LOG NO: 0305 RD.

ACTION:

FILE NO:

REPORT ON COMBINED HELICOPTER-BORNE MAGNETIC, ELECTROMAGNETIC AND VLF SURVEY PEMBERTON BRITISH COLUMBIA

FOR
A & M EXPLORATION LTD.
BY
AERODAT LIMITED
March 21, 1989

GEOLOGICAL BRANCH
ASSESSMENT REPORT

19,735

J8896

K.P. Fisk
Geophysicist

19735

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources

ASSESSMENT REPORT TITLE PAGE AND SUMMARY

TYPE OF REPORT/SURVEY(S): Airborne Geophysical
TOTAL COST:

AUTHOR(S): K.P. FISK
SIGNATURE(S): per. [signature]

DATE STATEMENT OF EXPLORATION AND DEVELOPMENT FILED: Nov. 27, 1989
YEAR OF WORK: 1989

PROPERTY NAME(S): OWL, OWL 2, OWL 3, OWL 4, OWL 5

COMMODITIES PRESENT: GOLD

B.C. MINERAL INVENTORY NUMBER(S), IF KNOWN:

MINING DIVISION: LILLOOET
NTS: MAP 92 J 7 W

LATITUDE: 50° 23" N
LONGITUDE: 122° 50" W

NAMES and NUMBERS of all mineral tenures in good standing (when work was done) that form the property (Examples: TAX 1-4, FIRE 2 (12 units); PHOENIX (Lot 1706); Mineral Lease M 123; Mining or Certified Mining Lease ML 12 (claims involved)):

3402, 3601 - 3604.
Owl, Owl 2-5.

OWNER(S)
(1) GEORGE RES. CO. LTD.
(2)

MAILING ADDRESS
#616 - 626 W. PENDER
VAN. B.C. V6B 1V6

OPERATOR(S) (that is, Company paying for the work)
(1) DAVID J. STEWART
(2)

MAILING ADDRESS
4784 WEST 7TH AVENUE
VANCOUVER, B.C. V6T 1C6

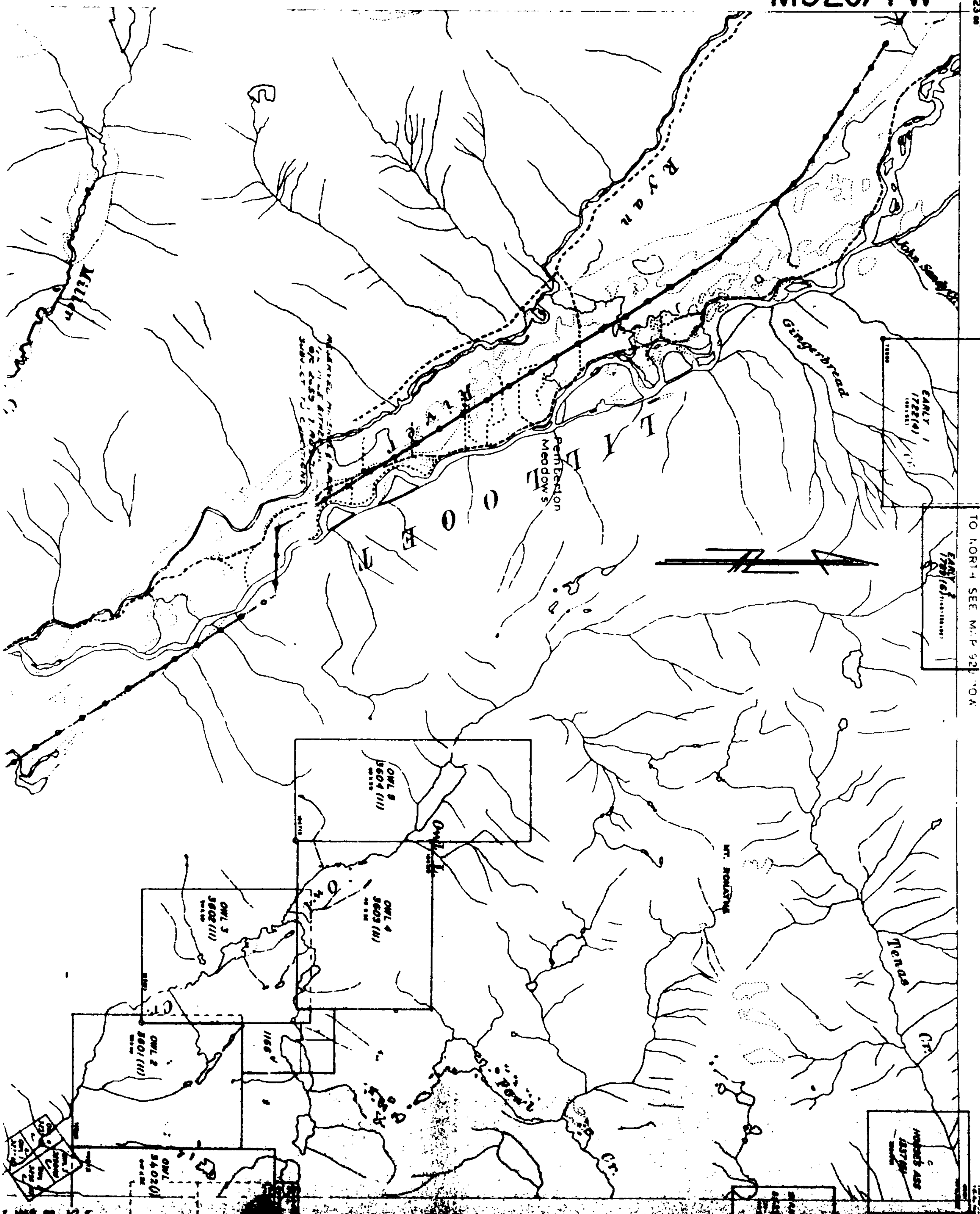
SUMMARY GEOLOGY (lithology, age, structure, alteration, mineralization, size, and attitude):
SCARN

REFERENCES TO PREVIOUS WORK:

(over)

0 2000 4000 M

M92J/7W



CLAIM MAP

AERODAT LIMITED

3883 NASHUA DRIVE • MISSISSAUGA • ONTARIO • CANADA • L4V 1R3
Telephone: (416) 671-2446 Telex: 06-968872 Fax: (416) 671-8160

Invoice No: 20-8896-0091
Date: March 27, 1989

A & M Exploration Ltd.
Suite 704
850 West Hastings St.
Vancouver, B.C.
V6C 1E1

Attn: Mr. Stuart Travis

In Account With:

Aerodat Limited
3883 Nashua Drive
Mississauga, Ontario
L4V 1R3

Re: Airborne Geophysical Survey - Pemberton, B.C.

