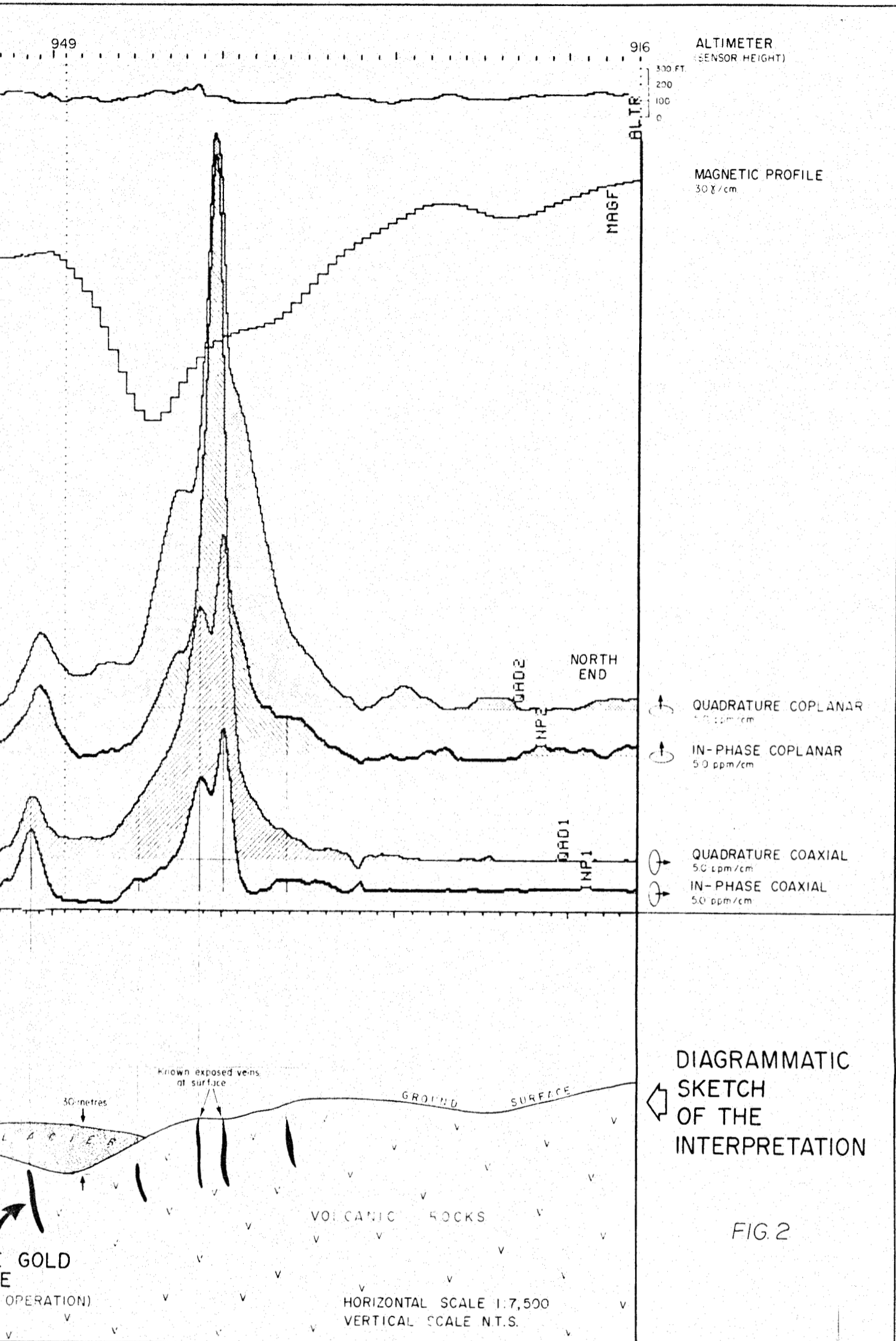


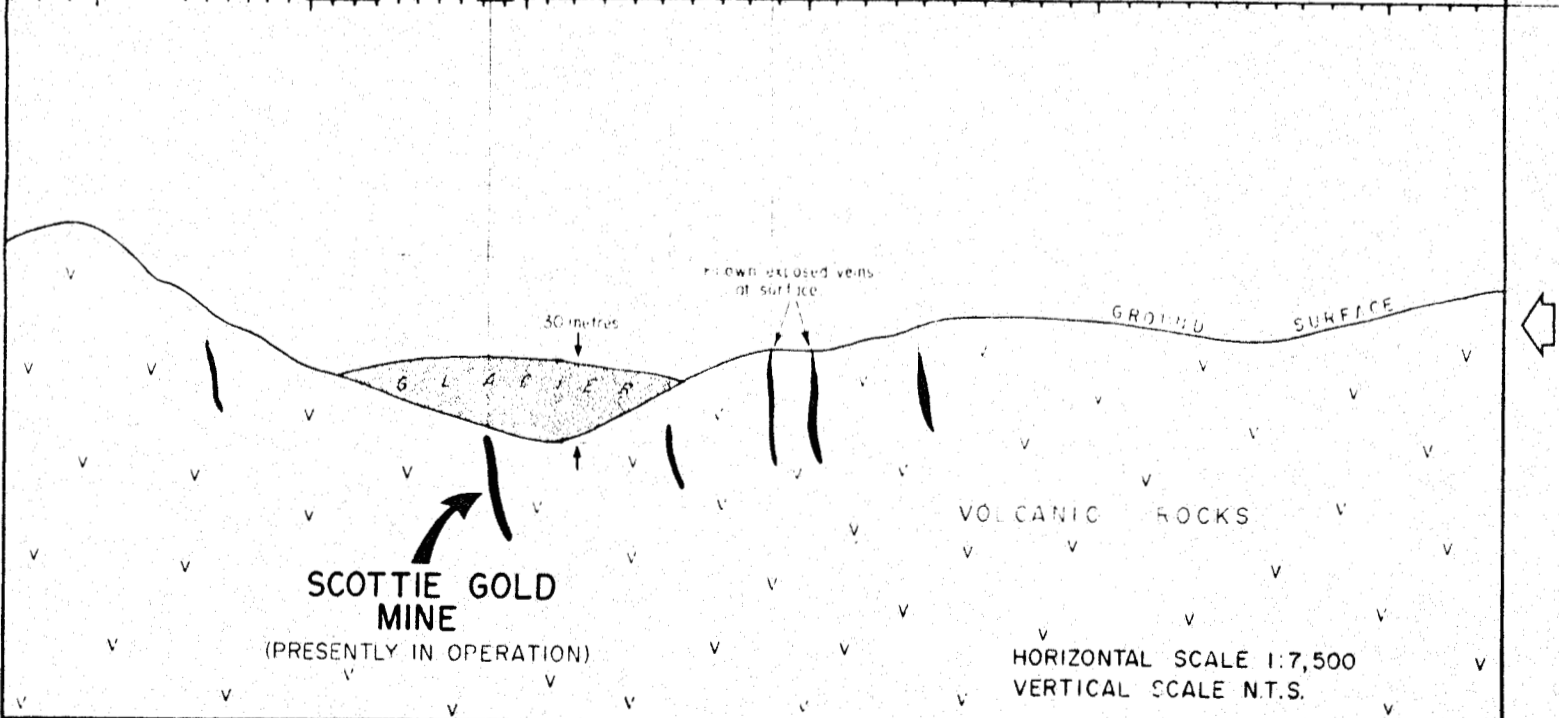
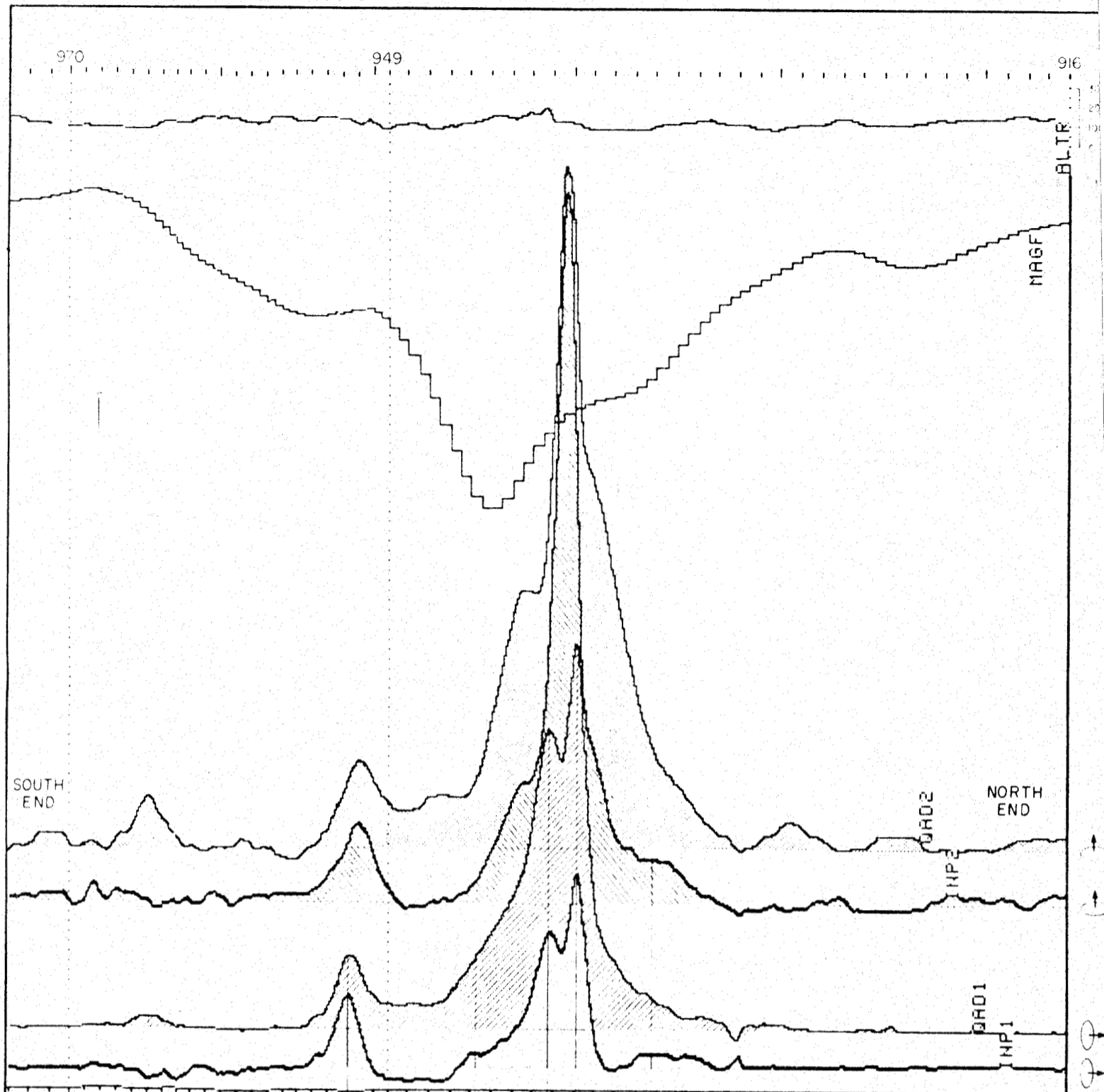
FIGURE 1  
SCHEMATIC OF TWO FREQUENCY-CONFIGURATION  
H.E.M. SYSTEM

