

# Report on a Helicopter-Borne AeroTEM System Electromagnetic & Magnetic Survey



**Aeroquest Job # 08040**

## **South Claims Project**

Vanderhoof Area, British Columbia, Canada  
NTS 093F05,06,12

For

**Golden Dragon Explorations Inc.**

**BC Geological Survey  
Assessment Report  
29485**

by



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Report date: November 2007

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### LIST OF MAPS (1:10,000)

- TMI – Coloured Total Magnetic Intensity (TMI) with line contours and EM anomaly symbols.
- ZOFF3 – AeroTEM Z3 Off-time with line contours and EM anomaly symbols.
- EM – AeroTEM off-time profiles Z5 – Z15 and EM anomaly symbols.

## 1. INTRODUCTION

This report describes a helicopter-borne geophysical survey carried out on behalf of Golden Dragon Explorations Inc. their South Claims project, near Burns Lake, British Columbia.

The principal geophysical sensor is Aeroquest's exclusive AeroTEM II (Bravo) time domain helicopter electromagnetic system which is employed in conjunction with a high-sensitivity caesium vapour magnetometer. Ancillary equipment includes a real-time differential GPS navigation system, radar altimeter, video recorder, and a base station magnetometer. Full-waveform streaming EM data is recorded at 36,000 samples per second. The streaming data comprise the transmitted waveform, and the X component and Z component of the resultant field at the receivers. A secondary acquisition system (RMS) records the ancillary data.

The total survey coverage is 985.8 line-km, of which 938.8 line-km fell within the defined project area (Appendix 1). The survey was flown at 100 metre line spacing and in a Northeast-Southwest survey flight direction. The survey flying described in this report took place from August 4<sup>th</sup> – 6<sup>th</sup>, 2007. This report describes the survey logistics, the data processing, presentation, and provides the specifications of the survey.

## 2. SURVEY AREA

The Project area (Figure 1) is located in central British Columbia approximately 80 km southwest of Fraser Lake and 80 km south of Burns Lake. Towns close to the project area include Marilla , 20 km to the northwest and Ootsa Lake 40 km northwest.

The survey is made up of a single block (85 km<sup>2</sup>) over rugged, mountainous terrain. Terrain elevations ranged from 850 – 1200 m. Chelaslie river runs NW-SE along the southern edge of the survey.

Project accessibility was good with a number of local roads in the surrounding areas. The project area itself was accessed by helicopter only.

There are 29 mining claims either wholly or partially covered by the survey, the majority of which are held by Christopher Bass. Full details are outlined in Appendix 2.

The base of survey operations and crew accommodation was in the town of Burns Lake.

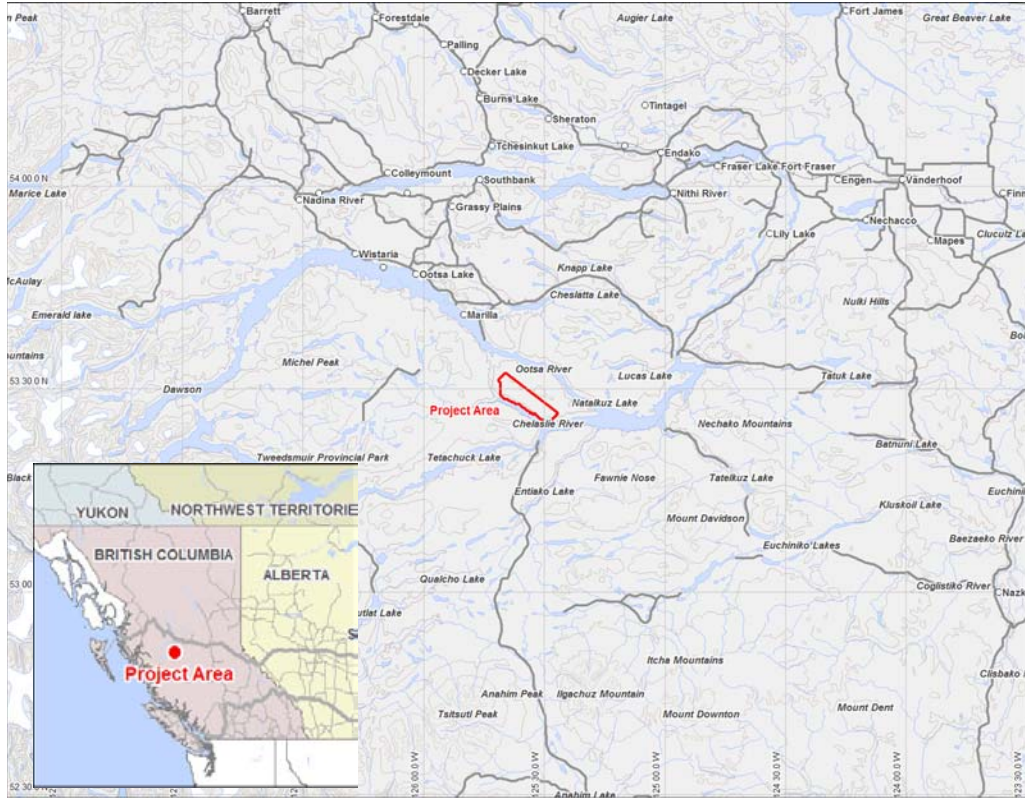


Figure 1. Project Area

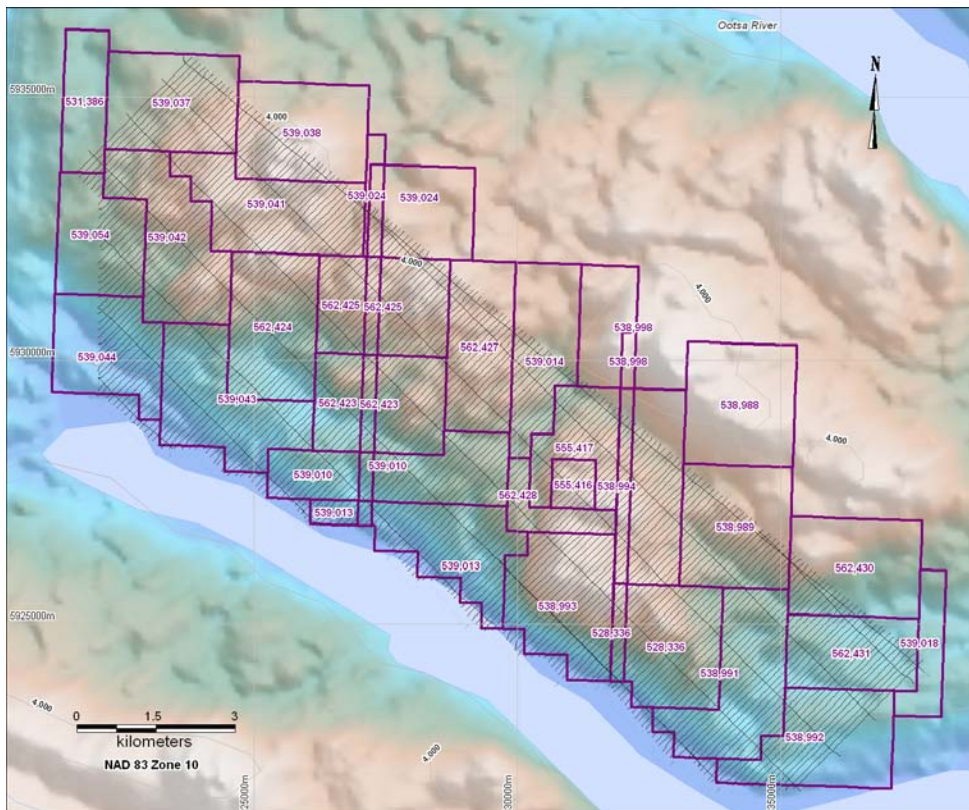


Figure 2. Project flight path and mining claims over shaded topography

### 3. SURVEY SPECIFICATIONS AND PROCEDURES

The survey specifications are summarised in the following table:

<b>Project Name</b>	<b>Line Spacing (metres)</b>	<b>Line Direction</b>	<b>Survey Coverage (line-km)</b>	<b>Date flown</b>
South Claims	100	NE-SW (45°)	938.8	August 4th – 6th, 2007

Table 1. Survey specifications summary

The survey coverage was calculated by adding up the along-line distance of the survey lines and control (tie) lines as presented in the final Geosoft database. The survey was flown with a line spacing of 100 metres. The control (tie) lines were flown perpendicular to the survey lines with a spacing of 1000 metres.

The nominal EM bird terrain clearance is 30 metres, but can be higher in more rugged terrain due to safety considerations and the capabilities of the aircraft. The magnetometer sensor is mounted in a smaller bird connected to the tow rope 17 metres above the EM bird and 21 metres below the helicopter (Figure 4). A second magnetometer is installed on the tail of the EM bird. Nominal survey speed over relatively flat terrain is 75 km/hr and is generally lower in rougher terrain. Scan rates for ancillary data acquisition is 0.1 second for the magnetometer and altimeter, and 0.2 second for the GPS determined position. The EM data is acquired as a data stream at a sampling rate of 36,000 samples per second and is processed to generate final data at 10 samples per second. The 10 samples per second translate to a geophysical reading about every 1.5 to 2.5 metres along the flight path.

#### 3.1. NAVIGATION

Navigation is carried out using a GPS receiver, an AGNAV2 system for navigation control, and an RMS DGR-33 data acquisition system which records the GPS coordinates. The x-y-z position of the aircraft, as reported by the GPS, is recorded at 0.2 second intervals. The system has a published accuracy of under 3 metres. A recent static ground test of the Mid-Tech WAAS GPS yielded a standard deviation in x and y of under 0.6 metres and for z under 1.5 metres over a two-hour period.

#### 3.2. SYSTEM DRIFT

Unlike frequency domain electromagnetic systems, the AeroTEM II system has negligible drift due to thermal expansion. The operator is responsible for ensuring the instrument is properly warmed up prior to departure and that the instruments are operated properly throughout the flight. The operator maintains a detailed flight log during the survey noting the times of the flight and any unusual geophysical or topographic features. Each flight included at least two high elevation ‘background’ checks. During the high elevation checks, an internal 5 second wide calibration pulse in all EM channels was generated in order to ensure that the gain of the system remained constant and within specifications.

#### 3.3. FIELD QA/QC PROCEDURES

On return of the pilot and operator to the base, usually after each flight, the AeroDAS streaming EM data and the RMS data are carried on removable hard drives and FlashCards, respectively and transferred to the data processing work station. At the end of each day, the base station magnetometer data on FlashCard is retrieved from the base station unit.

Data verification and quality control includes a comparison of the acquired GPS data with the flight plan; verification and conversion of the RMS data to an ASCII format XYZ data file; verification of the base station magnetometer data and conversion to ASCII format XYZ data; and loading, processing and conversion of the steaming EM data from the removable hard drive. All data is then merged to an ASCII XYZ format file which is then imported to an Oasis database for further QA/QC and for the production of preliminary EM, magnetic contour, and flight path maps.

Survey lines which show excessive deviation from the intended flight path are re-flown. Any line or portion of a line on which the data quality did not meet the contract specification was noted and reflown.