Pursuant to paragraph 10 c (on delivery of final maps and report) of Agreement between A & M Exploration Ltd. and Aerodat Limited dated December 14, 1989

Mobilization/demobilization	$ 5,000.00
Survey charges 250 km @ $100.00/km	$25,000.00
	$30,000.00
Less Invoice No. 20-8896-0041	$10,000.00
Less Invoice No. 19-8896-0383	$10,000.00
Amount Due	**$10,000.00**

TABLE OF CONTENTS

		Page No.
1.	INTRODUCTION	1-1
2.	SURVEY AREA LOCATION	2-1
3.	AIRCRAFT AND EQUIPMENT	
	3.1 Aircraft	3-1
	3.2 Equipment	3-1
	3.2.1 Electromagnetic System	3-1
	3.2.2 VLF-EM System	3-1
	3.2.3 Magnetometer	3-2
	3.2.4 Magnetic Base Station	3-2
	3.2.5 Radar Altimeter	3-2
	3.2.6 Tracking Camera	3-3
	3.2.7 Analog Recorder	3-3
	3.2.8 Digital Recorder	3-4
	3.2.9 Radar Navigation System	3-4
4.	DATA PRESENTATION	
	4.1 Base Map	4-1
	4.2 Flight Path Map	4-1
	4.3 Airborne Electromagnetic Anomaly Map	4-1
	4.4 Total Field Magnetic Contours	4-3
	4.5 Vertical Magnetic Gradient Contours	4-3
	4.6 Apparent Resistivity Contours	4-4
	4.7 VLF-EM Total Field Contours	4-4
5.	INTERPRETATION	
	5.1 Geology	5-1
	5.2 Magnetics	5-2
	5.3 Vertical Magnetic Gradient	5-3
	5.4 VLF-EM Total Field	5-3
	5.5 Electromagnetics	5-3
	5.6 Resistivity Contours	5-5
	5.7 Recommendations	5-6

APPENDIX I - Personnel
APPENDIX II - Certificate of Qualifications
APPENDIX III - General Interpretive Considerations
APPENDIX IV - Anomaly List

LIST OF MAPS
(Scale 1:10,000)

Maps: (As listed under Appendix "B" of the Agreement)

1. **PHOTOMOSAIC BASE MAP;**
prepared from an uncontrolled photo laydown, showing registration crosses corresponding to NTS co-ordinates on survey maps.

2. **FLIGHT LINE MAP;**
showing all flight lines, anomalies and fiducials with the photomosaic base map.

3. **AIRBORNE ELECTROMAGNETIC SURVEY INTERPRETATION MAP;**
showing flight lines, fiducials. conductor axes and anomaly peaks along with inphase amplitudes and conduc[illegible] thickness ranges for the 4600 Hz coaxial coil system with the photomosaic ba[illegible] [illegible]ap.

4. **TOTAL FIELD MAGNETIC CONTOURS;**
showing magnetic values contoured at 5 nanoTesla intervals, flight lines and fiducials with the photomosaic base map.

5. **VERTICAL MAGNETIC GRADIENT CONTOURS;**
showing magnetic gradient values contoured at 0.5 nanoTeslas per meter with the photomosaic base map.

6. **APPARENT RESISTIVITY CONTOURS;**
showing contoured resistivity values, flight lines and fiducials with the photomosaic base map.

7. **VLF-EM TOTAL FIELD CONTOURS;**
showing VLF-EM values contoured at 1% intervals, flight lines and fiducials with the photomosaic base map.

1. INTRODUCTION

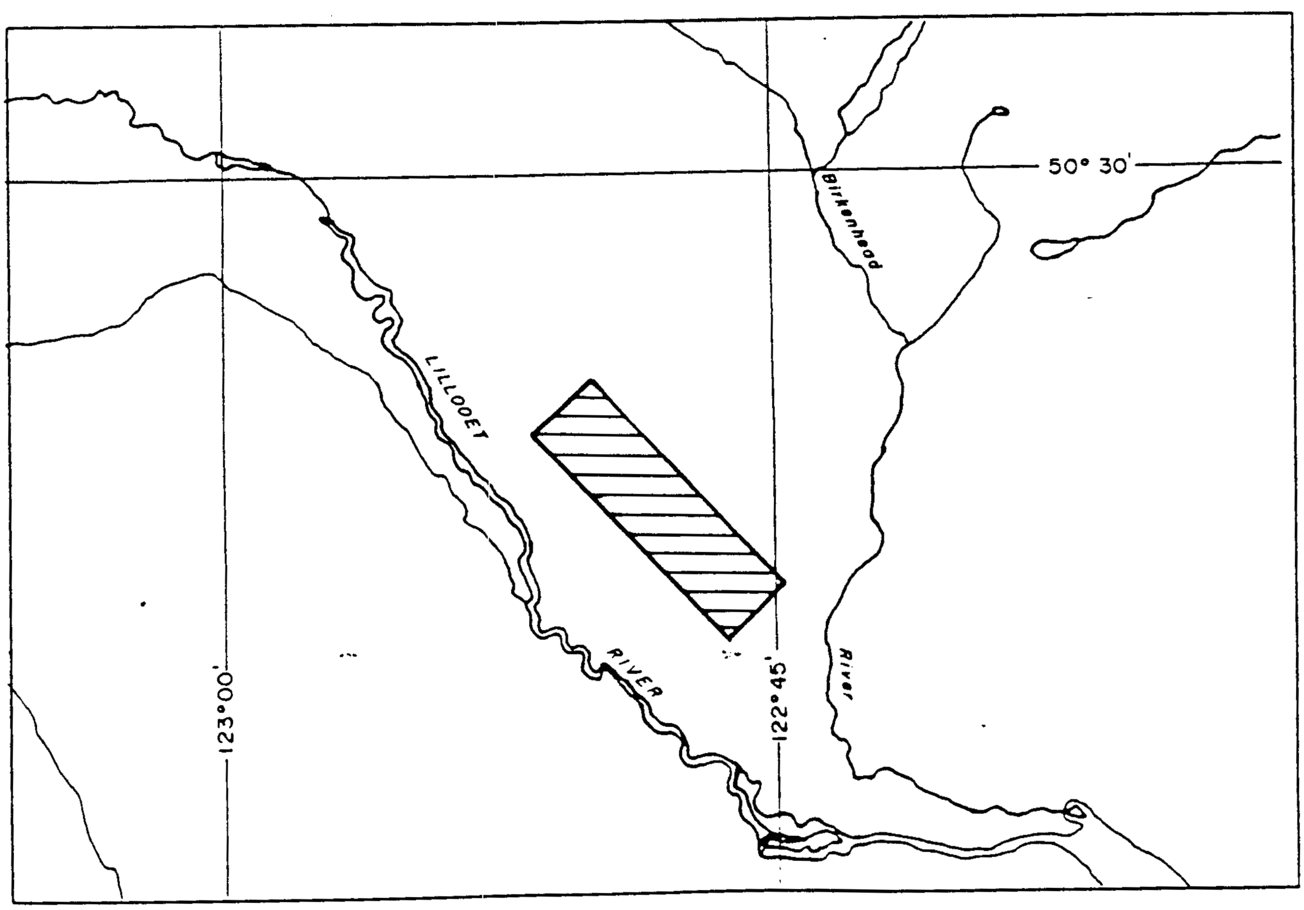
This report describes an airborne geophysical survey carried out on behalf of A & M Exploration Ltd. by Aerodat Limited. Equipment operated included a four frequency electromagnetic system, a high sensitivity cesium vapour magnetometer, a two frequency VLF-EM system, a VHS tracking camera, a radar positioning system and a radar altimeter. Electromagnetic, magnetic and altimeter data were recorded both in digital and analog form. Positioning data were stored in digital form and recorded on VHS video cassette, as well as being marked on the flight path mosaic by the operator while in flight.

The survey area, comprises a block of ground centred approximately 10 kilometres north of Pemberton, B.C. Seven flights, flown between February 6, 1989 and February 9, 1989 were required to complete the survey with flight lines oriented at an Azimuth of 045-225 degrees and flown at a nominal line spacing of 100 metres. Coverage and data quality were considered to be well within the specifications described in the contract.

