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

FOR
TOBEX RESOURCES LTD.
BY
AERODAT LIMITED
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J8869

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LIST OF MAPS

Scale 1:20,000

Maps:

1. **PHOTOMOSAIC BASE MAPS;**
   prepared from a semi-controlled photo laydown.

2. **FLIGHT LINES;**
   showing all flight lines, fiducials and EM anomalies with the base map.

3. **AIRBORNE ELECTROMAGNETIC SURVEY INTERPRETATION MAP;**
   showing flight lines, fiducials, conductor axes and anomaly peaks with conductivity thickness products for the 4600 Hz coaxial coil system with the base map.

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

5. **VERTICAL MAGNETIC GRADIENT CONTOURS;**
   showing magnetic gradient values contoured at 0.5 nanoTeslas per metre intervals, flight lines and fiducials with the base map.

6. **APPARENT RESISTIVITY CONTOURS;**
   showing contoured resistivity values, calculated from the 4600 Hz coaxial data, flight lines and fiducials with the base map.

7. **APPARENT RESISTIVITY CONTOURS;**
   showing contoured resistivity values calculated from the 32000 Hz coplanar data, flight lines and fiducials with the base map.

8. **ELECTROMAGNETIC PROFILES;**
   showing 935 Hz and 4600 Hz coaxial and 4175 Hz and 32000 Hz coplanar inphase and quadrature traces.

1. INTRODUCTION

This report describes an airborne geophysical survey carried out on behalf of Tobex Resources 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 video tracking camera and a radar altimeter. Electromagnetic, magnetic and altimeter data were recorded both in digital and analog form. Positioning data were recorded on VHS Video Tapes as well as being marked on the flight path mosaic by the operator while in flight.

The survey area, comprising of a single block of ground, is located immediately to the south of Trail, British Columbia, between the Columbia River and Cambridge Creek. Three flights, which were flown on October 23, 1988 were required to complete the survey with flight lines oriented at an Azimuth of 150-330 degrees at a nominal line spacing of 200 metres. Coverage and data quality were considered to be well within the specifications described in the contract.

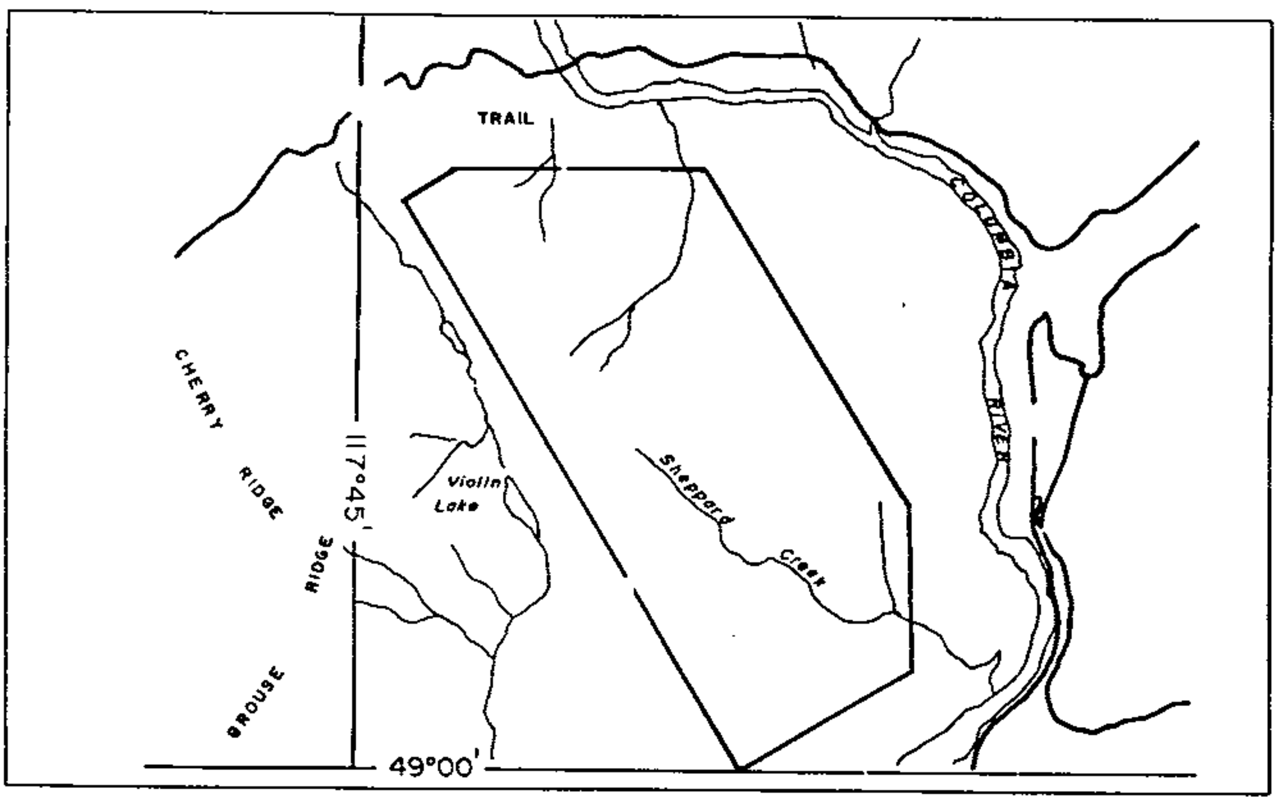
The survey objective is the detection and location of mineralized zones which can be directly or indirectly related to precious or base metal exploration targets. Of importance, therefore, are poorly mineralized conductors, displaying weak conductivity. These may represent structural features or alteration zones which can sometimes play an essential role in the eventual location of primary minerals. Weak conductors associated with sheared and altered mafic metavolcanics or metawacke rock types are considered primary targets for precious metals. In regard to base metal targets, short, isolated or flanking conductors displaying good conductivity and having either magnetic correlation or no magnetic correlation, are all considered to be areas of extreme interest.

A total of 226 kilometres of the recorded data were compiled in map form and presented as part of this report according to specifications outlined by Tobex Resources Ltd.

2. SURVEY AREA LOCATION

The survey area is depicted on the index map as shown, and is centred at Latitude 49 degrees 03 minutes north, Longitude 117 degrees 41 minutes west. (NTS Reference Map No. 82 F/4).

Access to the survey block is by road from Trail. The terrain is rough with a north-south ridge running along the west side of the survey parallel to the flight lines. Known roads access the area from the northwest, the east, and the southeast. Logging roads may provide additional access.



3. AIRCRAFT AND EQUIPMENT

3.1 Aircraft

Aerospatiale A-Star 350D helicopter, (C-GXYM), 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 32000 Hz. 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 and NLK, Jim Creek, Washington at 24.8 kHz for the Line Station and NDT, Yosami Japan at 17.4 kHz for the Ortho Station.

3.2.3 Magnetometer

The magnetometer employed 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 15 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 HRA-100 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 tapes. 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, and were subsequently used for flight path recovery.