## **4. AIRCRAFT AND EQUIPMENT**

### **4.1. AIRCRAFT**

A Eurocopter (Aerospatiale) AS350B2 "A-Star" helicopter - registration C-FPTG was used as survey platform. The helicopter was owned and operated by Hi-Wood Helicopters, Calgary, Alberta. Installation of the geophysical and ancillary equipment was carried out by Aeroquest Limited personnel in conjunction with a licensed aircraft. The survey aircraft was flown at a nominal terrain clearance of 220 ft (65 metres).



Figure 3. Helicopter registration number C-FPTG

### **4.2. MAGNETOMETER**

The AeroTEM II airborne survey system employs the Geometrics G-823A caesium vapour magnetometer sensor installed in a two metre towed bird airfoil attached to the main tow line, 21 metres below the helicopter (Figure 4). The sensitivity of the magnetometer is 0.001 nanoTesla at a 0.1 second sampling rate. The nominal ground clearance of the magnetometer bird is 51 metres (170 ft.). The magnetic data is recorded at 10 Hz by the RMS DGR-33.

### **4.3. MAGNETOMETER II**

In addition to the main magnetometer bird on the main tow line, the AeroTEM II system includes an additional G-828A magnetometer installed on the tail of the EM bird (Figure 4).



The sensor is located 37 metres below the helicopter and has a superior nominal terrain clearance of 31 m. Data is recorded at 300 samples a second and down sampled to 10 Hz by the AeroDAS acquisition system.



Figure 4. AeroTEM II EM bird. Arrow indicates the location of the second cesium magnetometer sensor.

#### 4.4. ELECTROMAGNETIC SYSTEM

The electromagnetic system is an Aeroquest AeroTEM II time domain towed-bird system (Figure 4, Figure 5). The current AeroTEM II transmitter dipole moment is 38.8 kNIA. The AeroTEM bird is towed 38 metres (125 ft) below the helicopter. More technical details of the system may be found in Appendix 4.

The wave-form is triangular with a symmetric transmitter on-time pulse of 1.10 ms and a base frequency of 150 Hz (Figure 5). The current alternates polarity every on-time pulse. During every Tx on-off cycle (300 per second), 120 contiguous channels of raw X and Z component (and a transmitter current monitor, itx) of the received waveform are measured. Each channel width is 27.78 microseconds starting at the beginning of the transmitter pulse. This 120 channel data is referred to as the raw streaming data. The AeroTEM system has two separate EM data recording streams, the conventional RMS DGR-33 and the AeroDAS system which records the full waveform (Figure 6).

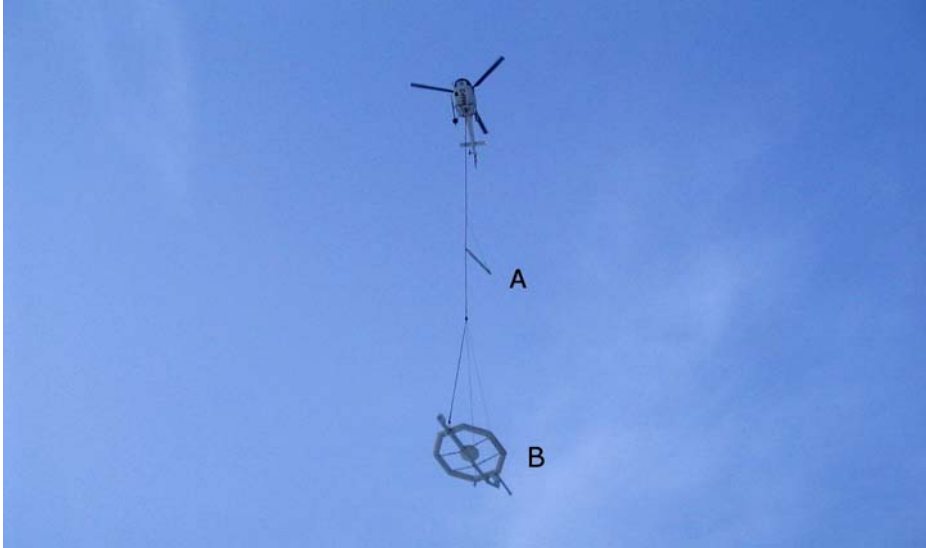


Figure 5. The magnetometer bird (A) and AeroTEM II EM bird (B)

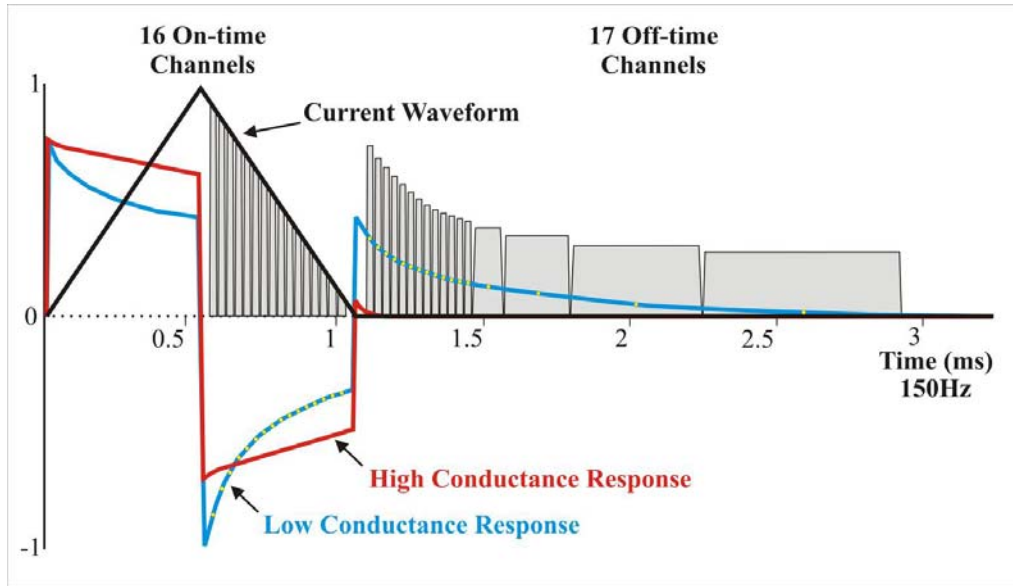


Figure 6. Schematic of Transmitter and Receiver waveforms

#### 4.5. AERODAS ACQUISITION SYSTEM

The 120 channels of raw streaming data are recorded by the AeroDAS acquisition system (Figure 7) onto a removable hard drive. The streaming data are processed post-survey to yield 33 stacked and binned on-time and off-time channels at a 10 Hz sample rate. The timing of the final processed EM channels is described in the following table:



Average TxOn 8.1437 us  
 Average TxOff 1135.8563 us

Channel	Sample	Range	Time Width (us)	Time Center (us)	Time After TxOn (us)
On1	3	3 - 3	27.778	69.444	61.301
On2	4	4 - 4	27.778	97.222	89.079
On3	5	5 - 5	27.778	125.000	116.856
On4	6	6 - 6	27.778	152.778	144.634
On5	7	7 - 7	27.778	180.556	172.412
On6	8	8 - 8	27.778	208.333	200.190
On7	9	9 - 9	27.778	236.111	227.967
On8	10	10 - 10	27.778	263.889	255.745
On9	11	11 - 11	27.778	291.667	283.523
On10	12	12 - 12	27.778	319.444	311.301
On11	13	13 - 13	27.778	347.222	339.079
On12	14	14 - 14	27.778	375.000	366.856
On13	15	15 - 15	27.778	402.778	394.634
On14	16	16 - 16	27.778	430.556	422.412
On15	17	17 - 17	27.778	458.333	450.190
On16	18	18 - 18	27.778	486.111	477.967

Channel	Sample	Range	Time Width (us)	Time Center (us)	Time After TxOff (us)
Off0	43	43 - 43	27.778	1180.556	44.699
Off1	44	44 - 44	27.778	1208.333	72.477
Off2	45	45 - 45	27.778	1236.111	100.255
Off3	46	46 - 46	27.778	1263.889	128.033
Off4	47	47 - 47	27.778	1291.667	155.810
Off5	48	48 - 48	27.778	1319.444	183.588
Off6	49	49 - 50	55.556	1361.111	225.255
Off7	51	51 - 52	55.556	1416.667	280.810
Off8	53	53 - 54	55.556	1472.222	336.366
Off9	55	55 - 56	55.556	1527.778	391.921
Off10	57	57 - 59	83.333	1597.222	461.366
Off11	60	60 - 62	83.333	1680.556	544.699
Off12	63	63 - 66	111.111	1777.778	641.922
Off13	67	67 - 72	166.667	1916.667	780.810
Off14	73	73 - 80	222.222	2111.111	975.255
Off15	81	81 - 93	361.111	2402.778	1266.922
Off16	94	94 - 113	555.556	2861.111	1725.255

#### 4.6. RMS DGR-33 ACQUISITION SYSTEM

In addition to the magnetics, altimeter and position data, six channels of real time processed off-time EM decay in the Z direction and one in the X direction are recorded by the RMS DGR-33 acquisition system at 10 samples per second and plotted real-time on the analogue chart recorder. These channels are derived by a binning, stacking and filtering procedure on the raw streaming data. The primary use of the RMS EM data (Z1 to Z6, X1) is to provide for real-time QA/QC on board the aircraft.

The channel window timing of the RMS DGR-33 6 channel system is described in the table below.

RMS Channel	Start time (µs)	End time (µs)	Width (µs)	Streaming Channels
Z1, X1	1269.8	1322.8	52.9	48-50
Z2	1322.8	1455.0	132.2	50-54
Z3	1428.6	1587.3	158.7	54-59
Z4	1587.3	1746.0	158.7	60-65
Z5	1746.0	2063.5	317.5	66-77
Z6	2063.5	2698.4	634.9	78-101



Figure 7. AeroTEM II Instrument Rack., including AeroDAS and RMS DGR-33 systems, AeroTEM power supply, data acquisition computer and AG-NAV2 navigation system.

#### **4.7. MAGNETOMETER BASE STATION**

The base magnetometer was a Geometrics G-859 cesium vapour magnetometer system with integrated GPS. Data logging and UTC time synchronisation was carried out within the magnetometer, with the GPS providing the timing signal. The data logging was configured to measure at 1.0 second intervals. Digital recording resolution was 0.001 nT. The sensor was placed on a tripod in an area of low magnetic gradient and free of cultural noise sources. A continuously updated display of the base station values was available for viewing and regularly monitored to ensure acceptable data quality and diurnal variation.

#### **4.8. RADAR ALTIMETER**

A Terra TRA 3500/TRI-30 radar altimeter is used to record terrain clearance. The antenna was mounted on the outside of the helicopter beneath the cockpit. Therefore, the recorded data reflect the height of the helicopter above the ground. The Terra altimeter has an altitude accuracy of +/- 1.5 metres.

#### **4.9. VIDEO TRACKING AND RECORDING SYSTEM**

A high resolution digital colour 8 mm video camera is used to record the helicopter ground flight path along the survey lines. The video is digitally annotated with GPS position and time and can be used to verify ground positioning information and cultural causes of anomalous geophysical responses.



Figure 8. Digital video camera typical mounting location.