The survey objective is the detection of location of mineralized zones which can be directly or indirectly related to precious metal exploration targets. A total of 250 kilometres of the recorded data were compiled in map form and are presented as part of this report according to specifications outlined by A & M Exploration Ltd.

2. SURVEY AREA LOCATION

The survey area is depicted on the index map as shown. It is centred at Latitude 50 degrees 23 minutes north, Longitude 122 degrees 50 minutes west, approximately 10 kilometres north of Pemberton, B.C. (NTS Reference Map No. 92J). The north corner of the area contains Owl Lake and traversing across the centre of the Survey area is Owl Creek. Access to the area is by logging roads from Pemberton, B.C. area.



3. AIRCRAFT AND EQUIPMENT

3.1 Aircraft

An Aerospatiale A-Star 350D helicopter, (C-GFHS), owned and operated by Ranger Helicopters Limited, was used for the survey. Installation of the geophysical and ancillary equipment was carried out by Aerodat. The survey aircraft was flown at a mean terrain clearance of 60 metres.

3.2 Equipment

3.2.1 Electromagnetic System

The electromagnetic system was an Aerodat 4-frequency system. Two vertical coaxial coil pairs were operated at 935 Hz and 4600 Hz and two horizontal coplanar coil pairs at 4175 Hz and 32 kHz. The transmitter-receiver separation was 7 metres. Inphase and quadrature signals were measured simultaneously for the 4 frequencies with a time constant of 0.1 seconds. The electromagnetic bird was towed 30 metres below the helicopter.

3.2.2 VLF-EM System

The VLF-EM System was a Herz Totem 2A. This instrument measures the total field and quadrature components of two selected transmitters, preferably oriented at right angles to one another. The sensor was towed in a bird 12 metres below the helicopter. The transmitters monitored were NAA, Cutler, Maine broadcasting at 24.0 kHz. for the Line station and NLK, Jim Creek, Washington broadcasting at 24.8 kHz for the Orthogonal station.

3.2.3 Magnetometer

The magnetometer employed was a Scintrex Model VIW-2321 H8 cesium, optically pumped magnetometer sensor. The sensitivity of this instrument was 0.1 nanoTeslas at a 0.2 second sampling rate. The sensor was towed in a bird 12 metres below the helicopter.

3.2.4 Magnetic Base Station

An IFG-2 proton precession magnetometer was operated at the base of operations to record diurnal variations of the earth's magnetic field. The clock of the base station was synchronized with that of the airborne system to facilitate later correlation.

3.2.5 Radar Altimeter

A King Air KRA-10 radar altimeter was used to record terrain clearance. The output from the instrument is a linear function of altitude for maximum accuracy.

3.2.6 Tracking Camera

A Panasonic video tracking camera was used to record flight path on VHS video tape. The camera was operated in continuous mode and the fiducial numbers and time marks for cross reference to the analog and digital data were encoded on the video tape.

3.2.7 Analog Recorder

An RMS dot-matrix recorder was used to display the data during the survey. In addition to manual and [illegible]ducials, the following data were recorded:

Channel	Input	Scale
CPI2	High Frequency Coplanar Inphase	20 ppm/mm
CPQ2	High Frequency Coplanar Quadrature	20 ppm/mm
CXI1	Low Frequency Coaxial Inphase	2.5 ppm/mm
CXQ1	Low Frequency Coaxial Quadrature	2.5 ppm/mm
CXI2	High Frequency Coaxial Inphase	2.5 ppm/mm
CXQ2	High Frequency Coaxial Quadrature	2.5 ppm/mm
CPI1	Mid Frequency Coplanar Inphase	10 ppm/mm
CPQ1	Mid Frequency Coplanar Quadrature	10 ppm/mm
VLT	VLF-EM Total Field, Line	2.5% ppm/mm
VLQ	VLF-EM Quadrature, Line	2.5% ppm/mm
VOT	VLF-EM Total Field, Ortho	2.5% ppm/mm
VOQ	VLF-EM Quadrature, Ortho	2.5% ppm/mm
ALT	Altimeter	10 ft/mm

Channel	Input	Scale
MAGF	Magnetometer, fine	2.5 nT/mm
MAGC	Magnetometer, coarse	25 nT/mm

3.2.8 Digital Recorder

A DGR 33 data system recorded the survey on magnetic tape. Information recorded was as follows:

Equipment	Recording Interval
EM System	0.1 seconds
VLF-EM	0.5 seconds
Magnetometer	0.2 seconds
Altimeter	0.5 seconds

3.2.9 Radar Positioning System

A Motorola Mini-Ranger III radar navigation system was used for both navigation and flight path recovery. Transponders sited at fixed locations were interrogated several times per second and the ranges from these points to the helicopter measured to a high degree of accuracy. A navigational computer triangulates the position of the helicopter and provides the pilot with navigation information. The range/range data was recorded on magnetic tape for subsequent flight path determination.

4. DATA PRESENTATION

4.1 Base Map

A photomosaic base map at a scale of 1:10,000 was prepared from airborne photographs of the area, and is presented on a screened mylar base.

4.2 Flight Path Map

The flight path map was derived from the Mini-Ranger radar positioning system. The distance from the helicopter to two established reference locations was measured several times per second and the position of the helicopter calculated by triangulation. It is estimated that the flight path is generally accurate to about 10 metres with respect to the topographic detail of the base map. The flight path map showing all flight lines, is presented [illegible] a Cronaflex copy of the photomosaic base map, with time and navigator's [illegible]ual fiducials for cross reference to both the analog and digital data.

4.3 Airborne Electromagnetic Anomaly Map

The electromagnetic data were recorded digitally at a sample rate of 10 per second with a time constant of 0.1 seconds. A two stage digital filtering process was carried out to reject major sferic events and to reduce system noise.

Local sferic activity can produce sharp, large amplitude events that cannot be removed by conventional filtering procedures. Smoothing or stacking will reduce their amplitude but leave a broader residual response that can be confused with geological phenomena. To avoid this possibility, a computer algorithm searches out and rejects the major sferic events.

The signal to noise ratio was further enhanced by the application of a low pass digital filter. It has zero phase shift which prevents any lag or peak displacement from occurring, and it suppresses only variations with a wavelength less than about 0.25 seconds. This low effective time constant permits maximum profile shape resolution.

Following the filtering process, a base level correction was made. The correction applied is a linear function of time that ensures the corrected amplitude of the various inphase and quadrature components is zero when no conductive or permeable source is present. The filtered and levelled data were used in the interpretation of the electromagnetics.

An interpretation map was prepared showing peak locations of anomalies and conductivity thickness ranges along with the Inphase amplitudes (computed from the 4600 Hz coaxial response) and conductor axes. The anomalous responses of the three coil configurations along with the interpreted conductor axes were plotted on a Cronaflex copy of the photomosaic base map.

4.4 Total Field Magnetic Contours

The aeromagnetic data were corrected for diurnal variations by adjustment with the digitally recorded base station magnetic values. No correction for regional variation was applied. The corrected profile data were interpolated onto a regular grid at a 25 metre true scale interval using an akima spline technique. The grid provided the basis for threading the presented contours at a 5 nanoTesla interval.

The contoured aeromagnetic data have been presented on a Cronaflex copy of the photomosaic base map.