3.2.7 Analog Recorder

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

Channel	Input	Scale
CXI1	935 Hz Coaxial Inphase	2.5 ppm/mm
CXQ1	935 Hz Coaxial Quadrature	2.5 ppm/mm
CXI2	4600 Hz Coaxial Inphase	2.5 ppm/mm
CXQ2	4600 Hz Coaxial Quadrature	2.5 ppm/mm
CPI1	4175 Hz Coplanar Inphase	10 ppm/mm
CPQ1	4175 Hz Coplanar Quadrature	10 ppm/mm
CPI2	32000 Hz Coplanar Inphase	20 ppm/mm
CPQ2	32000 Hz Coplanar Inphase	20 ppm/mm
PWRL	Power Line	60 Hz

VLT	VLF-EM Total Field, Line	2.5%/mm
VLQ	VLF-EM Quadrature, Line	2.5%/mm
VOT	VLF-EM Total Field, Ortho	2.5%/mm
VOQ	VLF-EM Quadrature, Ortho	2.5%/mm
RALT	Radar Altimeter	10 ft./mm
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	0.2 seconds
Magnetometer	0.2 seconds
Altimeter	0.5 seconds

4. DATA PRESENTATION

4.1 Base Map

A photomosaic base at a scale of 1:20,000, were prepared from a photo lay down map, and supplied by Aerodat as a screened mylar base.

4.2 Flight Path Map

The flight path for the survey area was recovered from the VHS Video Tracking Tapes by transferring the time at which the helicopter passes over a recognizeable feature onto the photomosaic. These coordinates are then digitized into the database and form the basis of the flight path data.

The flight path map showing all flight lines, are presented on a Cronaflex copy of the photomosaic base map, with time and navigator's manual 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 flight lines, fiducials, peak locations of anomalies and conductor axes. The data have been presented 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

50 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 calculated from the gridded total field magnetic data. Contoured at a 0.5 nT/m interval, the gradient data were presented on a Cronaflex clear overlay 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 both the 4600 Hz coaxial and 32000 Hz coplanar frequency pairs. The apparent resistivity profile data were interpolated onto a regular grid at a 50 metre true scale interval using an Akima spline technique.

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

5. INTERPRETATION

5.1 Geology

Based on the GSC geology map (Rossland - Trail, 1504A) supplied by the client, the area consists mostly of a central Jurassic intrusion of granite and syenite, with peripheral intrusions of monzonite and granodiorite into a host of Triassic volcanics consisting mostly of andesite, basalt and breccia. Isolated occurrences of host volcanics scattered throughout the intrusive granite implies that the volcanics may be more extensive than first thought. Occurrences of both base and precious metals have been noted in the vicinity of contacts and alteration zones between the host and intruded rocks.

The provided geology shows a large fault running parallel to and outside of the western edge of the survey, without any faulting within the survey area. The airborne geophysics bares this out with one exception. The geological contacts inferred by the geophysics deviate in places from those published and this survey should improve the understanding of the geology of the area.

5.2 Magnetics

The magnetic data from the high sensitivity cesium magnetometer provided virtually a continuous magnetic reading, recording at two-tenth second intervals. The system is also noise free for all practical purposes.

The sensitivity of 0.1 nT allows for the mapping of very small inflections in the magnetic field, resulting in a contour map that is comparable in quality to ground data. The wider line spacing and small scale has not detracted from the quality or usefulness of this survey data. Both the fine and coarse magnetic traces were recorded on the analog.

The magnetic field ranges from 57050-58150 nT, with the central granitic formation being generally less magnetic and less active than other regions which are dominated by the host volcanics.

In the north, the volcanics follow a general east-west trend, and seem less extensive than the mapped geology allows. Conversely, in the south the volcanics are generally more extensive with particular reference to a spur-like feature extending from line 100 at time 15:08:30 to line 71 at time 15:38:00.

5.3 Vertical Magnetic Gradient

The vertical gradient is most useful when used to define geological contacts, as the zero contour interval coincides directly with, or very close to these contacts, when confronted with vertical bedding. It is because of this phenomenon that the calculated vertical gradient map can be compared to a pseudo-geological map. When the bedding dip is steep to moderate, it will be found that the geological contact will be closer to the magnetic peak by a small distance.

A few contact lines have been derived from this data and presented on the Interpretation Map, which should improve the understanding of the structural geology of the area.

5.4 Electromagnetics

The electromagnetic data was first checked by a line-by-line examination of the analog records. Record quality was good with minor noise levels. Instrument noise was well within specifications. Geologic noise, in the form of surficial conductors, was minimal.

Anomalies were picked off the analog traces of the low and high frequency coaxial responses and then validated on the coplanar data. The data were then edited and re-plotted on a copy of the profile map. This procedure ensured that every anomalous response spotted on the analog data was plotted on the final map, and allowed for the rejection of - or inclusion of if warranted - obvious surficial conductors. Each conductor was evaluated on the basis of magnetic (and lithologic, where applicable) correlations. The video film was used to check for man made or surficial features not obvious on the analog charts.

RESULTS

The results of this survey clearly show a rather resistive overburden cover, and very few conductors. Cultural features such as the power line across the southern corner of the survey, the road through the centre of the survey, and the gas pipeline just north of the road, have all been indicated on the final presentation.

The two anomalies on line 71 near 15:40:27 are also suspected of being cultural in nature as the video shows heavy forestry at that point. However, no actual presence could be seen, and something generating such a strong response should be quite large and easily seen. With its cultural nature in doubt it is well worth following up. In this case, the response is indicative of a flat lying conductor and there is evidence to suggest that it extends westwards towards line 60.

Of still greater interest are the two anomalies at the north end of lines 80 and 90. They exhibit only a small quadrature response, but they correspond to a significant magnetic low which has been interpreted as a fault. This trend should be the primary target of ground follow up.

5.5 Apparent Resistivity

The resistivity based on the 4600 Hz coaxial data is reflecting mostly surficial cultural conductors here, as the ground is so resistive.

The second resistivity however, based on the 32000 Hz coplanar data is far more responsive and presents quite a useful picture. There is good correlation between the resistivity and magnetic lows, especially through the central core. These are likely produced by the numerous intrusions noted in the geology, and appear to be a very good indicator of said intrusions. This is particularly useful as mineralizations are often associated with accompanying alteration zones.

An area of low resistivity appears in the southern corner of both resistivity maps. This is believed to be a result of poor drainage in the only topographically flat lying area of the survey.

5.6 Recommendations

On the basis of this airborne survey, ground follow-up work is recommended for the selected targets, in the north-western corner of the survey.

It is suggested that the published geology may be modified slightly to enlarge the extent of the volcanics in the south, and to reduce it in the north. Additional outcroppings of late intrusions are also indicated in the north and may prove to have accompanying alteration mineralizations.

Respectfully submitted,

T. Jeffrey Gamey

T. Jeffrey Gamey
Geophysicist
Aerodat Limited
December 1, 1988

APPENDIX I

PERSONNEL

FIELD

Flown	- October, 1988
Pilot	- B. Steuri
Operator	- S. Arstad

OFFICE

Processing	- T. Jeffrey Gamey
Report	- T. Jeffrey Gamey

APPENDIX II

CERTIFICATE OF QUALIFICATIONS

I, T. JEFFREY GAMEY, certify that: -

1. I hold a B. Sc Geophysics from the University of Western Ontario having graduated in 1985.

2. I reside at 2517 Lakeshore Blvd. West in Toronto, Ontario.

3. I have been engaged in both professional and managerial roles in the minerals industry in Canada and abroad for the past seven years.

4. I have been an active member of the Society of Exploration Geophysicists since 1988 and hold memberships in other professional societies involved in the minerals extraction and exploration industry.

5. The accompanying report was prepared from information published by government agencies, materials supplied by Tobex Resources Ltd. and from a review of the proprietary airborne geophysical survey flown by Aerodat Limited for Tobex Resources 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 Tobex Resources Ltd.