APEX AIRBORNE SURVEYS LTD.



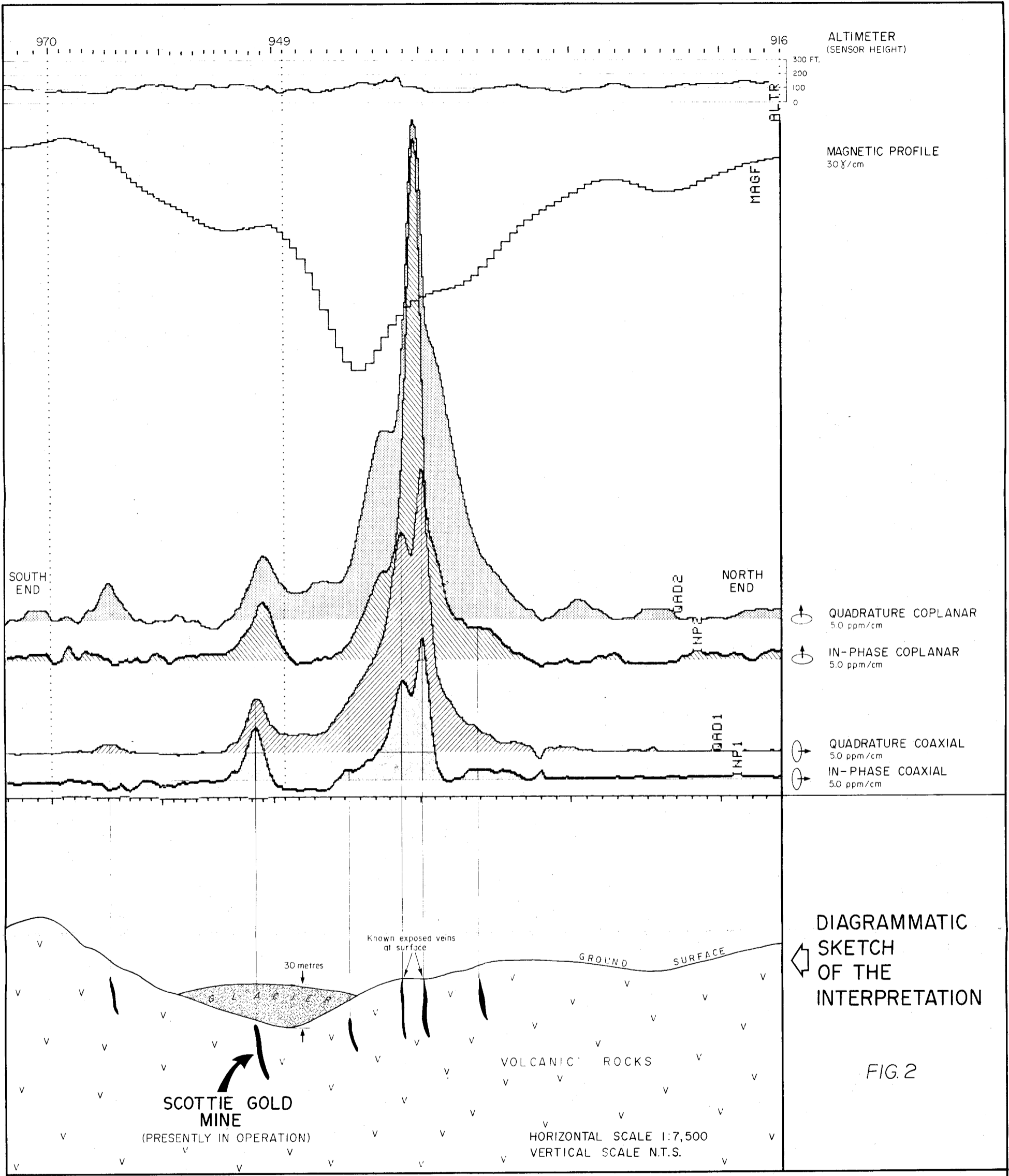
GEOPHYSICAL EXAMPLE : SCOTTIE GOLD MINE  
STEWART, B.C.  
DATA COLLECTED - SEPTEMBER, 1983





**GEOPHYSICAL EXAMPLE : SCOTTIE GOLD MINE**  
**STEWART, B.C.**  
 DATA COLLECTED - SEPTEMBER, 1983

**APEX AIRBORNE SURVEYS**



GEOPHYSICAL EXAMPLE : SCOTTIE GOLD MINE  
 STEWART, B.C.  
 DATA COLLECTED - SEPTEMBER, 1983

APEX AIRBORNE SURVEYS LTD.