4.5 Vertical Magnetic Gradient Contours

The vertical magnetic gradient was computed from the total field magnetic data to obtain values in nanoteslas/metre.

The gridded data were compiled at a 20 metre true scale interval and contoured at an interval of 0.2 nanotesla per metre and presented with flight path on a Cronaflex copy of the photomosaic base map.

4.6 Apparent Resistivity Contours

The electromagnetic information was processed to yield a map of the apparent resistivity of the ground.

The approach taken in computing apparent resistivity was to assume a model of a 200 metre thick conductive layer (i.e., effectively a half space) over a resistive bedrock. The computer then generated, from nomograms for this model, the resistivity that would be consistent with the bird elevation and recorded amplitude for the 4175 hz coplanar frequency pair used. The apparent resistivity profile data were interpolated onto a regular grid at a 25 metres true scale interval using an akima spline technique.

The contoured apparent resistivity data were presented on a Cronaflex copy of the photomosaic base map with the flight path.

4.7 VLF-EM Total Field Contours

The VLF-EM signals from NAA, Cutler, Maine broadcasting at 24.0 kHz. for the Line station were compiled in contour form and presented on Cronaflex copies of the photomosaic base map.

5. INTERPRETATION

5.1 Geology

The general geological information was taken from a map produced by the Geological Survey of Canada Department of Energy Mines and Resources entitled PEMBERTON (East Half) Map 13-1973.

The survey area is within the coastal mountain range of B.C. and covers an area of the Pioneer formation. The formation in this area is known to be a greenstone derived from andesite breccia, tuff and flows, minor rhyolitic breccia and flows, slate, argillite, limestone and conglomerate. To the north east of the survey area is a granodiorite known as the Scuzzy Pluton formation, and to the south west is Quartz Diorite.

Several mineral showings are known within the survey area and include the J property in the northern part of the area with occurrences of pyrite, the Owl Creek C zone in the southern portion of the survey and further south, the Owl Creek B zone, both with occurrences of copper and molybdenum.

5.2 Magnetics

The greatest magnetic activity with amplitude variations up to 2000 gammas, occurs in the north west corner of the survey block, moderately active amplitude variations are noted along the north western edge of the area.

The highest intensity magnetics along the northwestern edge of the survey seem to be related to the mapped granodiorite of the Scuzzy Pluton. To the south west of this zone is a band of lower intensity magnetics thought to be associated with the Pioneer Formation. Within this band of lower intensity magnetics are moderate magnetic highs, which may be a signature from the underlying granodiorite. Note that both HEM conductor axis (A & B) are associated with this zone of the lower magnetization bordered by the higher intensity magnetics.

5.3 Vertical Magnetic Gradient

The areas of higher intensity magnetics have been clearly broken up into unique trends as a result of the computation of the vertical gradient. This interpretation is not as readily obvious when one refers to the magnetic total field maps. Geological contacts coincide with the 'zero' contour interval closely and if desired a pseudo geological map may be compiled using known geological information and the presented calculated vertical gradient map. For vertical bedding this method works very well, however, for steep to moderately dipping bedding it will be found that the geological contact will be closer to the magnetic peak by a small distance.

Breaks and offsets are more clearly defined in the Vertical Gradient maps and some faults and shears are recognizable. Some of the more prominent features have been drafted on the interpretation map. However, it should be noted that there is the suggestion of more possible faulting but the confidence level for their proper identification was low. As more field geological information is correlated with these features it will become apparent to the client whether other fault zones do exist.

5.4 VLF-EM Total Field

In rugged terrain Total Field VLF-EM generally responds to terrain as well as to bedrock conductors. There seems to be a slight correlation to the magnetic data in the centre of the survey showing similar E-W linears. Only the larger VLF-EM responses have been noted on the interpretation but there are a fair number of high amplitude total field responses within the survey area. Note that HEM conductor axis A corresponds with a slight VLF-EM high. Any faults or shears that may be striking N-S cannot be expected to show up on the VLF-EM map due to the preferred direction of the VLF signal.

5.5 Electromagnetics

The electromagnetic data was first checked by a line to line examination of the analog record. The record quality was very good with little sferic activity. The system noise levels were low and were removed by an appropriate smoothing filter. Geologic noise, in the form of surficial conductors and variations in background geological resistivities are present on the high frequency coil pair profiles.

Anomalies were picked off the analog traces of the low and high frequency coaxial responses and then validated on the coplanar profile data. These selections were then digitized, edited and replotted on a copy of the profile map and allowed for the rejection or inclusion if warranted, of obvious surficial conductors.

Each conductors or group of conductors was evaluated on the basis of magnetic and lithologic correlation as well as cultural (man made) or surficial features not obvious on the analog chart.

RESULTS

There are two distinct conductor axes, one in the north east corner and the other in the centre of the survey block. Both regions are associated with the Pioneer Formation greenstone. Bedrock conductors seldom have good conductivity response characteristics in this area. Along any conductive horizon, the response amplitude, profile characteristics, apparent conductivity and strike are variables. The grading of anomalies therefore become somewhat subjective for low response amplitude anomalies. Two possible EM targets have been isolated using these variables and have favourable criterion.

Targets have not been prioritized but may be summarized as follows:

CONDUCTOR A

VLF-EM : Slight High

Magnetics : Low

Comments : Profile shape characteristic of steeply dipping conductors, continuity along with magnetic low.

CONDUCTOR B

VLF-EM : -

Magnetics : Low

Comments : Profile shape characteristic of steeply dipping conductor, continuity along with magnetic low.

Isolated anomalies along the north east edge of the survey area are associated with a high magnetite content (negative EM inphase response). These high magnetite zones are sometimes associated with other mineralization and may warrant further investigation as well.

5.6 Resistivity Contours

The resistivity contours approximate the profile amplitude trends only in particular situations. Overlaying the EM map on the apparent resistivity map, one can readily visualize the relationship of the various conductors and the resistivity mapping with some of the known geology.

The apparent resistivity data presentation may render some additional information in extending strike length for some of the more weaker trends. It may also be used to delineate folds in geological structures as well.

5.7 Recommendations

Bedrock EM responses have been noted for the purpose of qualifying further follow-up. Detailed geological mapping and sampling is recommended for every zone. With additional information the explorationist may be able to explain some conductors and reject unfavourable geological environments. Geophysical surveys are warranted on zones which cannot be adequately tested by surface sampling. Further evaluations of the airborne survey during the ground exploration are recommended as the explanations of generic classes of conductors is obtained.

Induced Polarization (IP) surveys are more conducive in the search for targets than are electromagnetic surveys. However, a ground EM system with 4 frequencies should adequately resolve the selected conductors. There are many types of base and precious metal deposits which have relatively weak airborne EM or VLF-Em response, but may have a ground EM or IP response.

In conjunction with this, a complete and comprehensive evaluation of the magnetic data and calculated vertical magnetic gradient data and subsequent diamond drill hole geology results and surficial geology will produce more isolated targets.

Respectfully submitted,

Keith Fisk

K.P. Fisk, Geophysicist
AERODAT LIMITED
March 21, 1989

J8896

APPENDIX II

CERTIFICATE OF QUALIFICATIONS

I, KEITH P. FISK, certify that: -

1. I hold a B. Sc in Geological Geophysics from the University of Western Ontario.

2. I reside at 1009-26 Carluke Cres. in the city of North York, Ontario.

3. I have been engaged in a professional role in the minerals industry in Canada for the past three years.

4. I have been a member of the Prospectors & Developers Association since 1985.

5. The accompanying report was prepared from information supplied by A & M Exploration Ltd. and from a review of the proprietary airborne geophysical survey flown by Aerodat Limited for A & M Exploration Ltd. I have not personally visited the property.

