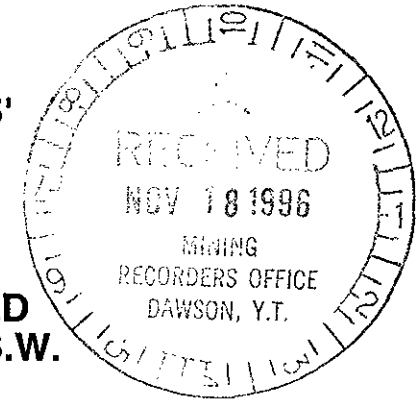
REPORT

ON A
COMBINED HELICOPTER-BORNE
ELECTROMAGNETIC, MAGNETIC
AND RADIOMETRIC SURVEY
SURVEYED SEPT 10 TO 13, 1996
POKER CREEK PROSPECT
UNI AND CICI CLAIM GROUPS
LITTLE GOLD AREA
CENTRAL WEST YUKON
NTS 116 C/2
LAT. 64° 3', LONG. 140° 55'



FOR

MADRONA MINING LIMITED
SUITE 1125, 333 11th AVE. S.W.
CALGARY, ALBERTA
T2R 1L9

BY

AERODAT INC.
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October 23, 1996

R. W. Woolham, P. Eng.
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J9674

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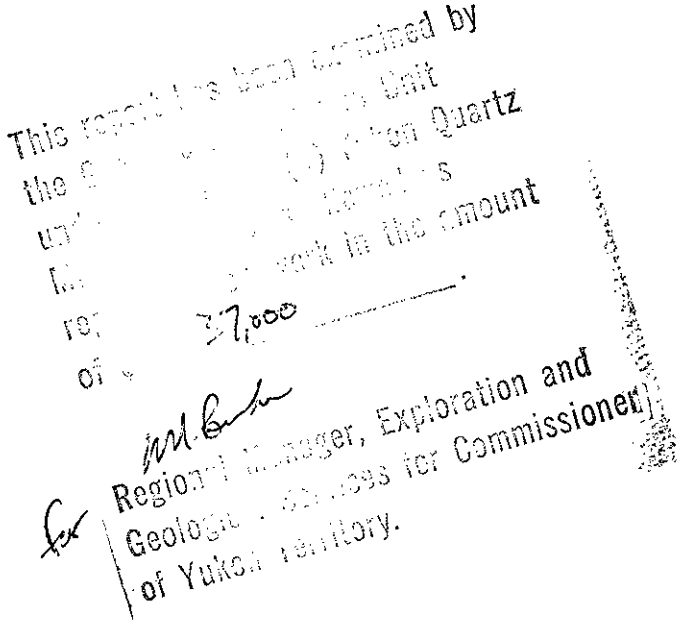

This report has been examined by
the
Unit
on Quartz
work in the amount
of $7,000
Regional Manager, Exploration and
Geological Services for Commissioner
of Yukon Territory.

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LIST OF MAPS

The survey data are presented in a set of numbered maps in the following format:

I BLACK LINE MAPS: (Scale 1:10,000)

Map No. Description

1. BASE MAP; screened topographic base map plus claim boundaries survey area boundary, and UTM grid.

2. COMPILATION / INTERPRETATION MAP; with base map, flight path map and EM anomaly symbols with interpretation.

3. TOTAL FIELD MAGNETIC CONTOURS; with base map EM anomalies and flight lines.

5A. APPARENT RESISTIVITY CONTOURS; apparent resistivity calculated for the coplanar 865 Hz data, with base map EM anomalies and flight lines.

5B. APPARENT RESISTIVITY CONTOURS; apparent resistivity calculated for the coplanar 4,175 Hz data, with base map EM anomalies and flight lines.

II COLOUR MAPS: (Scale 1:10,000)

1. TOTAL FIELD MAGNETICS; with superimposed contours, flight lines and EM anomaly symbols.

2. VERTICAL MAGNETIC GRADIENT; with superimposed contours, flight lines and EM anomaly symbols.

3A. HEM OFFSET PROFILES; coplanar 865 Hz and coaxial 935 Hz Hz data with flight lines and EM anomaly symbols.

3B. HEM OFFSET PROFILES; coplanar 4,175 Hz and coaxial 4,600 Hz data with flight lines and EM anomaly symbols.

3C. HEM OFFSET PROFILES; coplanar 32,000 Hz data with flight lines and EM anomaly symbols.

4A. APPARENT RESISTIVITY; calculated for the coplanar 865 Hz data with superimposed contours, flight lines and EM anomaly symbols.

4B. APPARENT RESISTIVITY; calculated for the coplanar 4,175 Hz data with superimposed contours, flight lines and EM anomaly symbols.

5A. URANIUM COUNT with superimposed contours, EM anomaly symbols and flight lines.

5B. THORIUM COUNT with superimposed contours, EM anomaly symbols and flight lines.

5C. POTASSIUM COUNT with superimposed contours, EM anomaly symbols and flight lines.

5D. TOTAL COUNT with superimposed contours, EM anomaly symbols and flight lines.

III SHADOW DERIVATIVE: (Scale 1:10,000)

1. TOTAL FIELD MAGNETICS SHADOW MAP; with suitable sun angle

2. TERNARY MAP; of Uranium, Thorium and Potassium

REPORT ON A COMBINED HELICOPTER-BORNE ELECTROMAGNETIC, MAGNETIC AND RADIOMETRIC SURVEY LITTLE GOLD AREA CENTRAL WEST YUKON

1. INTRODUCTION

This is a report on an airborne geophysical survey carried out for Madrona Mining Limited by Aerodat Inc. under a contract dated July 25, 1996. Principal geophysical sensors included a five frequency electromagnetic system, a high sensitivity cesium vapour magnetometer and a radiometric system. Ancillary equipment included a colour video tracking camera, Global Positioning System (GPS) navigation instrumentation, a radar altimeter, a power line monitor and a base station magnetometer.

The survey covered an area of about 40 square kilometres located 75 km west of Dawson City. Total survey coverage is approximately 442 line kilometres including 38 kilometres of tie lines. The Aerodat Job Number is J9674.

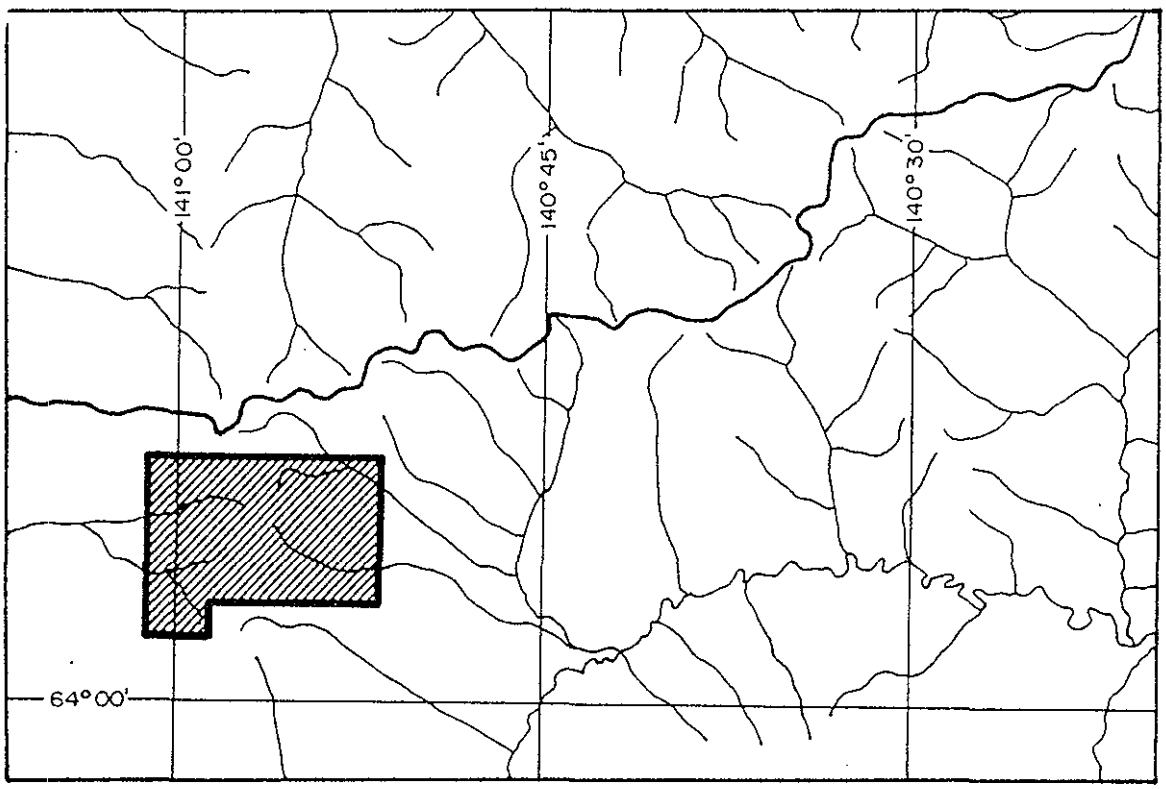
This report describes the survey, the data processing, data presentation and interpretation of the geophysical results. Identified electromagnetic anomalies appear on selected map products as EM anomaly symbols with interpreted source characteristics. The interpretation map indicates conductive and anomalous radiometric areas of possible interest. It also shows prominent structural features interpreted from the magnetic results. Significant anomalous radiometric, structural, conductive and/or magnetic associations are the basis for the selection of specific geophysical anomalies for further investigation. Recommendations are more focused if the exploration target and/or geological environment is known.

2. SURVEY AREA

The west survey boundary covers the United States/Canada border and the north boundary is just south of the Little Gold Canada Customs Camp on the Top of the World #9 Highway. The claims comprise the Uni group, tag numbers 1 to 4 and 6 to 40 inclusive and the Cici group, tag numbers 1 to 12 and 15 to 34 inclusive all 100% owned by Madrona Mining Limited.

Topography is shown on the 1:50,000 scale NTS map sheet 116 C/2. Local relief is rugged. Elevations range from 825 m to over 1,400 m above mean sea level. The survey area is shown in the attached index map that includes local topography and latitude - longitude coordinates. This index map also appears on all black line map products. The flight line direction is north-south. Line spacing is 100 metres.

INDEX MAP



Claims registered to Peter Ross

UNI 1-13	YB67499-511	CICI 1-34	YB67512-545
UNI 14-17	YB88049-052	UNI 18-40	YB88681-703

3. GENERAL SURVEY LOGISTICS

The survey was completed in the period September 10 to 13, 1996. Principal personnel are listed in Appendix III. A total of eight survey flights was required to complete the project. Aircraft ground speed is maintained at approximately 60 knots (30 metres per second) and mean terrain clearance of 60 metres consistent with the safety of the aircraft and crew.

A global positioning system (GPS) consisting of a Magnavox MX 9212 operated in differential mode guides aircraft navigation and flight line control. Field processing of the differential GPS data in the field utilizes a PC using software supplied by the manufacturer. One system is installed in the survey helicopter. This involves mounting the receiver antenna on the tail boom. A second system acts as the base station.

The published NTS maps provide the Universal Transverse Mercator (UTM) coordinates of the survey area corners. These coordinates program the navigation system. A test flight confirms if area coverage is correct. Thereafter the navigation system guides the pilot along the survey traverse lines marked on the topographic map. The operator also enters manual fiducials over prominent topographic features. Survey lines showing excessive deviation are re-flown.

The magnetic tie line navigation is visual and, where possible, traverses cover areas of low topographic and magnetic relief. Aircraft position is registered by the navigation system. The operator calibrates the geophysical systems at the start, middle (if required) and end of every survey flight. During calibration the aircraft is flown away from ground effects to record electromagnetic zero levels.

4. DELIVERABLES

The report on the results of the survey is presented in four copies. The report includes folded white print copies of all black line maps. Four copies of the colour, shadow and ternary maps are in accompanying map tube(s).

The black line maps show topography, UTM grid coordinates and the survey boundary. A full list of all map types is at the beginning of this report. A summary follows:

MAP NO.	DESCRIPTION
	BLACK LINE
1	Base Map
2	Compilation/Interpretation Map
3	Total Field Magnetic Contours
4	Vertical Magnetic Gradient Contours

5A Apparent Resistivity Contours - 865 Hz
5B Apparent Resistivity Contours - 4,175 Hz

COLOUR

1 Total Field Magnetics
2 Vertical Magnetic Gradient
3A HEM Offset Profiles - 865 Hz and 935 Hz
3B HEM Offset Profiles - 4,175 Hz and 4,600 Hz
3C HEM Offset Profiles - 32,000 Hz
4A Apparent Resistivity Contours - 865 Hz
4B Apparent Resistivity Contours - 4,175 Hz
5A Uranium Count Radiometric
5B Thorium Count Radiometric
5C Potassium Count Radiometric
5D Total Count Radiometric

Total Field Magnetic Shadow
Ternary Map

The processed digital data, including both the profile and the gridded data, is on CD ROM'S (ISO 9660). Profile data is written as columnar ASCII records and the gridded data as standard Geosoft PC grids. A full description of the format is included with the package. All gridded data can be displayed on IBM compatible microcomputers using the Aerodat AXIS (Aerodat Extended Imaging System) or RTI (Real Time Imaging) software package. The complete data package includes all analog records, base station magnetometer records, flight path video tape and original map cronaflexes.

5. AIRCRAFT AND SURVEY EQUIPMENT

5.1 Aircraft

The survey aircraft was an Aerospatiale SA 315B Lama helicopter, piloted by D. Rokosh, owned and operated by Turbowest Helicopters Ltd. J. Douglas of Aerodat acted as navigator and equipment operator. Aerodat performed the installation of the geophysical and ancillary equipment. The survey aircraft is flown at a mean terrain clearance of 60 metres (200 feet) and speed of 60 knots.

5.2 Electromagnetic System

The electromagnetic system is an Aerodat five frequency configuration. Two vertical coaxial coil pairs operate at frequency ranges of 935 Hz and 4,600 Hz and three horizontal coplanar coil pairs at frequency ranges of 865, 4,175 Hz and 32 kHz. The

actual frequencies used depend on the particular bird configuration. At the present time Aerodat has eight bird systems. This survey utilized the Hawk bird with frequencies of 919 Hz and 4,341 Hz for the coaxial coil pairs and 847 Hz, 4,737 Hz and 33,360 Hz for the coplanar coil pairs. The transmitter-receiver separation is 6.40 metres. Inphase and quadrature signals are measured simultaneously for the five frequencies with a time constant of 0.1 seconds. The HEM bird is towed 30 metres (100 feet) below the helicopter.

5.3 Magnetometer

A Scintrex H8 cesium, optically pumped magnetometer sensor, measures the earth's magnetic field. The sensitivity of this instrument is 0.001 nanoTesla at a sampling rate of 0.2 second. The sensor is towed in a bird 15 metres (50 feet) below the helicopter 45 metres (150 feet) above the ground).

5.4 Gamma-Ray Spectrometer

An Exploranium GR-820 spectrometer coupled to 1,024 cubic inches of crystal sensor records four channels of radiometric data. Spectrum stabilization is based on the 662 KeV peak from Cesium sources planted on the crystals. A 256 cubic inch upward looking atmospheric detector is used to monitor background radiation.

The channels recorded and their energy windows are as follows:

Standard Windows		
Element	Lower Boundary MeV	Upper Boundary MeV
Total Count (TC)	0.400	2.810
Potassium (K)	1.370	1.570
Uranium (U)	1.660	1.860
Thorium (Th)	2.410	2.810
Uranium Upward	1.660	1.860
Cosmic	3.000	∞

The four channels of radiometric data record at a one second update rate (counts per second - cps). Digital recording resolution is one cps.

5.5 Ancillary Systems

Base Station Magnetometer

A Gem Systems, Inc. GSM19 magnetometer is set up at the base of operations to record diurnal variations of the earth's magnetic field. Synchronization of the clock of the base station with that of the airborne system is checked each day to insure diurnal corrections will be accurate. Recording resolution is 1 nT with an update rate of four seconds. Magnetic field variation data are plotted on a 3" wide gridded paper chart analog recorder. Each division of the grid (0.25") is equivalent to one minute (chart speed) or five nT (vertical sensitivity). The date, time and current total field magnetic value are automatically recorded every 10 minutes. The data is also saved to digital tape.

Radar Altimeter

A King KRA-10 radar altimeter records terrain clearance. The output from the instrument is a linear function of altitude. The radar altimeter is pre-calibrated by the manufacturer and is checked after installation using an internal calibration procedure.

Tracking Camera

A Panasonic colour video camera records the flight path on VHS video tape. The camera operates in continuous mode. The video tape also shows the flight number, 24 hour clock time (to .01 second), and manual fiducial number.

Global Positioning System (GPS)

The Global Positioning System is a U.S. Department of Defense program that will provide worldwide, 24 hour, all weather position determination capability. GPS consists of three segments:

- a constellation of satellites
- ground stations that control the satellites
- a receiver

The receiver takes in coded data from satellites in view and there after works out the range to each satellite. The coded data must therefore include the instantaneous position of the satellite relative to some agreed earth-fixed coordinate system. The satellite constellation consists of 24 satellites with a proportion of the satellites acting as standby spares.

Analog Recorder

An RMS dot matrix recorder displays the data during the survey. Record contents are as follows:

LABEL	PARAMETER	CHART SCALE
MAGF	Total Field Magnetics, Fine	2.5 nT/mm
MAGC	Total Field Magnetics, Coarse	25 nT/mm
L9XI	935 Hz, Coaxial, Inphase	2.5 ppm/mm
L9XQ	935 Hz,Coaxial,Quadrature	2.5 ppm/mm
M4XI	4,600 Hz, Coaxial, Inphase	2.5 ppm/mm
M4XQ	4,600 Hz, Coaxial, Quadrature	2.5 ppm/mm
L8PI	865 Hz, Coplanar, Inphase	2.5 ppm/mm
L8PQ	865 Hz, Coplanar, Quadrature	2.5 ppm/mm
M4PI	4,175 Hz, Coplanar, Inphase	10 ppm/mm
M4PQ	4,175 Hz, Coplanar, Quadrature	10 ppm/mm
H3PI	32,000 Hz, Coplanar, Inphase	20 ppm/mm
H3PQ	32,000 Hz, Coplanar, Quadrature	20 ppm/mm
TC	Radiometric - Total Count	50 counts/mm
K	Radiometric - Potassium	5 counts/mm
U	Radiometric - Uranium	2.5 counts/mm
TH	Radiometric - Thorium	2.5 counts/mm
BARO	Barometer	10 ft/mm
RALT	Radar Altimeter	10 ft/mm
PWRL	60 Hz Power Line Monitor	-

Data is recorded with positive - up, negative - down. The analog zero of the radar altimeter is 5 cm from the top of the analog record. A helicopter terrain clearance of 60 m (200 feet) should therefore be seen some 3 cm from the top of the analog record.

Chart speed is 2 mm/second. The 24-hour clock time is printed every 20 seconds. The total magnetic field value is printed every 30 seconds. The ranges from the radar navigation system are printed every minute.

Vertical lines crossing the record are manual fiducial markers activated by the operator. The start of any survey line is identified by two closely spaced manual fiducials. The end of any survey line is identified by three closely spaced manual fiducials. Manual fiducials

are numbered in order. Every tenth manual fiducial is indicated by its number, printed at the bottom of the record.

Calibration sequences are located at the start and end of each flight and at intermediate times where needed.

Digital Recorder

A DGR-33 data system records the digital survey data on magnetic media. Contents and update rates are as follows:

DATA TYPE	RECORDING INTERVAL	RECORDING RESOLUTION
Magnetometer	0.1 second	0.001 nT
VLF-EM (4 Channels)	0.2 second	0.03%
HEM, (8 or 10 Channels)	0.1 second	
HEM, coaxial- 935 Hz/4,600 Hz		0.03 ppm
HEM, coplanar- 865 Hz/4,175 Hz		0.06 ppm
HEM, coplanar- 32,000 Hz		0.125 ppm
Radiometer	1 second	1 cps
Position (2 Channels)	0.2 second	0.1 m
Altimeter	0.2 second	0.05 m
Power Line Monitor	0.2 second	
Manual Fiducial		
Clock Time		

6. DATA PROCESSING AND PRESENTATION

6.1 Base Map

The base map is taken from a photographic enlargement of the NTS topographic maps. A UTM reference grid and the survey area boundaries are added. After registration of the flight path to the topographic base map, some topographic detail and the survey boundary are added digitally. This digital image forms the base for the colour, shadow and ternary maps.

6.2 *Flight Path Map*

Global Positioning System

The GPS receiver takes in coded data from satellites in view and there after calculates the range to each satellite. The coded data must therefore include the instantaneous position of the satellite relative to some agreed earth-fixed coordinate system.

A further calculation using ranges to several satellites gives the position of the receiver in that coordinate system (eg. UTM, lat/long.). The elevation of the receiver is given with respect to a model ellipsoidal earth.

Normally the receiver must see four satellites for a full positional determination (three space coordinates and time). If the elevation is known in advance, only three satellites are needed. These are termed 3D and 2D solutions.