#### **4.10. GPS NAVIGATION SYSTEM**

The navigation system consists of an Ag-Nav Incorporated AG-NAV2 GPS navigation system comprising a PC-based acquisition system, navigation software, a deviation indicator in front of the aircraft pilot to direct the flight, a full screen display with controls in front of the operator, a Mid-Tech RX400p WAAS-enabled GPS receiver mounted on the instrument rack and an antenna mounted on the magnetometer bird. WAAS (Wide Area Augmentation System) consists of approximately 25 ground reference stations positioned across the United States that monitor GPS satellite data. Two master stations located on the east and west coasts collect data from the reference stations and create a GPS correction message. This correction accounts for GPS satellite orbit and clock drift plus signal delays caused by the atmosphere and ionosphere. The corrected differential message is then broadcast through one of two geostationary satellites, or satellites with a fixed position over the equator. The corrected position has a published accuracy of less than 3 metres.

Survey co-ordinates are set up prior to the survey and the information is fed into the airborne navigation system. The co-ordinate system employed in the survey design was WGS84 [World] using the UTM zone 10N projection. The real-time differentially corrected GPS positional data was recorded by the RMS DGR-33 in geodetic coordinates (latitude and longitude using WGS84) at 0.2 s intervals.

#### **4.11. DIGITAL ACQUISITION SYSTEM**

The AeroTEM received waveform sampled during on and off-time at 120 channels per decay, 300 times per second, was logged by the proprietary AeroDAS data acquisition system. The channel sampling commences at the start of the Tx cycle and the width of each channel is 26.04 microseconds. The streaming data was recorded on a removable hard-drive and was later backed-up onto DVD-ROM from the field-processing computer.

The RMS Instruments DGR33A data acquisition system was used to collect and record the analogue data stream, i.e. the positional and secondary geophysical data, including processed 6 channel EM, magnetics, radar altimeter, GPS position, and time. The data was recorded on 128 Mb capacity FlashCard. The RMS output was also directed to a thermal chart recorder.

### **5. PERSONNEL**

The following Aeroquest personnel were involved in the project:

- Manager of Operations: Bert Simon
- Manager of Data Processing: Gord Smith
- Field Data Processor(s): Eicka Alinne Solano
- Field Operator: Gabriel Genier
- Data Interpretation and Reporting: Matt Pozza, Eric Steffler, Marion Bishop

The survey pilot, Ted Slavin, was employed directly by the helicopter operator – Hi-Wood Helicopters.

## **6. DELIVERABLES**

### **6.1. HARDCOPY DELIVERABLES**

The report includes a set of nine 1:10,000 maps. The survey area is covered by three map plates and three geophysical data products are delivered as listed below:

- TMI – Coloured Total Magnetic Intensity (TMI) with line contours and EM anomaly symbols.
- ZOFF3 – AeroTEM Z3 Off-time with line contours and EM anomaly symbols.
- EM – AeroTEM off-time profiles Z5 – Z15 and EM anomaly symbols.

The coordinate/projection system for the maps is NAD83 – UTM Zone 10N. For reference, the latitude and longitude in WGS84 are also noted on the maps.

All the maps show flight path trace, skeletal topography, and conductor picks represented by an anomaly symbol classified according to calculated off-time conductance. The anomaly symbol is accompanied by postings denoting the calculated off-time conductance, a thick or thin classification and an anomaly identifier label. The anomaly symbol legend and survey specifications are displayed on the left margin of the maps.

### **6.2. DIGITAL DELIVERABLES**

#### **6.2.1. Final Database of Survey Data (.GDB, .XYZ)**

The geophysical profile data is archived digitally in a Geosoft GDB binary format database. A description of the contents of the individual channels in the database can be found in Appendix 2. A copy of this digital data is archived at the Aeroquest head office in Mississauga.

#### **6.2.2. Geosoft Grid files (.GRD)**

Levelled Grid products used to generate the geophysical map images. Cell size for all grid files is 20 metres.

- Total Magnetic Intensity from Mag sensor on the tow cable (MagUF)
- AeroTEM Z Offtime Channel 3 (zoff3F)
- Tilt Derivative of TMI (TDRF)
- Digital Terrain Model (DTMF)

#### **6.2.3. Digital Versions of Final Maps (.MAP, .PDF)**

Map files in Geosoft .map and Adobe PDF format.

#### **6.2.4. Google Earth Survey Navigation Files (.KML)**

Flight navigation lines in Google earth KML format. Double click to view flight lines in Google Earth.

#### **6.2.5. Free Viewing Software (.EXE)**

- Geosoft Oasis Montaj Viewing Software
- Adobe Acrobat Reader
- Google Earth Viewer

#### **6.2.6. Digital Copy of this Document (.PDF)**

Adobe PDF format of this document.

### **7. DATA PROCESSING AND PRESENTATION**

All in-field and post-field data processing was carried out using Aeroquest proprietary data processing software and Geosoft Oasis Montaj software. Maps were generated using 36-inch wide Hewlett Packard ink-jet plotters.

#### **7.1. BASE MAP**

The geophysical maps accompanying this report are based on positioning in the NAD83 datum. The survey geodetic GPS positions have been projected using the Universal Transverse Mercator projection in Zone 10 North. A summary of the map datum and projection specifications is given following:

- Ellipse: GRS 1980
- Ellipse major axis: 6378137m eccentricity: 0.081819191
- Datum: North American 1983 - Canada Mean
- Datum Shifts (x,y,z) : 0, 0, 0 metres
- Map Projection: Universal Transverse Mercator Zone 10 (Central Meridian 123°W)
- Central Scale Factor: 0.9996
- False Easting, Northing: 500,000m, 0m

For reference, the latitude and longitude in WGS84 are also noted on the maps.

The background vector topography was sourced from Natural Resources Canada 1:50000 National Topographic Data Base data and the background shading was derived from NASA Shuttle Radar Topography Mission (SRTM) 90 metre resolution DEM data.

#### **7.2. FLIGHT PATH & TERRAIN CLEARANCE**

The position of the survey helicopter was directed by use of the Global Positioning System (GPS). Positions were updated five times per second (5 Hz) and expressed as WGS84 latitude and longitude calculated from the raw pseudo range derived from the C/A code signal. The instantaneous GPS flight path, after conversion to UTM co-ordinates, is drawn using linear interpolation between the x/y positions. The terrain clearance was maintained with reference

to the radar altimeter. The raw Digital Terrain Model (DTM) was derived by taking the GPS survey elevation and subtracting the radar altimeter terrain clearance values. The calculated topography elevation values are relative and are not tied in to surveyed geodetic heights.

Each flight included at least two high elevation ‘background’ checks. These high elevation checks are to ensure that the gain of the system remained constant and within specifications.

### **7.3. ELECTROMAGNETIC DATA**

The raw streaming data, sampled at a rate of 36,000 Hz (120 channels, 300 times per second) was reprocessed using a proprietary software algorithm developed and owned by Aeroquest Limited. Processing involves the compensation of the X and Z component data for the primary field waveform. Coefficients for this compensation for the system transient are determined and applied to the stream data. The stream data are then pre-filtered, stacked, binned to the 33 on and off-time channels and checked for the effectiveness of the compensation and stacking processes. The stacked data is then filtered, levelled and split up into the individual line segments. Further base level adjustments may be carried out at this stage. The filtering of the stacked data is designed to remove or minimize high frequency noise that can not be sourced from the geology.

The final field processing step was to merge the processed EM data with the other data sets into a Geosoft GDB file. The EM fiducial is used to synchronize the two datasets. The processed channels are merged into ‘array format; channels in the final Geosoft database as Zon, Zoff, Xon, and Xoff.

Apparent bedrock EM anomalies were interpreted with the aid of an auto-pick from positive peaks and troughs in the off-time Z channel responses correlated with X channel responses. The auto-picked anomalies were reviewed and edited by a geophysicist on a line by line basis to discriminate between thin and thick conductor types. Anomaly picks locations were migrated and removed as required. This process ensures the optimal representation of the conductor centres on the maps.

At each conductor pick, estimates of the off-time conductance have been generated based on a horizontal plate source model for those data points along the line where the response amplitude is sufficient to yield an acceptable estimate. Some of the EM anomaly picks do not display a Tau value; this is due to the inability to properly define the decay of the conductor usually because of low signal amplitudes. Each conductor pick was then classified according to a set of seven ranges of calculated off-time conductance values. For high conductance sources, the on-time conductance values may be used, since it provides a more accurate measure of high-conductance sources. Each symbol is also given an identification letter label, unique to each flight line. Conductor picks that did not yield an acceptable estimate of off-time conductance due to a low amplitude response were classified as a low conductance source. Please refer to the anomaly symbol legend located in the margin of the maps.

### **7.4. MAGNETIC DATA**

Prior to any levelling the magnetic data was subjected to a lag correction of -0.1 seconds and a spike removal filter. The filtered aeromagnetic data were then corrected for diurnal variations using the magnetic base station and the intersections of the tie lines. No corrections for the regional reference field (IGRF) were applied. The corrected profile data were interpolated on to a grid using a bi-directional grid technique with a grid cell size of 20 metres. The final levelled grid provided the basis for threading the presented contours which have a minimum contour interval of 25 nT.



## **8. GENERAL COMMENTS**

The survey was successful in mapping the magnetic and conductive properties of the geology throughout the survey area. Below is a brief interpretation of the results. For a detailed interpretation please contact Aeroquest Limited.

### **8.1. MAGNETIC RESPONSE**

The magnetic data provide a high resolution map of the distribution of the magnetic mineral content of the survey area. This data can be used to interpret the location of geological contacts and other structural features such as faults and zones of magnetic alteration. The sources for anomalous magnetic responses are generally thought to be predominantly magnetite because of the relative abundance and strength of response (high magnetic susceptibility) of magnetite over other magnetic minerals such as pyrrhotite.

### **8.2. EM ANOMALIES**

The EM anomalies on the maps are classified by conductance (as described earlier in the report) and also by the thickness of the source. A thin, vertically orientated source produces a double peak anomaly in the z-component response and a positive to negative crossover in the x-component response (Figure 8). For a vertically orientated thick source (say, greater than 10 metres), the response is a single peak in the z-component response and a negative to positive crossover in the x-component response (Figure 9). Because of these differing responses, the AeroTEM system provides discrimination of thin and thick sources and this distinction is indicated on the EM anomaly symbols (N = thin and K = thick). Where multiple, closely spaced conductive sources occur, or where the source has a shallow dip, it can be difficult to uniquely determine the type (thick vs. thin) of the source (Figure 10). In these cases both possible source types may be indicated by picking both thick and thin response styles. For shallow dipping conductors the 'thin' pick will be located over the edge of the source, whereas the 'thick' pick will fall over the downdip 'heart' of the anomaly.