6. I have no interest, direct or indirect, in the property described nor do I hold securities in A & M Exploration Ltd.

Signed,

Keith Fisk

Keith P. Fisk
Geophysicist

Mississauga, Ontario
March, 1989

APPENDIX III

GENERAL INTERPRETIVE CONSIDERATIONS

Electromagnetic

The Aerodat four frequency system utilizes two different transmitter-receiver coil geometries. The traditional coaxial coil configuration is operated at two widely separated frequencies and the horizontal coplanar coil pair is operated at a frequency approximately aligned with one of the coaxial frequencies.

The electromagnetic response measured by the helicopter system is a function of the "electrical" and "geometrical" properties of the conductor. The "electrical" property of a conductor is determined largely by its electrical conductivity, magnetic susceptibility and its size and shape; the "geometrical" property of the response is largely a function of the conductor's shape and orientation with respect to the measuring transmitter and receiver.

Electrical Considerations

For a given conductive body the measure of its conductivity or conductance is closely related to the measured phase shift between the received and transmitted electromagnetic field. A small phase shift indicates a r[illegible] high conductance, a large phase shift lower conductance. A small phase shift indicates a relatively high conductance, a large phase shift lower conductance. A small phase shift results in a large inphase to quadrature ratio and a large phase shift a low ratio. This relationship is shown quantitatively for a non-magnetic vertical half-plane model on the accompanying phasor diagram. Other physical models will show the same trend but different quantitative relationships.

The phasor diagram for the vertical half-plane model, as presented, is for the coaxial coil configuration with the amplitudes in parts per million (ppm) of the primary field as measured at the response peak over the conductor. To assist the interpretation of the survey results the computer is used to identify the apparent conductance and depth at selected anomalies. The results of this calculation are presented in table form in Appendix II and the conductance and inphase amplitude are presented in symbolized form on the map presentation.

The conductance and depth values as presented are correct only as far as the model approximates the real geological situation. The actual geological source may be of limited length, have significant dip, may be strongly magnetic, its conductivity and thickness may vary with depth and/or strike and adjacent bodies and overburden may have modified the response. In general the conductance estimate is less affected by these limitations than is the depth estimate, but both should be considered as relative rather than absolute guides to the anomaly's properties.

Conductance in mhos is the reciprocal of resistance in ohms and in the case of narrow slab-like bodies is the product of electrical conductivity and thickness.

Most overburden will have an indicated conductance of less than 2 mhos; however, more conductive clays may have an apparent conductance of say 2 to 4 mhos. Also in the low conductance range will be electrolytic conductors in faults and shears.

The higher ranges of conductance, greater than 4 mhos, indicate that a significant fraction of the electrical conduction is electronic rather than electrolytic in nature. Materials that conduct electronically are limited to certain metallic sulphides and to graphite. High conductance anomalies, roughly 10 mhos or greater, are generally limited to sulphide or graphite bearing rocks.

Sulphide minerals, with the exception of such ore minerals as sphalerite, cinnabar and stibnite, are good conductors; sulphides may occur in a disseminated manner that inhibits electrical conduction through the rock mass. In this case the apparent conductance can seriously underrate the quality of the conductor in geological terms. In a similar sense the relatively non-conducting sulphide minerals noted above may be present in significant consideration in association with minor conductive sulphides, and the electromagnetic response only relate to the minor associated mineralization. Indicated conductance is also of little direct significance for the identification of gold mineralization. Although gold is highly conductive, it would not be expected to exist in sufficient quantity to create a recognizable anomaly, but minor accessory sulphide mineralization could provide a useful indirect indication.

In summary, the estimated conductance of a conductor can provide a relatively positive identification of significant sulphide or graphite mineralization; however, a moderate to low conductance value does not rule out the possibility of significant economic mineralization.

Geometrical Considerations

Geometrical information about the geologic conductor can often be interpreted from the profile shape of the anomaly. The chance in shape is primarily related to the change in inductive coupling among the transmitter, the target, and the receiver.

In the case of a thin, steeply dipping, sheet-like conductor, the coaxial coil pair will yield a near symmetric peak over the conductor. On the other hand, the coplanar coil pair will pass through a null couple relationship and yield a minimum over the conductor, flanked by positive side lobes. As the dip of the conductor decreased from vertical, the coaxial anomaly shape changes only slightly, but in the case of the coplanar coil pair the side lobe on the down dip side strengthens relative to that on the up dip side.

As the thickness of the conductor increases, induced current flow across the thickness of the conductor becomes relatively significant and complete null coupling with the coplanar coils is no longer possible. As a result, the apparent minimum of the coplanar response over the conductor diminishes with increasing thickness, and in the limiting case of a fully 3 dimensional body or a horizontal layer or half-space, the minimum disappears completely.

A horizontal conducting layer such as overburden will produce a response in the coaxial and coplanar coils that is a function of altitude (and conductivity if not uniform). The profile shape will be similar in both coil configurations with an amplitude ratio (coplanar:coaxial) of about 4:1*.

In the case of a spherical conductor, the induced currents are confined to the volume of the sphere, but not relatively restricted to any arbitrary plane as in the case of a sheet-like form. The response of the coplanar coil pair directly over the sphere may be up to 8* times greater than that of the coaxial pair.

In summary, a steeply dipping, sheet-like conductor will display a decrease in the coplanar response coincident with the peak of the coaxial response. The relative strength of this coplanar null is related inversely to the thickness of the conductor; a pronounced null indicates a relatively thin conductor. The dip of such a conductor can be inferred from the relative amplitudes of the side-lobes.

Massive conductors that could be approximated by a conducting sphere will display a simple single peak profile form on both coaxial and coplanar coils, with a ratio between the coplanar to coaxial response amplitudes as high as 8*.

Overburden anomalies often produce broad poorly defined anomaly profiles. In most cases, the response of the coplanar coils closely follows that of the coaxial coils with a relative amplitude ration of 4*.

Occasionally, if the edge of an overburden zone is sharply defined with some significant depth extent, an edge effect will occur in the coaxial coils. In the case of a horizontal conductive ring or ribbon, the coaxial response will consist of two peaks, one over each edge; whereas the coplanar coil will yield a single peak.

* It should be noted at this point that Aerodat's definition of the measured ppm unit is related to the primary field sensed in the receiving coil without normalization to the maximum coupled (coaxial configuration). If such normalization were applied to the Aerodat units, the amplitude of the coplanar coil pair would be halved.

Magnetics

The Total Field Magnetic Map shows contours of the total magnetic field, uncorrected for regional variation. Whether an EM anomaly with a magnetic correlation is more likely to be caused by a sulphide deposit than one without depends on the type of mineralization. An apparent coincidence between an EM and a magnetic anomaly may be caused by a conductor which is also magnetic, or by a conductor which lies in close proximity to a magnetic body. The majority of conductors which are also magnetic are sulphides containing pyrrhotite and/or magnetite. Conductive and magnetic bodies in close association can be, and often are, graphite and magnetite. It is often very difficult to distinguish between these cases. If the conductor is also magnetic, it will usually produce an EM anomaly whose general pattern resembles that of the magnetics. Depending on the magnetic permeability of the conducting body, the amplitude of the inphase EM anomaly will be weakened, and if the conductivity is also weak, the inphase EM anomaly may even be reversed in sign.