The position of the receiver is updated every tenth of a second. The accuracy of any one position determination is described by the Circular Error Probability (CEP). Ninety-five percent of all position determinations will fall within a circle of a certain radius. If the horizontal position accuracy is 25 m CEP, for example, 95% of all trials will fall within a circle of 25 m radius centred on the mean. The system may be degraded for civilian use and the autonomous accuracy is then 100 m CEP. This situation is called selective availability (SA). Much of this error (due principally to satellite position/time errors and atmospheric delays) can be removed using two GPS receivers operating simultaneously. One receiver acting as the base station, is at a known position. The second remote receiver is in the unknown position. Differential corrections determined for the base station may then be applied to the remote station. Differential positions are accurate to five m CEP (for a one second sample). Averaging will reduce this error further.

Flight Path

The flight path is drawn using linear interpolation between x,y positions from the navigation system. These positions are updated every second (or about 3.0 mm at a scale of 1:10,000). Occasional dropouts occur when the optimum number of satellites are not available for the GPS to make accurate positional determinations. Interpolation is used to cover short flight path gaps. The navigator's flight path and/or the flight path recovered from the video tape may be stitched in to cover larger gaps. Such gaps may be recognized by the distinct straight line character of the flight path.

The manual fiducials are shown as a small circle and labelled by fiducial number. The 24-hour clock time is shown as a small square, plotted every 30 seconds. Small tick marks are plotted every two seconds. Larger tick marks are plotted every 10 seconds. The line and flight numbers are given at the start and end of each survey line.

The aircraft position is expressed in geographic latitude and longitude coordinates, using

the international WGS84 spheroid. Any particular survey area located on the globe has a specific reference ellipsoid or projection zone. A further refinement for a better fit to the earth's surface at the survey location is applied by adding or subtracting slight x, y and/or z datum shifts (a few metres to hundreds of metres) to the origin of the ellipsoid. The geographic coordinates are converted to fit this ellipsoid before calculating the UTM coordinates. The UTM coordinates are expressed as UTM eastings (x) and UTM northings (y), and are in the NAD 27 spheroid, (DX = -10.0, DY = 158.0, DZ = 187.0).

The flight path map is merged with the base map by matching UTM coordinates from the base maps and the flight path record. The match is confirmed by checking the position of prominent topographic features as recorded by manual fiducial marks or as seen on the flight path video record.

6.3 Electromagnetic Survey Data

The electromagnetic data are recorded digitally at a sample rate of 10 per second with a time constant of 0.1 seconds. A two stage digital filtering process rejects major sferic events and reduces 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. This is referred to as a "surgical mute" in signal processing terms. The signal to noise ratio is further enhanced by the application of a low pass digital filter. This filter has zero phase shift that 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 gives minimal profile distortion.

Following the filtering process, a base level correction is made using EM zero levels determined during high altitude calibration sequences. 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 are the basis for the determination of apparent resistivity (see following section). The inphase and quadrature responses along the flight line are presented in profile form offset along the flight lines. Differentiation of the various profiles is achieved using two colours (coaxial and coplanar) and two line weights (inphase and quadrature). For interpretation purposes the coaxial and coplanar data sets for a similar frequency range are presented together on one map (865/935 and 4,175/4,600).

6.4 Total Field Magnetics

The aeromagnetic data is corrected for diurnal variations by adjustment with the recorded base station magnetic values. No corrections for regional variations are applied. The corrected profile data are interpolated on to a regular grid using an Akima spline technique. The grid provided the basis for threading the presented contours. The

minimum contour interval is 1 nT with a grid cell size of 25 m. Magnetic high areas are assigned warm colours (orange/red) while magnetic low areas show as cool colours (blue).

6.5 Calculated Vertical Magnetic Gradient

The vertical magnetic gradient is calculated from the gridded total field magnetic data. The calculation is based on a FFT algorithm. The results are contoured using a minimum contour interval of 0.01 nT/m. Grid cell sizes are the same as those used in processing the total field data. The high and low amplitude responses are give the same colour representation as the total field contours.

6.6 Colour Relief or Shadow Map of Total Field Magnetics

A useful manipulation of the magnetic data is the production of a colour shadow map. It is an aid in the interpretation and presentation of the magnetic information. The shadow map displays two independent variables simultaneously on the same map. The two variables are the amplitude and the gradient of the quantity measured over the mapping region. At every point or grid cell on the map the hue represents the amplitude of the magnetic value and the lightness/darkness of the hue is varied according to the slope or gradient of the data at the cell location. The gradient is translated into a reflectance parameter with respect to a chosen illumination direction. Subtle magnetic structures having a specific trend are enhanced or attenuated depending on the position and angle to the horizon of the light source relative to the trend. If the light source is orthogonal to the trend there will be maximum shadow effect. Regional discontinuities representing fault structures are easily recognized with shadow enhancement.

6.7 Apparent Resistivity

The apparent resistivity is calculated by assuming a 200 metre thick conductive layer over resistive bedrock. The computer determines the resistivity that would be consistent with the sensor elevation and recorded inphase and quadrature response amplitudes at the selected frequency. The apparent resistivity profile data is re-interpolated onto a regular grid at a 25 metres true scale interval using an Akima spline technique and contoured using logarithmically arranged contour intervals. The minimum contour interval depends on the selected frequency and is in units of log(ohm.m) in logarithmic intervals of 0.01, 0.05, 0.2, 1.0, 5.0 etc. The colour presentation assigns warmer colours (reds) to low resistivity or very conductive responses and cooler colours (blues) to high resistivity or poor conductivity responses.

The highest measurable resistivity is approximately equal to the transmitter frequency. The lower limit on apparent resistivity is rarely reached.

6.8 Radiometric Data

The four channels of radiometric data are subject to a number of corrections and filters:

The stages are:

- livetime correction
- background removal (cosmic and radon)
- terrain clearance correction
- compton scattering correction
- low pass profile filter (seven point Hanning)
- low pass grid filter (5X5 point Hanning)

The Compton stripping factors are:

ALPHA	0.221	Th into U
BETA	0.384	Th into K
GAMMA	0.720	U into K
A	0.040	U into Th
B	0.002	K into Th
G	0.005	K into U

where alpha, beta and gamma are the forward stripping coefficients and a, b, g are the backward stripping coefficients. These coefficients are taken in part from the sample checks done at the start of each flight.

The altitude attenuation coefficients are TC: 0.007; K: 0.008; U: 0.008; and Th: 0.007. The units are metres $^{-1}$. These coefficients are taken from GSC publications for similar radiometric systems. Radiometric data are corrected to a mean terrain clearance of 60 m.

The corrected data are interpolated on a square grid (cell size 25 m) using an Akima spline technique. The grids provided the basis for threading the presented contours. The minimum contour intervals are TC = 10 cps, K = 2 cps, Th = U = 1 cps.

6.9 Ternary Map of Radiometric Channels

The relative amplitude of the three radioelement concentrations measured is often an important parameter. High potassium with relatively no thorium or high thorium with relatively no potassium often indicates a specific alteration environment or rock type. The presence or absence of an uranium response is also often diagnostic. In order to readily recognize and display these signatures a ternary map is generated. It is obtained by

assigning each radioelement a primary colour and intensity relative to amplitude. The three primary colour intensities are mixed to give unique colour hues for various radioelement signatures. The usual colour assignments are potassium = Cyan, thorium = yellow and uranium = magenta.

7. INTERPRETATION

7.1 Regional Geology

Palaeozoic arenaceous and argillaceous sediments including iron formation and carbonate underlay the area as well as some younger Tertiary volcanic flows and pyroclastic rocks. The geological environment is similar to that hosting the Cominco Ltd. and Westmin Resources Ltd. massive sulphide base metal deposits of the Finlayson Lake area in southeastern Yukon.

Geochemically anomalous base metal values are present in several locations on the property further indicating the area has potential for a base metal deposit.

7.2 Magnetic Interpretation

The total field magnetic responses reflect major changes in the magnetite content of the underlying rock units. The amplitude of the magnetic responses relative to the regional background help to assist in identifying specific magnetic and nonmagnetic units related to, for example, mafic flows or tuffs, mafic to ultramafic intrusives, felsic intrusives, felsic volcanics and/or sediments etc. Obviously, several geological sources can produce the same magnetic response. These ambiguities can be reduced considerably if basic geological information on the area is available to the geophysical interpreter.

In addition to amplitude variations, magnetic patterns related to the geometry of the particular rock unit also help in determining the probable source of the magnetic response. For instance, long narrow magnetic linears usually reflect mafic tuff/flow horizons or mafic intrusive dyke structures while semi-circular features with complex magnetic amplitudes may be produced by local plug-like intrusive sources such as pegmatites, carbonatites or kimberlites.

The calculated vertical magnetic gradient assists considerably in mapping weaker magnetic linears that are partially masked by nearby higher amplitude magnetic features. The broad zones of higher magnetic amplitude, however, are severely attenuated in the vertical magnetic gradient results. These higher amplitude zones reflect rock units having magnetic susceptibility signatures. For this reason both the total and gradient magnetic data sets must be evaluated.

Theoretically the magnetic gradient zero contour line marks the contacts or limits of large magnetic sources. This applies to wide sources, greater than 50 metres, having simple

slab geometries and shallow depth.(See discussion in Appendix I) Thus the gradient map also aids in the more accurate delineation of contacts between differing magnetic rock units.

The cross cutting structures, shown on the interpretation map as faults, are based on interruptions and discontinuities in the magnetic trends. Generally, sharp folding of magnetic units will produce a magnetic pattern indistinguishable from a fault break. Thus, if anomaly displacements are small such fault structures, where they mark an anomaly interruption, may actually represent a deformation node rather than faulting.

7.3 Magnetic Survey Results and Conclusions

To facilitate the following discussion of the magnetic results it is suggested the interpretation map be compared with the total field and vertical gradient magnetic colour contour maps either as overlays or side by side.

The magnetic background is interpreted to be approximately 57,325 nanoTesla (nT). Maximum amplitudes range from about 425 nT below background to 425 nT above background but in general the range of values are more in the order of -25 to +200 nT. The greatest variation in values are present in the east central portion of the survey area. A large semi-circular elongated "C" shaped magnetic anomaly is present on the east side of the survey block. This magnetic complex is probably reflecting mafic volcanic flows or mafic intrusive bodies. The anomaly is shown with horizontal hatching to differentiate it from less magnetic more linear magnetic trends. Similar higher amplitude anomaly complexes are present in the west side of the area and they are also indicated with horizontal hatching. The anomaly patterns around these higher amplitude responses suggest the source of the responses are intrusive into the surrounding lower amplitude magnetic linear trends. The latter probably reflect the original magnetic fabric of the area and are possibly intermediate to mafic volcanic units.

There are three designated anomalies of possible interest. Anomalies M1 and M2, in the west and east portions respectively of the survey block, are small circular features typical of the signature associated with vertical plug-like bodies. These anomalies may be produced by small mafic volcanic vents or pegmatitic bodies. Anomaly M2 is on the periphery of an anomalous Zinc/Lead geochemical zone.

The negative M3 anomaly has a negative amplitude as great as the most positive response in the area immediately to the southwest, within the high amplitude complex. This suggests the source of the negative response could have been introduced during a magnetic pole reversal and is actually a very magnetic, possibly intrusive body with remnant magnetism.

The other non-magnetic below background zones shown on the interpretation map with thick dashed lines and depression symbols probably map felsic volcanics, felsic intrusives

or sediments. The most extensive covers the northwest corner of the survey block.

7.4 Electromagnetic Anomaly Selection/Interpretation

Usually two sets of stacked colour coded profile maps of one coaxial and one coplanar inphase and quadrature responses are used to select conductive anomalies of interest. Selection of anomalies is based on conductivity as indicated by the inphase to quadrature ratios of the 935 Hz and/or 4,600 Hz coaxial data, anomaly shape, and anomaly profile characteristics relative to coaxial and corresponding coplanar responses.(see discussion and figure in Appendix I) It is difficult to differentiate between responses associated with the edge effects of flat lying conductors and actual poor conductivity bedrock conductors on the edge of or overlain by flat lying conductors. Poor conductivity bedrock conductors having low dips will also exhibit responses that may be interpreted as surficial overburden conductors. In such cases, where the source of the conductive response appears to be ambiguous, the anomaly is still selected for plotting. In some situations the conductive response has line to line continuity and some magnetic association thus providing possible evidence that the response is related to an actual bedrock source.

The calculation of the depth to the conductive source and its conductivity is based on the 4,600 Hz data assuming a thin vertical sheet model. The amplitude of the inphase and quadrature responses are used for the calculations which are automatically determined by computer. These data are listed in Appendix II and the depth and conductivity values are shown with each plotted anomaly. Further detailed discussion and illustration of the determination of these values is contained in Appendix I.

The selected anomalies are automatically categorized according to their conductivity and amplitude. The calculation of the conductivity of low amplitude anomalies can be very inaccurate. Therefore, anomalies having amplitudes below a certain level and/or low conductivity value are given a zero rating with the category increasing for increasing conductivity values that are statistically reliable.

7.5 Electromagnetic Survey Results and Conclusions

Conductive flat lying to gently dipping material is contributing to the electromagnetic responses in various degrees throughout the survey block. The flat lying responses are characterized by identically shaped coaxial and coplanar response profiles while gently dipping responses show a slight offset of the coaxial peak from the coplanar peak. These response shapes are illustrated in Appendix I, in the figure entitled "HEM Response Profile Shapes ....." profiles B, C and I. For a gently dipping source the small up-dip tail of the coplanar profiles B and C is not present. Note the coplanar peak is down dip from the coaxial peak.

Extensive flat lying to gently dipping conductors often have an "edge effect" anomaly which is a coaxial peak on the flank of the coplanar responses similar to one side of profile E, G or H. Often only one edge can be seen if the source is dipping.

Vertical and dipping tabular bodies have profile shapes as illustrated in Appendix I in the same figure profiles A, B and C. For dipping bodies the main coplanar peak is down dip from the coaxial peak.

There is a definite correlation between low resistivity and topographically low areas along drainage gulleys and on the flanks of hills. This is most obvious on the resistivity maps. Conductive talus and alluvial material related to weathering is the most likely source of these effects. Local variations in conductivity will produce peaks and edge effect anomalies within broader conductive zones. The better conductivity EM intercepts are all associated with the deep parts of the gulleys were maximum accumulation of conductive debris would be expected.

As a result, these conductive topographically low areas are low priority objectives. There are, however, a few low resistivity responses that do not correlate with a topographic low area or gulley as well as a few linear conductive trends suggesting a bedrock conductive source is present. These responses are designated with an E prefix for investigation. The low resistivity zones are E1, E2, E5 and E7 and the conductive trends are E3, E4 and E6. Anomalies E3, E4 and E5 are up slope from geochemically anomalous base metal zones. Anomalies E2 and E6 are within or near magnetic low areas while E1 is within an area of relatively high magnetic response. The significance, if any, of either low or high magnetic associations is not known. Felsic volcanics and sediments, the ore host rocks in the Finlayson Lake area, usually have very little magnetic minerals. Sulphide deposits, however, often contain magnetic minerals such as pyrrhotite or magnetite. Thus, all the designated responses require evaluation.

7.6 Radiometric Interpretation

The ability to detect natural occurring radiation, whether on the ground or from an airborne platform, depends on a number of factors listed as follows:

Count Time

Measurements or count rate statistics are more reliable the longer the detector is in position over a particular location. Therefore in airborne surveying, traverse speed is an important factor in detecting radiation sources. For this reason STOL aircraft and helicopters are a favoured platform for radiometric surveys.

Detector size

The detector crystal volume and thickness determine the sensitivity of the radiometric system to radiation. For accurate measurement and differentiation of higher energy levels of radiation, a large crystal volume is a pre-requisite.

Distance from Source (Altitude)

The attenuation or absorption of radiation in air, although not a significant factor in ground surveys, is a factor in airborne surveys. Normalization of the radiation amplitude data for altitude variations of the aircraft during the survey is necessary. The attenuation is not significant for large areal sources of radiation but is quite severe for localized point sources.

Overburden Cover

Radiation can be completely masked by one foot of rock or three feet of unconsolidated overburden.

Source Geometry

A large exposed outcrop of slightly radioactive material, such as granite which usually has a high potassium count, will be easily detectable from the air. A small outcrop of highly radioactive material, containing an appreciable amount of pitchblende for instance, may not be detectable unless the sensor passes directly over the outcrop and/or is quite close to it.

Source Characteristics

The type and percentage concentration of radioactive minerals present in the rock will determine radiation amplitudes and therefore the ability of the sensor to measure the radiation.

The above factors must be taken into consideration when evaluating and interpreting radiometric surveys. Variations in radiation amplitudes may only be a factor of overburden cover. As a result, an outcrop map of the survey area is very useful for initial evaluation of radioactive element concentrations.

Shales and felsic intrusives tend to have high potassium and thorium levels. Mafic intrusives, sandstone and especially limestone have concentrations of one half to one tenth of the highest levels. Specific intrusives types, such as pegmatites, can have levels of potassium, uranium and thorium, in the order of three to four times the amounts normally present. Uranium ore can contain concentrations of radioactive minerals one to four orders of magnitude greater than normally encountered.

Thus, interpretation of the source of radioactive anomalies, even when the uranium, thorium and potassium thresholds are separated, can be difficult and ambiguous. In some geological environments, specific rock units have higher or lower potassium/thorium, potassium/uranium or thorium/uranium ratios. Additional diagnostic information is sometimes available when such ratio maps are generated and compared to

known geological parameters.

7.7 Radiometric Survey Results and Conclusions

The potassium channel results are of most interest as high potassium usually reflects the presence of felsic intrusives such as granite type rocks as well as the presence of potassium associated with alteration processes. The additional absence or presence of thorium or uranium is also an important signature correlation for specific ore-model targets.

Anomalous responses are considered to be those having levels equal or greater than twice background. Interpreted background levels are: K = 45, Th = 15, U = 10. For this survey area most of the higher amplitude responses are only about one and one half times background. Nevertheless the potassium channel responses having levels greater than 70 cps are shown with diagonal cross hatching on the interpretation map and the more significant responses are designated with a "R" prefix letter. More dense cross hatching indicates the additional presence of anomalous thorium channel levels. Anomalies more than twice background are only present in three places namely within anomalies R1, R3 and R5. These anomalies also contain anomalous thorium levels. The only significant uranium channel response is present in conjunction with anomaly R2. R4 covers a ridge and is up slope from geochemically anomalous zones either side of the ridge.

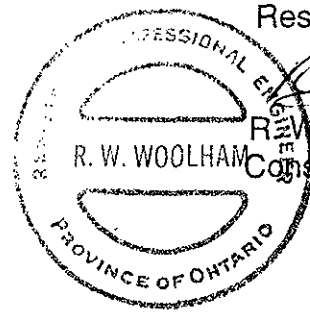
8. RECOMMENDATIONS

Selection of geophysical anomalies for further investigation is based on the structural and magnetic associations of the designated conductors as well as their relative conductivity. Significant radiometric anomalies having specific signatures and/or magnetic associations are also selected for evaluation. The geophysical anomalies associated with, or up-slope from, zones of anomalous geochemical activity, namely M2, E3, E4, E5 and R4, and the remaining designated conductive zones, E1, E2, and E6, are assigned a first priority while the remaining anomalies are considered secondary exploration targets.

There are a total of 15 designated anomalies of which only six are conductive signatures having possible potential for reflecting sulphide mineralization. The importance of the other designated radiometric and magnetic anomalies is unclear but some important mineralization relationships may be indicated after geological mapping and prospecting of the anomalies is complete.

The geophysical anomalies recommended for investigation represent a first phase exploration program. Additional work will be contingent on the results of this program. More detailed geological information used in conjunction with geophysics may help to direct further exploration efforts.

Respectfully submitted,



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Consulting Geophysicist

for

AERODAT INC.

J9674

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APPENDIX I

GENERAL INTERPRETIVE CONSIDERATIONS

GENERAL INTERPRETIVE CONSIDERATIONS

Electromagnetic

The Aerodat electromagnetic system utilized two different transmitter-receiver coil geometries. The traditional coaxial coil configuration is operated at widely separated frequencies. The horizontal coplanar coil configuration is similarly operated at different frequencies where at least one pair is approximately aligned with one of the coaxial frequencies.