Signed,

T. Jeffrey Gamey

Mississauga, Ontario
December 1, 1988

T. Jeffrey Gamey
Project Supervisor/
Geophysicist

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 lower frequency 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 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 change 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 ratio 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 measureable 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 the 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

ANOMALY LIST

J8869 - TOBEX RESOURCES LTD. - TRAIL B.C.

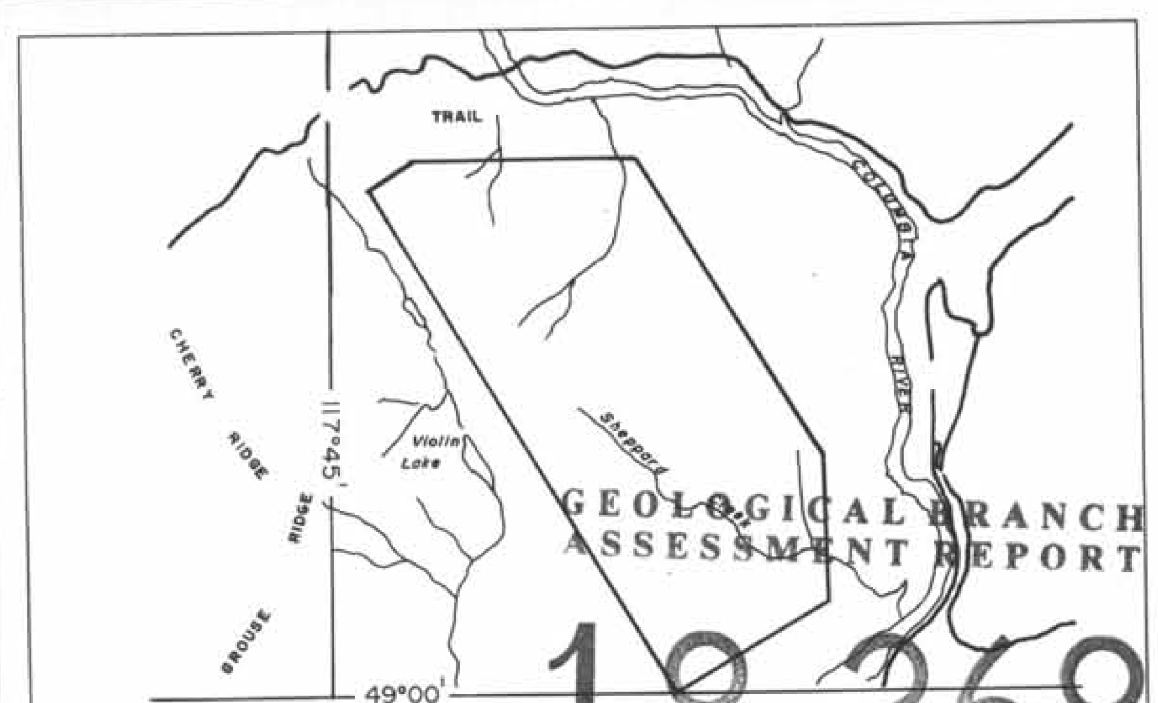
FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
2	50	A	CULTURE 7	4.3	6.3	0.4	14	44
2	60	A	CULTURE 7	3.0	4.8	0.3	10	53
2	71	A	CULTURE 7	2.7	5.0	0.2	11	48
2	71	B	0	2.0	4.7	0.1	20	37
2	71	C	0	1.7	5.5	0.0	12	37
2	80	A	CULTURE 7	2.6	2.3	0.6	32	56
2	80	B	0	0.7	4.4	0.0	7	36
2	90	A	0	1.9	5.9	0.0	8	40
2	90	B	CULTURE 7	5.2	7.5	0.4	4	50
2	100	A	CULTURE 7	1.7	3.0	0.1	12	61
3	111	A	CULTURE 7	4.7	6.0	0.5	11	50
2	122	A	CULTURE 7	5.1	6.0	0.6	8	53
2	130	A	CULTURE 7	0.2	3.7	0.0	0	50
2	130	B	CULTURE 7	5.1	5.6	0.6	18	45
1	140	A	CULTURE 7	5.6	5.4	0.8	17	48
1	140	B	CULTURE 7	0.2	4.4	0.0	0	53
1	150	A	CULTURE 7	4.8	5.1	0.6	12	54
1	160	A	CULTURE 7	5.1	6.1	0.5	15	46
1	160	B	CULTURE 7	0.7	3.3	0.0	0	54
1	170	A	CULTURE 7	4.7	5.1	0.6	16	50
1	180	A	CULTURE 7	2.7	4.2	0.2	12	54
1	180	B	CULTURE 7	7.5	12.1	0.4	0	47
1	190	A	CULTURE 7	6.3	8.6	0.5	0	64
1	190	B	CULTURE 7	5.3	13.8	0.1	0	43
1	200	A	CULTURE 7	5.6	11.7	0.2	0	43
1	200	B	CULTURE 7	14.0	14.1	1.1	0	51
1	210	A	CULTURE 7	14.9	14.4	1.2	0	60
1	210	B	CULTURE 7	5.7	6.2	0.7	13	49

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.

J8869 - TOBEX RESOURCES LTD. - TRAIL B.C.

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
1	220	A	CULTURE 7	7.9	10.3	0.6	0	57
1	220	B	CULTURE 7	4.7	5.7	0.5	0	64
1	230	A	CULTURE 7	-0.5	3.7	0.0	0	49
1	230	B	CULTURE 7	11.7	12.8	0.9	0	63
1	230	C	CULTURE 7	6.0	7.9	0.5	0	60

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.



GEOLOGICAL BRANCH
ASSESSMENT REPORT

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TOBEX RESOURCES LTD.