VLF Electromagnetics

The VLF-EM method employs the radiation from powerful military radio transmitters as the primary signals. The magnetic field associated with the primary field is elliptically polarized in the vicinity of electrical conductors. The Herz Totem uses three coils in the X, Y, Z configuration to measure the total field and vertical quadrature component of the polarization ellipse.

The relatively high frequency of VLF (15-25) kHz provides high response factors for bodies of low conductance. Relatively "disconnected" sulphide ores have been found to produce measurable VLF signals. For the same reason, poor conductors such as sheared contacts, breccia zones, narrow faults, alteration zones and porous flow tops normally produce VLF anomalies. The method can therefore be used effectively for geological mapping. The only relative disadvantage of the method lies in its sensitivity to conductive overburden. In conductive ground to depth of exploration is severely limited.

The effect of strike direction is important in the sense of the relation of the conductor axis relative to the energizing electromagnetic field. A conductor aligned along a radius drawn from a transmitting station will be in a maximum coupled orientation and thereby produce a stronger response than a similar conductor at a different strike angle. Theoretically, it would be possible for a conductor, oriented tangentially to the transmitter to produce no signal. The most obvious effect of the strike angle consideration is that conductors favourably oriented with respect to the transmitter location and also near perpendicular to the flight direction are most clearly rendered and usually dominate the map presentation.

The total field response is an indicator of the existence and position of a conductivity anomaly. The response will be a maximum over the conductor, without any special filtering, and strongly favour the upper edge of the conductor even in the case of a relatively shallow dip.

The vertical quadrature component over steeply dipping sheet-like conductor will be a cross-over type response with the cross-over closely associated with the upper edge of the conductor.

The response is a cross-over type due to the fact that it is the vertical rather than total field quadrature component that is measured. The response shape is due largely to geometrical rather than conductivity considerations and the distance between the maximum and minimum on either side of the cross-over is related to target depth. For a given target geometry, the larger this distance the greater the depth.

The amplitude of the quadrature response, as opposed to shape is function of target conductance and depth as well as the conductivity of the overburden and host rock. As the primary field travels down to the conductor through conductive material it is both attenuated and phase shifted in a negative sense. The secondary field produced by this altered field at the target also has an associated phase shift. This phase shift is positive and is larger for relatively poor conductors. This secondary field is attenuated and phase shifted in a negative sense during return travel to the surface. The net effect of these 3 phase shifts determine the phase of the secondary field sensed at the receiver.

A relatively poor conductor in resistive ground will yield a net positive phase shift. A relatively good conductor in more conductive ground will yield a net negative phase shift. A combination is possible whereby the net phase shift is zero and the response is purely in-phase with no quadrature component.

A net positive phase shift combined with the geometrical cross-over shape will lead to a positive quadrature response on the side of approach and a negative on the side of departure. A net negative phase shift would produce the reverse. A further sign reversal occurs with a 180 degree change in instrument orientation as occurs on reciprocal line headings. During digital processing of the quadrature data for map presentation this is corrected for by normalizing the sign to one of the flight line headings.

Appendix IV

ANOMALIES J8896 A & M EXPLORATION

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
3	20	A	0	1.0	7.5	0.0	0	58
3	30	A	0	3.2	11.7	0.0	0	48
3	40	A	0	4.3	16.5	0.1	0	38
3	50	A	0	1.8	6.2	0.0	0	63
3	60	A	0	2.6	6.6	0.1	0	57
2	370	A	0	5.8	12.0	0.2	0	60
2	410	A	0	6.4	11.8	0.3	0	62
2	430	A	0	6.2	12.6	0.3	0	66
2	440	A	0	6.5	8.4	0.5	0	74
2	450	A	0	5.5	10.1	0.3	0	72
2	450	B	0	10.2	14.7	0.6	0	59
2	450	C	0	-16.0	4.0	0.0	0	13
2	460	A	0	10.1	15.3	0.5	0	55
3	470	A	0	-16.5	5.8	0.0	0	5
4	1290	A	0	-9.3	2.4	0.0	0	31
5	1300	A	0	-108.6	12.4	0.0	0	11

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

Flight Path

Navigation and recovery using Motorola Mini-Ranger (MRS III) radar navigation system.

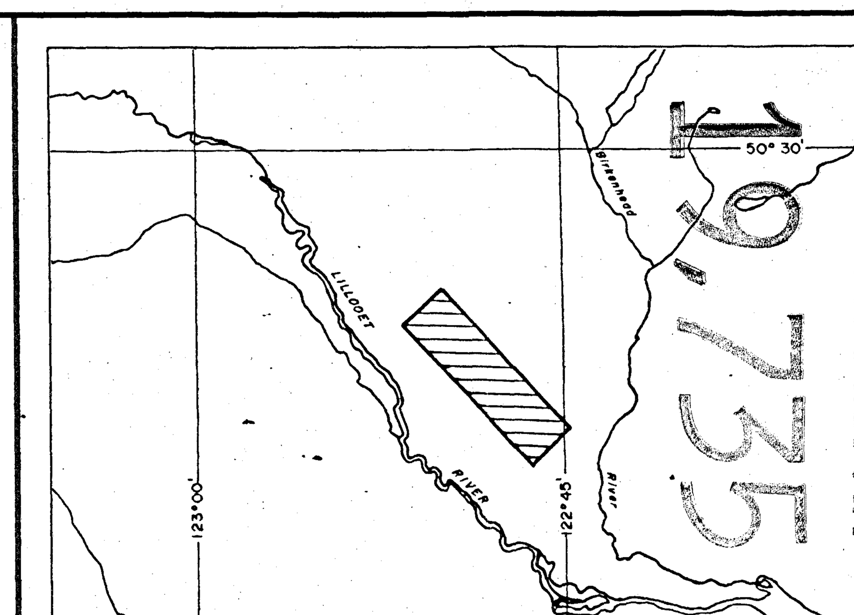
Average terrain clearance 60m
Average line spacing 100m

VLF-EM

VLF-EM Total Field Intensity in percent.

Station: NAA
Cutler, Maine
24.0 kHz

Sensor elevation 45m



GEOLOGICAL BRANCH
ASSESSMENT REPORT

19,735

A & M EXPLORATION LTD.

VLF-EM TOTAL FIELD CONTOURS

PEMBERTON
B.C.

SCALE 1:10,000

0 330 660 1320 2640 Feet

0 100 200 500 1000 Metres

AERODAT LIMITED

DATE: FEB 1989
NTS No: 92 J/7
MAP No: 7 J8896

Flight Path

Navigation and recovery using Motorola Mini-Ranger (MRS III) radar navigation system.