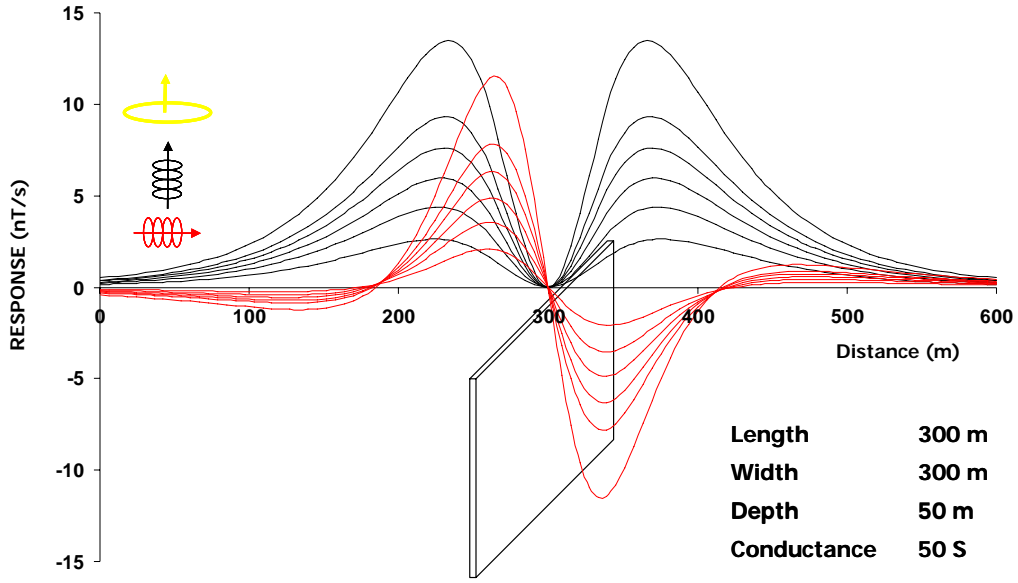


Figure 9. AeroTEM response to a 'thin' vertical conductor.

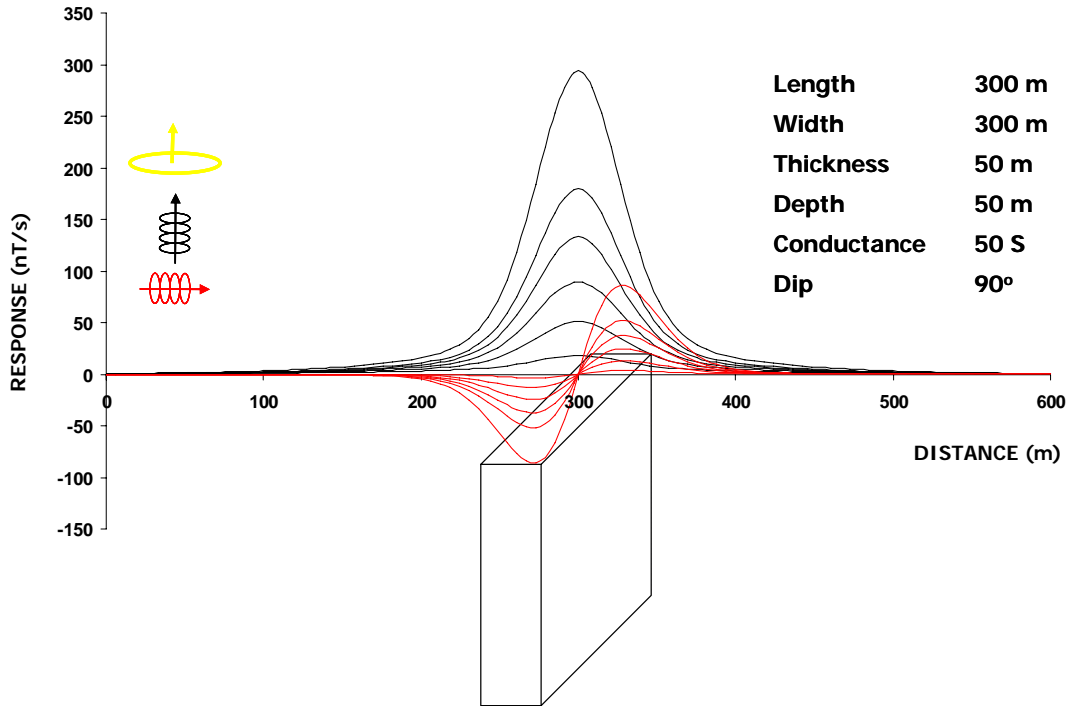


Figure 10. AeroTEM response for a 'thick' vertical conductor.

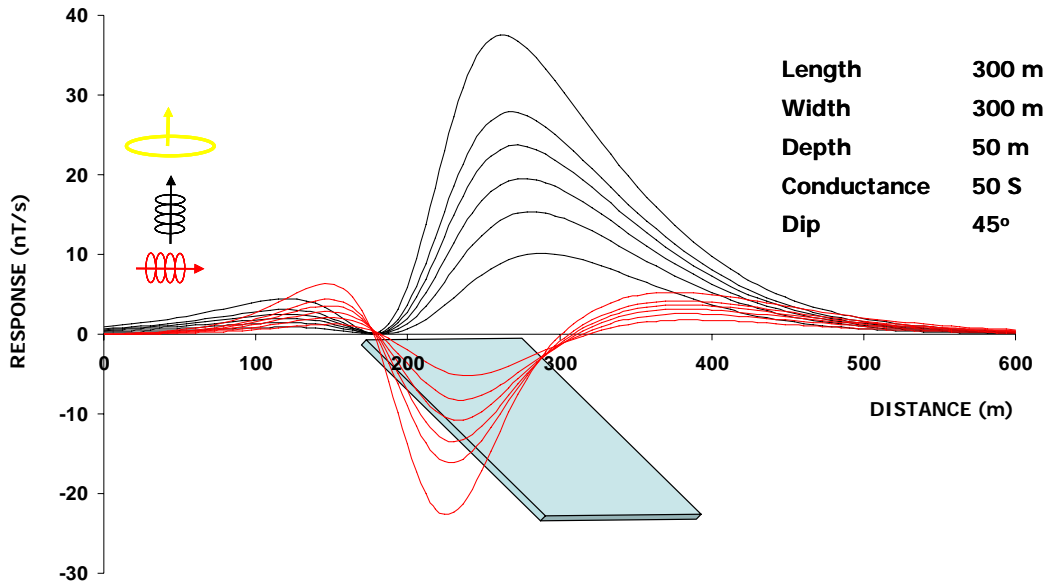


Figure 11. AeroTEM response over a 'thin' dipping conductor.

All cases should be considered when analyzing the interpreted picks and prioritizing for follow-up. Specific anomalous responses which remain as high priority should be subjected to numerical modeling prior to drill testing to determine the dip, depth and probable geometry of the source.

Respectfully submitted,

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Gord Smith  
 Aeroquest Limited  
 November, 2007

Reviewed By:

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Doug Garrie  
 Aeroquest Limited  
 November, 2007

## APPENDIX 1: SURVEY BOUNDARIES

The following table presents the South Claims block boundaries. All geophysical data presented in this report have been windowed to 100m outside these outlines. X and Y positions are in metres: NAD83 UTM Zone 10N.

X	Y
337699.3	5924186.3
335397.0	5921915.5
333729.0	5922073.0
333316.2	5922556.2
332902.0	5922575.0
331706.5	5923998.9
330919.0	5924028.0
330559.9	5924454.4
330091.0	5924477.0
329717.1	5924978.4
329326.0	5924986.0
328932.0	5925470.0
328555.3	5925919.9
328106.0	5925933.0
327302.5	5926922.2
326101.0	5926966.0
325715.5	5927446.2
325278.0	5927461.0
324903.0	5927894.2
324482.0	5927911.0
324067.8	5928410.5
323267.0	5928431.0
322130.9	5929463.4
322130.9	5933151.6
321638.6	5933631.9
323735.0	5935711.3

## APPENDIX 2: MINING CLAIMS

From Government of British Columbia Mineral Titles Online (October 2007)

Tenure Number	Claim Name	Owner	Good To Date	Area (Ha)
555416	SHELLIE	Bot, John Chrisostom	2008/apr/11	76.988
555417	SHELLIE 2	Bot, John Chrisostom	2008/apr/12	269.414
528336	TARA	Boga, Iqbal	2008/feb/15	462.216
538989	SOUTH 13	Bass, Christopher	2008/aug/09	481.247
538991	SOUTH 14	Bass, Christopher	2008/aug/09	481.545
538992	SOUTH 15	Bass, Christopher	2008/aug/09	462.388
538993	SOUTH 16	Bass, Christopher	2008/aug/09	481.398
538994	SOUTH 17	Bass, Christopher	2008/aug/09	461.929
538998	SOUTH 18	Bass, Christopher	2008/aug/09	480.873
539010	SOUTH 21	Bass, Christopher	2008/aug/09	481.167
539013	SOUTH 22	Bass, Christopher	2008/aug/09	442.793
539014	SOUTH 23	Bass, Christopher	2008/aug/09	384.735
539018	SOUTH 25	Bass, Christopher	2008/aug/09	481.462
539024	SOUTH 31	Bass, Christopher	2008/aug/09	480.64
539037	SOUTH 39	Bass, Christopher	2008/aug/09	461.256
539038	SOUTH 40	Bass, Christopher	2008/aug/09	461.301
539041	SOUTH 41	Bass, Christopher	2008/aug/09	480.673
539042	SOUTH 42	Bass, Christopher	2008/aug/09	480.74
539043	SOUTH 43	Bass, Christopher	2008/aug/09	481.047
539044	SOUTH 44	Bass, Christopher	2008/aug/09	461.715
539054	SOUTH 45	Bass, Christopher	2008/aug/09	442.279
562423	CHEL	Bass, Christopher	2008/aug/09	461.794
562424	CHEL1	Bass, Christopher	2008/aug/09	461.661
562425		Bass, Christopher	2008/aug/09	461.616
562427	CHEL3	Bass, Christopher	2008/aug/09	403.973
562428	CHEL4	Bass, Christopher	2008/aug/09	134.743
562430	CHEL6	Bass, Christopher	2008/aug/09	462.065
562431	CHEL7	Bass, Christopher	2008/aug/09	346.667
531386	WEST 13	Goldmember Ventures Corp.	2008/apr/06	480.31

### APPENDIX 3: DESCRIPTION OF DATABASE FIELDS

The GDB file is a Geosoft binary database. In the database, the Survey lines and Tie Lines are prefixed with an "L" for "Line" and "T" for "Tie".