- ↑ QUADRATURE COPLANAR  
5.0 ppm/cm
- ↑ IN-PHASE COPLANAR  
5.0 ppm/cm
- QUADRATURE COAXIAL  
5.0 ppm/cm
- IN-PHASE COAXIAL  
5.0 ppm/cm

DIAGRAMMATIC  
 SKETCH  
 OF THE  
 INTERPRETATION

FIG. 2

## 2. INTRODUCTION

This report discusses the results of an airborne geophysical survey over five areas in the Bowser River Area, B.C. undertaken on behalf of TEUTON RESOURCES CORP. of Vancouver.

The purpose of the survey was to delimit areas of conductive rocks that could be indicative of sulphide/gold mineralization. A recent survey over the SCOTTIE GOLD MINE showed that metallic mineralization could be detected by the APEX GEOPHYSICAL SYSTEM under cappings of glacier and other areas where terrain is extremely rugged. The response due to the Scottie Gold Mine, below 30 meters of glacier are included as FIGURE 2. (1)

The key equipment of the APEX GEOPHYSICAL SYSTEM comprises of a High Sensitivity Electromagnetometer (HEM), and a Total Field Nuclear Precession Magnetometer.

A total of 140 linear kilometers was flown between September 18, 1984 and September 20, 1984 over the five grids using a light turbine Long Ranger III Helicopter as a survey platform. The helicopter was supplied by Vancouver Island Helicopters of Victoria, B.C. from their base in Stewart.

The Electromagnetic (HEM) equipment consisted of an in-phase out-of-phase system comprising of two sets of transmitters and receivers operating at different frequencies and coil configurations.

See FIGURE 1-SCHEMATIC OF TWO FREQUENCY/CONFIGURATION H.E.M. SYSTEM.

(1) Permission to display this data has been kindly granted by Scottie Gold Mines Ltd.

The HEM and altimeter analogue outputs are digitized by the on-board computer using a sampling rate of 0.1 seconds.

REMARK: The survey flight speed is about 80-100 kilometers/hour which means that a 0.1 second scan interval is equivalent to a measurement about every 2-3 meters on the ground. The magnetometer data are recorded at 1.0 second intervals with a sensitivity of 1 gamma.

The proton magnetometer used for this survey can be understood by making an analogy to a tiny bar magnet spinning rapidly about its longitudinal axis, which has the properties of both a magnetized needle and a gyroscope. Because the former tries to point along the lines of magnetic force, but is perturbed by its centrifugal property, the needle gyrates. The essential characteristic of the system is that the rate of gyration is proportional to the ambient magnetic field. The rate of gyration is counted, multiplied by a suitable factor and is displayed on the recorder as the earth's total magnetic field.

APPENDIX I gives the details of the geophysical equipment used for this survey. APPENDIX II describes the flight record and flight path recovery process.

#### CLAIMS:

The claims covered by the survey include the following:

CLAIM NAME	RECORD NO.	NO. OF UNITS
KNIP	2559 (9)	20
DRUSUS	4110 (9)	20
TIBERIUS	4111 (9)	18
GERMANICUS	4106 (9)	18
AUGUSTUS	4107 (9)	12
ALPHA	3619 (11)	20
BETA	3620 (11)	15
GAMMA	3621 (11)	20
DELTA	3622 (11)	16

EPICURUS	4109 (9)	18
EMPEDOCLES	4112 (9)	20
ARMINIUS	4116 (9)	20
SENECA	4115 (9)	4
TENNYSON 1	4102 (9)	4
TENNYSON 2	4102 (9)	12
TENNYSON 3	4104 (9)	10
TENNYSON 4	4105 (9)	10
CORNFLAKES	4118 (9)	10

LOCATION AND ACCESS:

All the survey blocks are located within the BOWSER RIVER BASIN and lie within 20 kilometers of the GRANDUC MINE. Access to each of the claim groups is easiest made by helicopter from Stewart, B.C.

GEOLOGY:

D.J. Alldrick<sup>(2)</sup> describes the area as "underlain by a north-north-west trending belt of folded volcanic rocks which contains a thick sedimentary sequence infolded along a synclinal axis. The volcanic and sedimentary rocks are intruded by small stocks and extensive dyke swarms. The volcanic rocks are bounded on the west by composite stocks and batholiths of the Coast Range Plutonic Complex. The volcanic and sedimentary rocks of the Stewart Area have been mapped by and Grove (1971, 1973, and 1983) as Hazleton Group strata of Early Jurassic to Middle Jurassic age. They are considered to be correlative with the type Hazleton area 200 kilometers to the southeast."

(2) D.J. Alldrick, Geologic Setting of the Precious Metal Deposits in the Stewart Area, 1984

### 3. DATA PRESENTATION

A contour map of the total field magnetic values has been provided at a scale of 1:10,000 for all areas except for the Toe Lake Area which is presented at a scale of 1:20,000. The magnetic contour maps were produced by hand contouring diurnally corrected intercept data which were generated by computer. The magnetic data are uncorrected for regional gradient. The contour interval is 10 gammmas where gradients allow.

Electromagnetic conductors, and the claim boundaries are provided on PLATE 1.

The geophysical records for the survey have been corrected for flight direction and helicopter speed and are submitted to the client with this report.

#### 4. DISCUSSION OF RESULTS

##### MAGNETIC DATA

Magnetic data can be interpreted to reveal areas underlain by different rock types and lineaments which could indicate fault or fracture zones. Magnetic maps can reveal the location of ore bodies which contain higher percentages of magnetite or pyrrhotite than the surrounding rocks.

##### ELECTROMAGNETIC DATA

The geological responses encountered by an electromagnetic survey are of three main types. Bedrock conductors, which include formational graphitic and massive sulphide targets, are normally limited in dimension and very often "maximum couple" with the vertical coaxial coil. They can be interpreted for conductance, depth, strike.

Secondly, surficial conductors such as overburden, glacial till and lake sedimentation responses, "maximum couple" with the horizontal coplanar coil configuration and are often "broad" responses.

Thirdly, "negative" permeability effects occur when rocks are magnetic. The electromagnetic response can become distorted by decreasing the in-phase response, often reversing the sign of the E.M. anomaly. Both coil configurations are affected by this phenomenon. Resistivity, conductance, and depth calculations in this case are not generally representative.

Non-geological responses such as lightning interference and "cultural responses" including those due to pipelines,

powerlines, buildings, metal culverts, and fence lines etc. are normally indicated by the monitors in the system or otherwise evident from the character of the trace, or their location.

#### KNIPPLE LAKE AREA (Knip Claims)

The geophysical data from the Knip Claim did not identify any magnetic or electromagnetic responses that are convincingly anomalous or appear to be caused by concentrations of metallic mineralization. The E.M. responses at the eastern ends of L 12 and L 13 coincide with sedimentary rocks<sup>(3)</sup> and are typical of formational graphitic responses.