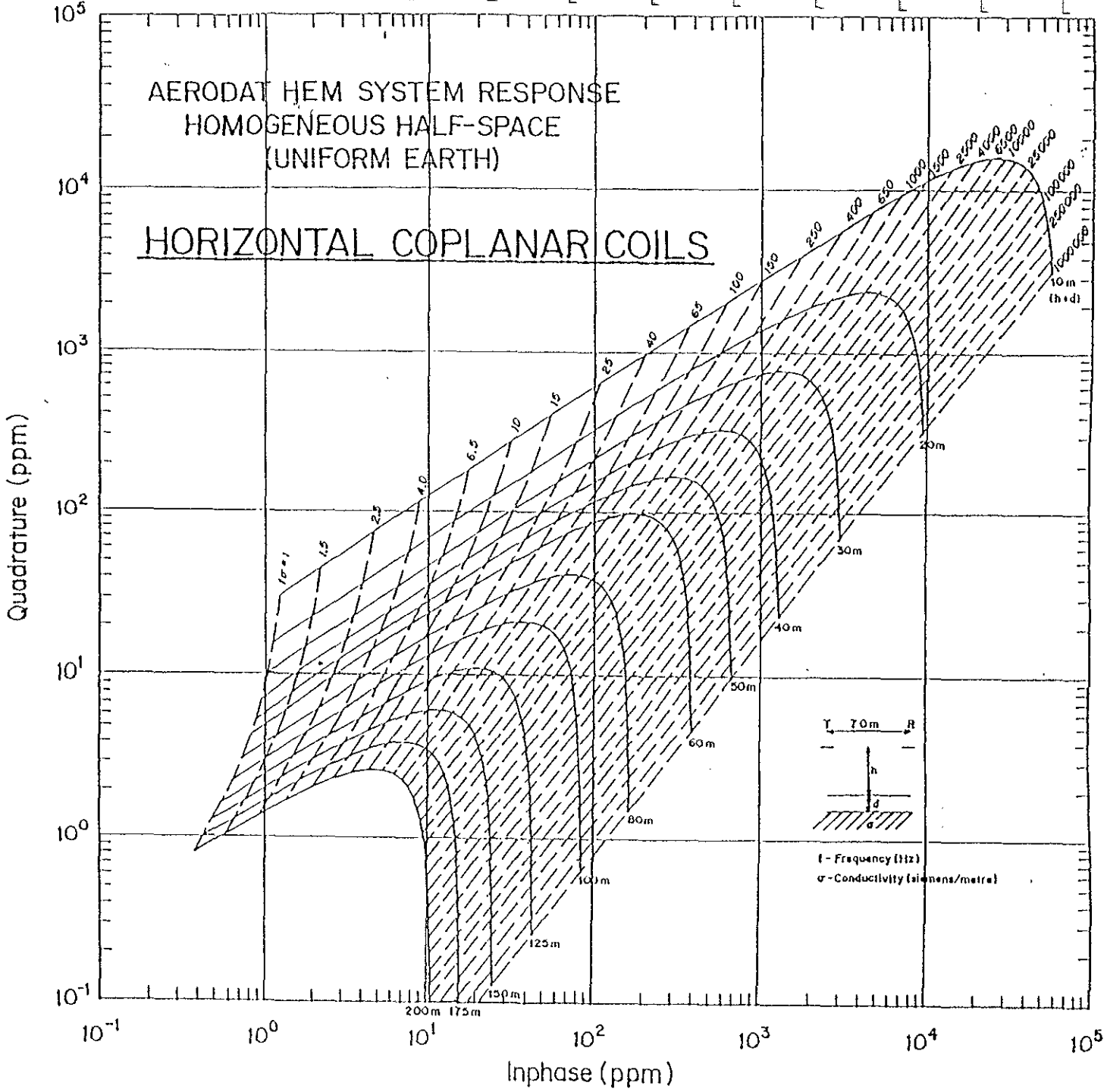
The electromagnetic response measured by the helicopter system is a function of the "electrical" and "geometrical" properties of the conductor. The "electrical" property of a conductor is determined largely by its electrical conductivity, magnetic susceptibility and its size and shape; the "geometrical"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

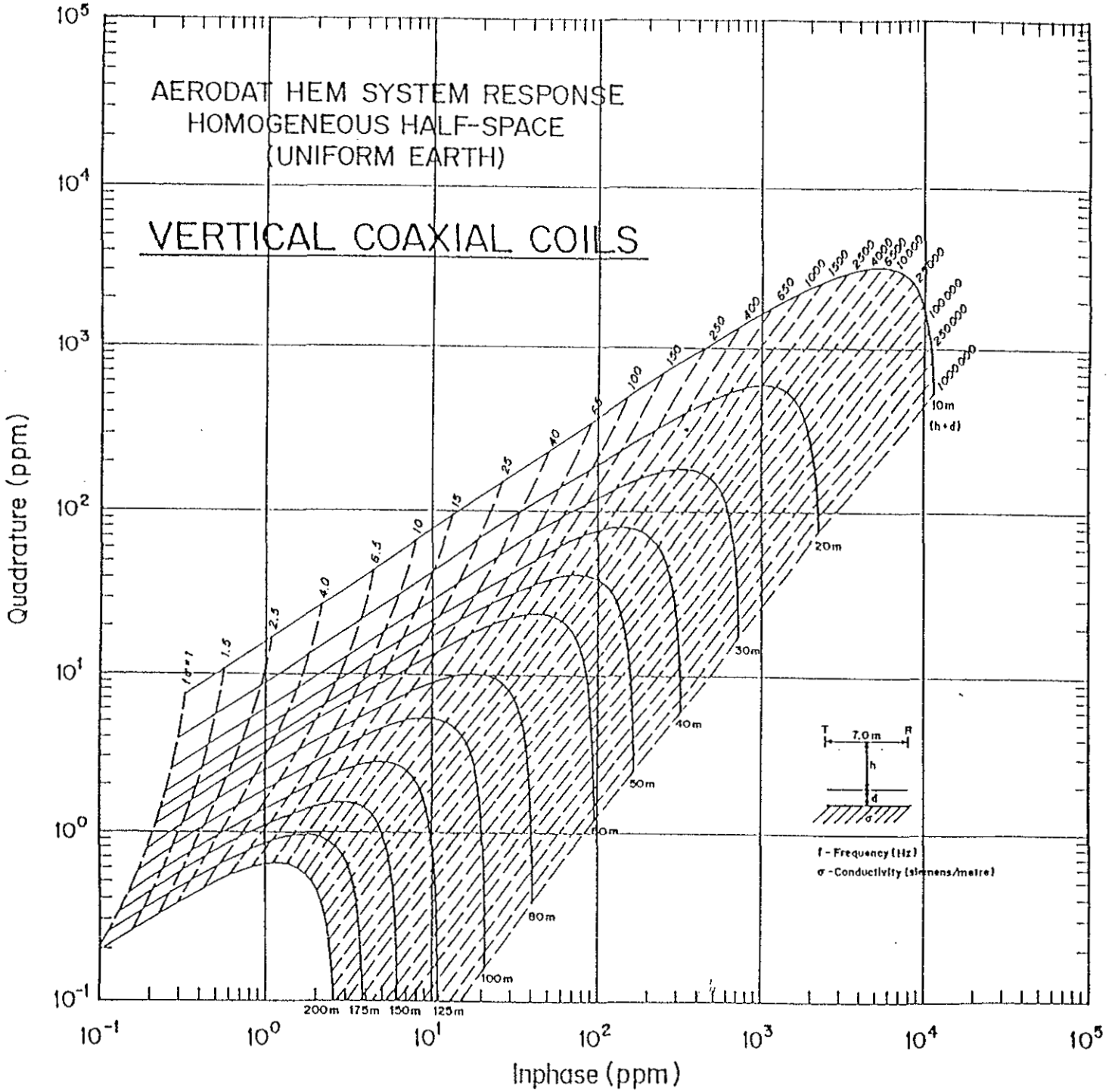
Electrical Considerations

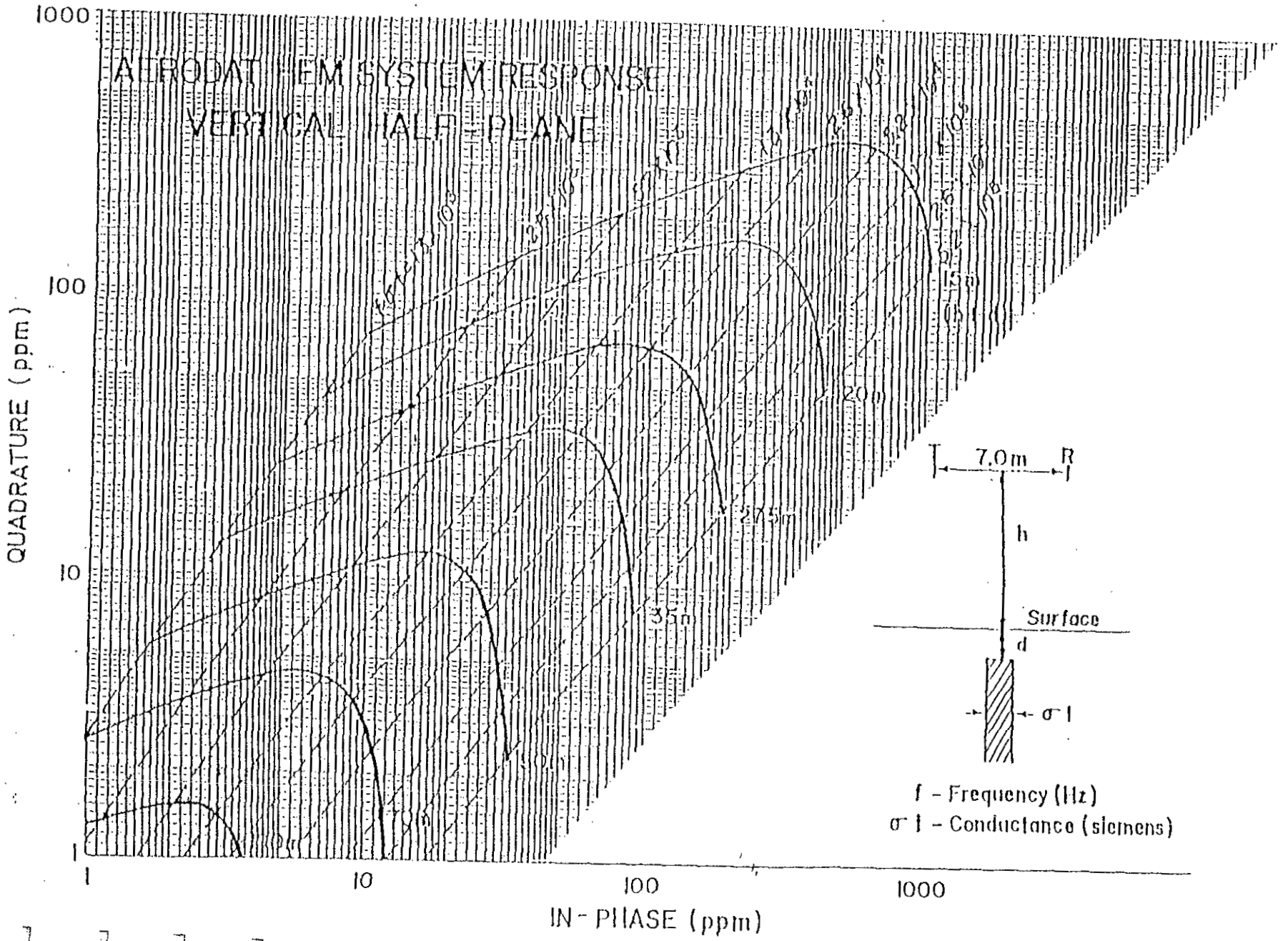
For a given conductive body the measure of its conductivity or conductance is closely related to the measured phase shift between the received and transmitted electromagnetic field. A small phase shift indicates a relatively high conductance, a large phase shift lower conductance. A small phase shift 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 and half space models on the accompanying phasor diagrams. 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 anomaly listings included in the survey report and the conductance and inphase amplitude are presented in symbolized form on the map presentation.

The conductance estimate is most reliable when anomaly amplitudes are large and background resistivities are high. Where the anomaly is of low amplitude and background resistivities are low, the conductance estimates are much less reliable. In such situations, the conductance estimate is often quite low regardless of the true nature of the conductor. This is due to the elevated background response levels in the quadrature channel. In an extreme case, the conductance estimate should be discounted and should not prejudice target selection.


AERODAT HEM SYSTEM RESPONSE
HOMOGENEOUS HALF-SPACE
(UNIFORM EARTH)
HORIZONTAL COPLANAR COILS
Quadrature (ppm)
Inphase (ppm)
10^5
10^4
10^3
10^2
10^1
10^0
10^{-1}
10^{-1}
10^0
10^1
10^2
10^3
10^4
10^5
10m (h+d)
20m
30m
40m
50m
60m
80m
100m
125m
150m
175m
200m
T 7.0m R
h
d
f - Frequency (Hz)
σ - Conductivity (siemens/metre)


AERODAT HEM SYSTEM RESPONSE
HOMOGENEOUS HALF-SPACE
(UNIFORM EARTH)
VERTICAL COAXIAL COILS
Quadrature (ppm)
Inphase (ppm)
10m (h+d)
20m
30m
40m
50m
60m
80m
100m
200m 175m 150m 125m
T 7.0m R
h
d
σ
f - Frequency (Hz)
σ - Conductivity (siemens/metre)


AIRBORNE EM SYSTEM RESPONSE
VERTICAL HALF PLANE
1000
100
10
1
QUADRATURE (ppm)
1
10
100
1000
IN-PHASE (ppm)
7.0m
R
h
Surface
d
σ 1
f - Frequency (Hz)
σ 1 - Conductance (siemens)

The conductance and depth vales 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.

The higher ranges of conductance, greater than 2-4 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 massive sulphides or graphites.

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 concentrations in association with minor conductive sulphides, and the electromagnetic response will 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. Minor accessory sulphide mineralization may however provide a useful indirect indication.

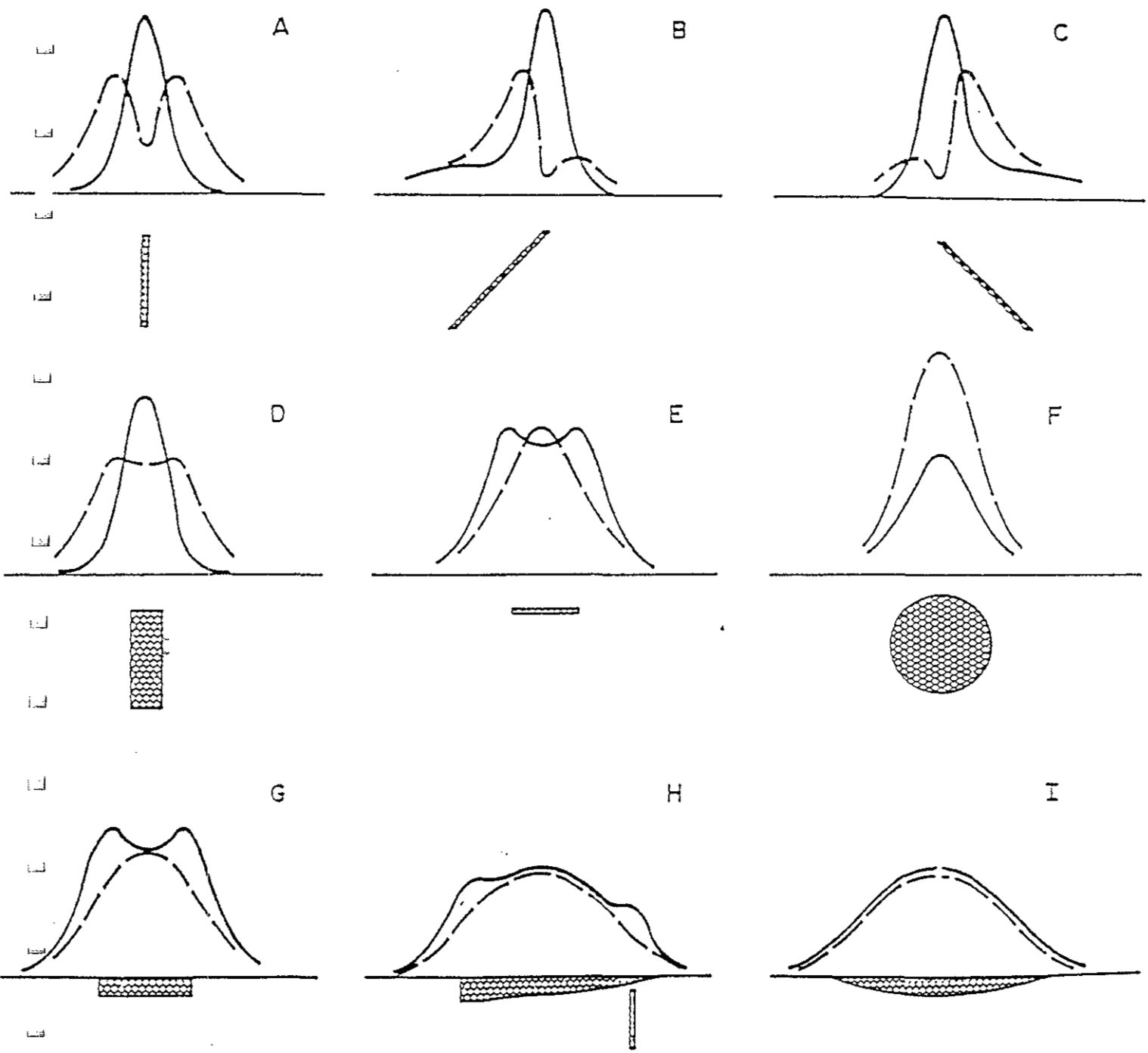
In summary, the estimated conductance of a conductor can provide a relatively positive identification of significant sulphide or graphite mineralization. A moderate to low conductance value does not rule out the possibility of significant economic mineralization.

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. The accompanying figure shows a selection of HEM response profile shapes from nine idealized targets. Response profiles are labelled A through I. These labels are used in the discussion which follows.

HEM RESPONSE PROFILE SHAPE AS AN INDICATOR OF CONDUCTOR GEOMETRY

——— COAXIAL vertical scale 1 ppm/unit
— — — COPLANAR vertical scale 4ppm/unit



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 (Profile A). As the dip of the conductor decrease 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 (Profiles B and C).

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 (Profile D). 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 a horizontal thin sheet or 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* (Profiles E and G).

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 (Profile F).

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 (Profile I). 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 (Profile H).

* 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.

The interpretation of contoured aeromagnetic data is a subject on its own involving an array of methods and attitudes. The interpretation of source characteristics for example from total field results is often based on some numerical modelling scheme. The vertical gradient data is more legible in some aspects however and useful inferences about source characteristics can often be read off the contoured VG map.

The zero contour lines in contoured VG data are often sited as a good approximation to the outline of the top of the magnetic source. This only applies to wide (relative to depth of burial) near vertical sources at high magnetic latitudes. It will give an incorrect interpretation in most other cases.

Theoretical profiles of total field and vertical gradient anomalies from tabular sources at a variety of magnetic inclinations are shown in the attached figure. Sources are 10, 50 and 200 m wide. The source-sensor separation is 50 m. The thin line is the total field profile. The thick line is the vertical gradient profile.

The following comments about source geometry apply to contoured vertical gradient data for magnetic inclinations of 70 to 80°.

Outline

Where the VG anomaly has a single sharp peak, the source may be a thin near-vertical tabular source. It may be represented as a magnetic axis or as a tabular source of measurable width - the choice is one of geological preference.

Where the VG anomaly has a broad, flat or inclined top, the source may be a thick tabular source. It may be represented as a thick body where the width is taken from the zero contour lines if the body dips to magnetic north. If the source appears to be dipping to the south (i.e. the VG anomaly is asymmetric), the zero contours are less reliable indicators of outline. The southern most zero contour line should be ignored and the outline taken from the northern zero contour line and the extent of the anomaly peak width.

Dip

A symmetrical vertical gradient response is produced by a body dipping to magnetic north. An asymmetrical response is produced by a body which is vertical or dipping to the south. For southern dips, the southern most zero contour line may be several hundred meters south of the source.

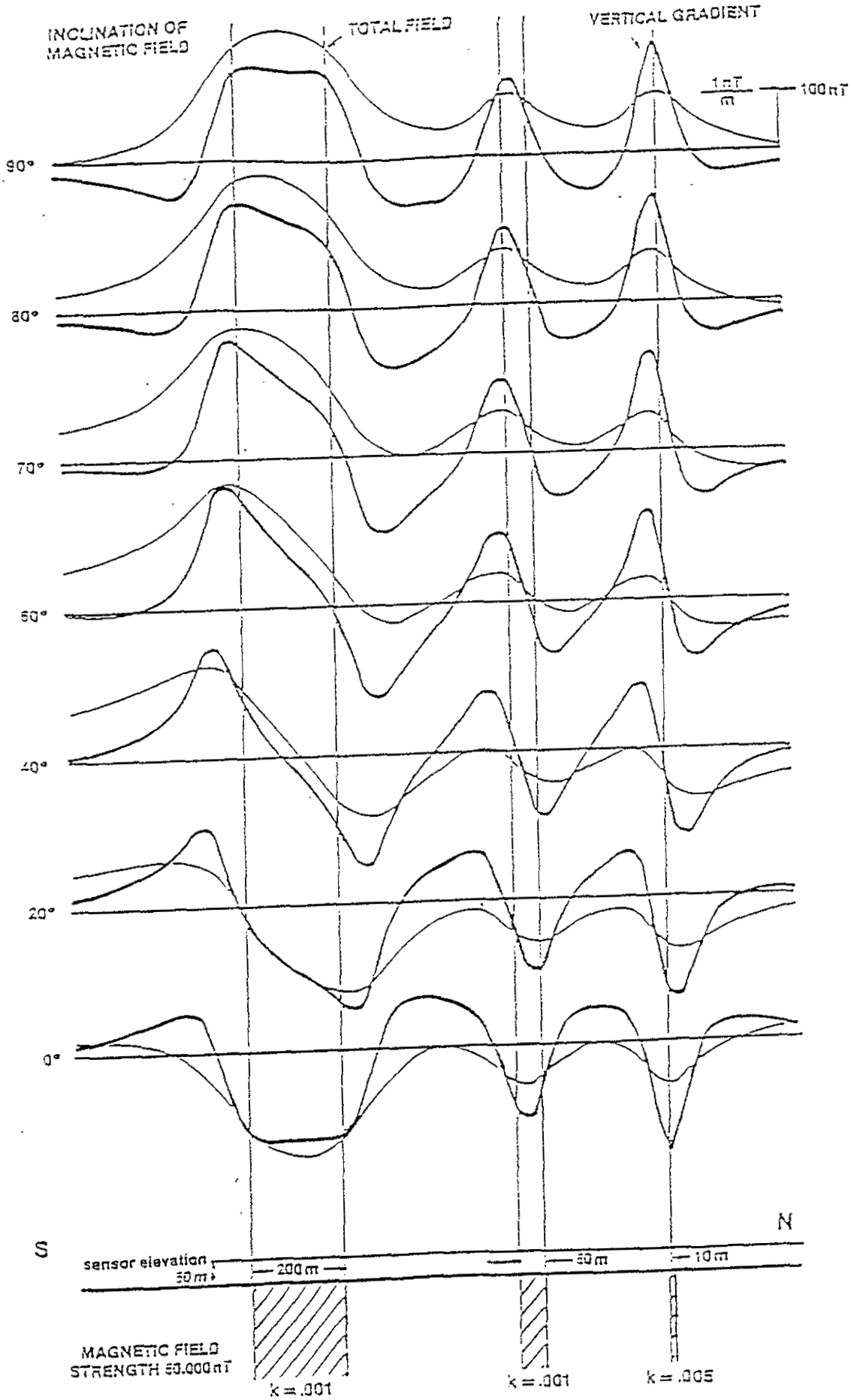
Depth of Burial

The source-sensor separation is about equal to half of the distance between the zero contour lines for thin near-vertical sources. The estimated depth of burial for such sources is this separation minus 50 m. If a variety of VG anomaly widths are seen in an area, use the narrowest width seen to estimate local depths.