COLUMN	UNITS	DESCRIPTOR
Line		Line number
Flight		Flight #
emfid		AERODAS Fiducial
utctime	hh:mm:ss.ss	UTC time
x	m	UTM Easting (NAD83, Zone 10N)
y	m	UTM Northing (NAD83, Zone10N)
Galtf	M	GPS altitude of Mag bird
bheight	m	Terrain clearance of EM bird
dtm	m	Digital Terrain Model
magUf	nT	Final levelled total magnetic intensity from upper mag sensor installed in a bird 17 m above the EM bird.
magLf	nT	Final levelled total magnetic intensity from lower mag sensor installed on the tail of the EM bird.
Basemagf	nT	Base station total magnetic intensity
Zon	nT/s	Processed Streaming On-Time Z component Channels 1-16
Zoff	nT/s	Processed Streaming Off-Time Z component Channels 0-16
Xon	nT/s	Processed Streaming On-Time X component Channels 1-16
Xoff	nT/s	Processed Streaming Off-Time X component Channels 0-16
Anom_labels		Alphanumeric label of conductor pick
Off_Con	S	Off-time conductance at conductor pick
Off_Tau	μs	Off-time decay constant at conductor pick
Anom_ID		Anomaly Character (K= thick, N = thin)
grade		Classification from 1-7 based on conductance of conductor pick
pwrline		powline monitor data channel
Off_allcon	S	Off-time conductance
Off_AllTau	μs	Off-time decay constant

## APPENDIX 4: AEROTEM ANOMALY LISTING

Line	Label	Anom_ID	Grade	emfid	bheight	galtf	Off_Con	Off_Tau	utctime	x	y
L10010	A	K	5	824100	30.30516	1081.038	23.065	480.259	17:19:22	321803.4	5933742
L10010	B	K	5	837390	33.95594	1107.518	20.853	456.649	17:37:05	322540.2	5934482
L10010	C	K	4	853800	39.88867	1117.337	19.574	442.427	17:58:58	323427.7	5935368
L10020	A	K	5	877050	37.87555	1121.189	29.936	547.135	18:29:58	323465.8	5935265
L10030	A	K	5	921450	38.99483	1112.16	20.452	452.244	19:29:10	322228.5	5933886
L10030	B	K	5	944610	35.82458	1127.025	30.332	550.741	20:00:02	323513.6	5935168
L10040	A	K	5	966900	33.47877	1124.912	28.965	538.193	20:29:46	323589.4	5935113
L10050	A	K	5	1035540	32.70903	1127.829	23.611	485.913	22:01:17	323588.5	5934968
L10060	A	K	4	1061610	35.58809	1133.821	15.244	390.439	22:36:02	323645.1	5934896
L10070	A	K	4	1123800	39.00335	1127.78	10.774	328.234	23:58:58	323419	5934514
L10070	B	K	3	1129830	45.4136	1140.281	9.995	316.143	0:07:00	323701.8	5934810
L10080	A	K	4	1157160	31.16874	1137.047	11.811	343.67	0:43:26	323807.9	5934751
L10080	B	K	3	1162230	38.96435	1135.25	6.78	260.381	0:50:12	323494.3	5934447
L10090	A	K	4	1191570	52.38931	1110.871	13.958	373.598	1:29:19	322216.5	5932978
L10090	B	K	3	1209540	35.3307	1145.103	9.922	314.987	1:53:17	323144.1	5933969
L10090	C	K	3	1217430	52.72852	1155.539	7.095	266.368	2:03:48	323594.3	5934399
L10090	D	K	4	1222470	38.03449	1145.311	13.898	372.8	2:10:31	323830.3	5934638
L10100	A	K	3	1256280	37.38324	1159.15	8.048	283.692	2:55:36	323627.6	5934286
L10100	B	K	3	1262670	36.17569	1156.663	8.796	296.589	3:04:07	323199.4	5933875
L10100	C	K	4	1274850	53.19001	1116.885	18.856	434.231	3:20:22	322458.6	5933108
L10100	D	K	4	1279020	40.83354	1096.8	11.449	338.357	3:25:55	322203.2	5932865
L10110	A	K	4	1297710	42.76718	1121.661	14.283	377.932	3:50:50	322503.7	5933032
L10110	B	K	3	1311030	34.90214	1148.752	8.591	293.105	4:08:36	323176.5	5933720
L10110	C	K	4	1314630	28.94038	1164.007	15.169	389.478	4:13:24	323365	5933896
L10120	A	K	4	1363200	40.92895	1181.676	10.247	320.106	5:18:10	323638.6	5934036
L10120	B	K	4	1372980	48.67434	1151.383	14.017	374.389	5:31:12	323052.7	5933430
L10120	C	K	4	1383000	48.44784	1122.092	15.992	399.903	5:44:34	322455.6	5932845
L10130	A	K	4	1403610	38.11085	1117.447	14.8	384.706	6:12:02	322505.2	5932752
L10130	B	K	4	1412460	37.589	1143.562	16.383	404.761	6:23:50	322941.6	5933187
L10140	A	K	4	1471410	52.18512	1186.623	10.612	325.764	7:42:26	323646.8	5933764
L10140	B	K	5	1479150	37.2292	1155.008	22.161	470.753	7:52:46	323169.8	5933274
L10140	C	K	4	1482960	38.86307	1149.621	16.025	400.307	7:57:50	322954.3	5933048
L10140	D	K	4	1486590	39.52416	1141.364	15.132	388.993	8:02:41	322760.1	5932849
L10140	E	K	4	1490160	47.473	1115.735	13.776	371.163	8:07:26	322555.3	5932651
L10140	F	K	3	1494630	35.02043	1094.741	7.834	279.884	8:13:24	322294.9	5932400
L10150	A	K	5	1506180	45.09362	1106.821	24.824	498.242	8:28:48	322373.3	5932338
L10150	B	K	4	1514040	33.03567	1133.852	15.513	393.862	8:39:17	322778.4	5932739
L10150	C	K	4	1517340	39.44728	1149.878	15.357	391.878	8:43:41	322933.2	5932900
L10150	D	K	3	1532820	36.33187	1173.482	9.026	300.434	9:04:19	323708.9	5933671
L10160	A	K	3	1561290	40.47981	1163.846	5.75	239.796	9:42:17	324947.1	5934804
L10160	B	K	3	1584510	36.6345	1165.676	8.931	298.855	10:13:14	323608.7	5933433
L10160	C	K	5	1591260	36.34476	1160.163	22.357	472.835	10:22:14	323221.6	5933039
L10160	D	K	4	1596210	57.34504	1159.737	17.469	417.964	10:28:50	322930	5932743
L10160	E	K	3	1600230	49.73829	1114.226	9.513	308.436	10:34:12	322670	5932489

Line	Label	Anom_ID	Grade	emfid	bheight	galtf	Off_Con	Off_Tau	utctime	x	y
L10170	A	K	3	1622820	52.12314	1101.164	7.71	277.663	11:04:19	322376.7	5932039
L10170	B	K	3	1630110	35.00595	1104.128	9.779	312.721	11:14:02	322746.6	5932427
L10170	C	K	4	1634460	33.86839	1126.718	13.492	367.313	11:19:50	322948.3	5932621
L10170	D	K	4	1642680	32.61632	1155.458	15.049	387.934	11:30:48	323294.7	5932966
L10170	E	K	3	1648320	34.32307	1167.862	7.782	278.954	11:38:19	323554.7	5933230
L10180	A	K	4	1713480	38.82765	1162.015	10.353	321.759	13:05:12	323338.5	5932886
L10200	A	K	3	1849380	47.50331	1110.042	7.636	276.326	16:06:24	322947.6	5932179
L10210	A	K	2	1898790	42.95587	1175.215	2.737	165.442	17:12:17	323623	5932718
L10220	A	K	2	1946910	51.00395	1217.054	3.632	190.577	18:16:26	325005.6	5933980
L10220	B	K	2	1969770	48.63405	1172.741	3.859	196.443	18:46:55	323626.9	5932605
L10220	C	K	2	1978890	45.68869	1111.781	4.421	210.258	18:59:05	323090.3	5932038
L10230	A	K	2	2009460	29.80491	1063.694	2.255	150.157	19:39:50	322536	5931364
L10230	B	K	2	2022630	36.73999	1100.678	1.626	127.511	19:57:24	323203	5932035
L10230	C	K	3	2050230	41.30967	1192.589	5.124	226.362	20:34:12	324752.3	5933576
L10230	D	K	2	2056290	46.65355	1234.968	3.006	173.367	20:42:17	325098.7	5933939
L10240	A	K	2	2083800	30.85653	1188.364	3.012	173.537	21:18:58	324740.3	5933415
L10240	B	K	2	2107500	37.17051	1105.228	1.87	136.736	21:50:34	323331.1	5932016
L10240	C	K	2	2119950	33.11	1060.083	2.337	152.861	22:07:10	322613.8	5931304
L10250	A	K	2	2147130	35.51457	1055.716	2.024	142.26	22:43:24	322674.7	5931232
L10250	B	K	2	2159460	33.27815	1098.91	1.301	114.051	22:59:50	323387.9	5931933
L10250	C	K	2	2184540	43.77243	1194.093	2.152	146.688	23:33:17	324778.5	5933320
L10260	A	K	2	2225580	30.57643	1187.337	2.027	142.36	0:28:00	324846.9	5933257
L10260	B	K	1	2232210	36.75465	1202.043	0.599	77.396	0:36:50	324503.8	5932880
L10270	A	K	2	2331360	41.63411	1193.965	2.023	142.241	2:49:02	324928.7	5933200
L10280	A	K	2	2373450	32.70897	1186.065	1.719	131.113	3:45:10	325002.8	5933120
L10280	B	K	2	2386410	50.38859	1163.558	1.058	102.845	4:02:26	324249.3	5932360
L10290	A	K	4	2464200	62.1807	1146.142	11.511	339.283	5:46:10	323788.2	5931765
L10290	B	K	2	2465220	54.52811	1144.487	4.329	208.07	5:47:31	323843.7	5931821
L10290	C	K	5	2466630	45.97741	1144.934	21.93	468.29	5:49:24	323915.8	5931900
L10290	D	K	2	2474400	36.48589	1159.212	1.032	101.609	5:59:46	324315.7	5932311
L10290	E	K	2	2487720	45.67041	1199.64	1.09	104.409	6:17:31	325098.8	5933083
L10310	A	K	1	287790	39.72828	1182.397	0.416	64.497	5:32:24	325003.2	5932695
L10320	A	K	1	404370	37.21618	1181.377	0.166	40.736	8:07:55	325085.4	5932635
L10330	A	K	2	466950	37.58229	1192.16	1.661	128.864	9:31:22	325104.2	5932531
L10340	A	K	1	582930	37.76345	1189.158	0.165	40.568	12:06:00	325307.5	5932583
L10350	A	K	1	622950	41.81199	1205.599	0.043	20.698	12:59:22	325740.5	5932860
L10350	B	K	1	629310	33.90396	1192.121	0.629	79.299	13:07:50	325394.9	5932525
L10360	A	K	1	749700	37.59425	1203.605	0.133	36.534	15:48:22	325502.1	5932491
L10360	B	K	1	767790	43.79299	1213.235	0.65	80.596	16:12:24	326525.6	5933514
L10380	A	K	2	854280	43.6366	939.9118	4.345	208.444	18:07:48	322662.2	5929370
L10380	B	K	1	893340	42.65963	1168.192	0.021	14.561	18:59:53	324746.5	5931464
L10380	C	K	1	920310	44.64077	1215.261	0.247	49.698	19:35:50	326203.6	5932921
L10390	A	K	2	934590	42.35757	1167.659	4.101	202.514	19:54:53	326740.3	5933299
L10390	B	K	1	966720	41.31323	1166.842	0.031	17.605	20:37:43	324803.5	5931384
L10390	C	K	2	992490	42.62949	992.3491	1.826	135.121	21:12:05	323303.5	5929874
L10400	A	K	3	1016790	39.31823	940.996	6.918	263.025	21:44:29	322837.9	5929263
L10400	B	K	2	1029060	41.12191	1011.671	1.364	116.782	22:00:50	323560.1	5929983