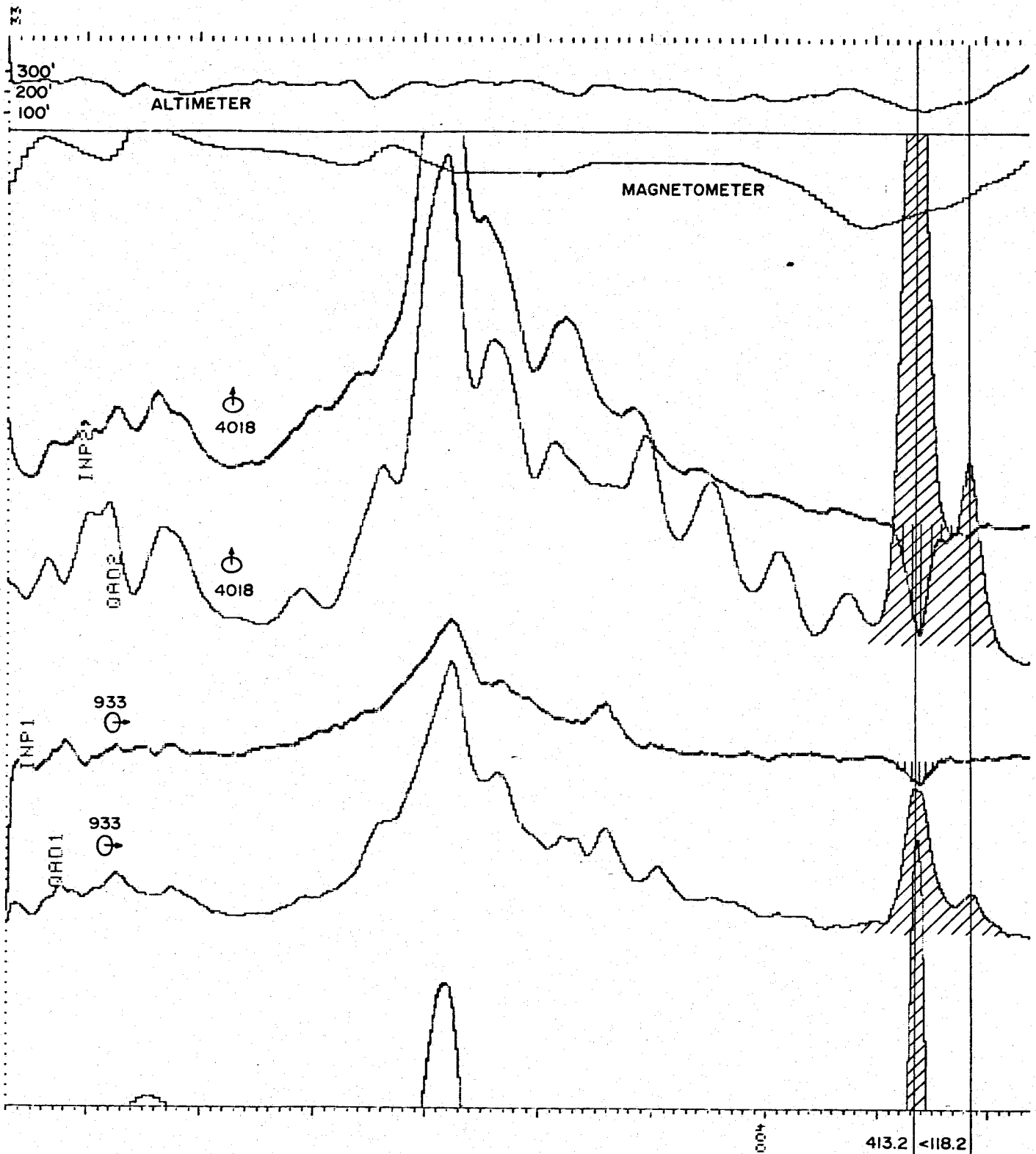
REMARK: Recent reevaluation of the area has suggested that some of the graphitic sedimentary sequences in the Stewart Complex may contain stratabound Pb-Zn mineralization. A cursory examination of the conductive area is warranted in light of this.

The E.M. responses in the western part of the grid are caused by the normal conductivities of the underlying rocks.

Quartz stockwork type mineralization (Au, and Sulphides) is outcropping in an area North of Knipple Lake. The mineral occurrence did not give rise to a geophysical response. It should be noted, however that if a conductor has limited sulphide content or has been fractured and/or contains non-conductive minerals (sphalerite for example) so that the conductor is not continuously conductive over meters or tens of meters, then the geophysical system may not respond. Although the system is extremely sensitive, quartz vein/stockwork suites most often do not contain enough metallic mineralization to give rise to electromagnetic responses.

(3) See report by E.W. Grove, June 11, 1983





LN 4

PROG. VER. 111082.

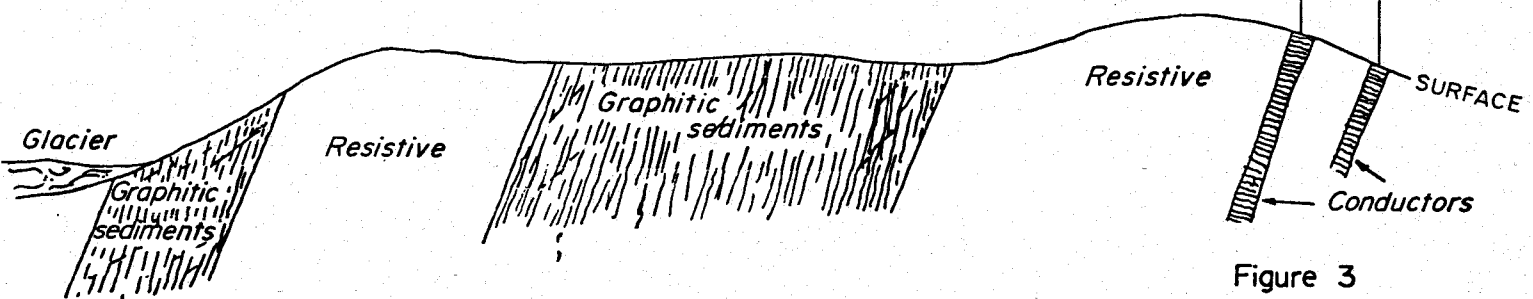


Figure 3  
 HED LAKE  
 ANOMALY 413.2 and 18.3, L4.  
 SCHEMATIC INTERPRETATION

HED LAKE AREA (Empedocles, Arminius, and Seneca Claims)

The Head Lake data indicate large areas of conductive rocks that are probably due to graphitic sediments. The conductive rocks are generally limited to the area of low magnetic susceptibility in the central portion of the mapsheet.

Of the 50 conductors identified on PLATE 1 only the electromagnetic anomalies on L 5 at fiducials 413.2 and 418.2 are considered to be anomalous. The response indicates some limited conductivity and lies within the sequence of resistive host rocks and may be a concentration of magnetic and sulphide mineralization.

The data from Line 4 with a schematic interpretation of the geophysical response is displayed in FIGURE 3.

The sources of the two anomalous responses are interpreted to be buried 2-5 meters and dipping to the north. Because of the permeability effect no calculation of the conductance at fiducial 413.2 can be made. The apparent conductance of the response at fiducial 418.2 is less than 3 mhos (very weak).

REMARK: With respect to permeability responses, they are a function of both magnetite content and terrain clearance. Some permeability responses, like conductive responses, can result from a rapid change in terrain clearance. Some component of low terrain clearance is evident in the response on Line 4, but nevertheless it is considered anomalous and warrants examination for metallic mineralization.

BERENDON GLACIER AREA ( Tennyson Claims)

Although there were no anomalous electromagnetic responses on the Berendon Glacier Survey, the airborne magnetic contour data indicates a localized concentration of magnetic materials.