BASE MAP

TRAIL

BRITISH COLUMBIA

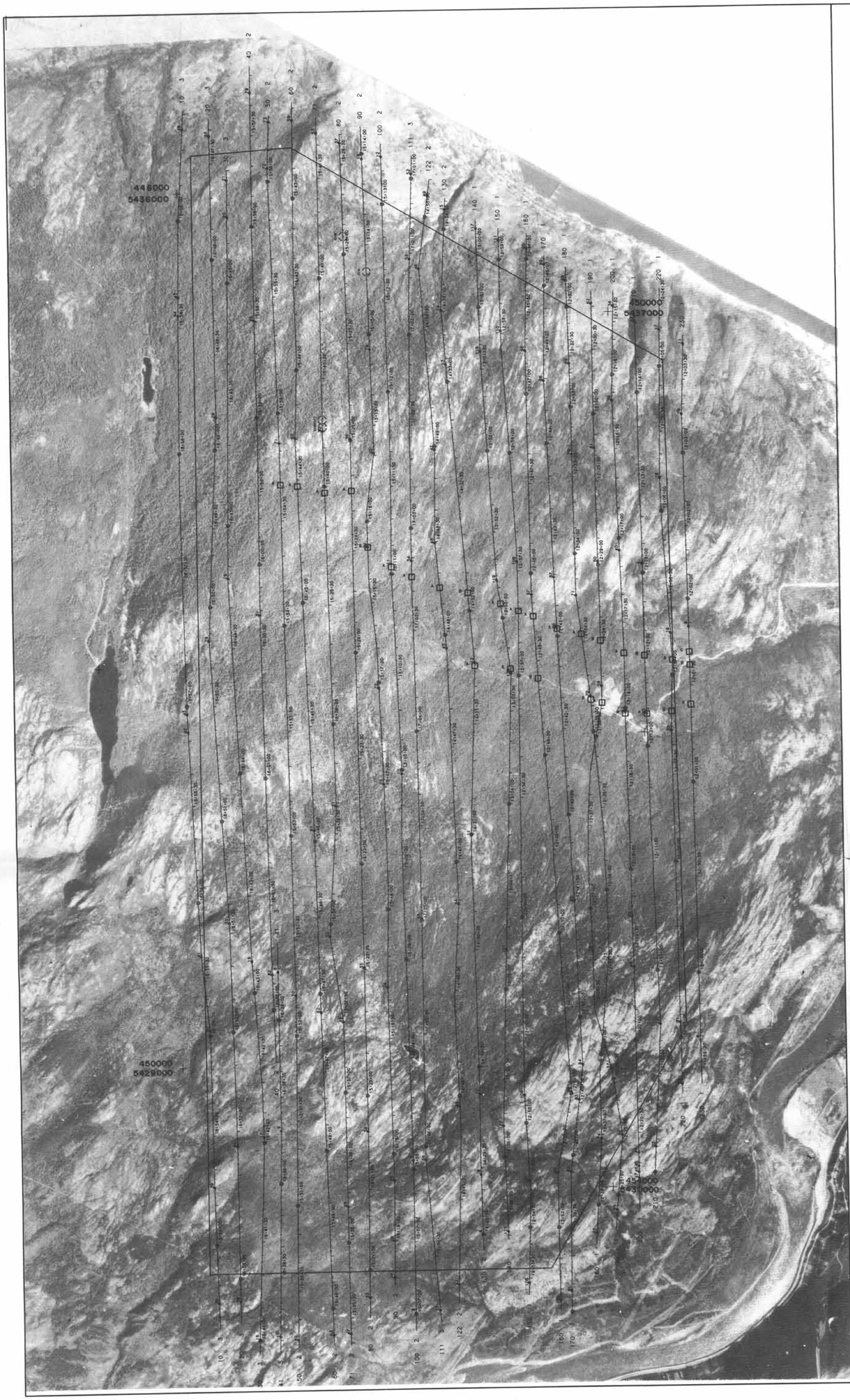
SCALE 1:20,000

0 660 1320 2640 1 MILE

0 200 400 1000 2000 METRES

AERODAT LIMITED

DATE:	OCTOBER 23, 1988
NTS No:	82 F/04
MAP No:	1 J8869



N

Flight Path

Flight path recovery from VHS video tape.

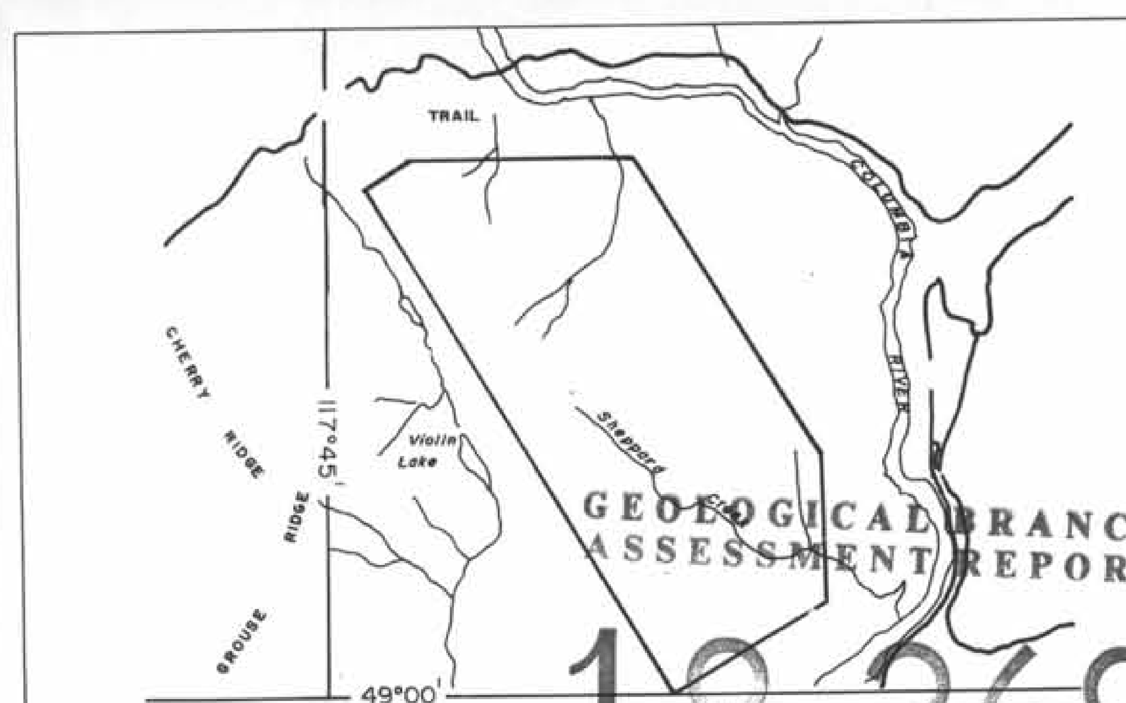
Average terrain clearance 60m
Average line spacing 200m

EM Anomalies

Conductivity Thickness (mhos)

◌	0 - 1
○	1 - 2
⊖	2 - 4
◔	4 - 8
◒	8 - 15
◕	15 - 30
●	> 30
□	Cultural response

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



GEOLOGICAL BRANCH
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TOBEX RESOURCES LTD.