Line	Label	Anom_ID	Grade	emfid	bheight	galtf	Off_Con	Off_Tau	utctime	x	y
L10400	C	K	1	1052880	52.48334	1166.373	0.083	28.75	22:32:36	324930.4	5931348
L10400	D	K	1	1076910	34.32607	1206.729	0.556	74.598	23:04:38	326242.9	5932668
L10400	E	K	2	1087500	38.64386	1162.02	3.555	188.537	23:18:46	326839.1	5933262
L10410	A	K	2	1101420	41.95995	1193.064	1.226	110.709	23:37:19	326353.3	5932627
L10410	B	K	1	1126560	36.15006	1148.494	0.099	31.444	0:10:50	324879.9	5931170
L10420	A	K	3	1176630	39.50607	940.1407	5.835	241.549	1:17:36	323058.3	5929199
L10420	B	K	1	1192260	32.49278	1028.087	0.861	92.772	1:38:26	323995.1	5930122
L10420	C	K	2	1235520	38.92865	1186.094	1.373	117.167	2:36:07	326410.7	5932553
L10430	A	K	2	1259850	40.76957	1177.41	1.352	116.262	3:08:34	326464.9	5932453
L10430	B	K	1	1266240	40.04076	1180.326	0.048	21.986	3:17:05	326105.1	5932097
L10430	C	K	2	1312230	35.16058	980.7131	2.594	161.045	4:18:24	323457.3	5929441
L10440	A	K	1	1355790	45.8645	1063.143	0.599	77.422	5:16:29	324454.8	5930305
L10440	B	K	2	1391550	46.57385	1175.544	1.576	125.529	6:04:10	326499.1	5932348
L10450	A	K	2	1408830	40.79925	1176.314	2.724	165.035	6:27:12	327162.4	5932873
L10450	B	K	2	1419240	40.1407	1167.984	1.55	124.518	6:41:05	326522.3	5932245
L10460	A	K	2	1512510	37.93917	1046.522	1.686	129.855	8:45:26	324589.7	5930152
L10460	B	K	2	1549140	35.61496	1160.917	1.526	123.514	9:34:17	326543.8	5932123
L10460	C	K	2	1564830	38.56544	1178.662	2.31	151.994	9:55:12	327281.5	5932859
L10470	A	K	2	1569930	33.45609	1180.546	3.168	178	10:02:00	327283.6	5932766
L10470	B	K	2	1621260	37.68587	1036.545	2.207	148.561	11:10:24	324355.8	5929793
L10470	C	K	2	1629810	34.86769	994.6911	4.178	204.405	11:21:50	323847.3	5929271
L10480	A	K	2	1670490	39.78539	1027.861	3.028	174.011	12:16:05	324231.6	5929515
L10480	B	K	2	1713390	41.97155	1167.573	1.351	116.243	13:13:17	326705	5932009
L10490	A	K	2	1786380	32.99183	1028.307	2.453	156.633	14:50:36	324443.2	5929585
L10490	B	K	2	1789110	31.09468	1019.178	2.265	150.485	14:54:14	324288.8	5929440
L10500	A	K	2	1825260	31.96228	988.6141	4.651	215.673	15:42:26	324042.2	5929045
L10500	B	K	2	1835100	33.72206	1034.58	2.772	166.496	15:55:34	324588	5929590
L10510	A	K	2	1905090	49.12175	1194.929	1.203	109.686	17:28:53	326922.5	5931786
L10510	B	K	2	1943520	26.98422	1027.908	2.181	147.666	18:20:07	324730.4	5929585
L10520	A	K	1	2029200	39.79259	1190.177	0.643	80.202	20:14:22	326950.2	5931674
L10520	B	K	2	2044560	27.59697	1188.364	1.55	124.505	20:34:50	327767.1	5932491
L10530	A	K	2	2053500	43.51577	1185.989	1.048	102.357	20:46:46	327637.1	5932239
L10530	B	K	1	2056680	40.17591	1192.866	0.817	90.368	20:51:00	327449.8	5932037
L10530	C	K	2	2104470	38.88848	1024.156	1.956	139.869	21:54:43	324569.1	5929146
L10540	A	K	2	2138160	34.27876	1024.666	1.979	140.674	22:39:34	324668.8	5929105
L10540	B	K	1	2194560	41.4113	1180.748	0.891	94.377	23:54:46	327926.2	5932366
L10550	A	K	1	2200620	47.60141	1183.305	0.912	95.473	0:02:50	327985.9	5932298
L10550	B	K	1	2202870	47.71576	1184.291	0.731	85.503	0:05:50	327849.4	5932168
L10550	C	K	1	2242350	41.08662	1019.21	0.434	65.909	0:58:29	325442.7	5929724
L10550	D	K	2	2249730	31.56358	1028.47	1.309	114.39	1:08:19	325036.9	5929340
L10550	E	K	2	2255310	38.50393	1022.896	1.079	103.894	1:15:46	324728.8	5929038
L10560	A	K	2	2285520	34.59349	1023.008	2.01	141.765	1:56:02	324885	5929030
L10560	B	K	2	2289270	41.29219	1034.715	1.318	114.794	2:01:02	325139.8	5929298
L10560	C	K	1	2295120	40.17075	1019.223	0.415	64.454	2:08:50	325526	5929697
L10570	A	K	2	2402880	39.6611	1022.373	1.494	122.226	4:32:31	324929.7	5928949
L10580	A	K	2	2435820	28.66853	1010.706	1.927	138.822	5:16:26	325024.5	5928902
L10590	A	K	2	2554680	38.29159	1008.708	1.559	124.868	7:54:55	325068.4	5928803

Line	Label	Anom_ID	Grade	emfid	bheight	galtf	Off_Con	Off_Tau	utctime	x	y
L10600	A	K	2	2590770	31.56771	1004.905	1.445	120.222	8:43:02	325179.4	5928768
L10600	B	K	1	2600070	43.07154	1011.408	0.202	44.959	8:55:26	325786.7	5929383
L10600	C	K	1	2631180	26.393	1204.162	0.033	18.259	9:36:55	327683	5931284
L10610	A	K	2	2705100	35.57274	1005.809	1.486	121.89	11:15:29	325213.5	5928662
L10640	A	K	1	2901750	37.02784	1010.347	0.357	59.733	15:37:41	326102.7	5929111
L10650	A	K	2	1106790	35.91475	1006.402	3.141	177.232	4:39:00	325557.3	5928436
L10650	B	K	3	1115730	66.96871	952.2355	7.287	269.936	4:50:55	325079.6	5927979
L10670	A	K	1	1251390	44.52845	1043.737	0.425	65.155	7:51:48	326504.7	5929111
L10680	A	K	1	1313940	41.45066	1047.478	0.397	62.971	9:15:12	326593.8	5929059
L10690	A	K	2	1416600	39.63856	1041.038	1.813	134.664	11:32:05	326214.9	5928538
L10690	B	K	3	1423380	34.78504	1025.746	5.153	226.992	11:41:07	325835.6	5928168
L10700	A	K	2	1458750	36.91374	1034.141	3.106	176.247	12:28:17	326053.7	5928229
L10700	B	K	2	1462920	38.80794	1042.204	1.676	129.469	12:33:50	326319.8	5928491
L10700	C	K	1	1492650	37.20118	1143.336	0.056	23.651	13:13:29	328050.6	5930227
L10710	A	K	1	1541460	31.34007	1134.846	0.124	35.223	14:18:34	328119.5	5930165
L10710	B	K	2	1574370	27.37653	1032.408	1.695	130.203	15:02:26	326412.4	5928450
L10720	A	K	3	1621590	36.73397	1036.635	6.082	246.627	16:05:24	326268.8	5928157
L10720	B	K	1	1653390	46.0023	1141.243	0.22	46.926	16:47:48	328187.9	5930090
L10730	A	K	1	1701330	38.47902	1131.159	0.202	44.914	17:51:43	328233.5	5929992
L10740	A	K	2	1771410	39.89849	1030.139	4.331	208.117	19:25:12	326367.3	5927979
L10740	B	K	1	1803120	49.76846	1145.509	0.091	30.236	20:07:26	328302.8	5929934
L10750	A	K	1	1853100	32.77554	1133.601	0.044	20.954	21:14:05	328341.1	5929804
L10750	B	K	2	1888980	31.16385	1018.436	3.753	193.731	22:02:00	326423.3	5927905
L10760	A	K	2	1923060	38.34165	1020.054	2.726	165.101	22:47:22	326474	5927794
L10820	A	K	1	1022670	29.53202	1055.657	0.839	91.611	9:40:12	327602.5	5928090
L10830	A	K	1	1144770	48.11469	1058.518	0.339	58.234	12:23:00	327942.4	5928264
L10840	A	K	1	1228050	36.41059	1049.61	0.266	51.615	14:14:02	327988.1	5928193
L10840	B	K	1	1232130	28.0327	1054.936	0.556	74.554	14:19:29	327756.9	5927959
L10850	A	K	1	1274880	31.63588	1043.78	0.688	82.93	15:16:29	327644.1	5927697
L10850	B	K	1	1278180	35.76866	1062.249	0.47	68.583	15:20:53	327820.5	5927880
L10850	C	K	1	1282290	44.50971	1053.883	0.239	48.873	15:26:22	328044.5	5928118
L10900	A	K	1	1638330	40.57881	1090.34	0.139	37.272	23:21:05	328974.8	5928332
L10910	A	K	1	1714890	40.80767	1128.602	0.94	96.94	1:03:10	329895.5	5929106
L10960	A	K	2	2009580	33.2378	1092.553	1.035	101.725	7:36:05	330502.8	5929001
L10960	B	K	1	2030850	31.74621	1085.2	0.747	86.418	8:04:26	329305	5927803
L10970	A	K	1	2109330	41.84785	1097.866	0.402	63.386	9:49:05	330582.2	5928941
L10980	A	K	1	2139450	33.08512	1094.457	0.358	59.817	10:29:14	330557.7	5928773
L10990	A	K	1	2241390	39.70715	1097.19	0.265	51.473	12:45:10	330520	5928596
L11000	A	K	1	2280540	41.66757	1098.539	0.52	72.144	13:37:22	330439.1	5928381
L11010	A	K	1	2375430	40.26515	1099.807	0.882	93.938	15:43:53	330303.1	5928113
L11020	A	K	1	2429280	47.09214	1103.011	0.777	88.152	16:55:46	330313	5927967
L11030	A	K	3	2481690	39.22698	995.5056	8.11	284.78	18:05:34	328718.4	5926227
L11030	B	K	1	2509560	45.64117	1122.114	0.719	84.821	18:42:43	330308.3	5927826
L11040	A	K	1	2565990	46.61058	1132.38	0.649	80.586	19:58:00	330315.3	5927695
L11050	A	K	1	2636430	45.10443	1128.526	0.399	63.152	21:31:50	330324.2	5927563
L11060	A	K	1	2699760	43.26666	1112.261	0.475	68.943	22:56:19	330334.2	5927438
L11070	A	K	2	2765580	30.72908	1111.565	1.863	136.488	0:24:05	329935.6	5926903