# BERENDON GLACIER MAGNETIC ANOMALY

## GROUND PROFILE

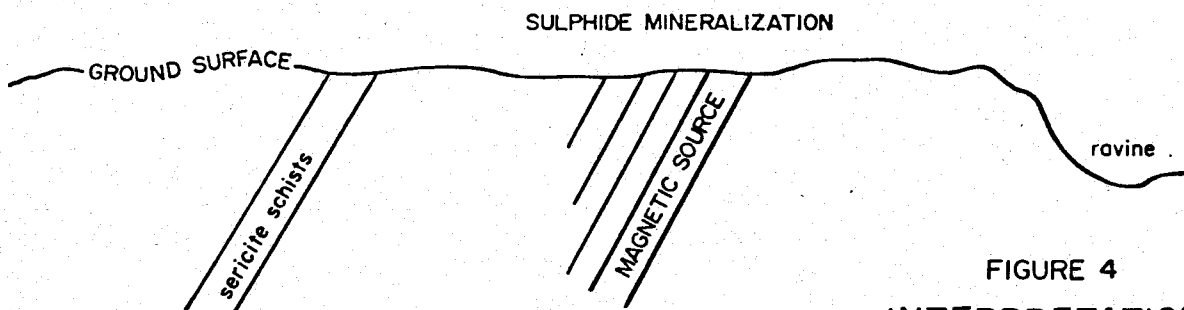
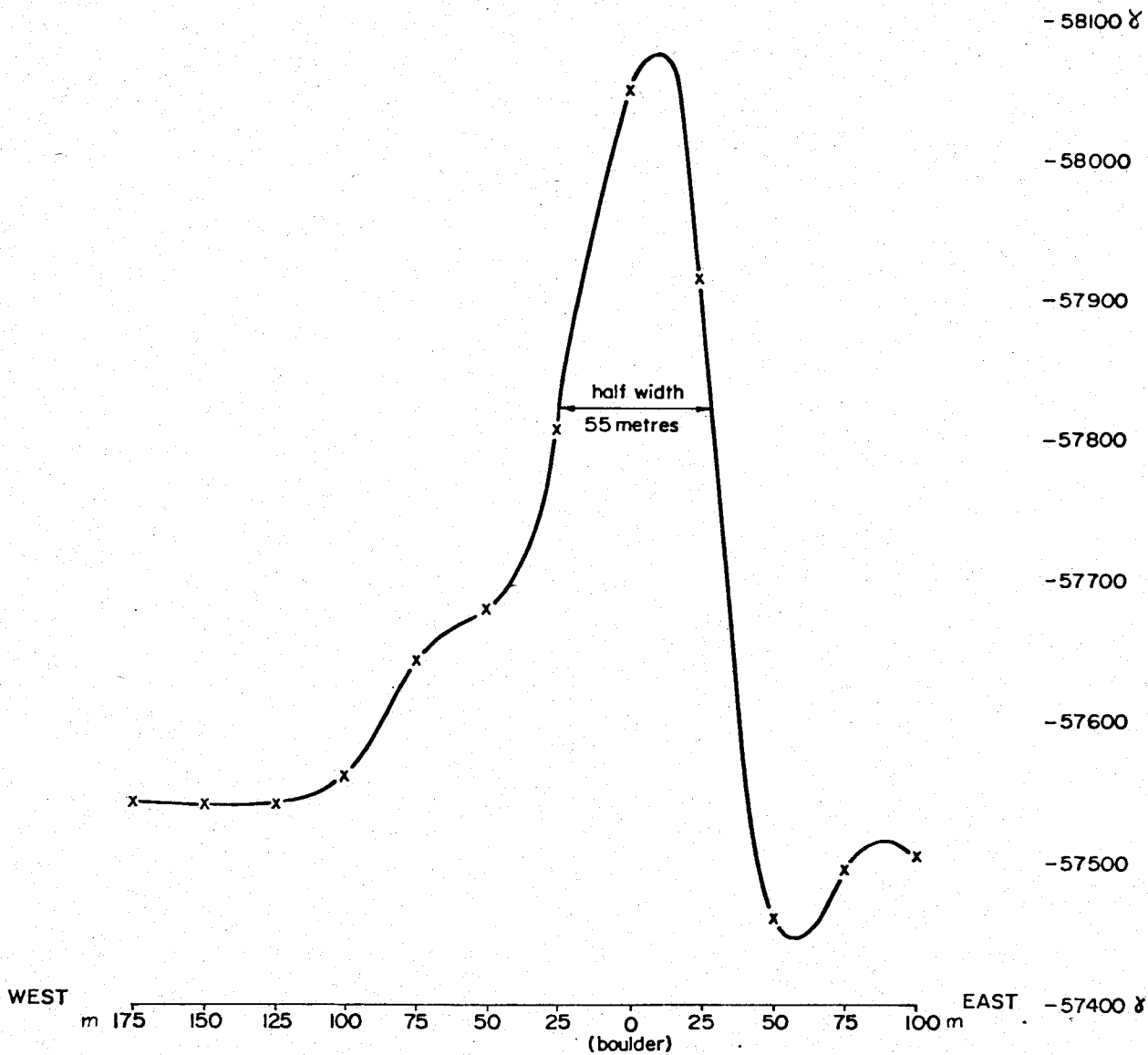


FIGURE 4  
INTERPRETATION:  
MAGNETIC RESPONSE

Notes: Not to scale  
Some glacial wash overburden  
Station interval approximate

This anomalous response is very distinct and ought to be given a priority consideration.

The writer was able to do some limited ground follow-up work while in the area including three ground magnetic traverses (the stations were not chained but only paced off) and the magnetic results from the center traverse over the anomaly (run E-W) are plotted in profile form in FIGURE 4.

The ground magnetic data indicate a conformable magnetic source 2-8 meters in thickness at a depth of 10-20 meters. (The "bump" on the west flank of the anomaly is likely due to pacing errors rather than to another magnetic source.)

REMARK: Samples of a quartzite bed (approximate strike  $030^{\circ}$  True, dip approximately  $80^{\circ}$  W.) that lie very near the magnetic source ( $\pm$  20 meters) were chip sampled by Mr. Dino Cremonese<sup>(4)</sup>. The samples were sulphide enriched; the best sample running .035 Oz/ton Ag, 0.56 oz/ton Au, and 6.48 % Cu.

Except for the previously mentioned quartzite bed, the majority of the outcrop near the magnetic anomaly consisted of sericite schists which are expected to be magnetically quiet. The strike of the quartzite bed and the schists are parallel to (at least in the area of the anomaly) the strike of the airborne anomaly.

The magnetic anomaly may be due to a sulphide enriched core, (possibly with pyrrhotite) and may be related to the source of the mineralization that outcrops in the area of the magnetic response. The airborne data indicates this "core" is in the order of 200 meters in length.

(4) verbal communication Mr. Dino Cremonese.

TOE LAKE AREA (Drusus, Tiberius, Germanicus, Augustus, Alpha, Beta, Gamma, Delta, Epicurus Claims)

The Toe Lake mapsheet is predominated in the north-east quadrant by a fairly active magnetic contour pattern indicating the presence of volcanic and or intrusive rocks. A number of lineaments are evident from the magnetic contour pattern that may indicate contacts or faults. These inferred features are displayed on PLATE 1.

REMARK: The magnetic contours are a very informative dataset in the Stewart Area. Unfortunately no regional low level survey work has been done in the area, so at present there is no way to correlate the magnetic responses from the present surveys, in a regional sense.

The area of relatively nonactive magnetics and abundant E.M. conductors in the southern portion of the mapsheet probably indicates the area is underlain with sedimentary rocks, of which a large number have a graphitic component. There is a general correlation of this area to Unit 16, the Betty Creek Formation, that has been mapped by Grove(1964-1970).

A comment is warranted on the magnetic enclosure that is centered on fiducial 761 on Line 7. This feature is both magnetic and resistive and may be due to an intrusive plunging to the West. Although there are a number of conductors near this feature none of them are convincingly anomalous. However this may be a productive area for prospecting for a contact metasomatic metallic deposit.