FLIGHT PATH

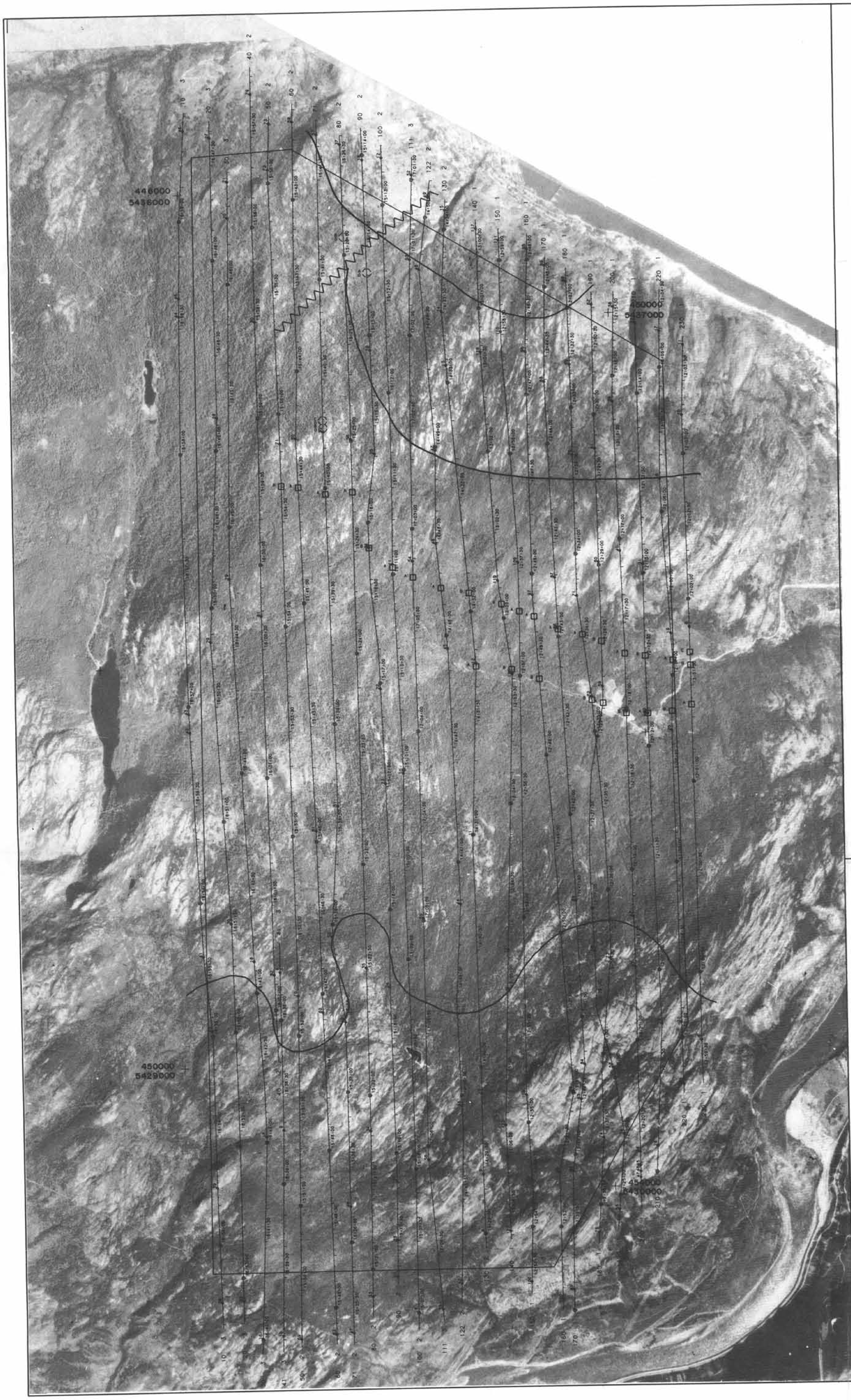
TRAIL
BRITISH COLUMBIA

SCALE 1:20,000

0 660 1320 2640 1 MILE
0 200 400 1000 2000 METRES

AERODAT LIMITED

DATE:	OCTOBER 23, 1988
NTS No:	82 F/04
MAP No:	2 J8869



Flight Path

Flight path recovery from VHS video tape.

Average terrain clearance 60m
Average line spacing 200m

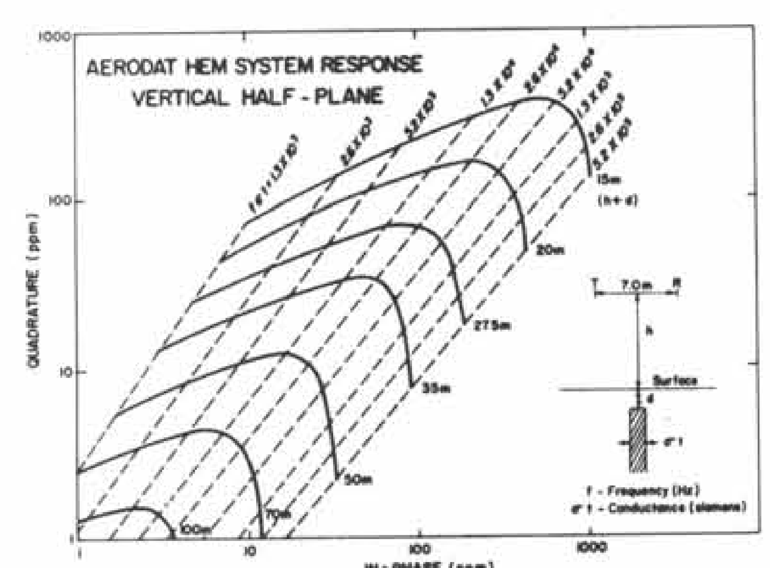
EM Anomalies

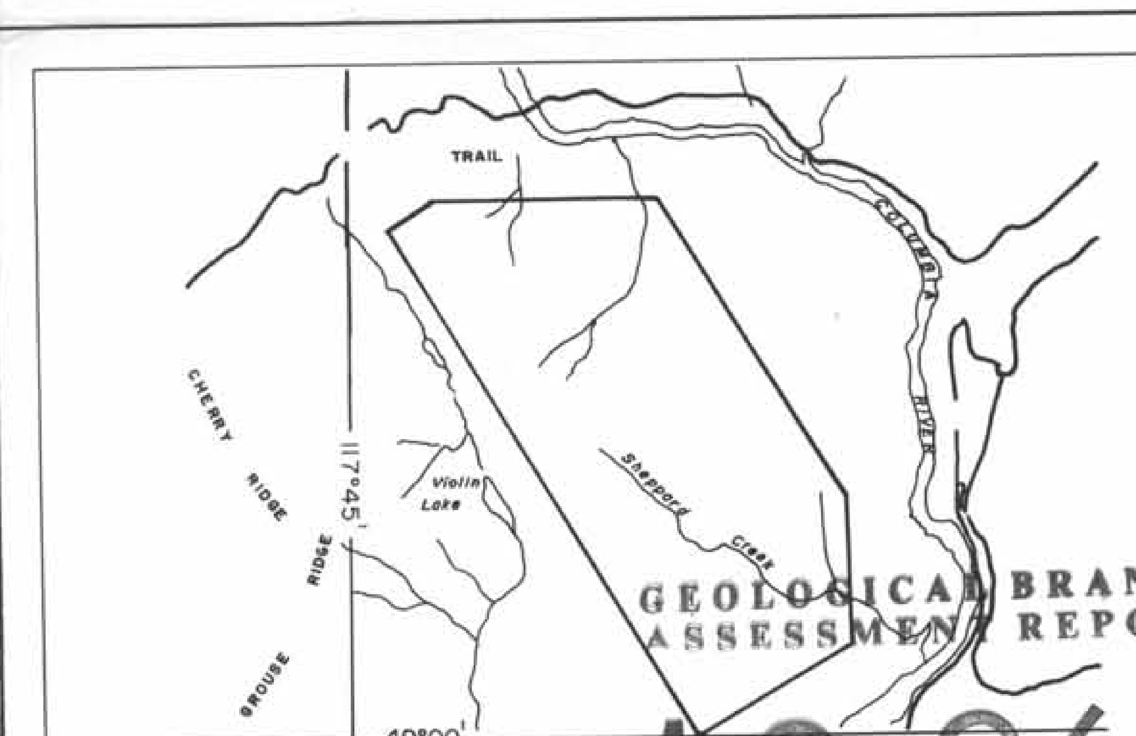
Conductivity Thickness (mhos)

- 0 - 1
- 1 - 2
- 2 - 4
- 4 - 8
- 8 - 15
- 15 - 30
- > 30
- Cultural response
- EM Anomaly A, 4600 Hz inphase amplitude 7 ppm. Conductivity thickness 1-2 mhos (see code).

INTERPRETATION LEGEND

- Contact
- Fault





TOBEX RESOURCES LTD.