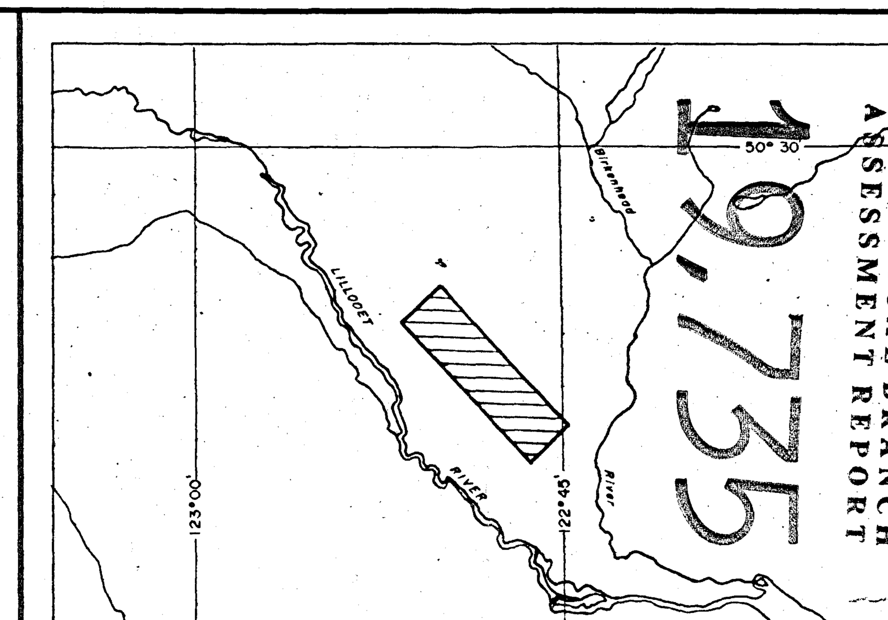
Average terrain clearance 60m
Average line spacing 100m

Apparent Resistivity

Calculated from 4175 Hz coplanar EM response assuming a 200 m conductive layer.

Contouring in ohm•m at logarithmic intervals.

Sensor elevation 30m



A & M EXPLORATION LTD.

APPARENT RESISTIVITY CONTOURS

PEMBERTON
B.C.

SCALE 1:10,000
0 330 660 1320 2640 Feet
0 100 200 500 1000 Metres

AERODAT LIMITED

DATE:	FEB 1989
NTS No:	92 J/7
MAP No:	6 J8896

Flight Path

Navigation and recovery using Motorola Mini-Ranger (MRS III) radar navigation system.

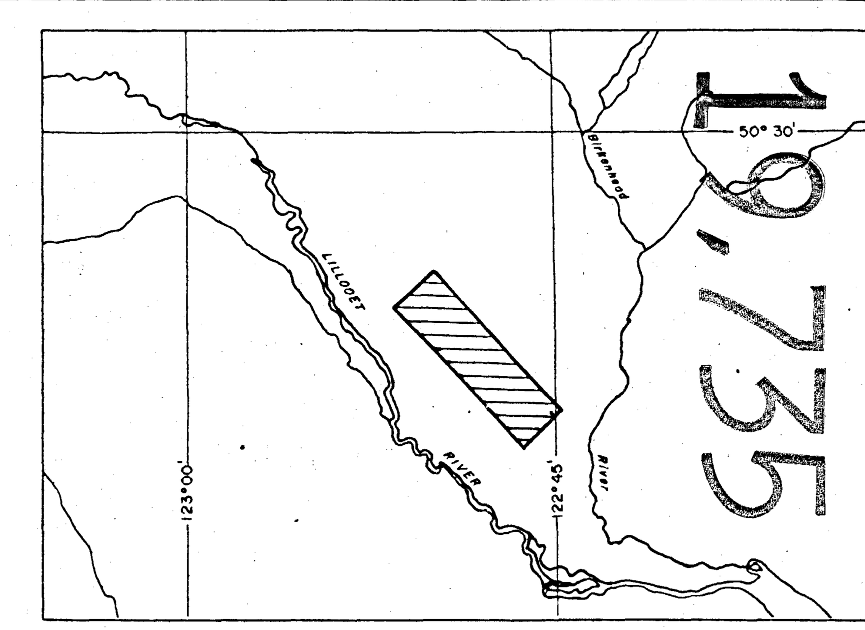
Average terrain clearance 60m
Average line spacing 100m

Vertical Gradient

Vertical Magnetic Gradient calculated from the total field magnetic intensity in nT/m.

Cesium high sensitivity magnetometer.

Sensor elevation 45m



GEOLOGICAL BRANCH
ASSESSMENT REPORT

19,735

A & M EXPLORATION LTD.

CALCULATED VERTICAL MAGNETIC GRADIENT

PEMBERTON

B.C.

SCALE 1:10,000

0 330 660 1320 2640 Feet

0 100 200 500 1000 Metres

AERODAT LIMITED

DATE: FEB 1989

NTS No: 92 J/7

MAP No: 5 J8896

Flight Path

Navigation and recovery using Motorola Mini-Ranger (MRS III) radar navigation system.

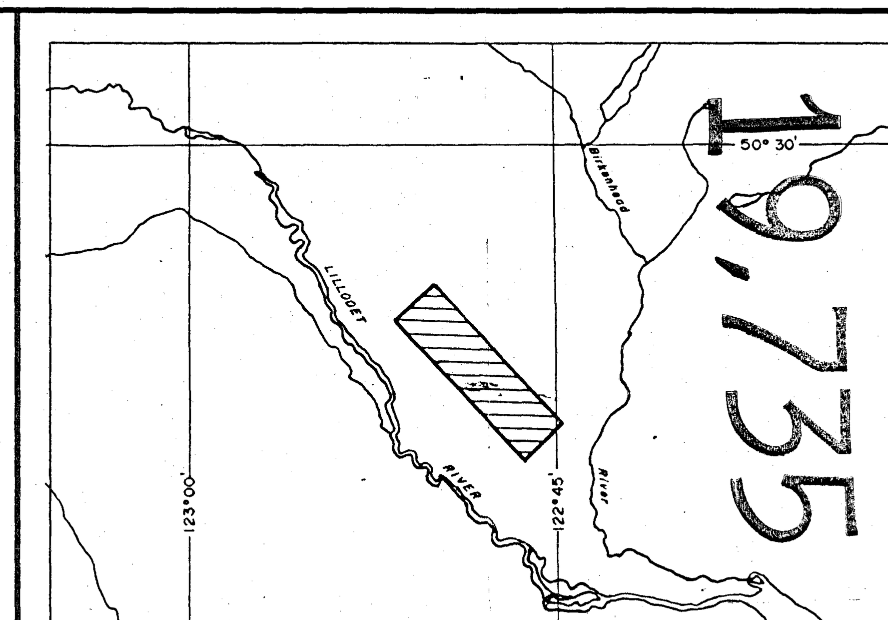
Average terrain clearance 60m
Average line spacing 100m

Magnetics

Total Field Magnetic Intensity Contours in nT.

Cesium high sensitivity magnetometer.

Sensor elevation 45m



GEOLOGICAL BRANCH
ASSESSMENT REPORT

19,735

A & M EXPLORATION LTD.

TOTAL FIELD MAGNETIC CONTOURS

PEMBERTON

B.C.