In summary, there are 134 conductors on the Toe Lake map sheet. Twenty-one of them are "permeability" anomalies, and the remainder are category 3 "formational responses". The area is

known to have mineral occurrences, however no conductors were recorded on this survey that are convincingly anomalous or are thought to be caused by metallic sulphide mineralization.

SUMMIT LAKE AREA (Cornflakes Claims)

Three traverses were flown in the area of these claims in order to test the regional geophysical character of the area.

Four conductors are identified on PLATE 1-A indicating the presence of graphitic formations or possibly massive sulphide mineralization.

Because of the recent recognition of stratoform Ag-Pb-Zn mineralization within the Bowser Basin Area, none of the formational conductors recorded in any of the claim groups in the area should be abandoned without geological examination.

## 5.1 CONCLUSIONS AND RECOMMENDATIONS

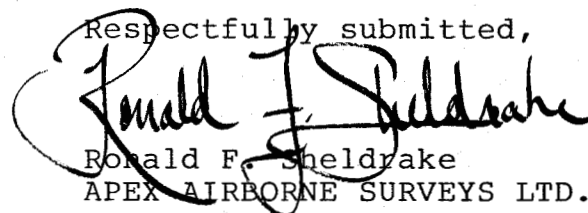
All of the 5 claim groups that were surveyed have important mineral occurrences and each of them offers good prospects for the discovery of economic mineralization.

It was anticipated, and subsequently realized, because of the nature of mineralization exposed on the properties of Teuton Resources Ltd., that the geophysical system would not respond to some of the known mineral occurrences. Nevertheless, the present survey was successful in identifying 2 anomalous areas (Berendon and Hed Lake) that may be directly related to metallic deposits. As well, the geophysical data will provide an excellent data-base for future exploration work.

It is recommended on the Berendon Glacier Prospect that a detailed ground magnetometer survey be undertaken over the area of the airborne anomaly. Line spacing should be 20 meters and station interval should be 10 meters. Data should be collected to a 2 gamma accuracy. A drill hole location ought to be identifiable from that data.

For the Hed Lake anomaly on Line 4 a detailed examination of the area should be undertaken, followed with a VLF E.M. and Horizontal Loop E.M. Survey.

Respectfully submitted,

  
Ronald F. Shel Drake  
APEX AIRBORNE SURVEYS LTD.

DATE SIGNED

Dec 21, 1963

## BIBLIOGRAPHY

- Geonics Ltd. (Toronto). Technical note TN-4 - "Interpretation Aids for E.M. 33 Helicopter Electromagnetic System".
- Gosh M.K. and West G.F., "A.E.M. Analogue Model Studies", produced by Norman Paterson & Associates Limited, Toronto
- Vacquier, V., Steenland, N.C., and Henderson, R.G., "Interpretation of Aeromagnetic Maps", Geological Society of America, Memoir No. 47., 1951
- Alldrick D.J., "Geologic Setting of the Precious Metal Deposits in the Stewart Area." 1984
- Grove E.W., "Geology and Mineral Deposits of the Stewart Area, B.C., Ministry of Energy, Mines and Petroleum Res., Bull 58, 219 pp., 1971
- Grove E.W., Geology and Mineral Deposits of the Stewart Complex, B.C., McGill University, Ph.D. Thesis, 434 pp., 1973.
- Grove E.W., "Geological Report and Work Proposal on the Teuton Resources Corp. Mineral Properties in the Bowser River Area." E.W. Grove Consultants Ltd., June 1983
- Grove E.W., "Unuk River-Salmon River-Anyox Area Geology.", 1964-70, published by the Province of British Columbia, Ministry of Energy, Mines, and Petroleum Resources.



## APPENDIX I INSTRUMENTATION

### ELECTROMAGNETOMETER

The electromagnetic instrumentation that was used on this survey utilized both coplanar and coaxial coil configurations, as well as two frequencies.

The system comprises of two sets of receivers and transmitters as follows:

(1) COAXIAL PAIR - The coaxial transmitter-receiver pair are separated by 6 meters and utilize a low frequency signal of 933 Hz. This configuration couples best with vertical dike-like targets.

(2) COPLANAR PAIR - The coplanar transmitter-receiver pair are separated by 5.5 meters and utilize a "high frequency" signal of 4018 Hz. This configuration couples best with horizontal tabular targets. The transmitter and receiver coils for the two frequencies are located at the ends of the six meter sensor that is commonly called a "bird". The bird is towed 30 meters below the helicopter by means of a suitable cable which also carries the electric signals to and from the bird.

Changes in the alternating electromagnetic field at the receiver coil, caused by eddy currents in the subsurface rock are recorded. These changes are expressed in ratios of the normal undistorted primary field. They are so small as to be expressed in parts per million (ppm). The electromagnetic instrument was manufactured by GEONICS LTD of Mississauga, Ontario with modification done by Geotech Ltd. of Ontario.

### MAGNETOMETER

The magnetometer that was used on this survey was a Geometrics Corp Model G803. It is a total field nuclear precession instrument that measures the magnetic field strength with a resolution of 1 gamma. The sensor is a toroidal coil and is positioned 20 meters from the helicopter.

### ANCILLARY EQUIPMENT

UDAS data acquisition system with digital printer.

Geocam 35 mm flight path camera

King Radio Altimeter

Geometrics G 826 magnetic base station and recorder

## APPENDIX II

## THE ANALOGUE CHART AND FLIGHT PATH RECOVERY

The in-flight chart is a roll of heat sensitive paper which moves through the digital printer at a speed of 5.48 cm per minute.

The digital printer chart facilitates the use of a full alphanumeric system. All "header", sensitivity and fiducial information is printed on the chart automatically.

The in-flight records are bound and submitted to the client with the report.

The chart is 18.5 centimeters wide as follows:

## FROM THE BOTTOM OF THE CHART

0 TO 3.5 cm	QAD2 - low frequency coaxial 10 ppm/cm
3.5 cm to 7.0 cm	INP2 - low frequency coaxial 10 ppm/cm
7.0 cm to 10.5 cm	QAD1 - high frequency coplanar 10 ppm/cm
10.5 cm to 14.0 cm	INP1 - high frequency coplanar 10 ppm/cm
14.0 cm to 17.0 cm	MAG - magnetics 30 gammas per cm.
17.0 cm to 18.6 cm	ALTR - helicopter terrain clearance 280ft/cm
17.0 cm to 17.5 cm	PRWL - power line monitor
17.0 cm to 17.5 cm	SFRS - sferics (lightning) monitor

The helicopter flight path is recovered from 35 mm film, which is exposed at 2 second intervals while the helicopter is on survey traverse. After processing and anotating, recognizable fiducials(pictures) are pin-pointed on the photomosaic map.

## APPENDIX III

## SURVEY PERSONNEL

Field Geophysicist

Ronald F. Sheldrake  
1271 W. 22nd Street  
North Vancouver, B.C.

Field Technician

Mr. Robert Langsdon  
C/O Geotech Ltd.  
Toronto

Helicopter Pilot

Mr. John King  
C/O Vancouver Island Helicopters  
Stewart, B.C.

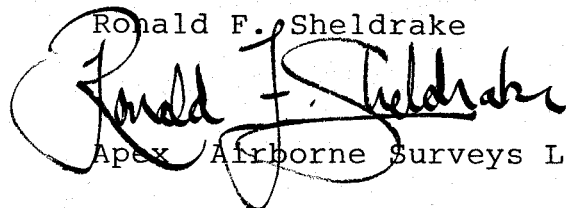
## CERTIFICATION

I, RONALD F. SHELDRAKE, of the City of Vancouver, Province of British Columbia, hereby certify as follows:

1. I am President of Apex Airborne Surveys Ltd., a company incorporated under the laws of the Province of British Columbia.
2. The Vancouver office of Apex Airborne Surveys Ltd. is located at Suite 514 - 625 Howe Street, Vancouver, British Columbia.
3. I received my degree in Geophysics (B.Sc.) from the University of British Columbia in May 1974.
4. I have practised my profession since that date.
5. I have no interest, direct or indirect, in the properties or claims of TEUTON RESOURCES CORP. or their associated companies nor do I expect to receive any.
6. I consent to the use of this report in, or in connection with, engineering reports or in a Statement of Material facts.