Line	Label	Anom_ID	Grade	emfid	bheight	galtf	Off_Con	Off_Tau	utctime	x	y
L11160	A	K	1	734280	42.56324	991.8428	0.539	73.448	12:01:36	329618.2	5925299
L11250	A	K	1	1410960	38.10923	1161.297	0.03	17.438	3:03:50	332772.8	5927198
L11250	B	K	1	1418730	33.81402	1143.342	0.01	7.529	3:14:12	333202	5927604
L11260	A	K	1	1434930	31.79694	1139.811	0.023	15.218	3:35:48	333205.6	5927484
L11270	A	K	1	1553040	35.32563	1156.175	0.03	17.374	6:13:17	333024.3	5927143
L11340	A	K	1	1967850	27.73485	1159.349	0.126	35.482	15:26:22	333966.3	5927102
L11360	A	K	1	2095890	35.73796	1164.828	0.083	28.89	18:17:05	334282.9	5927114
L11390	A	K	1	2321610	38.81031	1161.437	0.082	28.594	23:18:02	334242.8	5926668
L11460	A	K	1	973200	26.50498	1076.508	0.037	19.298	3:54:38	334092.5	5925516
L11480	A	K	1	1092360	30.02826	1090.394	0.153	39.059	6:33:31	334305.1	5925453
L11530	A	K	2	1410120	39.28111	995.5645	1.148	107.141	13:37:07	332870.7	5923326
L11530	B	K	1	1425570	48.09159	1078.117	0.032	17.967	13:57:43	334061.9	5924500
L11540	A	K	1	1491900	37.64724	1071.734	0.031	17.667	15:26:10	334105.4	5924402
L11630	A	K	1	2115060	31.6583	1019.085	0.122	34.934	5:17:07	334893.8	5923922
L11630	B	K	1	2123160	34.41954	1056.901	0.035	18.717	5:27:55	335537.5	5924580
L11650	A	K	2	2234400	44.39756	992.0773	2.418	155.508	7:56:14	333973.9	5922715
L11650	B	K	1	2251650	36.22681	1024.89	0.187	43.299	8:19:14	335204.6	5923943
L11650	C	K	1	2258850	42.07487	1049.974	0.12	34.647	8:28:50	335717.9	5924488
L11650	D	K	1	2265390	44.16957	1032.905	0.025	15.821	8:37:34	336191.5	5924957
L11680	A	K	1	2449110	34.95106	1021.962	0.361	60.108	12:42:31	335477	5923803
L11790	A	K	3	1199340	41.75407	1041.377	5.194	227.908	3:52:24	336503.5	5923275
L11800	A	K	2	1240050	28.33293	1032.893	1.929	138.872	4:46:43	337107.9	5923731
T19020	A	K	2	2509680	52.05507	1183.851	2.271	150.685	8:45:53	327861.8	5932107
T19020	B	K	1	2523570	40.93134	1224.818	0.317	56.304	9:04:24	328664.8	5931313
T19020	C	K	1	2559240	48.79428	1107.048	0.226	47.522	9:51:53	330750.6	5929207
T19020	D	K	3	2663400	32.37017	1038.332	5.942	243.759	12:10:46	336648.6	5923317
T19030	A	K	2	2808150	39.12005	1098.436	1.85	135.999	15:23:46	330246.9	5928348
T19030	B	K	1	2826990	35.08	1157.903	0.036	19.099	15:48:53	329269.7	5929324
T19030	C	K	2	2888430	42.23391	1193.788	1.115	105.597	17:10:53	326219.1	5932370
T19030	D	K	2	2915700	49.07457	1210.581	3.797	194.864	17:47:10	324919.3	5933678
T19030	E	K	5	2942160	32.67143	1122.443	28.999	538.51	18:22:26	323509.6	5935075
T19040	A	K	6	2973210	37.20818	1110.311	36.159	601.324	19:03:50	322648.7	5934595
T19040	B	K	3	2982180	37.79446	1145.065	9.506	308.315	19:15:48	323177.3	5934047
T19040	C	K	3	2990100	43.03453	1176.526	8.291	287.938	19:26:22	323669	5933546
T19040	D	K	2	3001920	34.91852	1207.354	2.288	151.251	19:42:07	324365.5	5932854
T19040	E	K	2	3031110	39.62088	1133.176	1.491	122.126	20:21:02	326018.8	5931194
T19040	F	K	1	3083100	29.26712	1083.594	0.286	53.49	21:30:22	328989.3	5928216
T19040	G	K	2	3089130	39.21207	1092.799	1.021	101.047	21:38:24	329355.4	5927861
T19040	H	K	1	3187380	33.21884	1012.783	0.736	85.807	23:49:24	334734.8	5922481
T19040	I	K	2	3194670	42.97058	990.4042	2.205	148.502	23:59:07	335143.6	5922064
T19050	A	K	4	170370	38.09025	1108.864	16.471	405.843	2:47:43	322141	5933689
T19050	B	K	4	178800	45.46556	1127.177	17.22	414.964	2:58:58	322656.2	5933181
T19050	C	K	4	183900	39.318	1152.901	14.35	378.818	3:05:46	322960.3	5932876
T19050	D	K	3	187740	36.79999	1157.909	8.433	290.399	3:10:53	323183.2	5932649
T19050	E	K	5	200070	46.56739	1154.584	21.684	465.658	3:27:19	323946.2	5931894
T19050	F	K	4	201720	40.6624	1172.029	17.197	414.692	3:29:31	324042.6	5931795
T19050	G	K	2	258660	37.19617	1062.62	1.32	114.895	4:45:26	327525.9	5928319

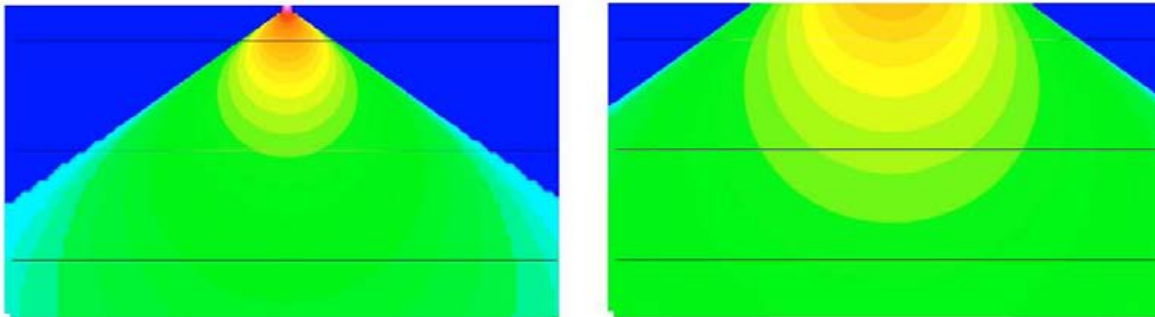
Line	Label	Anom_ID	Grade	emfid	bheight	galtf	Off_Con	Off_Tau	utctime	x	y
T19050	H	K	2	262800	31.41843	1058.919	1.674	129.399	4:50:58	327755.7	5928078
T19050	I	K	2	338970	45.91331	945.8346	2.717	164.844	6:32:31	332374	5923466
T19060	A	K	2	481080	35.37727	1033.834	2.891	170.028	9:42:00	326375.6	5928087
T19060	B	K	1	519810	43.01484	1054.667	0.911	95.472	10:33:38	324241.6	5930205
T19910	A	K	3	2037180	44.6085	1125.329	9.384	306.327	22:15:53	324013.4	5935392
T19910	B	K	2	2142780	45.92641	1127.377	1.047	102.336	0:36:41	330432.3	5930104
T19910	C	K	1	2151000	42.73291	1112.168	0.257	50.648	0:47:38	330956.7	5929668
T19910	D	K	1	2165910	38.31021	1122.577	0.027	16.532	1:07:31	331904.4	5928876
T19910	E	K	1	2185860	42.56036	1146.428	0.01	8.489	1:34:07	333251.8	5927781

## APPENDIX 5: AEROTEM DESIGN CONSIDERATIONS

Helicopter-borne EM systems offer an advantage that cannot be matched from a fixed-wing platform. The ability to fly at slower speed and collect data with high spatial resolution, and with great accuracy, means the helicopter EM systems provide more detail than any other EM configuration, airborne or ground-based. Spatial resolution is especially important in areas of complex geology and in the search for discrete conductors. With the advent of helicopter-borne high-moment time domain EM systems the fixed wing platforms are losing their *only* advantage – depth penetration.

### Advantage 1 – Spatial Resolution

The AeroTEM system is specifically designed to have a small footprint. This is accomplished through the use of concentric transmitter-receiver coils and a relatively small diameter transmitter coil (5 m). The result is a highly focused exploration footprint, which allows for more accurate “mapping” of discrete conductors. Consider the transmitter primary field images shown in Figure 1, for AeroTEM versus a fixed-wing transmitter.

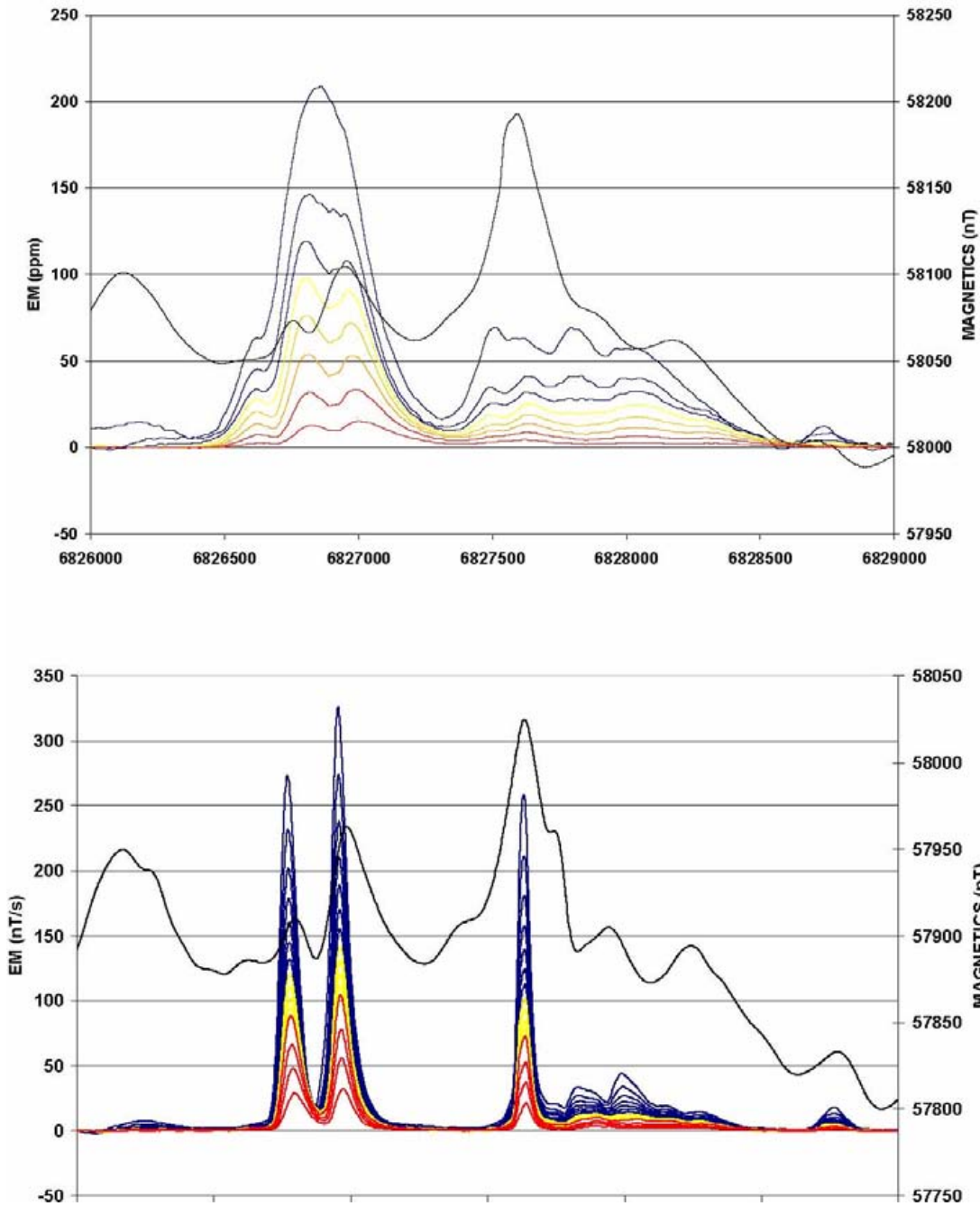


The footprint of AeroTEM at the earth's surface is roughly 50m on either side of transmitter