INTERPRETATION

TRAIL

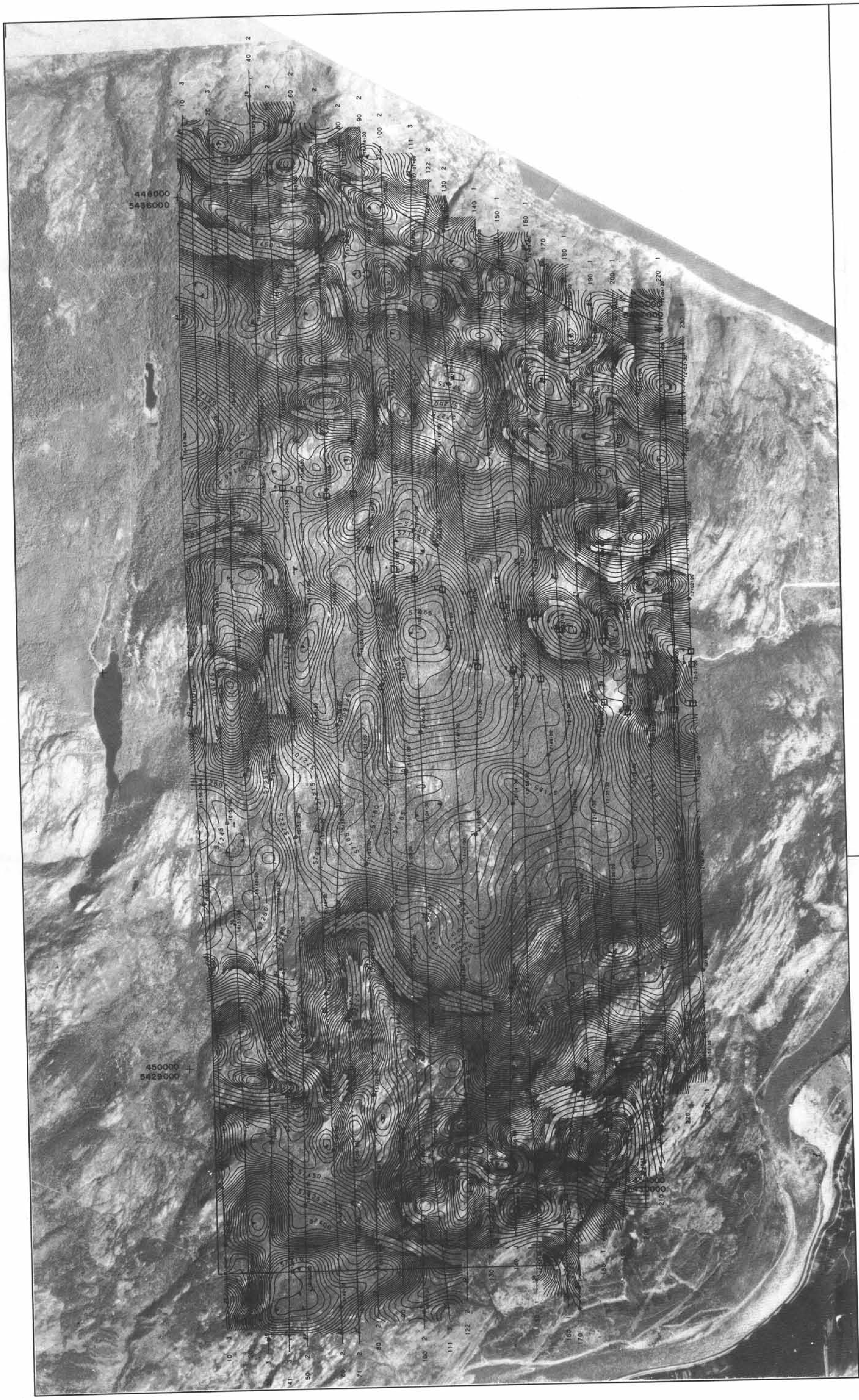
BRITISH COLUMBIA

SCALE 1:20,000

0 660 1320 2640 1 MILE

0 200 400 1000 2000 METRES

AERODAT LIMITED	
	DATE: OCTOBER 23, 1988
	NTS No: 82 F/04
	MAP No: 3 J8869



Flight Path

Flight path recovery from VHS video tape.

Average terrain clearance 60m
Average line spacing 200m

Magnetics

Total Field Magnetic Intensity Contours in nT.

Cesium high sensitivity magnetometer.

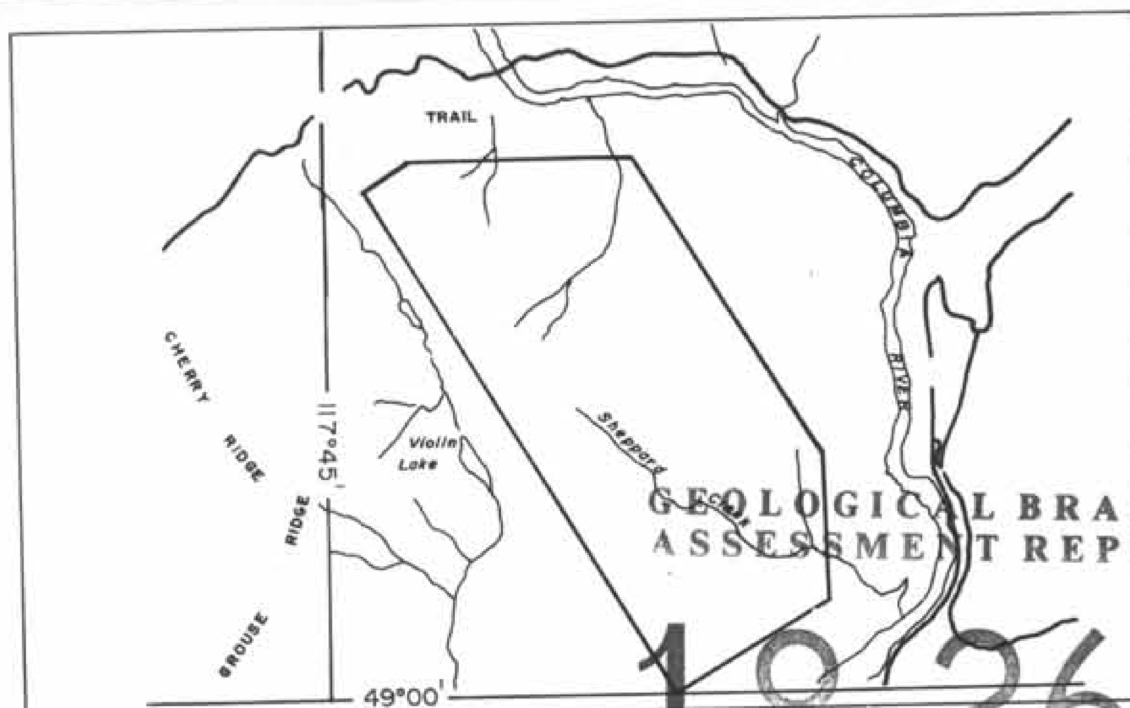
Sensor elevation 45m

Map contours are multiples of those listed below
5 nT
25 nT
100 nT
500 nT

EM Anomalies

Conductivity Thickness (mhos)

- 0 - 1
- 1 - 2
- 2 - 4
- 4 - 8
- 8 - 15
- 15 - 30
- > 30
- Cultural response
- EM Anomaly A, 4600 Hz inphase amplitude 7 ppm. Conductivity thickness 1-2 mhos (see code).



TOBEX RESOURCES LTD.