December 5, 1984

Ronald F. Shel Drake



Apex Airborne Surveys Ltd.

STATEMENT OF COSTS

## HELICOPTER SURVEY

Type of survey:	Helicopter Electromagnetic-Magnetic
Dates of fieldwork:	September 18-20, 1984
Survey Kilometers:	140 kilometers airborne
Cost per Linear Kilometer	\$ 135.00
Helicopter Costs:	paid by Teuton Resources Corp.
Total cost of the survey:	\$ 19,000.00

**PART III**

## CONCLUSIONS

The airborne survey was successful in defining two significant geophysical anomalies. The sharp, magnetic anomaly on the Tennyson 1 claim warrants careful follow-up. This work should include a ground magnetometer survey (as recommended by Mr. Shel Drake, B.Sc.) complemented by soil and rock geochemistry and detailed geological mapping. Similarly, the E.M. conductor identified on the border of the Arminius and Seneca claims deserves a follow-up ground program: VLF/EM and mag, soil and rock geochem and geological mapping. This type of conductor, situated in a magnetic low, may result from a Scottie-type pyrrhotite vein.

The failure of the Apex system to respond to known lead/zinc veins in the Knip claim area shows that careful prospecting/reconnaissance geochemistry should be applied to all the survey areas before dismissing their potential. Tests on samples from the Knip claim veins, carrying 20 to 50% combined galena/sphalerite, indicated weak conductivity, only. Disseminated mineralization of potential economic importance might also have been missed by the airborne system. In this regard, the author recommends that the Toe Lake sheet be thoroughly prospected: geophysical information on hand should prove useful in defining structure in this area.

Respectfully submitted,

*William D. Groves.*

W.D. Groves, Ph.D., P.Eng.

### WORK COST STATEMENT

**Field Costs:**

Geophysical Survey: Apex Airborne Surveys Ltd.  
 Contract Price: \$19,000  
 (140 kilometers @ \$135 per linear kilometer)  
 (See Part II - Statement of Costs) \$ 19,000.00

Vancouver Island Helicopter Ltd.  
 14.4 hours @ \$575/hour \$ 8,280.00  
 9.3 hours @ \$78.0 (Fuel) \$ 725.40  
 1.1 hours @ \$515/hour \$ 566.50

**Field Supervision:**

D. Cremonese, P.Eng.: Sept. 15-21  
 7 days @ \$300/day \$ 2,100.00

Air photo enlargements - survey base maps:  
 McElhanney Group 12 KP5 prints and 6  
 Cronaflex positives \$ 1,074.67

Topographic map blow-ups - survey areas:  
 Western Reproducers \$ 142.36

Meals, food, accomodation, gasoline,  
 supplies for crew \$ 463.07

Transportation: Vancouver/Stewart/Vancouver \$ 471.00

**Report Costs:**

W.D. Groves, P.Eng., Ph.D.: 1 day @ \$350/day \$ 350.00  
 Word Processor: 3 1/2 hours @ \$25/hour \$ 87.50  
 Materials (Xerox, etc.) \$ 25.00

TOTAL \$ 33,285.50  
 =====

WDG



APPORTIONMENT OF COSTS

Claim or Group Name	% Apportionment	% \$ Apportionment	Value of Work Filed
Knip Claim	13.5%	\$ 4,493.54	\$ 4,000.00
New Alphabet Group	30%	\$ 9,985.65	\$ 8,900.00
Tennyson Group	12.5%	\$ 4,160.69	\$ 3,600.00
Germanicus Group	12.5%	\$ 4,160.69	\$ 3,000.00
Drusus Group	12.5%	\$ 4,160.69	\$ 3,800.00
Classics Group	15%	\$ 4,992.82	\$ 4,400.00
Cornflakes Claim	4%	\$ 1,331.42	\$ 1,000.00
	<u>100%</u>	<u>\$33,285.50</u>	<u>\$28,700.00</u>

Surplusage of \$4,585.50 to be placed in P.A.C. account if possible.

*WDG*

## CERTIFICATE

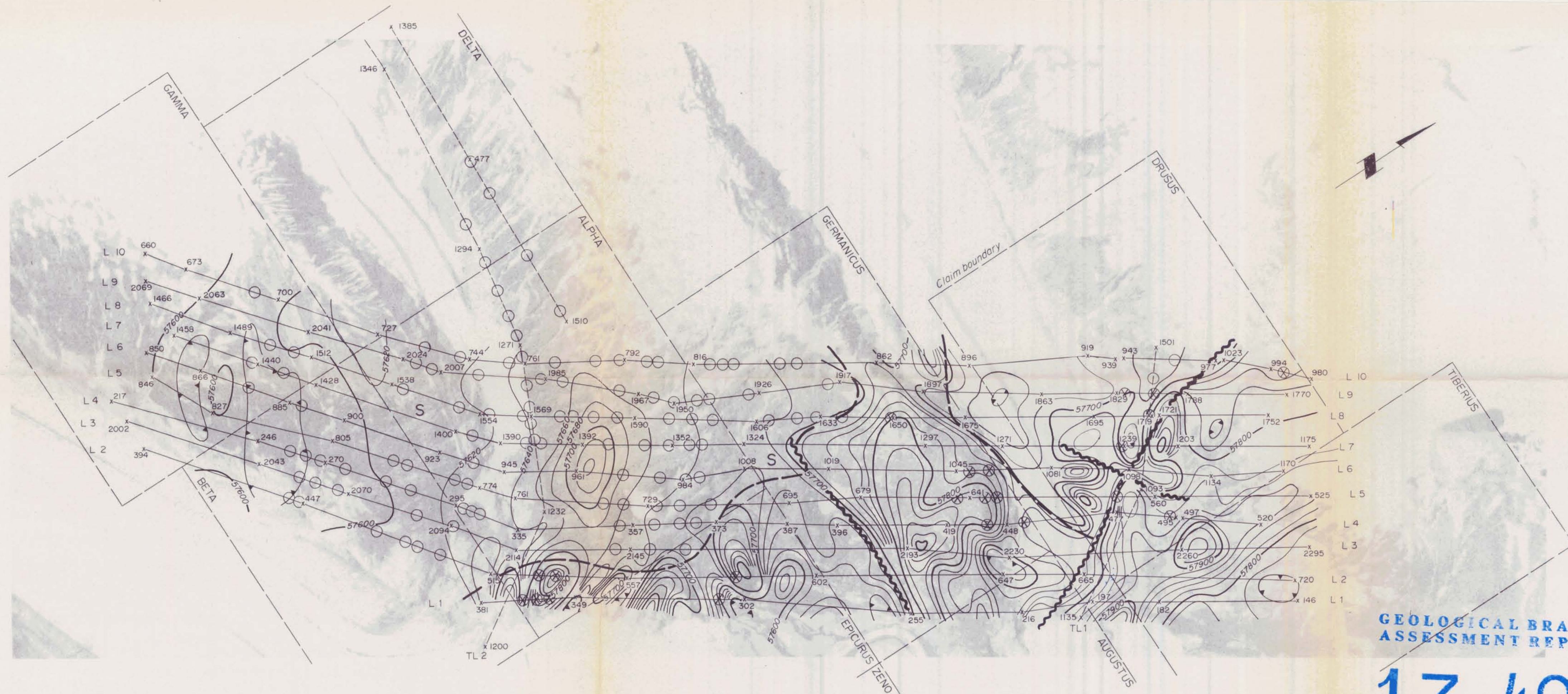
I, WILLIAM D. GROVES, do hereby certify:

1. THAT I am a consulting engineer with an office at #200 - 675 West Hastings Street, Vancouver, B.C.
2. THAT I am a graduate of the University of British Columbia with a B.A.Sc., in Geological Engineering (1960) and a Ph.D. in Chemical Engineering (1971). I am a graduate of the University of Alberta with a B.Sc. in Chemical Engineering (1962).
3. THAT I am a registered Professional Engineer in the Province of British Columbia #8082.
4. THAT I have practiced my profession since 1960.
5. THAT as senior consultant for Archaean Resources Corp., a Vancouver based mineral property consulting firm, I was in charge of the September, 1984 geophysical assessment work program on the claims forming the subject of this report. D. Cremonese, P.Eng., supervised the field operation.
6. THAT this report was prepared solely to satisfy assessment work requirements as stipulated by the government of British Columbia.