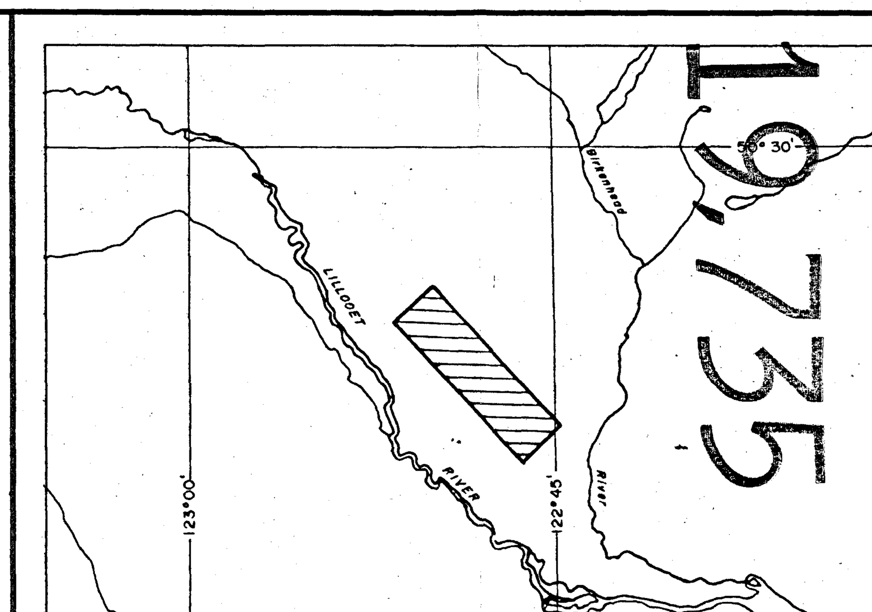
SCALE 1:10,000

0 330 660 1320 2640 Feet

0 100 200 500 1000 Metres

AERODAT LIMITED

DATE:	FEB 1989
NTS No:	92 J/7
MAP No:	4 J8896



GEOLOGICAL BRANCH
ASSESSMENT REPORT

19,735

A & M EXPLORATION LTD.

BASE MAP

PEMBERTON
B.C.

SCALE 1:10,000
0 330 660 1320 2640 Feet
0 100 200 500 1000 Metres

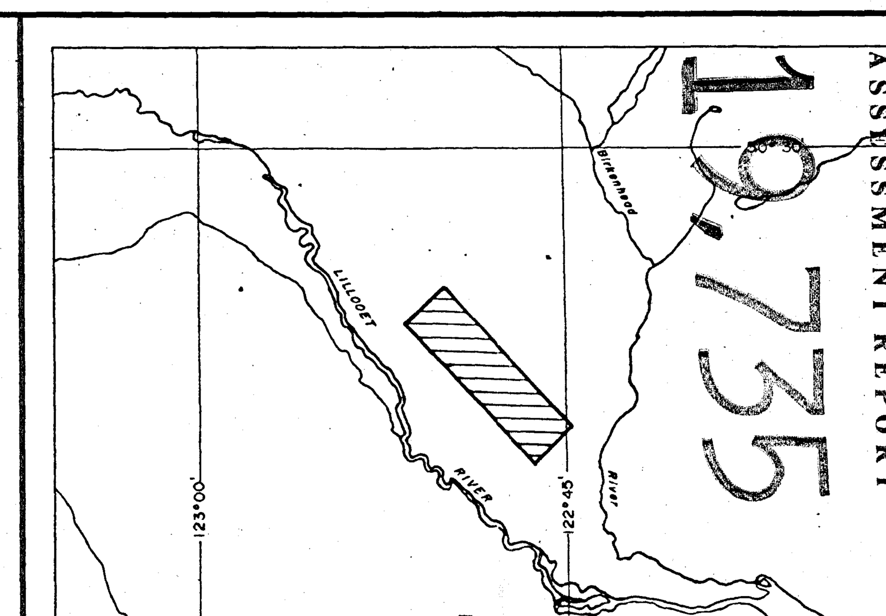
AERODAT LIMITED

DATE: FEB 1989
NTS No: 92 J/7
MAP No: 1 J8896

Flight Path

Navigation and recovery using Motorola Mini-Ranger (MRS III) radar navigation system.

Average terrain clearance 60m
Average line spacing 100m



A & M EXPLORATION LTD.

FLIGHT PATH

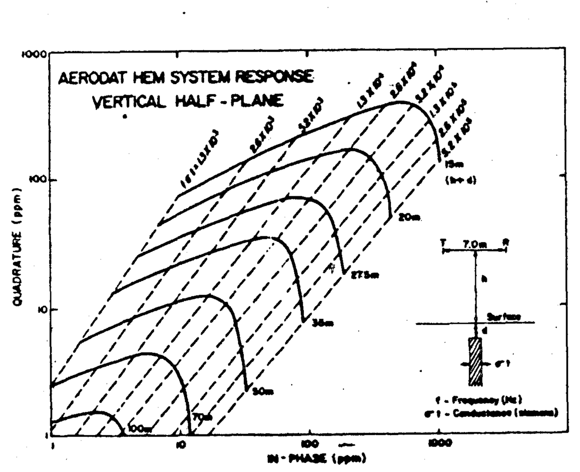
PEMBERTON
B.C.

SCALE 1:10,000

0 330 660 1320 2640 Feet
0 100 200 500 1000 Metres

AERODAT LIMITED

DATE: FEB 1989
NTS No: 92 J/7
MAP No: 2 J8896



Flight Path

Navigation and recovery using Motorola Mini-Ranger (MRS III) radar navigation system.

Average terrain clearance 60m
Average line spacing 100m

INTERPRETATION LEGEND

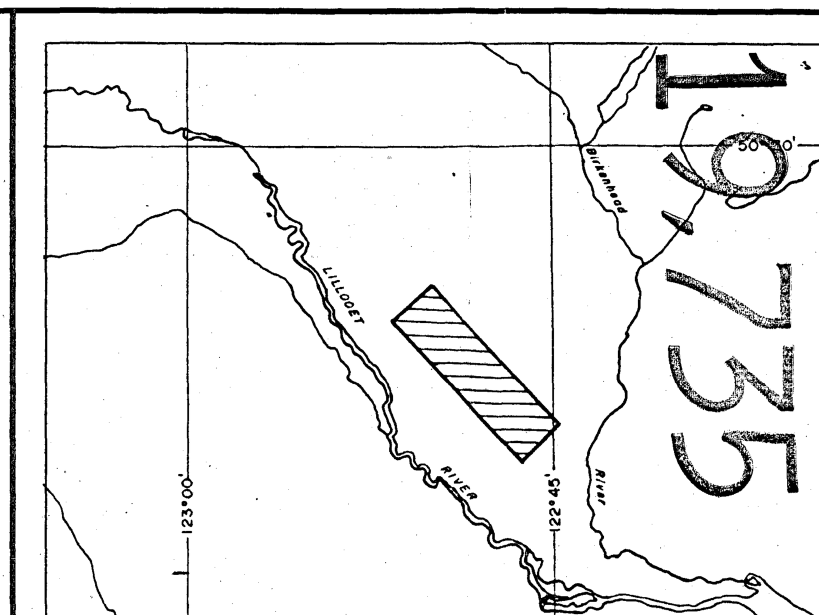
———	VLF-EM Axis
WWWW	Possible Fault
---O---	EM Conductor Axis

EM Anomalies

Conductivity Thickness (mhos)

- 0 - 1
- 1 - 2
- 2 - 4
- 4 - 8
- 8 - 15
- 15 - 30
- > 30

EM Anomaly A, 4600 Hz inphase amplitude 7 ppm. Conductivity thickness 1-2 mhos (see code).



A & M EXPLORATION LTD.

INTERPRETATION

PEMBERTON

B.C.

SCALE 1:10,000

0 330 660 1320 2640 Feet

0 100 200 500 1000 Metres

AERODAT LIMITED

DATE: FEB 1989

NTS No: 92 J/7

MAP No: 3 J8896