TOTAL FIELD MAGNETIC CONTOURS

TRAIL

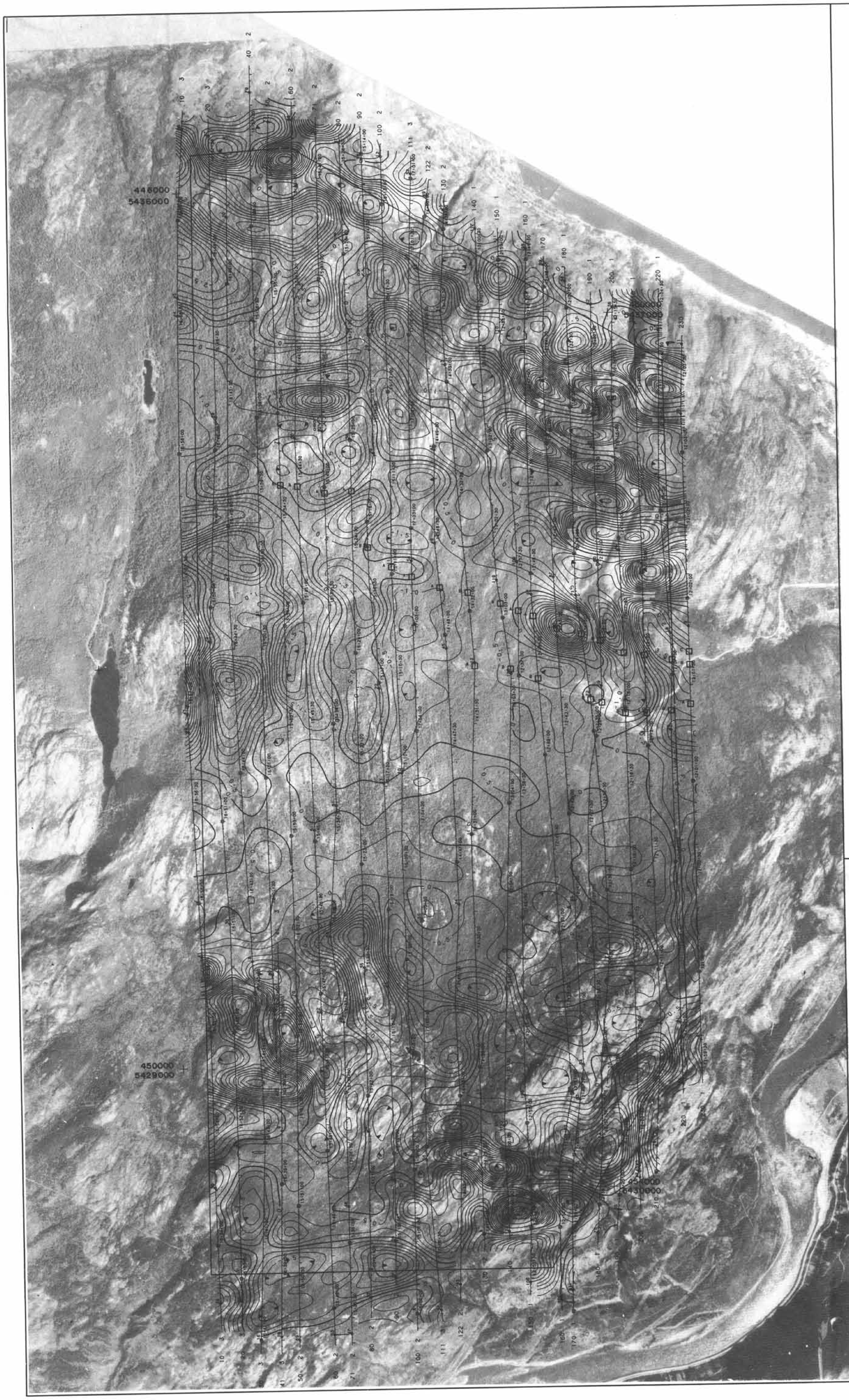
BRITISH COLUMBIA

SCALE 1:20,000

0 660 1320 2640 1 MILE
0 200 400 1000 2000 METRES

AERODAT LIMITED

DATE: OCTOBER 23, 1988
NTS No: 82 F/04
MAP No: 4 J8869



Flight Path

Flight path recovery from VHS video tape.

Average terrain clearance 60m
Average line spacing 200m

Vertical Gradient

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

Cesium high sensitivity magnetometer.

Sensor elevation 45m

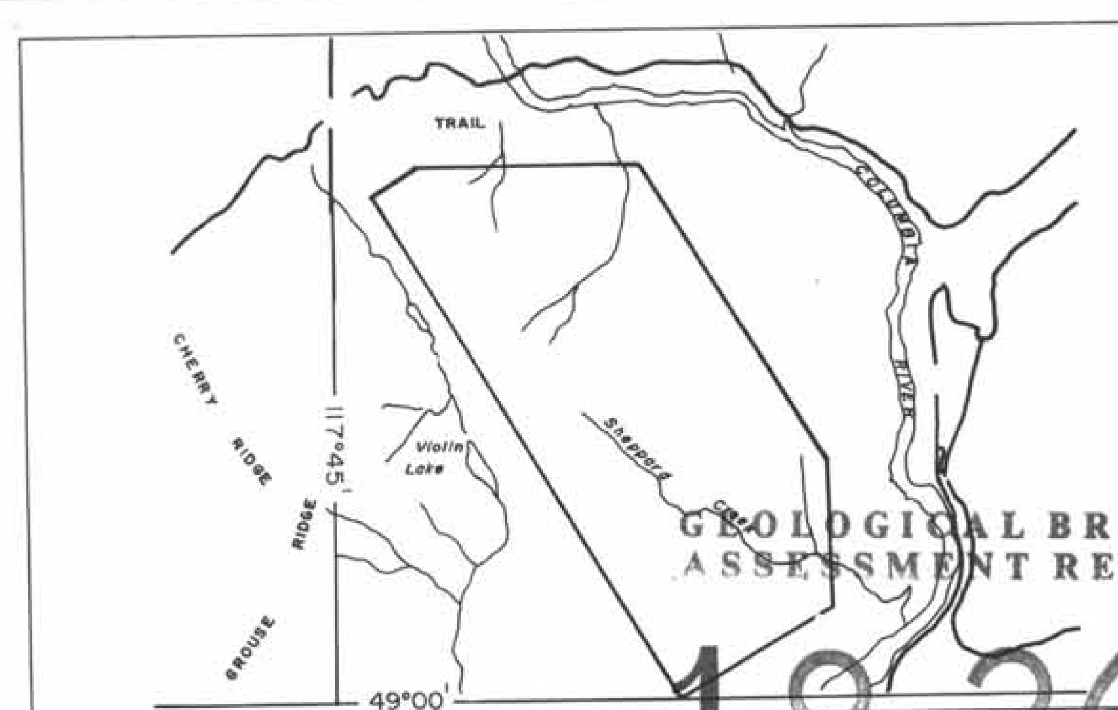
Map contours are multiples of those listed below

- 0.5 nT/m
- 2.5 nT/m
- 10 nT/m
- 50 nT/m

EM Anomalies

Conductivity Thickness (mhos)

- 0 - 1
- 1 - 2
- 2 - 4
- 4 - 8
- 8 - 15
- 15 - 30
- > 30
- Cultural response
- EM Anomaly A, 4600 Hz inphase amplitude 7 ppm. Conductivity thickness 1-2 mhos (see code).



GEOLOGICAL BRANCH
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TOBEX RESOURCES LTD.