Respectfully submitted,

*William D. Groves*

W.D. Groves, P.Eng.



Magnetic declination 29°E  
 Magnetic inclination 73°

- Contour interval = 20 gammas
- Magnetic low
- Priority 1 Response
- Priority 2 Response
- Priority 3 Response
- Permeability Response
- Inferred contact
- Inferred fault
- S Sedimentary rocks

**TEUTON RESOURCES CORP.**

TOE LAKE AREA SKEENA M.D.

Plate 1

**MAGNETIC CONTOUR  
AND  
E.M. CONDUCTOR MAP**

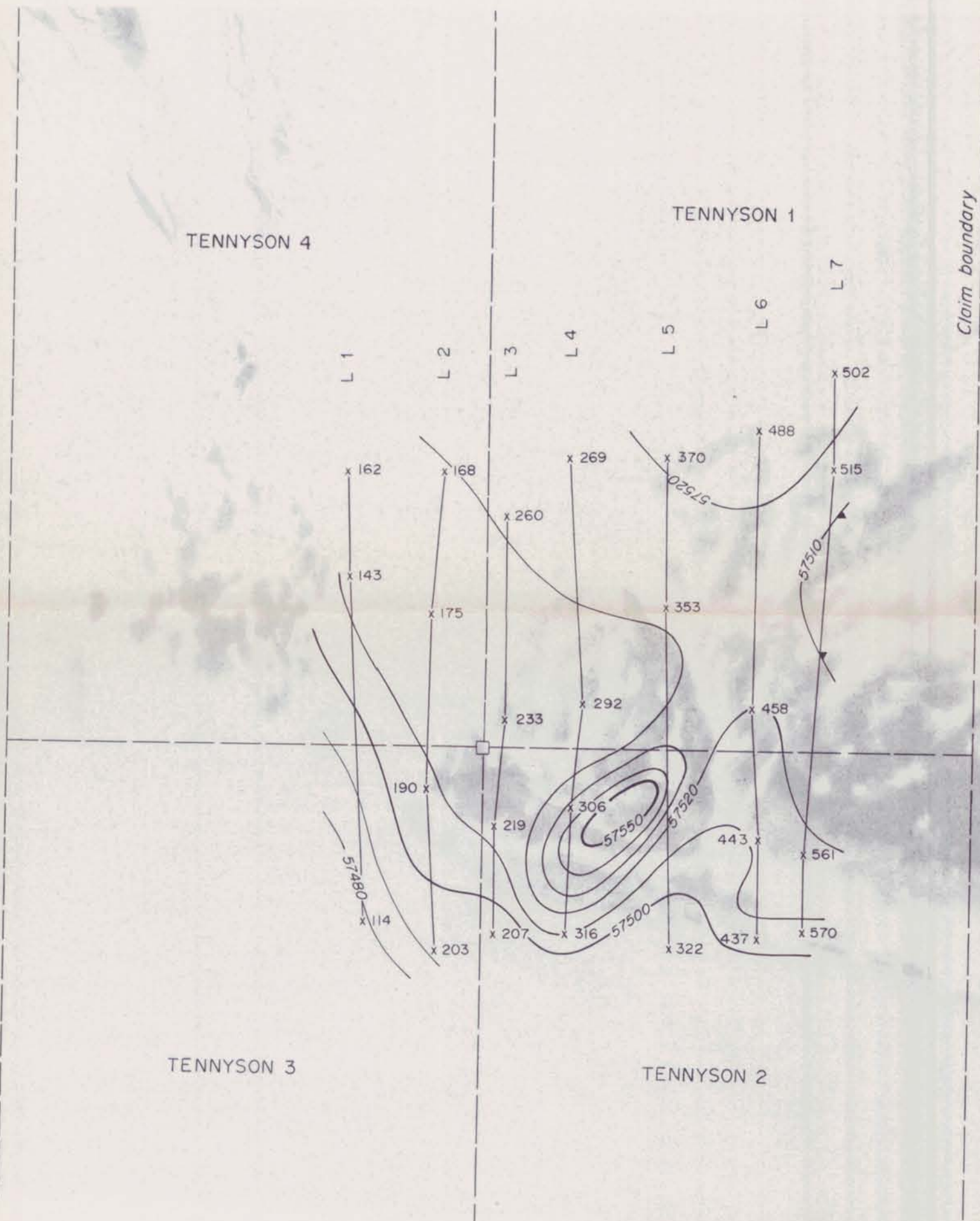
SCALE	DATE	BY	NTS.	DWG. No.
1:20,000	Dec '84	dip RFS	104 B/8	PLATE 1

Scale 0 400 800 1200 1600 metres

APEX AIRBORNE SURVEYS LTD. VANCOUVER, B.C.

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**

13,403



Magnetic declination 29°E  
 Magnetic inclination 73°

—57550—  
 —57500—  
 Contour interval = 10 gammas

○  
 Magnetic low

● Priority 1 Response  
 ◐ Priority 2 Response  
 ○ Priority 3 Response

**GEOLOGICAL BRANCH  
 ASSESSMENT REPORT**

**13,403**

TEUTON RESOURCES CORP.

BERENDON GLACIER AREA SKEENA M.D.

Plate 1

MAGNETIC CONTOUR  
 AND  
 E.M. CONDUCTOR MAP

SCALE	DATE	BY	NTS	DWG No.
1:10,000	Dec. '84	dip RFS	104 B/8	PLATE 1

Scale 0 200 400 600 800 metres

APEX AIRBORNE SURVEYS LTD. VANCOUVER, B.C.



Magnetic declination 29°E  
 Magnetic inclination 73°

- Contour interval = 10 gammas
- Magnetic low
- Priority 1 Response
- Priority 2 Response
- Priority 3 Response

TEUTON RESOURCES CORP.				
HED LAKE AREA		SKEENA M.D.		
Plate 1				
MAGNETIC CONTOUR AND E.M. CONDUCTOR MAP				
SCALE	DATE	BY	N.T.S.	DWG No
1:10,000	Dec. '84	dip RFS	104B/8	PLATE 1
Scale 0 200 400 600 800 metres				
APEX AIRBORNE SURVEYS LTD.			VANCOUVER, B.C.	

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**

STAKED

13,403



BC5504 No 171



Magnetic declination 29°E  
Magnetic inclination 73°

- Priority 1 Response
- ◐ Priority 2 Response
- Priority 3 Response

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**  
**13,403**

TEUTON RESOURCES CORP.				
SUMMIT LAKE AREA		SKEENA M.D.		
Plate 1A				
FLIGHT LINE AND E.M. CONDUCTOR MAP				
SCALE	DATE	BY	NTS.	DWG No
1:10,000	Dec '84	dip RFS	104 B/B	PLATE 1
Scale 0 200 400 600 800 metres				
APEX AIRBORNE SURVEYS LTD.		VANCOUVER, B.C.		