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 locally horizontal and normal to a line pointing at the transmitter.

The Herz Totem uses three coils in the X, Y, Z configuration to measure the total field and vertical quadrature component from two VLF stations. These stations are designated Line and Ortho. The line station is ideally in a direction from the survey area at right angles to the flight line direction. Conductors normal to the flight line direction point at the line station and are therefore optimally coupled to VLF magnetic fields and in the best situation to gather secondary VLF currents. The ortho station is ideally 90 degrees in azimuth from the line station.


INCLINATION OF MAGNETIC FIELD
TOTAL FIELD
VERTICAL GRADIENT
1 nT / m
100 nT
90°
80°
70°
60°
40°
20°
0°
S
N
sensor elevation 50 m
200 m
50 m
10 m
MAGNETIC FIELD STRENGTH 50,000 nT
k = .001
k = .001
k = .005

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 anomaly is an indicator of the existence and position of a conductor. 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.

Conversely a negative total field anomaly is often seen over local resistivity highs. This is because the VLF field produces electrical currents which flow towards (or away from) the transmitter. These currents are gathered into a conductor and are taken from resistive bodies. The VLF system sees the currents gathered into the conductor as a total field high. It sees the relative absence of secondary currents in the resistor as a total field low.

As noted, VLF anomaly trends show a strong bias towards the VLF transmitter. Structure which is normal to this direction may have no associated VLF anomaly but may be seen as a break or interruption in VLF anomalies. If these structures are of particular interest, maps of the ortho station data may be worthwhile.

Conductive overburden will obscure VLF responses from bedrock sources and may produce low amplitude, broad anomalies which reflect variations in the resistivity of thickness of the overburden.

Extreme topographic relief will produce VLF anomalies which may bear no relationship to variations in electrical conductivity. Deep gullies which are too narrow to have been surveyed at a uniform sensor height often show up as VLF total field lows. Sharp ridges show up as total field highs.

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 vertical quadrature component is rarely presented. Experience has shown the total field to be more sensitive to bedrock conductors and less affected by variations in conductive overburden.

Apparent Resistivity/Conductivity Maps

Overburden and different types of bedrock may be modelled as a large area horizontal conductor of fixed thickness. A phasor diagram may be constructed, in the same fashion as for the vertical sheet, to convert the measured HEM in-phase and quadrature response to a depth and conductivity value for a horizontal layer. Traditionally if the thickness is large, an infinite half-space, the associated conductivity value is referred to as "apparent conductivity". We have generalized the use of the word "apparent" to include any model where the thickness of the layer is a fixed as opposed to a variable parameter. The units of apparent resisitivity are ohm-m and those of apparent conductivity are the inverse mhos/m or siemen/m. If the chosen model layer thickness is close to the true thickness of the conductor then the apparent conductivity will closely conform to the true value; however, if the thickness is inappropriate the apparent value may be considerably different from the true value.

The benefit of the apparent conductivity mapping is that it provides a simple robust method of converting the HEM in-phase and quadrature response to apparent change in ground conductivity.

A phasor diagram for several apparent resistivity models is presented. The general forms for the various thicknesses is very similar and also closely resembles the diagram for the vertical sheet. The diagrams also show the curves for apparent depth. As with the conductivity value the depth value is meaningful if the model thickness closely resembles the true conductive layer thickness. If the HEM response from a thin conducting layer is applied to a thick layer model the apparent conductivity and depth will be less than the true conductivity and depth.

APPENDIX II

ANOMALY LISTINGS

J9674

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS		
2	10010	A	/ 1	14.4	16.6	1.0	11	32	499178.2	7103274.5
2	10010	B	/ 0	11.0	19.3	0.5	7	30	499177.3	7103240.5
2	10010	C	/ 0	15.9	19.2	0.9	19	21	499182.4	7102922.5
2	10010	D	/ 0	15.1	21.6	0.7	24	13	499187.3	7102891.0
2	10020	A	/ 0	0.7	11.7	0.0	0	23	499310.0	7102502.0
2	10020	B	/ 0	13.5	20.2	0.7	11	27	499284.5	7103266.0
2	10030	A	/ 0	3.1	11.7	0.0	8	28	499444.6	7104623.5
2	10030	B	/ 1	16.7	19.5	1.0	15	26	499423.1	7103384.5
2	10030	C	/ 0	3.5	11.6	0.1	18	20	499446.9	7102514.0
2	10040	A	/ 0	10.5	15.8	0.6	10	31	499532.8	7103342.0
3	10051	A	/ 0	13.6	15.8	0.9	18	26	499624.8	7103382.0
3	10051	B	/ 0	10.8	17.0	0.5	11	29	499622.8	7103333.0
3	10051	C	/ 0	9.6	13.7	0.6	15	30	499614.7	7102513.0
3	10052	A	/ 0	3.0	9.5	0.1	16	25	499627.8	7099055.5
3	10060	A	/ 0	7.8	13.2	0.4	6	37	499700.3	7103336.5
3	10070	A	/ 0	7.3	7.9	0.8	14	42	499827.2	7103435.0
3	10070	B	/ 0	4.0	10.2	0.1	0	48	499826.4	7102721.5
3	10070	C	/ 0	4.7	20.7	0.0	1	27	499822.3	7101955.5
3	10070	D	/ 0	5.5	25.5	0.0	3	22	499825.6	7101851.0
3	10070	E	/ 0	2.2	8.7	0.0	0	45	499815.6	7101056.5
3	10070	F	/ 0	1.2	6.4	0.0	4	36	499839.4	7100463.0
3	10080	A	/ 0	3.5	7.2	0.2	0	52	499927.8	7101174.0
3	10080	B	/ 0	7.0	13.9	0.3	5	36	499924.5	7101807.5
3	10080	C	/ 0	4.8	10.7	0.2	1	42	499924.2	7102702.0
3	10080	D	/ 0	4.8	6.9	0.4	0	58	499912.6	7103297.0
3	10090	A	/ 0	4.0	5.4	0.4	47	15	500017.9	7104473.0
3	10090	B	/ 1	9.7	9.9	1.0	26	26	500018.8	7103732.5
3	10090	C	/ 1	20.8	17.4	1.8	14	29	500018.1	7103473.5
3	10090	D	/ 0	12.5	17.9	0.7	6	34	500019.8	7103351.0
3	10090	E	/ 0	7.9	10.9	0.6	0	51	500020.2	7103169.0
3	10090	F	/ 0	19.5	35.0	0.6	9	21	500034.6	7102033.5
3	10090	G	/ 0	23.5	36.9	0.8	8	23	500038.1	7101926.5
3	10090	H	/ 0	21.8	40.6	0.6	6	23	500039.8	7101815.0
3	10090	I	/ 0	19.6	37.0	0.6	7	23	500040.4	7101781.0
3	10090	J	/ 0	4.4	12.4	0.1	18	21	500027.9	7101149.5

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FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	AMPLITUDE (PPM) QUAD.	CONDUCTOR CTP MHOS	CONDUCTOR DEPTH MTRS	BIRD HEIGHT MTRS		
3	10090	K	/ 0	0.6	8.5	0.0	12	14	500007.5	7100114.5
3	10090	M	/ 0	1.4	10.2	0.0	18	12	500008.2	7100075.0
3	10090	N	/ 0	0.8	9.1	0.0	9	18	500016.8	7099517.0
3	10090	O	/ 0	4.6	10.9	0.2	32	10	500016.3	7099072.5
3	10100	A	/ 0	3.0	6.2	0.2	2	52	500106.1	7101153.5
3	10100	B	/ 0	10.5	16.9	0.5	6	34	500106.3	7101771.5
3	10100	C	/ 1	12.9	10.1	1.6	0	61	500088.6	7103453.0
3	10110	A	/ 2	20.7	14.8	2.2	6	40	500227.5	7103465.5
3	10110	B	/ 0	9.5	14.7	0.5	0	44	500222.6	7103079.5
3	10110	C	/ 0	6.8	13.0	0.3	12	30	500230.4	7102783.0
3	10110	D	/ 0	2.9	8.6	0.1	19	24	500246.8	7102465.5
3	10110	E	/ 0	9.3	16.5	0.4	18	22	500250.9	7102000.0
3	10110	F	/ 0	14.0	25.2	0.5	10	24	500212.9	7101764.0
3	10110	G	/ 0	1.4	7.5	0.0	0	45	500201.8	7100988.0
3	10120	A	/ 0	9.2	13.5	0.6	10	34	500330.1	7101742.5
3	10120	B	/ 0	12.1	17.7	0.6	13	28	500335.7	7103047.5
3	10120	C	/ 0	13.2	19.0	0.7	15	25	500332.7	7103147.5
3	10120	D	/ 1	21.4	18.1	1.7	5	38	500315.8	7103485.5
3	10130	A	/ 0	4.7	8.4	0.3	32	18	500405.0	7104462.0
3	10130	B	/ 0	8.3	10.0	0.7	28	23	500423.9	7103927.5
3	10130	C	/ 1	16.6	15.0	1.4	16	30	500433.3	7103434.0
3	10130	D	/ 0	8.4	8.7	0.9	14	40	500417.6	7102916.5
3	10130	E	/ 0	12.0	19.7	0.5	11	27	500412.5	7101788.5
3	10130	F	/ 0	10.5	19.4	0.4	5	32	500406.5	7100151.5
3	10130	G	/ 0	7.2	15.1	0.3	28	11	500413.2	7099413.0
3	10140	A	/ 0	4.3	18.5	0.0	2	27	500510.1	7099367.0
3	10140	B	/ 1	15.1	16.0	1.1	2	42	500529.5	7099947.5
3	10140	C	/ 0	8.5	12.7	0.5	12	33	500532.0	7101978.0
4	10160	A	/ 0	8.0	10.5	0.6	20	29	500625.6	7103647.5
4	10160	B	/ 0	1.2	8.0	0.0	2	31	500617.9	7102662.0
4	10160	C	/ 0	0.9	6.1	0.0	10	27	500612.7	7102610.0
4	10160	D	/ 0	7.8	15.1	0.3	11	29	500627.7	7101938.5
4	10160	E	/ 0	9.4	15.7	0.5	14	27	500592.2	7101704.0
4	10160	F	/ 0	4.4	11.7	0.1	2	39	500613.8	7101396.5
4	10160	G	/ 0	4.0	10.8	0.1	0	45	500607.2	7101317.0
4	10160	H	/ 1	23.4	22.3	1.5	11	28	500602.8	7099925.0
4	10160	J	/ 1	20.2	20.9	1.3	3	37	500598.4	7099812.0
4	10160	K	/ 0	4.7	29.9	0.0	4	18	500568.6	7099445.5
4	10160	M	/ 0	4.9	33.7	0.0	4	17	500566.6	7099413.5

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FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	AMPLITUDE (PPM) QUAD.	CONDUCTOR CTP MHOS	CONDUCTOR DEPTH MTRS	BIRD HEIGHT MTRS		
4	10160	N	/ 0	3.8	14.6	0.0	13	20	500575.2	7099093.5
4	10165	A	/ 0	3.2	12.3	0.0	0	36	500710.0	7099164.0
4	10165	B	/ 0	7.1	15.1	0.3	18	21	500704.8	7099365.5
4	10165	C	/ 0	12.9	17.0	0.8	20	22	500744.5	7100867.0
4	10165	D	/ 0	7.3	14.5	0.3	12	28	500748.2	7101272.0
4	10165	E	/ 0	7.4	17.0	0.2	0	42	500729.6	7101401.5
4	10165	F	/ 0	12.8	19.2	0.6	10	29	500735.3	7101769.0
4	10170	A	/ 0	15.1	21.2	0.7	19	19	500847.5	7103646.0
4	10170	B	/ 0	12.0	16.4	0.7	5	37	500850.0	7103357.0
4	10170	C	/ 0	6.5	13.4	0.3	16	25	500850.6	7103181.0
4	10170	D	/ 0	7.7	28.7	0.1	3	23	500856.4	7102580.5
4	10170	E	/ 0	5.3	18.3	0.1	12	19	500862.4	7102513.0
4	10170	F	/ 0	3.3	11.6	0.1	15	22	500863.5	7102452.5
4	10170	G	/ 1	19.8	24.9	1.0	14	22	500867.1	7101637.5
4	10170	H	/ 0	18.3	24.4	0.9	15	21	500872.3	7101232.0
4	10170	J	/ 1	29.5	29.0	1.6	21	15	500864.6	7101017.0
4	10170	K	/ 0	5.5	14.1	0.2	18	20	500837.3	7100381.5
4	10180	A	/ 0	1.8	1.5	0.6	31	72	500948.9	7099381.0
4	10180	B	/ 0	5.4	14.0	0.2	17	20	500924.4	7100525.0
4	10180	C	/ 0	5.3	11.0	0.2	16	28	500947.0	7100767.0
4	10180	D	/ 1	17.6	21.3	1.0	0	39	500941.8	7101521.0
4	10180	E	/ 0	6.2	24.3	0.1	9	18	500937.6	7102451.0
4	10180	F	/ 0	5.5	25.4	0.0	9	16	500936.4	7102588.0
4	10180	G	/ 0	7.2	8.1	0.8	6	50	500925.3	7103395.0
4	10190	A	/ 0	-0.3	2.6	0.0	0	24	500992.0	7104656.0
4	10190	B	/ 1	21.6	18.0	1.8	23	20	501042.6	7103763.0
4	10190	C	/ 1	18.9	22.2	1.1	2	36	501045.8	7103442.5
4	10190	D	/ 0	6.3	12.0	0.3	23	20	501026.1	7103114.0
4	10190	E	/ 0	3.3	14.7	0.0	8	24	501052.2	7102367.0
4	10190	F	/ 0	6.9	10.7	0.5	19	28	501001.1	7099461.0
4	10191	A	/ 0	2.9	7.0	0.1	20	29	501003.1	7099085.5
4	10200	A	/ 0	19.6	29.8	0.7	5	28	501130.8	7101237.5
4	10200	B	/ 1	28.2	36.0	1.1	0	32	501125.5	7101454.0
4	10200	C	/ 0	11.5	18.2	0.6	13	27	501110.2	7101965.5
4	10210	A	/ 0	12.9	16.0	0.8	28	15	501216.2	7104295.0
4	10210	B	/ 2	28.5	20.5	2.4	19	22	501216.1	7103864.5
4	10210	C	/ 2	47.3	40.1	2.3	7	26	501238.5	7103739.0
4	10210	D	/ 2	45.0	37.8	2.3	4	29	501244.2	7103693.5

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FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS		
4	10210	E	/ 0	19.9	27.2	0.9	10	25	501209.6	7103386.0
4	10210	F	/ 0	8.4	15.8	0.4	15	24	501238.7	7101927.0
4	10210	G	/ 0	23.8	33.9	0.9	0	34	501255.2	7101369.5
4	10210	H	/ 0	21.1	38.2	0.6	10	19	501258.5	7101071.0
4	10210	J	/ 0	21.5	38.8	0.6	9	20	501253.7	7101025.5
4	10220	A	/ 0	3.0	4.5	0.3	10	55	501305.9	7100837.5
4	10220	B	/ 0	17.2	23.5	0.8	6	31	501307.2	7101361.5
4	10220	C	/ 0	9.0	15.1	0.5	16	25	501292.4	7101956.5
4	10220	D	/ 2	40.9	27.6	2.9	0	37	501298.2	7103748.0
4	10220	E	/ 1	13.3	11.9	1.3	23	27	501301.9	7104210.5
4	10220	F	/ 1	9.8	9.3	1.1	26	28	501310.1	7104348.5
4	10230	A	/ 0	9.7	10.8	0.9	24	26	501436.1	7104383.5
4	10230	B	/ 2	18.4	12.1	2.3	15	34	501437.2	7104008.5
4	10230	C	/ 1	19.4	15.8	1.8	16	29	501441.7	7103830.5
4	10230	D	/ 1	20.6	22.2	1.2	14	25	501390.9	7103248.5
4	10230	E	/ 0	18.7	27.7	0.8	11	23	501377.2	7102896.5
4	10230	F	/ 0	10.5	19.0	0.4	2	35	501386.6	7101636.5
4	10230	G	/ 0	19.7	25.3	0.9	0	37	501364.0	7101465.5
4	10230	H	/ 0	23.1	31.1	0.9	6	27	501371.9	7101378.0
4	10230	J	/ 0	23.1	40.9	0.6	8	20	501403.6	7100908.5
4	10240	A	/ 0	19.2	38.0	0.5	13	15	501501.1	7101165.5
4	10240	B	/ 0	13.7	24.4	0.5	6	28	501533.0	7101800.5
4	10240	C	/ 1	8.9	6.4	1.5	22	40	501545.0	7104367.5
4	10250	A	/ 1	9.2	8.6	1.1	25	30	501625.9	7104462.0
4	10250	B	/ 0	13.3	20.7	0.6	24	13	501612.2	7103626.5
4	10250	C	/ 1	18.8	18.5	1.3	12	30	501612.5	7103147.0
4	10250	D	/ 0	19.7	29.9	0.8	12	22	501637.6	7102765.0
4	10250	E	/ 0	14.5	21.5	0.7	8	29	501634.1	7101659.5
4	10250	F	/ 0	12.2	26.1	0.4	16	16	501637.5	7101144.0
4	10260	A	/ 0	4.7	8.3	0.3	27	24	501747.8	7104712.0
4	10270	A	/ 0	6.8	12.8	0.3	27	16	501806.8	7104757.0
4	10270	B	/ 1	10.8	9.9	1.2	34	19	501817.3	7104257.5
4	10270	C	/ 0	13.6	22.3	0.6	17	20	501824.5	7103494.0
4	10270	D	/ 0	15.2	18.7	0.9	11	30	501825.1	7103385.5
4	10270	E	/ 0	14.9	20.6	0.8	26	13	501827.4	7103131.0
4	10270	F	/ 0	14.9	30.1	0.4	17	14	501826.1	7102795.5
4	10270	G	/ 0	13.4	24.3	0.5	26	8	501828.7	7102653.5
4	10270	H	/ 0	3.0	12.1	0.0	12	23	501796.4	7100357.0
4	10270	J	/ 0	0.8	9.9	0.0	11	15	501807.0	7100206.5