CALCULATED VERTICAL MAGNETIC GRADIENT

TRAIL

BRITISH COLUMBIA

SCALE 1:20,000

0 660 1320 2640 1 MILE

0 200 400 1000 2000 METRES

AERODAT LIMITED

DATE:	OCTOBER 23, 1988
NTS No:	82 F/04
MAP No:	5 J8869

Flight Path

Flight path recovery from VHS video tape.

Average terrain clearance 60m
Average line spacing 200m

Apparent Resistivity

Calculated from 4600 Hz coaxial EM response assuming a 200 m conductive layer.

Contouring in ohm•m at logarithmic intervals.

Sensor elevation 30m

Map contours are multiples of those listed below

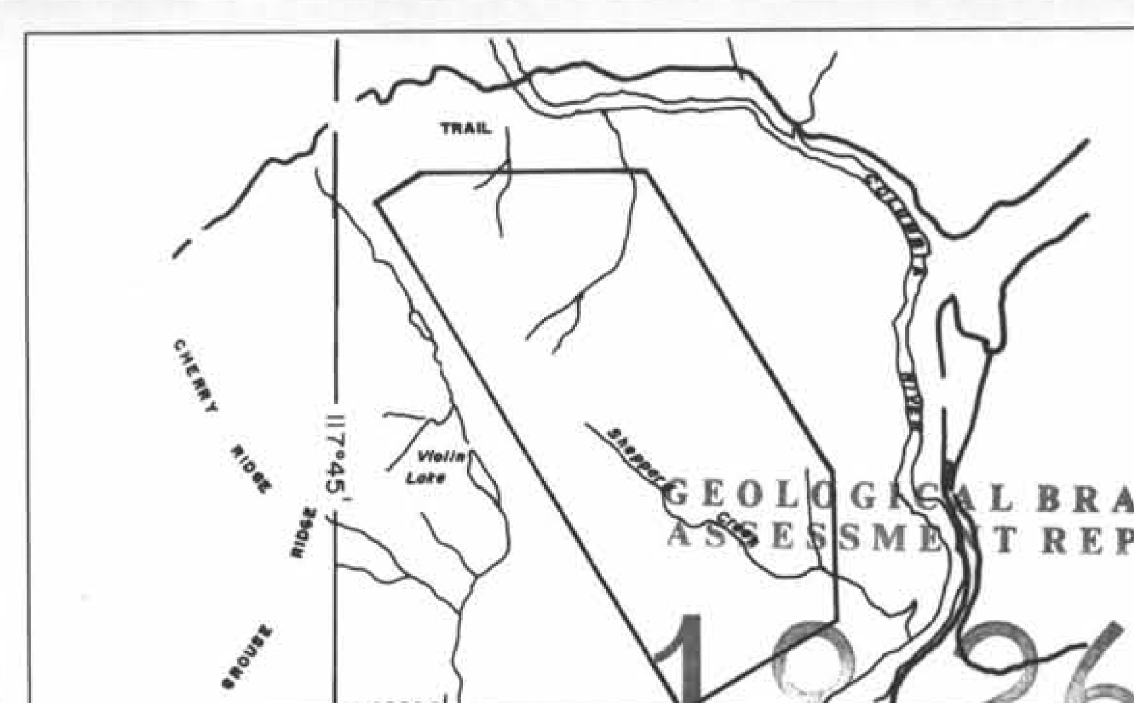
0.1 log(ohm•m)
0.5 log(ohm•m)
2.5 log(ohm•m)

EM Anomalies

Conductivity Thickness (mhos)

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

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



GEOLOGICAL BRANCH
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APPARENT RESISTIVITY CONTOURS

TRAIL

BRITISH COLUMBIA

SCALE 1:20,000

0 660 1320 2640 1 MILE

0 200 400 1000 2000 METRES

AERODAT LIMITED

DATE: OCTOBER 23, 1988

NTS No: 82 F/04

MAP No: 6 J8869

Flight Path

Flight path recovery from VHS video tape.

Average terrain clearance 60m
Average line spacing 200m

Apparent Resistivity

Calculated from 32000 Hz coplanar EM response assuming a 200 m conductive layer.

Contouring in ohm•m at logarithmic intervals.

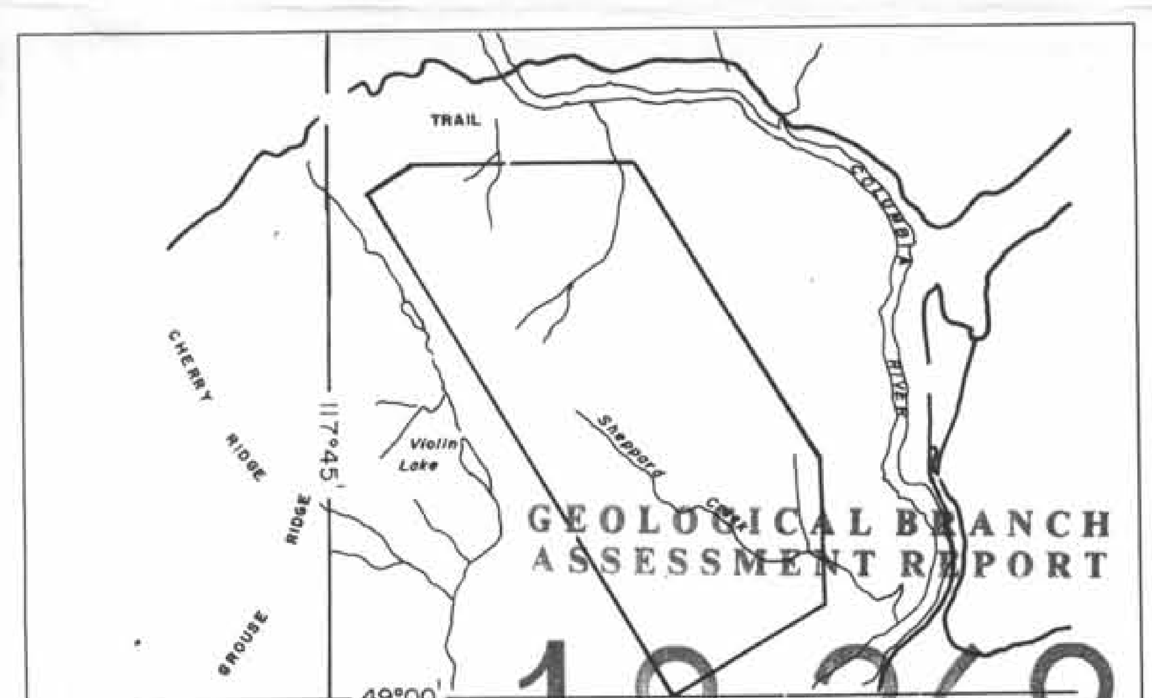
Sensor elevation 30m

Map contours are multiples of those listed below
- 0.1 log(ohm•m)
- 0.5 log(ohm•m)
- 2.5 log(ohm•m)

EM Anomalies

Conductivity Thickness (mhos)

- 0 - 1
- 1 - 2
- 2 - 4
- 4 - 8
- 8 - 15
- 15 - 30
- > 30
- Cultural response
- EM Anomaly A, 4600 Hz inphase amplitude 7 ppm. Conductivity thickness 1-2 mhos (see code).



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APPARENT RESISTIVITY CONTOURS

TRAIL

BRITISH COLUMBIA

SCALE 1:20,000

0 660 1320 2640 1 MILE

0 200 400 1000 2000 METRES

AERODAT LIMITED

DATE:	OCTOBER 23, 1988
NTS No:	82 F/04
MAP No:	7 J8869