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FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS		
4	10280	A	/ 1	10.0	10.3	1.0	23	28	501887.5	7103074.0
4	10280	B	/ 0	13.8	17.3	0.9	3	39	501878.9	7103459.0
4	10280	C	/ 1	12.7	12.9	1.1	16	32	501879.5	7103527.0
4	10290	A	/ 0	14.9	19.7	0.8	14	25	502037.1	7103467.5
4	10290	B	/ 0	23.9	32.4	0.9	11	22	502035.3	7103225.0
4	10290	C	/ 1	24.0	28.1	1.2	22	14	502033.4	7103170.5
4	10290	D	/ 0	14.0	24.3	0.5	18	16	502018.6	7102921.5
4	10290	E	/ 0	15.9	31.7	0.5	16	15	502008.6	7102826.5
4	10300	A	/ 0	8.0	21.7	0.2	18	13	502125.3	7102620.0
4	10300	B	/ 1	16.3	13.4	1.6	19	28	502139.7	7103179.0
5	10310	A	/ 0	2.4	5.1	0.1	35	22	502216.1	7104774.5
5	10310	B	/ 1	19.5	15.8	1.8	0	47	502191.0	7103179.0
5	10310	C	/ 0	26.6	40.2	0.9	7	23	502199.9	7102976.5
5	10310	D	/ 0	24.8	35.7	0.9	16	16	502207.0	7102906.0
5	10311	A	/ 0	10.5	24.7	0.3	18	14	502197.1	7102748.0
5	10320	A	/ 1	13.7	13.9	1.1	13	34	502318.2	7103344.0
5	10330	A	/ 0	6.7	27.9	0.1	0	25	502436.1	7104569.0
5	10330	B	/ 0	6.4	25.0	0.1	2	25	502437.3	7104512.5
5	10330	C	/ 0	9.7	16.3	0.5	10	30	502439.1	7103203.0
5	10330	D	/ 0	10.1	19.1	0.4	18	19	502450.6	7102948.5
5	10340	A	/ 0	5.8	48.1	0.0	0	18	502536.3	7104623.0
5	10340	B	/ 0	9.0	68.8	0.0	0	17	502539.5	7104556.5
5	10340	C	/ 0	10.4	25.1	0.3	13	18	502537.9	7103132.5
5	10340	D	/ 0	10.5	27.0	0.2	19	11	502542.9	7103004.0
5	10340	E	/ 0	3.6	17.7	0.0	8	21	502551.4	7102651.5
5	10380	A	/ 0	3.5	15.0	0.0	0	33	502915.5	7099987.0
5	10380	B	/ 0	5.5	16.6	0.1	10	24	502924.9	7102670.0
5	10390	A	/ 0	-0.5	13.9	0.0	0	18	503015.3	7103079.5
5	10390	B	/ 0	4.4	17.3	0.1	0	33	503011.0	7102800.0
5	10390	C	/ 0	5.3	12.2	0.2	13	28	503013.6	7101830.0
5	10390	D	/ 0	8.2	14.8	0.4	15	26	503025.9	7101538.5
5	10390	E	/ 0	11.1	26.2	0.3	8	23	503035.1	7101292.0
5	10390	F	/ 0	10.3	26.1	0.3	13	18	503034.4	7101252.5
5	10400	A	/ 0	1.3	4.6	0.0	34	16	503110.9	7100632.5

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FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS		
5	10400	B	/ 0	9.8	17.1	0.4	0	44	503117.8	7101494.0
5	10400	C	/ 0	11.8	20.7	0.5	6	30	503112.8	7101566.0
5	10400	D	/ 0	6.0	11.7	0.3	7	37	503106.3	7102689.5
5	10400	E	/ 0	4.6	14.4	0.1	1	34	503102.2	7102814.5
5	10400	F	/ 0	3.2	12.4	0.0	5	30	503099.3	7102932.0
5	10400	G	/ 0	6.3	10.1	0.4	12	35	503108.6	7104378.0
5	10410	A	/ 0	3.0	15.0	0.0	6	24	503218.3	7102832.5
5	10410	B	/ 0	4.4	23.1	0.0	6	20	503223.0	7102635.5
5	10410	C	/ 0	5.8	13.0	0.2	15	25	503230.0	7101240.0
5	10410	D	/ 0	0.2	6.7	0.0	2	21	503195.0	7100215.5
5	10420	A	/ 1	11.6	10.9	1.2	4	47	503309.6	7101564.5
5	10420	B	/ 0	10.3	15.1	0.6	15	28	503322.0	7101848.0
5	10420	C	/ 0	2.4	9.0	0.0	8	32	503331.5	7102796.5
5	10430	A	/ 0	5.0	13.0	0.2	23	15	503426.9	7104920.5
5	10430	B	/ 0	1.3	12.7	0.0	1	24	503421.6	7103409.5
5	10430	C	/ 0	2.1	14.5	0.0	8	19	503433.6	7103324.0
5	10430	D	/ 0	1.7	11.5	0.0	8	21	503430.4	7102802.0
5	10430	E	/ 0	1.6	18.5	0.0	3	17	503427.1	7102705.5
5	10430	F	/ 1	14.9	15.4	1.1	22	23	503412.4	7101622.5
5	10430	G	/ 1	15.6	18.2	1.0	5	36	503409.0	7101444.5
5	10430	H	/ 0	2.1	8.9	0.0	13	25	503417.2	7100102.0
5	10430	J	/ 0	2.4	9.0	0.0	16	23	503426.6	7100046.0
5	10440	A	/ 0	8.3	10.4	0.7	0	60	503557.5	7101656.0
5	10440	B	/ 1	10.7	10.3	1.1	1	51	503564.3	7102029.5
5	10450	A	/ 0	8.7	16.2	0.4	0	43	503632.0	7104387.0
5	10450	B	/ 0	8.5	14.7	0.4	9	32	503628.3	7104322.0
5	10450	C	/ 0	3.8	9.8	0.1	20	23	503633.1	7103823.5
5	10450	D	/ 0	2.5	13.4	0.0	6	25	503642.5	7103491.0
5	10450	E	/ 0	1.9	14.7	0.0	1	25	503644.4	7103349.0
5	10450	F	/ 0	28.3	44.4	0.8	7	21	503648.3	7101865.0
5	10450	G	/ 0	23.9	42.4	0.7	10	18	503649.9	7101757.5
5	10450	H	/ 0	2.8	9.1	0.1	23	19	503620.7	7101149.0
5	10460	A	/ 0	12.5	15.3	0.8	7	37	503740.0	7101836.5
5	10460	B	/ 0	12.8	23.3	0.5	11	23	503751.2	7104337.0
5	10460	C	/ 0	9.6	13.2	0.6	7	38	503745.1	7104545.5
5	10470	A	/ 0	13.6	19.3	0.7	0	39	503869.5	7104366.0
5	10470	B	/ 0	3.1	13.0	0.0	5	28	503834.4	7103557.5
5	10470	C	/ 0	2.9	13.9	0.0	7	24	503826.6	7103194.0

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FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS		
5	10470	D	/ 0	10.2	12.3	0.8	3	44	503808.3	7101752.0
5	10470	E	/ 0	13.0	15.2	0.9	9	35	503813.7	7101667.5
5	10480	A	/ 0	2.1	3.2	0.2	21	51	503909.0	7101082.5
5	10480	B	/ 1	8.3	7.1	1.2	5	55	503933.9	7101799.5
5	10480	C	/ 0	2.0	8.8	0.0	5	33	503904.5	7103162.0
5	10480	D	/ 0	15.7	21.9	0.8	16	22	503896.2	7104244.5
5	10490	A	/ 0	7.1	13.4	0.3	14	28	503997.1	7104842.5
5	10490	B	/ 0	18.2	26.1	0.8	11	24	504031.6	7103979.0
5	10490	C	/ 0	4.2	18.4	0.0	8	21	503994.8	7103053.0
5	10490	D	/ 1	12.7	13.3	1.1	6	41	504014.7	7101659.5
5	10490	E	/ 0	13.5	16.5	0.9	5	38	504015.7	7101552.0
5	10500	A	/ 0	12.7	15.0	0.9	7	38	504092.5	7101686.5
5	10500	B	/ 1	17.5	16.2	1.4	0	46	504098.3	7104365.0
6	10510	A	/ 1	16.2	13.4	1.6	4	43	504219.8	7104088.5
6	10510	B	/ 0	7.5	12.5	0.4	27	17	504230.7	7101312.0
6	10510	C	/ 0	3.4	22.5	0.0	5	19	504236.4	7100671.5
6	10510	D	/ 0	2.7	11.1	0.0	23	13	504241.7	7100608.0
6	10520	A	/ 0	-1.5	6.9	0.0	0	23	504306.8	7102795.0
6	10520	B	/ 1	11.3	9.2	1.4	8	47	504306.4	7104294.5
6	10530	A	/ 0	4.7	11.2	0.2	16	26	504480.2	7104783.5
6	10530	B	/ 0	4.5	11.2	0.2	13	28	504449.1	7104591.0
6	10530	C	/ 0	0.5	6.7	0.0	0	36	504438.3	7102765.5
6	10540	A	/ 0	7.5	8.8	0.7	50	4	504552.2	7102392.5
6	10540	B	/ 0	9.7	12.4	0.7	46	1	504555.1	7102419.5
6	10540	C	/ 0	-0.3	9.8	0.0	0	23	504542.0	7102705.5
6	10540	D	/ 0	6.4	12.2	0.3	12	31	504560.4	7103194.5
6	10540	E	/ 0	7.8	23.4	0.2	9	21	504553.9	7103571.5
6	10540	F	/ 0	6.1	11.4	0.3	23	22	504543.7	7104089.5
6	10540	G	/ 0	10.7	14.5	0.7	20	24	504541.9	7104348.0
6	10550	A	/ 0	8.3	17.0	0.3	16	22	504653.3	7104334.5
6	10550	B	/ 0	9.3	20.4	0.3	16	18	504649.9	7104080.0
6	10550	C	/ 0	7.7	20.1	0.2	13	21	504644.3	7103500.5
6	10551	A	/ 0	1.3	10.3	0.0	0	31	504653.8	7102667.5
6	10551	B	/ 0	10.4	18.0	0.5	16	22	504620.8	7101625.0
6	10560	A	/ 0	1.1	7.7	0.0	6	29	504713.9	7100593.5

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FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS		
6	10560	B	/ 0	14.2	19.5	0.7	10	30	504731.8	7101476.0
6	10560	C	/ 0	12.0	21.4	0.5	13	23	504753.7	7103514.5
6	10560	D	/ 0	8.1	19.1	0.2	15	20	504723.0	7103918.0
6	10560	E	/ 0	10.9	16.5	0.6	1	39	504736.3	7104252.5
6	10560	F	/ 0	11.0	16.7	0.6	9	31	504734.9	7104312.5
6	10560	G	/ 0	5.2	8.6	0.3	22	28	504733.6	7104573.5
6	10560	H	/ 0	5.6	10.3	0.3	23	23	504749.7	7104895.5
6	10570	A	/ 0	18.4	27.6	0.7	20	14	504804.0	7104322.0
6	10570	B	/ 0	1.4	14.2	0.0	1	23	504848.0	7102928.5
6	10570	C	/ 0	2.6	13.6	0.0	22	8	504840.9	7102622.0
6	10570	D	/ 0	0.9	12.9	0.0	7	15	504849.3	7102522.5
6	10570	E	/ 0	-0.8	19.4	0.0	0	14	504840.5	7102421.5
6	10570	F	/ 0	16.5	35.3	0.4	6	22	504840.5	7101795.5
6	10570	G	/ 0	15.3	22.8	0.7	13	23	504843.4	7101511.5
6	10570	H	/ 0	1.0	7.7	0.0	0	34	504835.5	7100537.5
7	10580	A	/ 0	17.5	26.3	0.7	4	31	504941.9	7101384.0
7	10580	B	/ 0	18.6	30.2	0.7	6	26	504920.5	7101764.0
7	10580	C	/ 0	0.6	19.4	0.0	0	29	504905.8	7102288.0
7	10580	D	/ 0	16.5	31.8	0.5	9	22	504925.1	7104126.0
7	10590	A	/ 0	17.8	24.3	0.8	1	35	505048.2	7104873.0
7	10590	B	/ 0	12.7	21.1	0.5	11	26	505020.1	7104477.5
7	10590	C	/ 0	15.5	25.3	0.6	6	29	505017.8	7104200.0
7	10590	D	/ 0	16.5	29.4	0.6	0	32	505030.1	7101826.0
7	10590	E	/ 0	22.7	34.1	0.8	8	24	505033.3	7101741.5
7	10590	F	/ 0	23.4	31.8	0.9	11	22	505019.9	7101458.0
7	10590	G	/ 0	6.8	25.3	0.1	5	22	505040.2	7100537.0
7	10600	A	/ 0	2.5	11.1	0.0	6	29	505097.8	7100526.0
7	10600	B	/ 1	22.0	24.5	1.2	13	24	505094.4	7101410.0
7	10600	C	/ 1	20.5	22.1	1.2	9	30	505092.8	7101542.0
7	10600	D	/ 0	14.9	22.8	0.7	4	33	505129.7	7101887.5
7	10600	E	/ 0	15.0	18.0	0.9	3	39	505128.6	7104369.0
1	10610	A	/ 0	3.3	8.3	0.1	2	44	505247.9	7100766.0
1	10610	B	/ 0	12.2	17.8	0.6	10	30	505234.7	7101003.5
1	10610	C	/ 0	13.7	19.2	0.7	17	22	505230.6	7101046.5
1	10610	D	/ 1	22.1	28.3	1.0	10	25	505230.6	7101493.0
1	10610	E	/ 0	16.2	24.7	0.7	12	24	505231.8	7101776.5
1	10610	F	/ 0	14.4	25.2	0.5	12	22	505232.4	7101889.5
1	10610	G	/ 0	11.5	15.5	0.7	10	33	505246.5	7104527.5
1	10610	H	/ 0	10.6	14.1	0.7	0	45	505242.0	7104900.5
1	10620	A	/ 0	9.4	18.0	0.4	4	34	505319.1	7104856.0

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FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS		
1	10620	B	/ 0	12.5	19.6	0.6	1	37	505308.7	7104406.5
1	10620	C	/ 0	11.8	19.3	0.5	1	37	505308.8	7104357.5
1	10620	D	/ 0	10.7	20.6	0.4	11	25	505324.6	7101788.5
1	10620	E	/ 0	17.6	24.4	0.8	11	25	505356.5	7101515.5
1	10620	F	/ 0	15.6	22.5	0.7	12	25	505360.7	7101458.5
1	10620	G	/ 0	4.1	11.8	0.1	11	28	505364.9	7100865.0
1	10630	A	/ 0	1.0	7.3	0.0	0	34	505399.6	7100943.5
1	10630	B	/ 0	12.4	16.9	0.7	13	29	505390.6	7101492.0
1	10630	C	/ 0	9.7	17.6	0.4	13	26	505402.5	7101756.0
1	10630	D	/ 0	0.2	10.4	0.0	0	22	505446.6	7103862.5
1	10630	E	/ 0	9.9	17.4	0.4	0	42	505413.4	7104817.0
1	10640	A	/ 0	8.0	15.6	0.3	7	33	505513.3	7104733.0
1	10640	B	/ 0	2.3	20.2	0.0	0	28	505529.8	7102322.0
1	10640	C	/ 0	7.6	16.4	0.3	11	27	505530.9	7101623.5
1	10640	D	/ 0	5.5	14.8	0.2	14	23	505532.6	7101354.5
1	10640	E	/ 0	4.9	17.7	0.1	7	24	505537.1	7100790.5
1	10650	A	/ 0	8.8	15.5	0.4	7	33	505642.3	7100759.0
1	10650	B	/ 0	5.1	11.0	0.2	14	30	505610.2	7101289.5
1	10650	C	/ 0	3.4	19.3	0.0	0	30	505628.4	7102339.0
1	10650	D	/ 0	2.5	14.4	0.0	4	25	505620.8	7104106.5
1	10660	A	/ 0	14.8	27.8	0.5	6	26	505699.9	7104643.5
1	10660	B	/ 0	17.8	30.2	0.6	2	30	505709.3	7104484.0
1	10660	C	/ 0	3.7	16.4	0.0	7	23	505718.7	7103890.5
1	10660	D	/ 0	3.6	20.4	0.0	0	32	505763.9	7102306.5
1	10660	E	/ 0	8.2	15.4	0.4	13	27	505739.9	7101416.0
1	10660	F	/ 0	17.1	22.2	0.9	0	39	505748.1	7100778.0
1	10660	G	/ 0	17.3	28.6	0.6	2	31	505749.7	7100397.0
1	10660	H	/ 0	7.3	14.9	0.3	8	31	505734.4	7100222.5
1	10670	A	/ 1	21.7	26.0	1.1	20	16	505816.7	7100767.0
1	10670	B	/ 0	8.6	29.1	0.1	3	24	505837.8	7102084.5
1	10670	C	/ 0	7.0	16.2	0.2	17	20	505820.9	7104264.5
1	10670	D	/ 0	16.2	29.0	0.5	0	32	505828.8	7104602.5
1	10680	A	/ 0	23.6	35.3	0.8	7	24	505935.0	7104504.5
1	10680	B	/ 0	4.7	9.7	0.2	18	27	505941.7	7103934.5
1	10680	C	/ 0	2.7	11.2	0.0	10	25	505962.8	7102961.5
1	10680	D	/ 0	7.6	24.4	0.1	7	22	505960.3	7102490.5
1	10680	E	/ 0	17.9	25.5	0.8	17	18	505953.6	7101595.0
1	10680	F	/ 0	13.5	16.1	0.9	21	22	505935.4	7101440.5
1	10680	G	/ 0	14.8	21.1	0.7	7	31	505957.6	7101009.0

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FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS		
1	10680	H	/ 0	15.7	23.8	0.7	10	26	505923.2	7100375.5
1	10680	J	/ 0	13.1	20.1	0.6	16	23	505923.4	7100335.0
1	10690	A	/ 0	6.3	8.3	0.6	32	22	506054.1	7100606.5
1	10690	B	/ 0	16.8	22.1	0.9	15	23	506046.5	7101013.5
1	10690	C	/ 0	15.7	21.8	0.8	6	32	506020.7	7101828.0
1	10690	D	/ 0	15.6	20.9	0.8	0	40	506017.0	7102007.5
1	10690	E	/ 0	1.9	13.7	0.0	10	18	506041.4	7102948.5
1	10690	F	/ 0	2.5	7.5	0.1	18	27	506053.4	7103955.0
1	10690	G	/ 1	18.4	21.5	1.0	0	44	506054.7	7104430.5
1	10690	H	/ 1	19.6	20.3	1.3	5	36	506050.9	7104474.5
1	10700	A	/ 0	19.9	25.7	0.9	11	25	506142.0	7104402.5
1	10700	B	/ 1	18.9	22.5	1.0	4	34	506133.4	7104322.5
1	10700	C	/ 0	7.4	10.4	0.5	24	25	506131.8	7104034.0
1	10700	D	/ 0	4.4	12.0	0.1	16	23	506110.4	7102968.5
1	10700	E	/ 0	21.8	29.6	0.9	0	36	506133.7	7101893.0
1	10700	F	/ 1	24.4	27.8	1.2	3	32	506142.2	7101078.0
1	10700	G	/ 0	15.9	25.3	0.6	12	23	506137.1	7100953.5
1	10700	H	/ 0	9.6	13.9	0.6	29	15	506114.9	7100356.5
1	10710	A	/ 0	9.1	13.1	0.6	15	30	506186.9	7100301.5
1	10710	B	/ 0	7.4	9.5	0.6	28	23	506215.8	7100840.0
1	10710	C	/ 1	17.1	14.9	1.5	19	27	506221.6	7100970.0
1	10710	D	/ 1	19.4	17.5	1.5	11	32	506221.3	7101025.5
1	10710	E	/ 1	15.8	18.3	1.0	12	30	506205.8	7101555.0
1	10710	F	/ 0	18.6	27.3	0.8	0	36	506197.3	7101752.5
1	10710	G	/ 1	23.5	30.9	1.0	0	37	506182.2	7101848.0
1	10710	H	/ 0	24.3	37.4	0.8	0	35	506182.4	7101889.5
1	10710	J	/ 0	9.2	24.1	0.2	14	17	506216.7	7102414.5
1	10710	K	/ 0	3.7	13.6	0.1	8	27	506220.4	7102882.0
1	10710	M	/ 0	8.7	16.0	0.4	1	38	506237.5	7103763.0
1	10710	N	/ 1	14.4	14.5	1.2	4	42	506221.6	7104334.5
1	10720	A	/ 0	11.6	13.6	0.9	15	31	506310.0	7104372.5
1	10720	B	/ 0	9.1	13.9	0.5	13	30	506319.0	7103984.5
1	10720	C	/ 0	9.0	23.5	0.2	14	17	506314.2	7103511.0
1	10720	D	/ 0	5.0	8.7	0.3	32	18	506317.0	7103207.0
1	10720	E	/ 0	4.9	5.1	0.7	38	28	506336.4	7102515.0
1	10720	F	/ 1	24.9	29.5	1.2	4	31	506326.2	7101612.5
1	10720	G	/ 0	22.5	30.3	0.9	5	28	506327.5	7101561.5
1	10720	H	/ 1	27.9	30.8	1.3	12	22	506331.4	7101380.5
1	10720	J	/ 1	43.8	56.7	1.3	4	23	506336.0	7101252.5
1	10720	K	/ 1	33.1	32.5	1.7	0	42	506339.8	7101101.0
1	10720	M	/ 1	30.1	28.9	1.7	7	29	506343.3	7101061.5

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FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS		
1	10720	N	/ 0	21.1	32.0	0.8	3	29	506308.3	7100147.0
1	10720	O	/ 0	20.3	39.6	0.5	3	25	506307.8	7100049.0
1	10730	A	/ 0	15.7	22.9	0.7	5	31	506401.8	7100026.5
1	10730	B	/ 0	16.2	20.2	0.9	2	37	506416.9	7100106.0
1	10730	C	/ 1	19.8	23.8	1.0	2	35	506420.9	7100363.0
1	10730	D	/ 1	18.0	22.0	1.0	6	32	506426.6	7100421.0
1	10730	E	/ 1	17.1	12.7	1.9	18	31	506441.3	7100577.5
1	10730	F	/ 2	22.3	14.9	2.4	18	27	506410.0	7101031.0
1	10730	G	/ 2	32.4	22.5	2.6	0	56	506415.5	7101191.0
1	10730	H	/ 2	53.2	47.2	2.2	0	39	506416.0	7101300.5
1	10730	J	/ 2	50.2	45.4	2.1	0	36	506412.2	7101331.0
1	10730	K	/ 1	15.6	14.3	1.4	14	32	506396.9	7101596.5
1	10730	M	/ 0	5.5	11.1	0.3	17	27	506460.6	7102909.5
1	10730	N	/ 0	11.4	15.6	0.7	1	41	506411.3	7104167.0
1	10740	A	/ 1	11.7	12.4	1.0	15	33	506516.2	7104251.0
1	10740	B	/ 0	8.9	19.0	0.3	16	19	506526.4	7103636.0
1	10740	C	/ 0	6.8	17.5	0.2	19	16	506526.8	7102608.5
1	10740	D	/ 1	14.5	14.3	1.2	17	29	506519.8	7101667.0
1	10740	E	/ 2	104.8	80.7	3.4	7	18	506524.3	7101323.5
1	10740	F	/ 2	110.6	80.2	3.7	7	19	506525.0	7101284.5
1	10740	G	/ 2	85.4	61.7	3.4	5	22	506527.0	7101239.5
1	10740	H	/ 2	51.9	36.3	3.0	0	36	506542.5	7101094.0
1	10740	J	/ 2	38.0	20.8	3.8	4	36	506522.1	7100873.5
1	10740	K	/ 2	19.9	13.0	2.4	11	36	506502.9	7100658.0
1	10740	M	/ 1	52.8	69.1	1.3	5	20	506513.1	7099901.0
1	10750	A	/ 3	52.8	28.8	4.2	7	29	506609.8	7101073.0
1	10750	B	/ 2	42.2	29.8	2.8	3	33	506596.6	7101306.5
1	10750	C	/ 2	36.2	23.1	3.0	15	24	506595.8	7101379.0
1	10750	D	/ 0	9.5	14.8	0.5	14	28	506614.4	7104321.5
1	10760	A	/ 0	6.1	10.2	0.4	12	36	506714.5	7104411.5
1	10760	B	/ 0	12.1	21.6	0.5	0	39	506725.8	7103933.5
1	10760	C	/ 0	4.2	14.5	0.1	9	25	506733.0	7103724.0
1	10760	D	/ 0	6.1	12.5	0.3	19	23	506722.4	7103093.5
1	10760	E	/ 0	12.0	29.7	0.3	8	22	506709.2	7102685.5
1	10760	F	/ 1	23.6	19.2	1.9	20	21	506742.2	7101536.0
1	10760	G	/ 1	31.4	32.1	1.5	17	18	506747.0	7101452.5
1	10760	H	/ 1	25.1	25.3	1.5	0	42	506734.1	7101236.0
1	10760	J	/ 2	25.3	17.8	2.3	1	42	506734.0	7101151.5
1	10760	K	/ 2	22.7	16.1	2.3	10	35	506737.6	7101104.5
1	10760	M	/ 0	11.4	17.9	0.6	17	23	506710.7	7100652.0
1	10760	N	/ 1	22.9	26.2	1.2	4	33	506715.4	7100135.5

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.

J9674

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS		
1	10770	A	/ 0	7.1	11.0	0.5	11	36	506858.8	7100494.5
1	10770	B	/ 0	5.9	7.0	0.6	19	39	506840.8	7100747.5
1	10770	C	/ 2	21.2	15.3	2.1	1	44	506843.5	7101447.5
1	10770	D	/ 2	19.4	12.5	2.4	11	38	506836.9	7101507.5
1	10770	E	/ 0	6.8	13.6	0.3	18	23	506834.7	7102640.5
1	10770	F	/ 0	7.2	15.0	0.3	14	25	506837.4	7102712.0
1	10770	G	/ 0	8.0	13.3	0.4	0	47	506846.2	7103977.5

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.

APPENDIX III

PERSONNEL

FIELD

Flown	September 10 to 13, 1996
Pilot(s)	D. Rokosh
Operator(s)	J. Douglas

OFFICE

Processing	Doug Oneschuk George McDonald
Report	R. W. Woolham

APPENDIX IV

CERTIFICATE OF QUALIFICATION

I, Roderick W. Woolham of the town of Pickering, Province of Ontario, do hereby certify that:-

1. I am a geophysicist and reside at 1463 Fieldlight Blvd., Pickering, Ontario, L1V 2S3

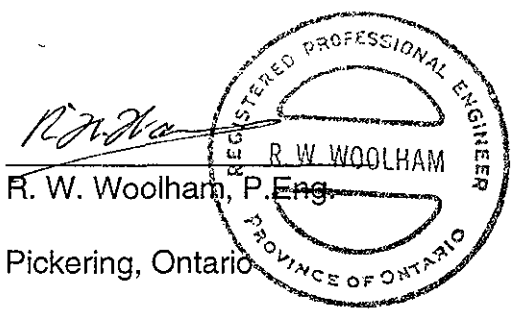
2. I graduated from the University of Toronto in 1961 with a degree of Bachelor of Applied Science, Engineering Physics, Geophysics Option. I have been practising my profession since graduation.

3. I am a member in good standing of the following organizations: Professional Engineers Ontario (Mining Branch); Society of Exploration Geophysicists; South African Geophysical Association; Prospectors and Developers Association of Canada.

4. I have not received, nor do I expect to receive, any interest, directly or indirectly, in the properties or securities of Madrona Mining Limited or any affiliate.

5. The statements contained in this report and the conclusions reached are based upon evaluation and review of maps and information supplied by Aerodat.

6. I consent to the use of this report in submissions for assessment credits or similar regulatory requirements.



R. W. Woolham, P.Eng.

Pickering, Ontario

October 23,1996

aerodat

AERODAT INC.

Tel: (905) 671-2446 Fax: (905) 671-8160

3883 Nashua Dr., Mississauga, Ontario, Canada L4V 1R3

Invoice No: **28-9674-0026**
Date: **October 28, 1996**

Madrona Mining Limited
Exploration Office
1125, 333 - 11th Ave. S.W.
Calgary, Alberta
T2R 1L9

In Account With:

Aerodat Inc.
3883 Nashua Drive
Mississauga, Ontario
Canada L4V 1R3

Attention: **Dr. Michael Marchand**
Director

Re: Helicopterborne Five-Frequency Electromagnetic, High Sensitivity Magnetic and Radiometric Survey, NTS Ref. #116C/2, Central West Yukon

Pursuant to Paragraph 8.3 (Upon Delivery of Final Data) of the Agreement between Madrona Mining Limited and Aerodat Inc. dated July 25, 1996:

Mobilization / demobilization	$ 7,000.00
Survey Charges 442 line kilometres @ $90.00/km	39,780.00
Total Cost of Survey	$46,780.00
Less Invoice 27-9674-0453	13,450.00
Less Invoice 28-9674-0004	26,900.00
Amount due	$ 6,430.00
7% GST (R100067024)	450.10
TOTAL AMOUNT DUE	**$ 6,880.10**

500000 E 502000 E 504000 E 506000 E

7102000 N 7100000 N

UNITED STATES OF AMERICA

CANADA

Poker Creek

R1 R2 R3 R4 R5

E1 E2 E3 E4 E5 E6 E7

M1 M2 M3

3500

4000

3100

126A

127

4992000 7099000

501000 7100000

506850 7100000

FLIGHT PATH AND PLANIMETERY

Navigation and flight path recovery was conducted using a Global Positioning System (GPS) satellite navigation system and has been differentially corrected.

Lines were flown at an azimuth of 0-180° with an average line spacing of 100 m.

Average aircraft-terrain clearance of 87 m was monitored by radar altimeter.

Planimetric information was derived from enlarged 1:50 000 N.T.S. map 116C/2. Roads are indicated by dashed lines and creeks are indicated by solid lines and

Square: Grid North
Star: True North
Arrow: Magnetic North

Angles presented are approximate mean deviations for centre of NTS sheet 1116C/2. Use diagram for reference only.

Grid North - True North: 0° 13' W
Grid North - Magnetic North: 29° 30' E
Annual change: decreasing 10.3' from 1991

INTERPRETATION

- High amplitude magnetic zone
- Other magnetic trend
- Non-magnetic below background zone
- Conductive zone
- Conductive trend
- Anomalous potassium channel response with minor thorium
- Anomalous potassium channel response with anomalous thorium channel component
- Fault/contact structure interpreted from magnetics
- M1 — Anomalous magnetic response designated for investigation
- E1 — Anomalous conductive response designated for investigation
- R1 — Anomalous radiometric response designated for investigation

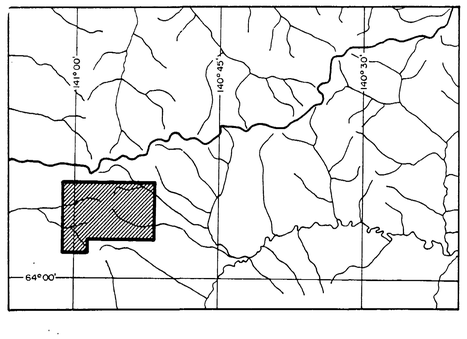
EM ANOMALIES

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Calculation of conductance is based on the response of the 4600 Hz coaxial data, and forms the basis for anomaly classification.

Letter codes are used to identify individual anomalies on a line, and the inphase amplitude of the 4600 Hz response is annotated opposite.

- A — 0 - 1 mhos
- B — 1 - 2 mhos
- C — 2 - 4 mhos
- D — 4 - 8 mhos
- E — 8 - 16 mhos
- F — 16 - 32 mhos
- G — > 32 mhos
- M — Magnetite



MADRONA MINING LIMITED

INTERPRETATION 093559

POKER CREEK PROJECT

Central West Yukon

(1)

SCALE 1:10 000

250 0 100 200 500 1000 metres

aerodat
AERODAT INC.

Date Flown: Sept, 1996
NTS Map Ref: 116-C/2
Project Ref: J9674-2

(1)

500000 E

502000 E

504000 E

506000 E

7104000 N

7102000 N

7100000 N

UNITED STATES OF AMERICA

CANADA

Poker Creek

3500

3500

4400

3100

4721

4237

126A

127

506850.
7105000

506850.
7100000

501800.
7100000

501000.
7099000

499200.
7099000

80010

80040

80070

80060

80050

Angles presented are approximate mean deviations for centre of NTS sheet 116C/2. Use diagram for reference only.

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Planimetric information was derived from enlarged 1:50 000 N.T.S. map 116C/2. Roads are indicated by dashed lines and creeks are indicated by solid lines and

TOTAL FIELD MAGNETICS

Total field magnetic intensity contour data, measured by a cesium high sensitivity magnetometer at an average sensor elevation of 72 m, and corrected for diurnal variation.

Map contours are in nanoTeslas, and are multiples of those listed below:

- 1 nT
- 5 nT
- 20 nT
- 100 nT
- 500 nT

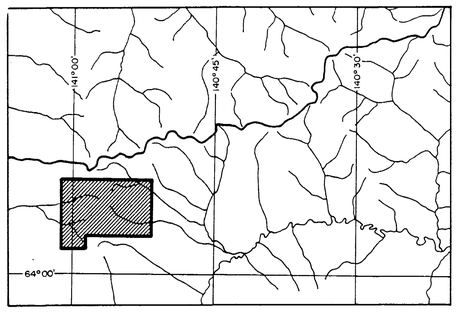
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Calculation of conductance is based on the response of the 4600 Hz coaxial data, and forms the basis for anomaly classification.

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- 1 - 2 mhos
- 2 - 4 mhos
- 4 - 8 mhos
- 8 - 16 mhos
- 16 - 32 mhos
- > 32 mhos
- M Magnetite



MADRONA MINING LIMITED

TOTAL FIELD MAGNETICS

00355

POKER CREEK PROJECT

Central West Yukon

2

SCALE 1:10 000

250 0 100 200 500 1000 metres

aerodat

AERODAT INC.

Date Flown: Sept, 1996

NTS Map Ref: 116-C/2

Project Ref: J9674-3

500000 E | 502000 E | 504000 E | 506000 E

7104000 N | 7102000 N | 7100000 N

506850 E
7105000 N

506850 E
7100000 N

126A

127

UNITED STATES OF AMERICA

CANADA

3500

3100

4700

4000

4711

4231

FLIGHT PATH AND PLANIMETERY

Navigation and flight path recovery was conducted using a Global Positioning System (GPS) satellite navigation system and has been differentially corrected.

Lines were flown at an azimuth of 0-180° with an average line spacing of 100 m.

Average aircraft-terrain clearance of 87 m was monitored by radar altimeter.

Planimetric information was derived from enlarged 1:50 000 N.T.S. map 116C/2. Roads are indicated by dashed lines and creeks are indicated by solid lines and

VERTICAL GRADIENT

Vertical magnetic gradient contour data, calculated from the gridded total field magnetics data by an FFT algorithm.

Map contours are in nanoTeslas/metre, and are multiples of those listed below:

- 0.01 nT/m
- 0.05 nT/m
- 0.2 nT/m
- 1 nT/m
- 5 nT/m

EM ANOMALIES

EM anomalies selected by computer algorithm and manually confirmed. Selection is based on the response correlation to theoretical sources such as a steeply dipping conductor.

Calculation of conductance is based on the response of the 4600 Hz coaxial data, and forms the basis for anomaly classification.

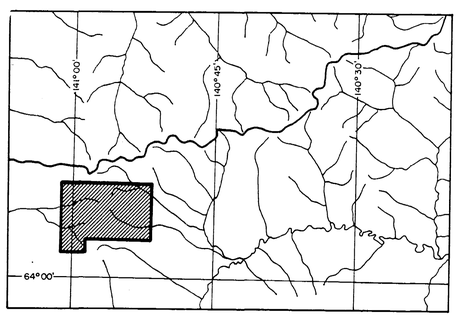
Letter codes are used to identify individual anomalies on a line, and the inphase amplitude of the 4600 Hz response is annotated opposite.

- A 0 - 1 mhos
- B 1 - 2 mhos
- C 2 - 4 mhos
- D 4 - 8 mhos
- E 8 - 16 mhos
- F 16 - 32 mhos
- G > 32 mhos
- M Magnetite

Square: Grid North
Star: True North
Arrow: Magnetic North

Angles presented are approximate mean deviations for centre of NTS sheet 116C/2. Use diagram for reference only.

Grid North - True North: 0° 13' W
Grid North - Magnetic North: 29° 30' E
Annual change: decreasing 10.3' from 1991



MADRONA MINING LIMITED

VERTICAL MAGNETIC GRADIENT

POKER CREEK PROJECT

Central West Yukon

093559

(3)

SCALE 1:10 000

250 0 100 200 500 1000 metres

aerodat
AERODAT INC.

Date Flown: Sept, 1996

NTS Map Ref: 116-C/2

Project Ref: J9674-4

(3)

UNITED STATES OF AMERICA

CANADA

Poker Creek

3300

3500

3100

4000

4200

3900

4100

4271

4423

127

402

26A

506850.
7105000

499200.
7099000

501000.
7099000

506850.
7100000

FLIGHT PATH AND PLANIMETERY

Navigation and flight path recovery was conducted using a Global Positioning System (GPS) satellite navigation system and has been differentially corrected.

Lines were flown at an azimuth of 0-180° with an average line spacing of 100 m.

Average aircraft-terrain clearance of 87 m was monitored by radar altimeter.

Planimetric information was derived from enlarged 1:50 000 N.T.S. map 116C/2. Roads are indicated by dashed lines and creeks are indicated by solid lines and

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Arrow: Magnetic North

Angles presented are approximate mean deviations for centre of NTS sheet 1116C/2. Use diagram for reference only.

Grid North - True North: 0° 13' W
Grid North - Magnetic North: 29° 30' E
Annual change: decreasing 10.3' from 1991

APPARENT RESISTIVITY

Apparent resistivity calculated from the measured 860 Hz coplanar EM response, assuming a resistive half-space (200 m) model. Average sensor elevation was 43 m.

Map contours are in ohm·m, at logarithmic intervals, in multiples of those listed below:

- 0.1 log(ohm·m)
- 0.5 log(ohm·m)
- 2.0 log(ohm·m)

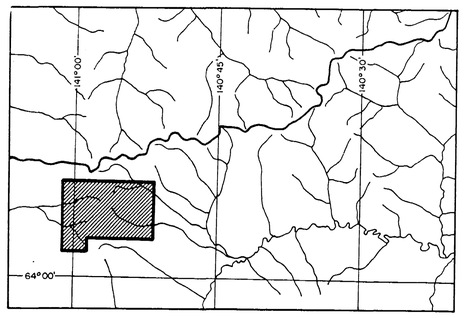
EM ANOMALIES

EM anomalies selected by computer algorithm and manually confirmed. Selection is based on the response correlation to theoretical sources such as a steeply dipping conductor.

Calculation of conductance is based on the response of the 4600 Hz coaxial data, and forms the basis for anomaly classification.

Letter codes are used to identify individual anomalies on a line, and the inphase amplitude of the 4600 Hz response is annotated opposite.

A, 2	0 - 1 mhos
O	1 - 2 mhos
⊖	2 - 4 mhos
◔	4 - 8 mhos
◕	8 - 16 mhos
◉	16 - 32 mhos
●	> 32 mhos
M	Magnetite



MADRONA MINING LIMITED

APPARENT RESISTIVITY

860 Hz COPLANAR

POKER CREEK PROJECT

Central West Yukon

SCALE 1:10 000

250 0 100 200 500 1000 metres

aerodat

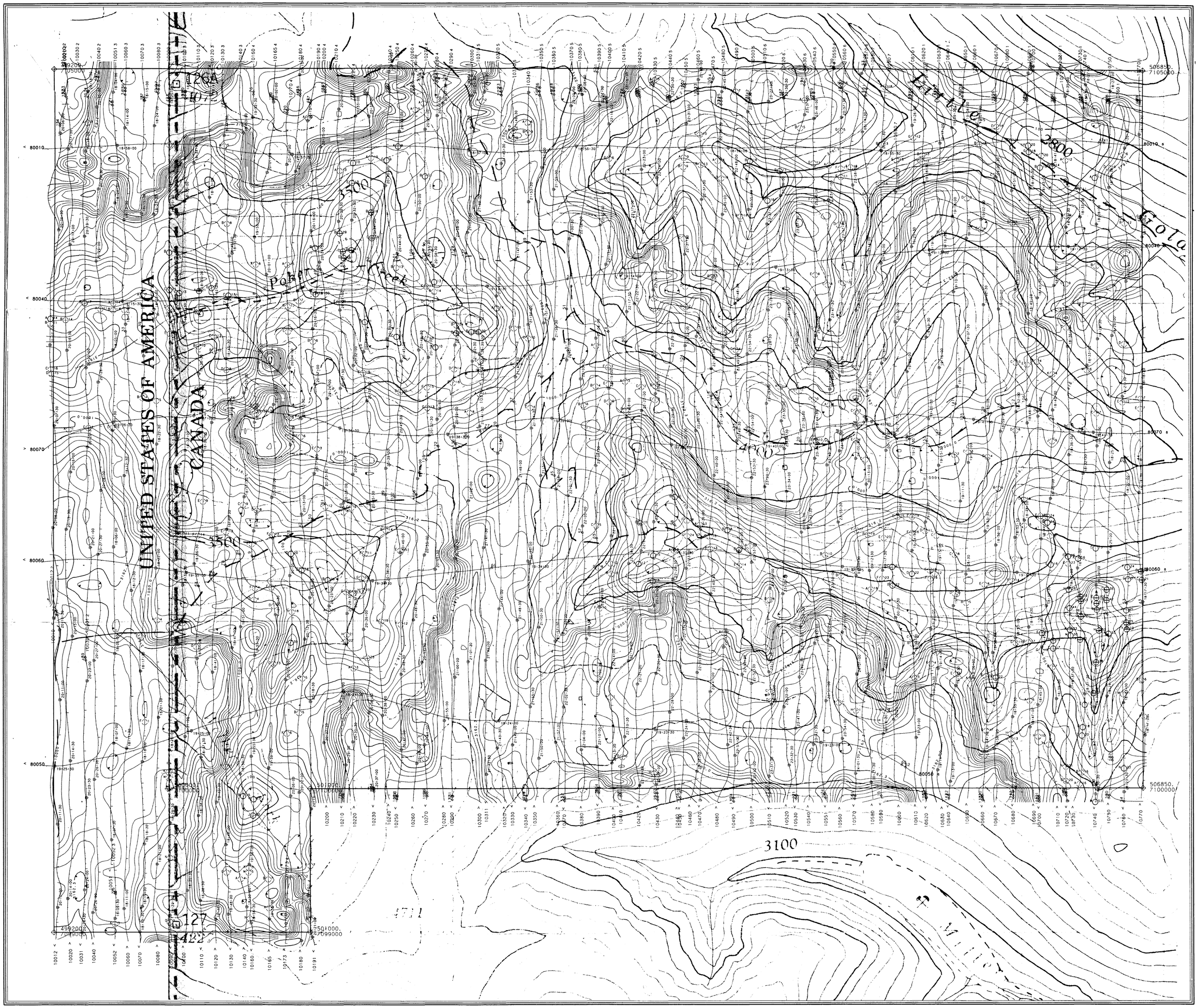
AERODAT INC.

Date Flown: Sept, 1996

NTS Map Ref: 116-C/2

Project Ref: J9674-5A

(4)



Square: Grid North
Star: True North
Arrow: Magnetic North

Angles presented are approximate mean deviations for centre of NTS sheet 116C/2. Use diagram for reference only.

Grid North - True North: 0° 13' W
Grid North - Magnetic North: 29° 30' E
Annual change: decreasing 10.3' from 1991

FLIGHT PATH AND PLANIMETERY

Navigation and flight path recovery was conducted using a Global Positioning System (GPS) satellite navigation system and has been differentially corrected.

Lines were flown at an azimuth of 0-180° with an average line spacing of 100 m.

Average aircraft-terrain clearance of 87 m was monitored by radar altimeter.

Planimetric information was derived from enlarged 1:50 000 N.T.S. map 116C/2. Roads are indicated by dashed lines and creeks are indicated by solid lines and

APPARENT RESISTIVITY

Apparent resistivity calculated from the measured 4175 Hz coplanar EM response, assuming a resistive half-space (200 m) model. Average sensor elevation was 43 m.

Map contours are in ohm·m, at logarithmic intervals, in multiples of those listed below:

- 0.1 log(ohm·m)
- 0.5 log(ohm·m)
- 2.0 log(ohm·m)

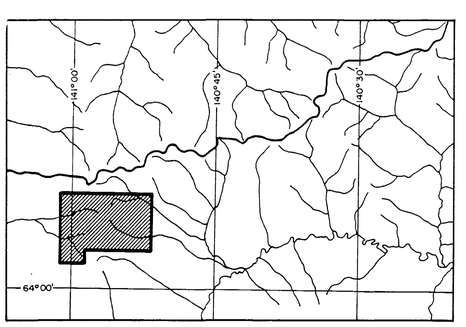
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- 0 - 1 mhos
- 1 - 2 mhos
- 2 - 4 mhos
- 4 - 8 mhos
- 8 - 16 mhos
- 16 - 32 mhos
- > 32 mhos
- M Magnetite



MADRONA MINING LIMITED

APPARENT RESISTIVITY
4175 Hz COPLANAR

093559

POKER CREEK PROJECT
Central West Yukon

(5)

SCALE 1:10 000

250 0 100 200 500 1000 metres

aerodat
AERODAT INC.

Date Flown: Sept, 1996

NTS Map Ref: 116-C/2

Project Ref: J9674-5B

(5)

500000 E
502000 E
504000 E
506000 E
7104000 N
7102000 N
7100000 N
506850.
7105000
500000.
7100000
501000.
7099000
499200.
7099000
506850.
7100000
POKER CREEK
GLACIER CREEK
MILLER CREEK

FLIGHT PATH AND PLANIMETERY

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Annual change: decreasing 10.3' from 1991

TOTAL FIELD MAGNETICS

Total field magnetic intensity contour data, measured by a cesium high sensitivity magnetometer at an average sensor elevation of 72 m, and corrected for diurnal variation.

Map contours are in nanoTeslas, and are multiples of those listed below:

- 1 nT
- 5 nT
- 20 nT
- 100 nT
- 500 nT

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- 2 - 4 mhos
- 4 - 8 mhos
- 8 - 16 mhos
- 16 - 32 mhos
- > 32 mhos
- M Magnetite

57860
57512
57482
57466
57446
57426
57410
57397
57387
57379
57373
57368
57363
57358
57353
57348
57344
57340
57338
57334
57331
57328
57325
57321
57315
57309
57305
56800

MADRONA MINING LIMITED

TOTAL FIELD MAGNETICS

POKER CREEK PROJECT

Central West Yukon

00355

SCALE 1:10 000

250 0 100 200 500 1000 metres

aerodat
AERODAT INC.

Date Flown: Sept, 1996
NTS Map Ref: 116-C/2
Project Ref: J9674-1

500000 E

502000 E

504000 E

506000 E

7104000 N

7102000 N

7100000 N

506850.
7105000

506850.
7100000

500000.
7100000

501000.
7099000

499200.
7099000

MILLER CREEK

POKER CREEK

GLACIER CREEK

MADRONA MINING LIMITED

VERTICAL MAGNETIC GRADIENT

POKER CREEK PROJECT

Central West Yukon

(7)

SCALE 1:10 000

250 0 100 200 500 1000 metres

aerodat

AERODAT INC.

Date Flown: Sept, 1996

NTS Map Ref: 116-C/2

Project Ref: J9674-2

FLIGHT PATH AND PLANIMETERY

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VERTICAL GRADIENT

Vertical magnetic gradient contour data, calculated from the gridded total field magnetics data by an FFT algorithm.

Map contours are in nanoTeslas/metre, and are multiples of those listed below:

0.01 nT/m
0.05 nT/m
0.2 nT/m
1 nT/m
5 nT/m

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A, B, C, D, E, F, G, H, J, K, L, M

0 - 1 mhos
1 - 2 mhos
2 - 4 mhos
4 - 8 mhos
8 - 16 mhos
16 - 32 mhos
> 32 mhos
Magnetite

16.000
0.600
0.240
0.140
0.110
0.080
0.060
0.050
0.040
0.030
0.020
0.010
0.000
-0.010
-0.020
-0.030
-0.040
-0.050
-0.060
-0.080
-0.100
-0.200
-0.300
-10.000

500000 E

502000 E

504000 E

506000 E

7104000 N

7102000 N

7100000 N

499200. 7105000

506850. 7105000

500000. 7100000

501000. 7100000

506850. 7100000

499200. 7099000

501000. 7099000

POKER CREEK

GLACIER CREEK

MILLER CREEK

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Annual change: decreasing 10.3' from 1991

EM PROFILES

Inphase and quadrature components (thick/thin) of measured EM responses. Coaxial and coplanar coil pairs operating at fixed frequencies are mounted in a towed bird with an average sensor elevation of 57 m. Coil separation has been corrected to 7 m.

Profiles are presented as offsets from flight lines, using the vertical scales listed below:

COAXIAL	COPLANAR
935 Hz - 2 ppm/mm	800 Hz - 8 ppm/mm
4600 Hz - 2 ppm/mm	4175 Hz - 8 ppm/mm
	32 kHz - 32 ppm/mm

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B	1 - 2 mhos
C	2 - 4 mhos
D	4 - 8 mhos
E	8 - 16 mhos
F	16 - 32 mhos
G	> 32 mhos
M	Magnetite

MADRONA MINING LIMITED

EM PROFILES

935 Hz COAXIAL 860 Hz COPLANAR

POKER CREEK PROJECT

Central West Yukon

93559

SCALE 1:10 000

250 0 100 200 500 1000 metres

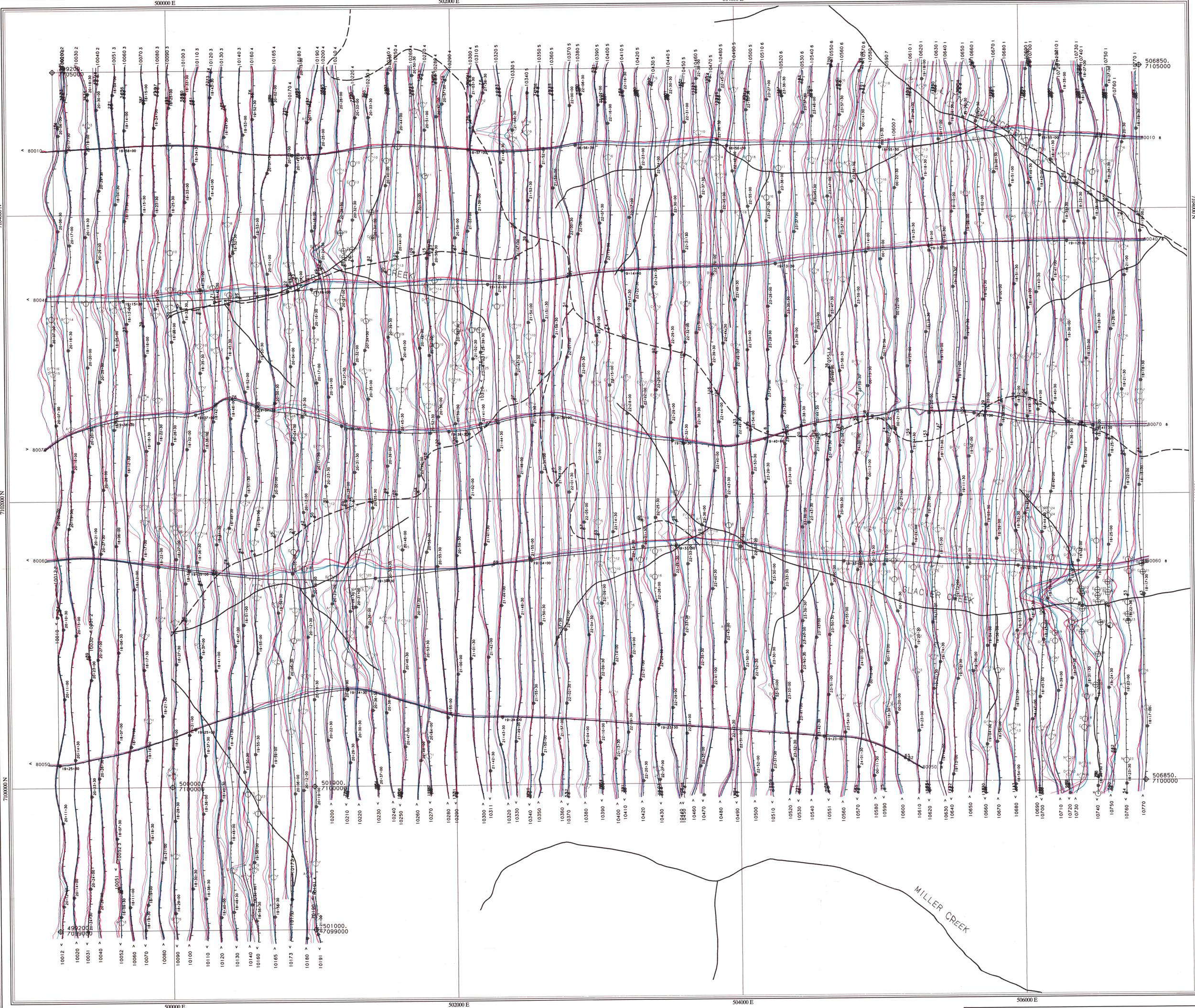
aerodat

AERODAT INC.

Date Flown: Sept, 1996

NTS Map Ref: 116-C/2

Project Ref: J9674-3A



Square: Grid North
Star: True North
Arrow: Magnetic North

Angles presented are approximate mean deviations for centre of NTS sheet 1116C/2. Use diagram for reference only.

Grid North - True North: 0° 13' W
Grid North - Magnetic North: 29° 30' E
Annual change: decreasing 10.3' from 1991

FLIGHT PATH AND PLANIMETERY

Navigation and flight path recovery was conducted using a Global Positioning System (GPS) satellite navigation system and has been differentially corrected.

Lines were flown at an azimuth of 0-180° with an average line spacing of 100 m.

Average aircraft-terrain clearance of 87 m was monitored by radar altimeter.

Planimetric information was derived from enlarged 1:50 000 N.T.S. map 116C/2. Roads are indicated by dashed lines and creeks are indicated by solid lines and

EM PROFILES

Inphase and quadrature components (thick/thin) of measured EM responses. Coaxial and coplanar coil pairs operating at fixed frequencies are mounted in a towed bird with an average sensor elevation of 57 m. Coil separation has been corrected to 7 m.

Profiles are presented as offsets from flight lines, using the vertical scales listed below:

COAXIAL	COPLANAR
935 Hz - 2 ppm/mm	800 Hz - 8 ppm/mm
4600 Hz - 2 ppm/mm	4175 Hz - 8 ppm/mm
	32 kHz - 32 ppm/mm

EM ANOMALIES

EM anomalies selected by computer algorithm and manually confirmed. Selection is based on the response correlation to theoretical sources such as a steeply dipping conductor.

Calculation of conductance is based on the response of the 4600 Hz coaxial data, and forms the basis for anomaly classification.

Letter codes are used to identify individual anomalies on a line, and the inphase amplitude of the 4600 Hz response is annotated opposite.

- A, B, C: 0 - 1 mhos
- ○ 1 - 2 mhos
- ⊖ 2 - 4 mhos
- ◐ 4 - 8 mhos
- ◒ 8 - 16 mhos
- ◓ 16 - 32 mhos
- ● > 32 mhos
- M Magnetite

MADRONA MINING LIMITED

EM PROFILES

4600 kHz COAXIAL 4175 kHz COPLANAR

POKER CREEK PROJECT

Central West Yukon

093559

SCALE 1:10 000

250 0 100 200 500 1000 metres

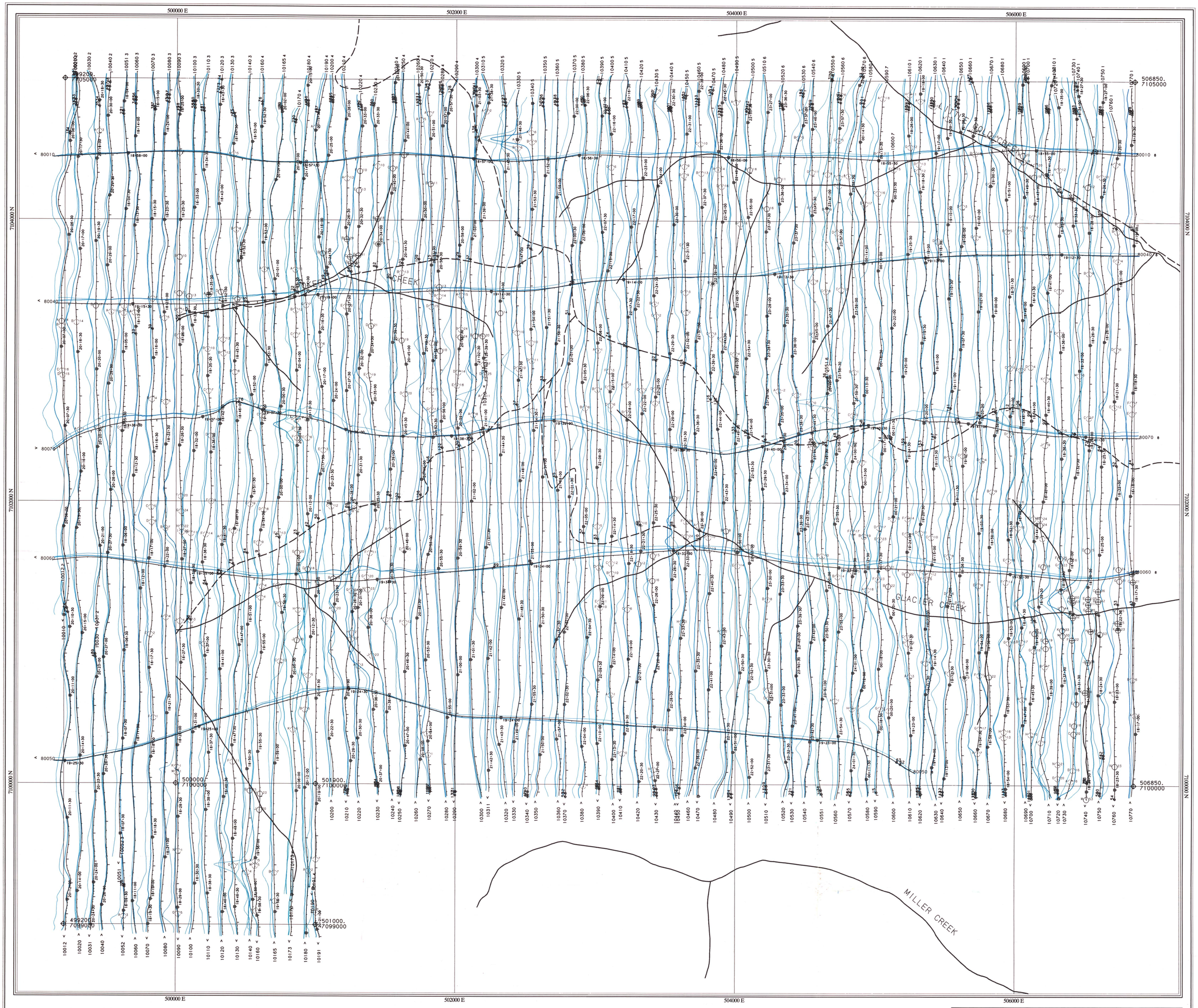
aerodat

AERODAT INC.

Date Flown: Sept, 1996

NTS Map Ref: 116-C/2

Project Ref: J9674-3B



Square: Grid North
Star: True North
Arrow: Magnetic North

Angles presented are approximate mean deviations for centre of NTS sheet 1116C/2. Use diagram for reference only.

Grid North - True North: 0° 13' W
Grid North - Magnetic North: 29° 30' E
Annual change: decreasing 10.3' from 1991

FLIGHT PATH AND PLANIMETERY

Navigation and flight path recovery was conducted using a Global Positioning System (GPS) satellite navigation system and has been differentially corrected.

Lines were flown at an azimuth of 0-180° with an average line spacing of 100 m.

Average aircraft-terrain clearance of 87 m was monitored by radar altimeter.

Planimetric information was derived from enlarged 1:50 000 N.T.S. map 116C/2. Roads are indicated by dashed lines and creeks are indicated by solid lines and

EM PROFILES

Inphase and quadrature components (thick/thin) of measured EM responses. Coaxial and coplanar coil pairs operating at fixed frequencies are mounted in a towed bird with an average sensor elevation of 57 m. Coil separation has been corrected to 7 m.

Profiles are presented as offsets from flight lines, using the vertical scales listed below:

COAXIAL	COPLANAR
935 Hz - 2 ppm/mm	800 Hz - 8 ppm/mm
4600 Hz - 2 ppm/mm	4175 Hz - 8 ppm/mm
	32 kHz - 32 ppm/mm

EM ANOMALIES

EM anomalies selected by computer algorithm and manually confirmed. Selection is based on the response correlation to theoretical sources such as a steeply dipping conductor.

Calculation of conductance is based on the response of the 4600 Hz coaxial data, and forms the basis for anomaly classification.

Letter codes are used to identify individual anomalies on a line, and the inphase amplitude of the 4600 Hz response is annotated opposite.

^C²	0 - 1 mhos
○	1 - 2 mhos
⊖	2 - 4 mhos
◐	4 - 8 mhos
◒	8 - 16 mhos
◕	16 - 32 mhos
●	> 32 mhos
M	Magnetite

MADRONA MINING LIMITED

EM PROFILES

33 kHz COPLANAR

POKER CREEK PROJECT

Central West Yukon

093559

(10)

SCALE 1:10 000

250 0 100 200 500 1000 metres

aerodat
AERODAT INC.

Date Flown:	Sept, 1996
NTS Map Ref:	116-C/2
Project Ref:	J9674-3C

500000 E | 502000 E | 504000 E | 506000 E

7104000 N | 7102000 N | 7100000 N

POKER CREEK | KITTY CREEK | GLACIER CREEK | MILLER CREEK

506850. 7105000

500000 7100000

501000. 7099000

498200 7099000

FLIGHT PATH AND PLANIMETERY

Navigation and flight path recovery was conducted using a Global Positioning System (GPS) satellite navigation system and has been differentially corrected.

Lines were flown at an azimuth of 0-180° with an average line spacing of 100 m.

Average aircraft-terrain clearance of 87 m was monitored by radar altimeter.

Planimetric information was derived from enlarged 1:50 000 N.T.S. map 116C/2. Roads are indicated by dashed lines and creeks are indicated by solid lines and

Square: Grid North
Star: True North
Arrow: Magnetic North

Angles presented are approximate mean deviations for centre of NTS sheet 1116C/2. Use diagram for reference only.

Grid North - True North: 0° 13' W
Grid North - Magnetic North: 29° 30' E
Annual change: decreasing 10.3' from 1991

APPARENT RESISTIVITY

Apparent resistivity calculated from the measured 860 Hz coplanar EM response, assuming a resistive half-space (200 m) model. Average sensor elevation was 43 m.

Map contours are in ohm·m, at logarithmic intervals, in multiples of those listed below:

0.1 log(ohm·m)
0.5 log(ohm·m)
2.0 log(ohm·m)

EM ANOMALIES

EM anomalies selected by computer algorithm and manually confirmed. Selection is based on the response correlation to theoretical sources such as a steeply dipping conductor.

Calculation of conductance is based on the response of the 4600 Hz coaxial data, and forms the basis for anomaly classification.

Letter codes are used to identify individual anomalies on a line, and the inphase amplitude of the 4600 Hz response is annotated opposite.

A, B, C — 0 - 1 mhos
D — 1 - 2 mhos
E — 2 - 4 mhos
F — 4 - 8 mhos
G — 8 - 16 mhos
H — 16 - 32 mhos
J — > 32 mhos
M — Magnetite

3162
1259
1000
794
631
501
316
200
126
100
79
63
40
8

MADRONA MINING LIMITED

APPARENT RESISTIVITY
860 Hz COPLANAR

POKER CREEK PROJECT
Central West Yukon

093559

SCALE 1:10 000

250 0 100 200 500 1000 metres

aerodat
AERODAT INC.

Date Flown: Sept, 1996
NTS Map Ref: 116-C/2
Project Ref: J9674-4A

500000 E | 502000 E | 504000 E | 506000 E

7104000 N | 7102000 N | 7100000 N

POKER CREEK | GLACIER CREEK | LITTLE GOLD CREEK | MILLER CREEK

FLIGHT PATH AND PLANIMETERY

Navigation and flight path recovery was conducted using a Global Positioning System (GPS) satellite navigation system and has been differentially corrected.

Lines were flown at an azimuth of 0-180° with an average line spacing of 100 m.

Average aircraft-terrain clearance of 87 m was monitored by radar altimeter.

Planimetric information was derived from enlarged 1:50 000 N.T.S. map 116C/2. Roads are indicated by dashed lines and creeks are indicated by solid lines and

Square: Grid North
Star: True North
Arrow: Magnetic North

Angles presented are approximate mean deviations for centre of NTS sheet 1116C/2. Use diagram for reference only.

Grid North - True North: 0° 13' W
Grid North - Magnetic North: 29° 30' E
Annual change: decreasing 10.3' from 1991

APPARENT RESISTIVITY

Apparent resistivity calculated from the measured 4175 Hz coplanar EM response, assuming a resistive half-space (200 m) model. Average sensor elevation was 43 m.

Map contours are in ohm·m, at logarithmic intervals, in multiples of those listed below:

0.1 log(ohm·m)
0.5 log(ohm·m)
2.0 log(ohm·m)

EM ANOMALIES

EM anomalies selected by computer algorithm and manually confirmed. Selection is based on the response correlation to theoretical sources such as a steeply dipping conductor.

Calculation of conductance is based on the response of the 4600 Hz coaxial data, and forms the basis for anomaly classification.

Letter codes are used to identify individual anomalies on a line, and the inphase amplitude of the 4600 Hz response is annotated opposite.

A, B, C — 0 - 1 mhos
D — 1 - 2 mhos
E — 2 - 4 mhos
F — 4 - 8 mhos
G — 8 - 16 mhos
H — 16 - 32 mhos
K — > 32 mhos
M — Magnetite

31623
6310
5012
3981
3162
2512
1995
1585
1259
1000
794
631
501
398
316
251
200
158
126
100
63
10

MADRONA MINING LIMITED

APPARENT RESISTIVITY

4175 Hz COPLANAR

POKER CREEK PROJECT

Central West Yukon

093559
12

SCALE 1:10 000

250 0 100 200 500 1000 metres

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AERODAT INC.

Date Flown: Sept, 1996
NTS Map Ref: 116-C/2
Project Ref: J9674-4B

500000 E | 502000 E | 504000 E | 506000 E

7104000 N | 7102000 N | 7100000 N

POKER CREEK | GLACIER CREEK | MILLER CREEK

506850. 7105000

506850. 7100000

500000 E | 501000. 7099000

MADRONA MINING LIMITED

URANIUM COUNT RADIOMETRICS

POKER CREEK PROJECT

Central West Yukon

083559 (13)

SCALE 1:10 000

250 0 100 200 500 1000 metres

aerodat

AERODAT INC.

Date Flown: Sept, 1996

NTS Map Ref: 116-C/2

Project Ref: J9674- 5A

FLIGHT PATH AND PLANIMETERY

Navigation and flight path recovery was conducted using a Global Positioning System (GPS) satellite navigation system and has been differentially corrected.

Lines were flown at an azimuth of 0-180° with an average line spacing of 100 m.

Average aircraft-terrain clearance of 87 m was monitored by radar altimeter.

Planimetric information was derived from enlarged 1:50 000 N.T.S. map 116C/2. Roads are indicated by dashed lines and creeks are indicated by solid lines and

Square: Grid North
Star: True North
Arrow: Magnetic North

Angles presented are approximate mean deviations for centre of NTS sheet 1116C/2. Use diagram for reference only.

Grid North - True North: 0° 13' W
Grid North - Magnetic North: 29° 30' E
Annual change: decreasing 10.3' from 1991

RADIOMETRICS

Uranium count radiometric contour data measured by a 256 channel spectrometer system mounted in the aircraft. Corrections were made for Compton scatter and altitude variation.

Map contours are in counts/second, and are multiples of those listed below:

1 cps
5 cps
25 cps

EM ANOMALIES

EM anomalies selected by computer algorithm and manually confirmed. Selection is based on the response correlation to theoretical sources such as a steeply dipping conductor.

Calculation of conductance is based on the response of the 4600 Hz coaxial data, and forms the basis for anomaly classification.

Letter codes are used to identify individual anomalies on a line, and the inphase amplitude of the 4600 Hz response is annotated opposite.

A, B, C, D, E, F, G, H, J, K, L, M, N, P, Q, R, S, T, U, V, W, X, Y, Z, AA, BB, CC, DD, EE, FF, GG, HH, JJ, KK, LL, MM, NN, PP, QQ, RR, SS, TT, UU, VV, WW, XX, YY, ZZ

0 - 1 mhos
1 - 2 mhos
2 - 4 mhos
4 - 8 mhos
8 - 16 mhos
16 - 32 mhos
> 32 mhos
M Magnetite

30 17 16 15 14 13 12 11 10 9 8 0

500000 E | 502000 E | 504000 E | 506000 E

7104000 N | 7102000 N | 7100000 N

506850. 7105000

506850. 7100000

500000 7100000

501000. 7099000

POKER CREEK

GLACIER CREEK

MILLER CREEK

FLIGHT PATH AND PLANIMETERY

Navigation and flight path recovery was conducted using a Global Positioning System (GPS) satellite navigation system and has been differentially corrected.

Lines were flown at an azimuth of 0-180° with an average line spacing of 100 m.

Average aircraft-terrain clearance of 87 m was monitored by radar altimeter.

Planimetric information was derived from enlarged 1:50 000 N.T.S. map 116C/2. Roads are indicated by dashed lines and creeks are indicated by solid lines and

Square: Grid North
Star: True North
Arrow: Magnetic North

Angles presented are approximate mean deviations for centre of NTS sheet 1116C/2. Use diagram for reference only.

Grid North - True North: 0° 13' W
Grid North - Magnetic North: 29° 30' E
Annual change: decreasing 10.3' from 1991

RADIOMETRICS

Thorium count radiometric contour data measured by a 256 channel spectrometer system mounted in the aircraft. Corrections were made for Compton scatter and altitude variation.

Map contours are in counts/second, and are multiples of those listed below:

1 cps
5 cps
25 cps

EM ANOMALIES

EM anomalies selected by computer algorithm and manually confirmed. Selection is based on the response correlation to theoretical sources such as a steeply dipping conductor.

Calculation of conductance is based on the response of the 4600 Hz coaxial data, and forms the basis for anomaly classification.

Letter codes are used to identify individual anomalies on a line, and the inphase amplitude of the 4600 Hz response is annotated opposite.

A, C, Z	0 - 1 mhos
	1 - 2 mhos
	2 - 4 mhos
	4 - 8 mhos
	8 - 16 mhos
	16 - 32 mhos
	> 32 mhos
M	Magnetite

50 23 22 21 20 19 18 17 16 15 14 13 12 5

MADRONA MINING LIMITED

THORIUM COUNT RADIOMETRICS

POKER CREEK PROJECT

Central West Yukon

093559

(14)

SCALE 1:10 000

250 0 100 200 500 1000 metres

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Date Flown: Sept, 1996
NTS Map Ref: 116-C/2
Project Ref: J9674-5B

(14)

500000 E
502000 E
504000 E
506000 E
7104000 N
7102000 N
7100000 N
506850.
7105000
506850.
7100000
501000.
7099000
POKER CREEK
SLATE CREEK
MILLER CREEK

FLIGHT PATH AND PLANIMETERY

Navigation and flight path recovery was conducted using a Global Positioning System (GPS) satellite navigation system and has been differentially corrected.

Lines were flown at an azimuth of 0-180° with an average line spacing of 100 m.

Average aircraft-terrain clearance of 87 m was monitored by radar altimeter.

Planimetric information was derived from enlarged 1:50 000 N.T.S. map 116C/2. Roads are indicated by dashed lines and creeks are indicated by solid lines and

Square: Grid North
Star: True North
Arrow: Magnetic North

Angles presented are approximate mean deviations for centre of NTS sheet 1116C/2. Use diagram for reference only.

Grid North - True North: 0° 13' W
Grid North - Magnetic North: 29° 30' E
Annual change: decreasing 10.3' from 1991

RADIOMETRICS

Potassium count radiometric contour data measured by a 256 channel spectrometer system mounted in the aircraft. Corrections were made for Compton scatter and altitude variation.

Map contours are in counts/second, and are multiples of those listed below:

2 cps
10 cps
50 cps

EM ANOMALIES

EM anomalies selected by computer algorithm and manually confirmed. Selection is based on the response correlation to theoretical sources such as a steeply dipping conductor.

Calculation of conductance is based on the response of the 4600 Hz coaxial data, and forms the basis for anomaly classification.

Letter codes are used to identify individual anomalies on a line, and the inphase amplitude of the 4600 Hz response is annotated opposite.

A, B, C, D, E, F, G, H, J, K, L, M, N, P, Q, R, S, T, U, V, W, X, Y, Z
0 - 1 mhos
1 - 2 mhos
2 - 4 mhos
4 - 8 mhos
8 - 16 mhos
16 - 32 mhos
> 32 mhos
M Magnetite

130 70 66 62 60 58 56 54 52 50 48 46 44 42 40 38 36 34 30 5

MADRONA MINING LIMITED

POTASSIUM COUNT RADIOMETRICS

POKER CREEK PROJECT

Central West Yukon

SCALE 1:10 000

250 0 100 200 500 1000 metres

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AERODAT INC.

Date Flown: Sept, 1996
NTS Map Ref: 116-C/2
Project Ref: J9674-5C

500000 E

502000 E

504000 E

506000 E

7104000 N

7102000 N

7100000 N

506850.
7105000

506850.
7100000

501000.
7099000

499200.
7099000

POKER CREEK

MILLER CREEK

GLACIER CREEK

FLIGHT PATH AND PLANIMETERY

Navigation and flight path recovery was conducted using a Global Positioning System (GPS) satellite navigation system and has been differentially corrected.

Lines were flown at an azimuth of 0-180° with an average line spacing of 100 m.

Average aircraft-terrain clearance of 87 m was monitored by radar altimeter.

Planimetric information was derived from enlarged 1:50 000 N.T.S. map 116C/2. Roads are indicated by dashed lines and creeks are indicated by solid lines and

Square: Grid North
Star: True North
Arrow: Magnetic North

Angles presented are approximate mean deviations for centre of NTS sheet 1116C/2. Use diagram for reference only.

Grid North - True North: 0° 13' W
Grid North - Magnetic North: 29° 30' E
Annual change: decreasing 10.3' from 1991

RADIOMETRICS

Total count radiometric contour data measured by a 256 channel spectrometer system mounted in the aircraft. Corrections were made for Compton scatter and altitude variation.

Map contours are in counts/second, and are multiples of those listed below:

10 cps
50 cps
200 cps

EM ANOMALIES

EM anomalies selected by computer algorithm and manually confirmed. Selection is based on the response correlation to theoretical sources such as a steeply dipping conductor.

Calculation of conductance is based on the response of the 4600 Hz coaxial data, and forms the basis for anomaly classification.

Letter codes are used to identify individual anomalies on a line, and the inphase amplitude of the 4600 Hz response is annotated opposite.

A, B, C 0 - 1 mhos
D 1 - 2 mhos
E 2 - 4 mhos
F 4 - 8 mhos
G 8 - 16 mhos
H 16 - 32 mhos
I > 32 mhos
M Magnetite

1200
700
660
630
610
590
580
570
560
550
540
530
520
510
500
490
480
470
460
450
440
430
410
390
340
100

MADRONA MINING LIMITED

TOTAL COUNT RADIOMETRICS

POKER CREEK PROJECT

Central West Yukon

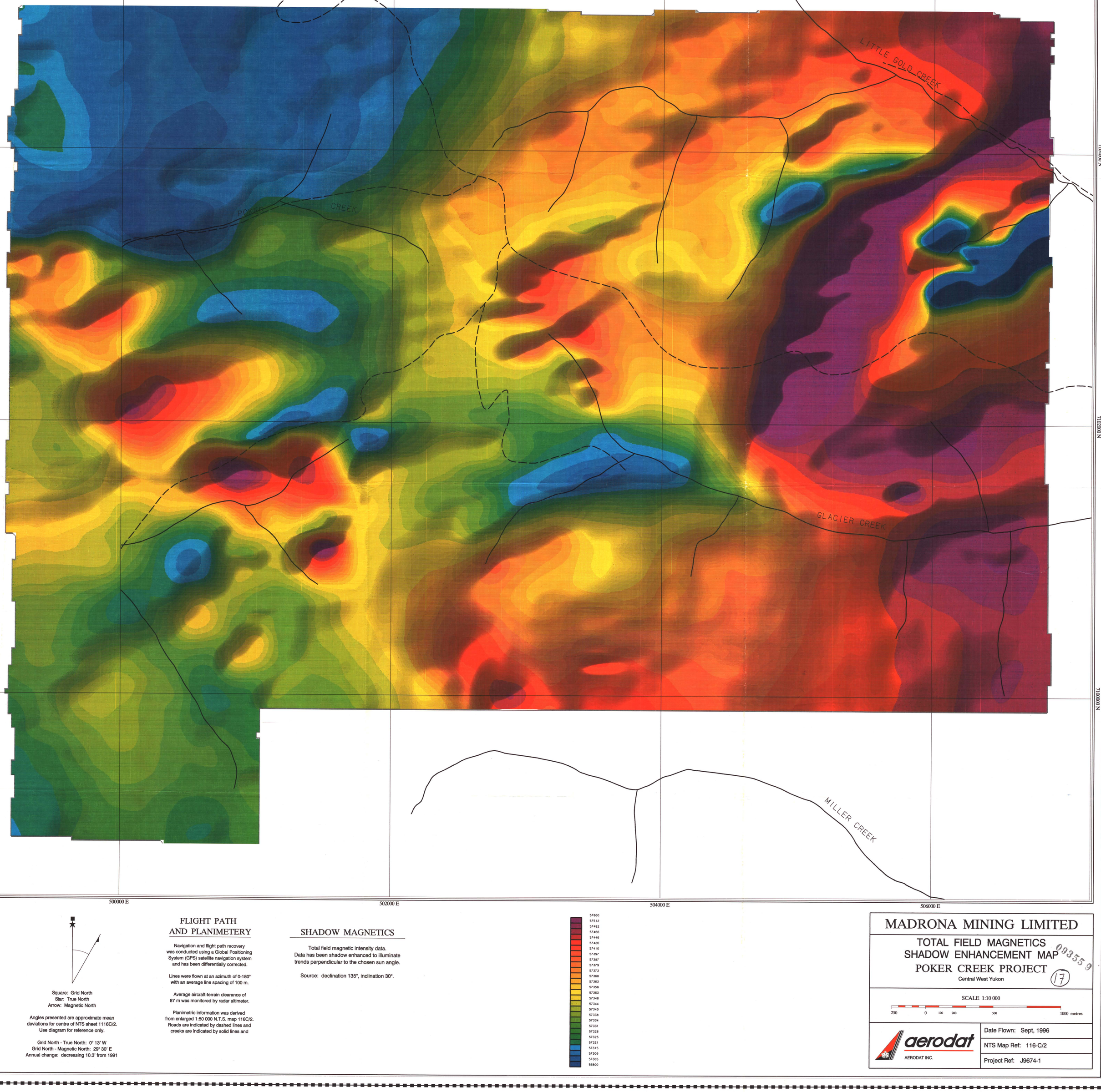
SCALE 1:10 000

250 0 100 200 500 1000 metres

aerodat
AERODAT INC.

Date Flown: Sept, 1996
NTS Map Ref: 116-C/2
Project Ref: J9674-5D

500000 E
502000 E
504000 E
506000 E
7104000 N
7102000 N
7100000 N



Square: Grid North
Star: True North
Arrow: Magnetic North

Angles presented are approximate mean deviations for centre of NTS sheet 1116C/2. Use diagram for reference only.

Grid North - True North: 0° 13' W
Grid North - Magnetic North: 29° 30' E
Annual change: decreasing 10.3' from 1991

FLIGHT PATH AND PLANIMETERY

Navigation and flight path recovery was conducted using a Global Positioning System (GPS) satellite navigation system and has been differentially corrected.

Lines were flown at an azimuth of 0-180° with an average line spacing of 100 m.

Average aircraft-terrain clearance of 87 m was monitored by radar altimeter.

Planimetric information was derived from enlarged 1:50 000 N.T.S. map 116C/2. Roads are indicated by dashed lines and creeks are indicated by solid lines and

SHADOW MAGNETICS

Total field magnetic intensity data.
Data has been shadow enhanced to illuminate trends perpendicular to the chosen sun angle.

Source: declination 135°, inclination 30°.

MADRONA MINING LIMITED

TOTAL FIELD MAGNETICS SHADOW ENHANCEMENT MAP
POKER CREEK PROJECT

Central West Yukon

093559

(17)

SCALE 1:10 000

250 0 100 200 500 1000 metres

aerodat
AERODAT INC.

Date Flown: Sept, 1996
NTS Map Ref: 116-C/2
Project Ref: J9674-1

(17)

500000 E 502000 E 504000 E 506000 E

7104000 N

7102000 N

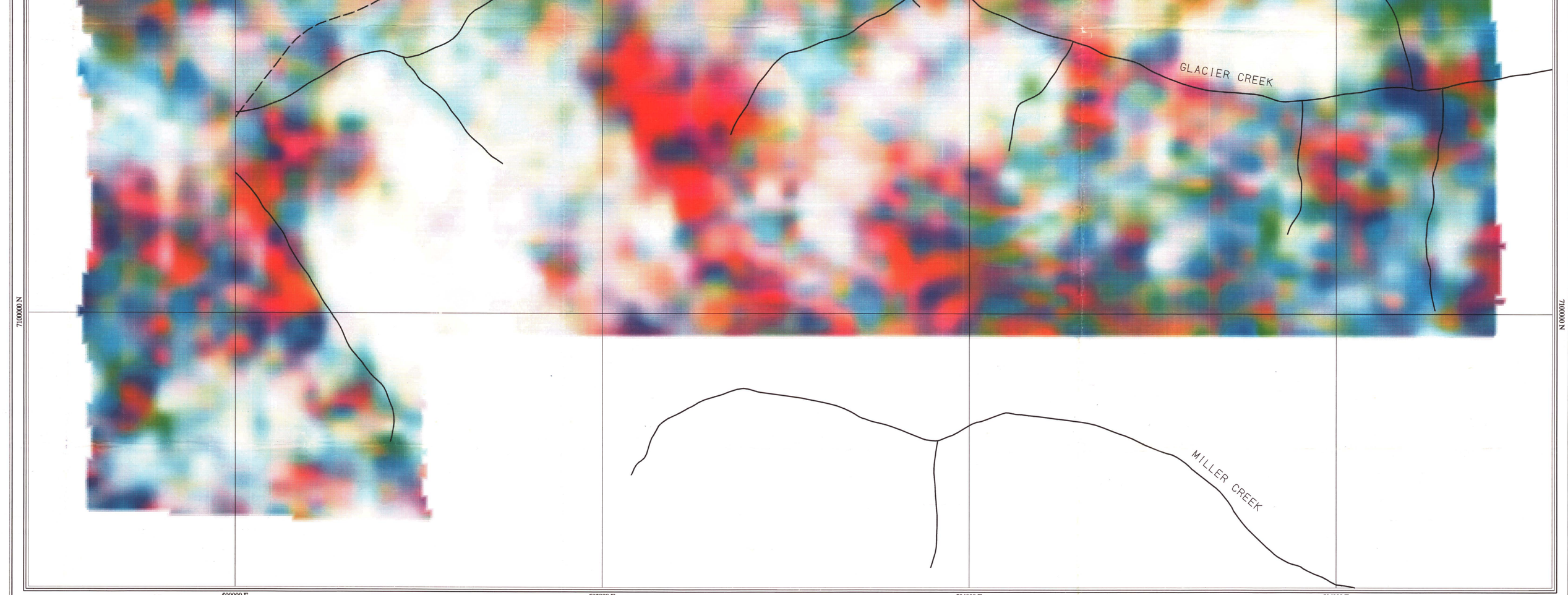
7100000 N

POKER CREEK

LITTLE GOLD CREEK

GLACIER CREEK

MILLER CREEK



500000 E 502000 E 504000 E 506000 E

7104000 N 7102000 N 7100000 N

126A
4072

Little 2800

Poker Creek

3500

20 21 18 19 15 17 14 16 1 3

CANADA

UNITED STATES OF AMERICA

10 12 38 40 11 13 37 39

GICI CLAIMS

4000

28 26 24 29 31 33 27 25 23 30 32 34 6 4 2 8 10 12 5 3 1 7 9 11

UNI CLAIMS

3500

2 4 6 7 8 9 33 35 16 17 19 21 23 25 27 29 31 32 34 36 15 18 20 22 22 24 26 28 30

Walkers Fork

3100

127
4227

4711

Square: Grid North
Star: True North
Arrow: Magnetic North

Angles presented are approximate mean deviations for centre of NTS sheet 116C/2. Use diagram for reference only.

Grid North - True North: 0° 13' W
Grid North - Magnetic North: 29° 30' E
Annual change: decreasing 10.3' from 1991

141°00'
140°45'
140°30'
64°00'

MADRONA MINING LIMITED

CLAIM MAP 093559

POKER CREEK PROJECT

Central West Yukon

(19)

SCALE 1:10 000

250 0 100 200 500 1000 metres

aerodat
AERODAT INC.

Date Flown: Sept, 1996
NTS Map Ref: 116-C/2
Project Ref: J9674-1

(19)