The footprint of a fixed-wing system is roughly 150 m on either side of the transmitter

**Figure 1. A comparison of the footprint between AeroTEM and a fixed-wing system, highlights the greater resolution that is achievable with a transmitter located closer to the earth's surface. The AeroTEM footprint is one third that of a fixed-wing system and is symmetric, while the fixed-wing system has even lower spatial resolution along the flight line because of the separated transmitter and receiver configuration.**

At first glance one may want to believe that a transmitter footprint that is distributed more evenly over a larger area is of benefit in mineral exploration. In fact, the opposite is true; by energizing a larger surface area, the ability to energize and detect discrete conductors is reduced. Consider, for example, a comparison between AeroTEM and a fixed-wing system over the Mesamax Deposit (1,450,000 tonnes of 2.1% Ni, 2.7% Cu, 5.2 g/t Pt/Pd). In a test survey over three flight lines spaced 100 m apart, AeroTEM detected the Deposit on all three flight lines. The fixed-wing system detected the Deposit only on two flight lines. In exploration programs that seek to expand the flight line spacing in an effort to reduce the cost of the airborne survey, discrete conductors such as the Mesamax Deposit can go undetected. The argument often put forward in favour of using fixed-wing systems is that because of their larger footprint, the flight line spacing can indeed be widened. Many fixed-wing surveys are flown at 200 m or 400 m. Much of the survey work performed by Aeroquest has been to survey in areas that were previously flown at these wider line spacings. One of the reasons for AeroTEM's impressive discovery record has been the strategy of flying closely spaced lines and finding all the discrete near-surface conductors. These higher resolution surveys are being flown within existing mining camps, areas that improve the chances of discovery.



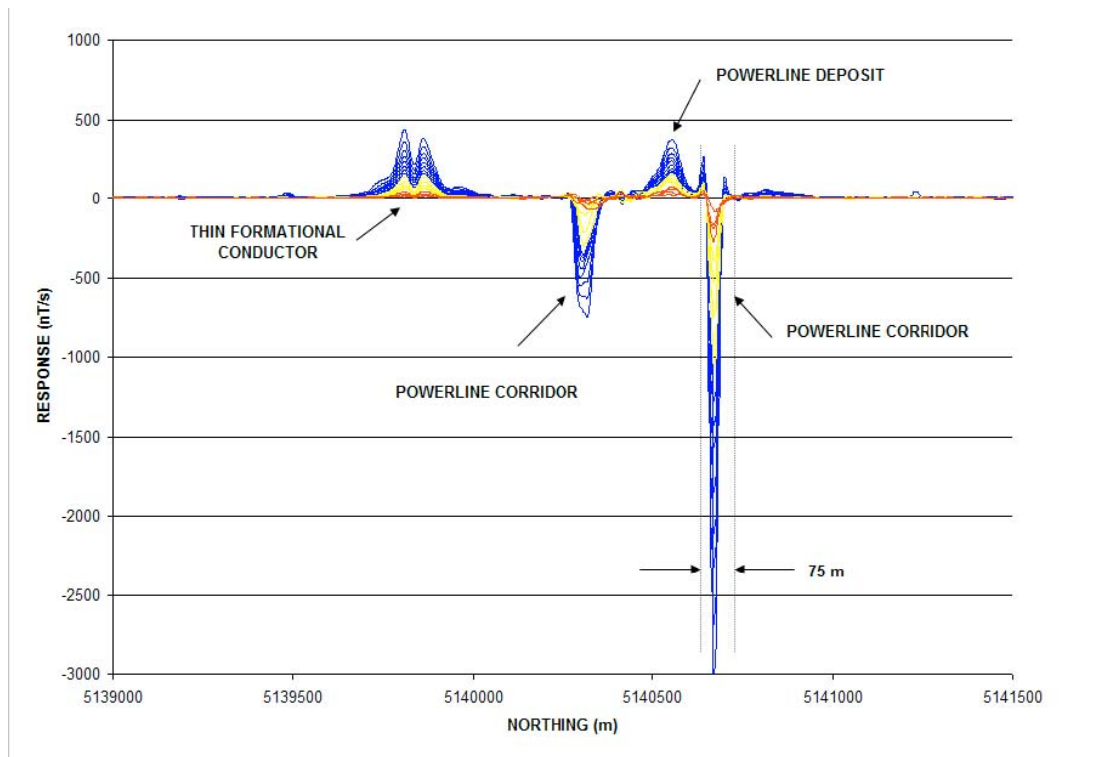
**Figure 2. Fixed-wing (upper) and AeroTEM (lower) comparison over the eastern limit of the Mesamax Deposit, a Ni-Cu-PGE zone located in the Raglan nickel belt and owned by Canadian Royalties. Both systems detected the Deposit further to the west where it is closer to surface.**

The small footprint of AeroTEM combined with the high signal to noise ratio (S/N) makes the system more suitable to surveying

in areas where local infrastructure produces electromagnetic noise, such as power lines and railways. In 2002 Aeroquest flew four exploration properties in the Sudbury Basin that were under option by FNX Mining Company Inc. from Inco Limited. One such property, the Victoria Property, contained three major power line corridors.

The resulting AeroTEM survey identified all the known zones of Ni-Cu-PGE mineralization, and detected a response between two of the major power line corridors but in an area of favorable geology. Three boreholes were drilled to test the anomaly, and all three intersected sulphide. The third borehole encountered 1.3% Ni, 6.7% Cu, and 13.3 g/t TPMs over 42.3 ft. The mineralization was subsequently named the Powerline Deposit.

The success of AeroTEM in Sudbury highlights the advantage of having a system with a small footprint, but also one with a high S/N. This latter advantage is achieved through a combination of a high-moment (high signal) transmitter and a rigid geometry (low noise). Figure 3 shows the Powerline Deposit response and the response from the power line corridor at full scale. The width of power line response is less than 75 m.

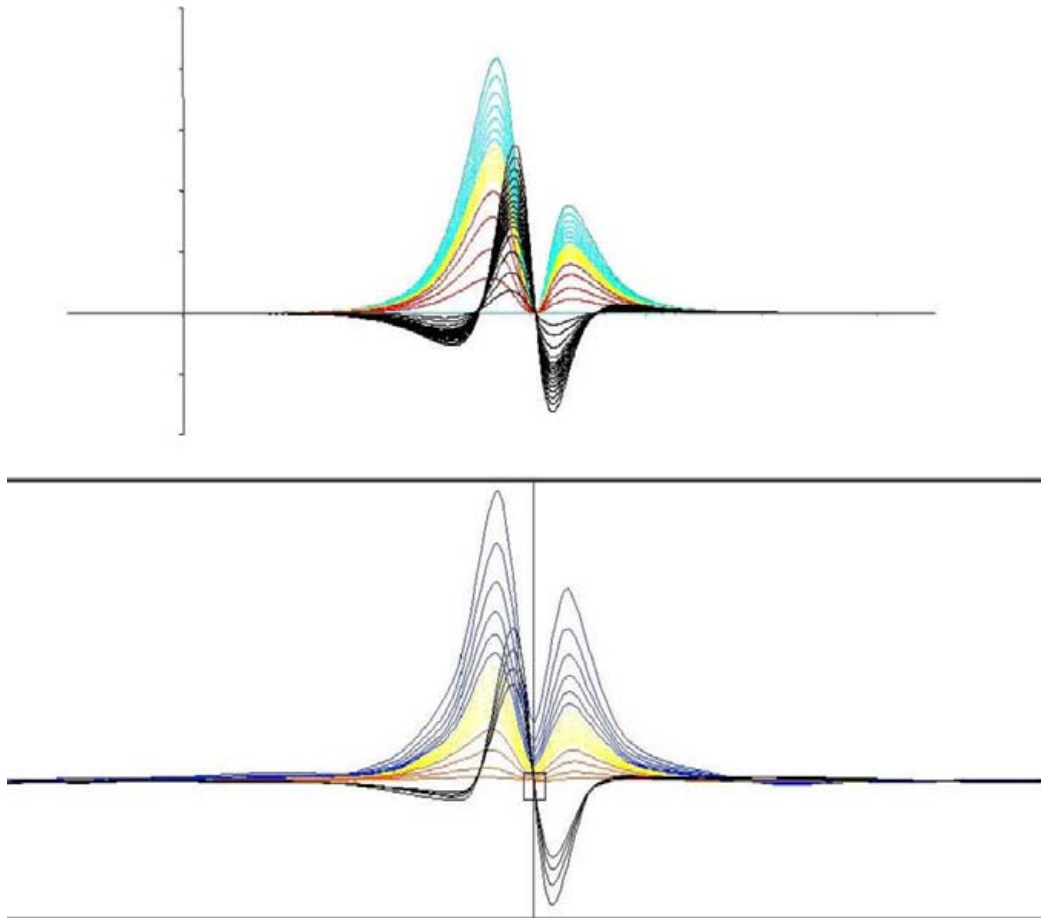


**Figure 3. The Powerline Deposit is located between two major power line corridors, which make EM surveying problematic. Despite the strong response from the power line, the anomaly from the Deposit is clearly detected. Note the thin formational conductor located to the south. The only way to distinguish this response from that of two closely spaced conductors is by interpreting the X-axis coil response.**

### **Advantage 2 – Conductance Discrimination**

The AeroTEM system features full waveform recording and as such is able to measure the on-time response due to high conductance targets. Due to the processing method (primary field removal), there is attenuation of the response with increasing conductance, but the AeroTEM on-time measurement is still superior to systems that rely on lower base frequencies to detect high conductance targets, but do not measure in the on-time.

The peak response of a conductive target to an EM system is a function of the target conductance and the EM system base frequency. For time domain EM systems that measure only in the off-time, there is a drop in the peak response of a target as the base frequency is lowered for all conductance values below the peak system response. For example, the AeroTEM peak response occurs for a 10 S conductor in the early off-time and 100 S in the late off-time for a 150 Hz base frequency. Because



**Figure 5. Measured (lower) and modeled (upper) AeroTEM responses are compared for a thin steeply dipping conductor. The response is characterized by two peaks in the Z-axis coil, and a cross-over in the X-axis coil that is centered between the two Z-axis peaks. The conductor dips toward the higher amplitude Z-axis peak. Using the X-axis cross-over is the only way of differentiating the Z-axis response from being two closely spaced conductors.**

### **HEM versus AeroTEM**

Traditional helicopter EM systems operate in the frequency domain and benefit from the fact that they use narrowband as opposed to wide-band transmitters. Thus all of the energy from the transmitter is concentrated in a few discrete frequencies. This allows the systems to achieve excellent depth penetration (up to 100 m) from a transmitter of modest power. The Aeroquest Impulse system is one implementation of this technology.

The AeroTEM system uses a wide-band transmitter and delivers more power over a wide frequency range. This frequency range is then captured into 16 time channels, the early channels containing the high frequency information and the late time channels containing the low frequency information down to the system base frequency. Because frequency domain HEM systems employ two coil configurations (coplanar and coaxial) there are only a maximum of three comparable frequencies per configuration, compared to 16 AeroTEM off-time and 12 AeroTEM on-time channels.

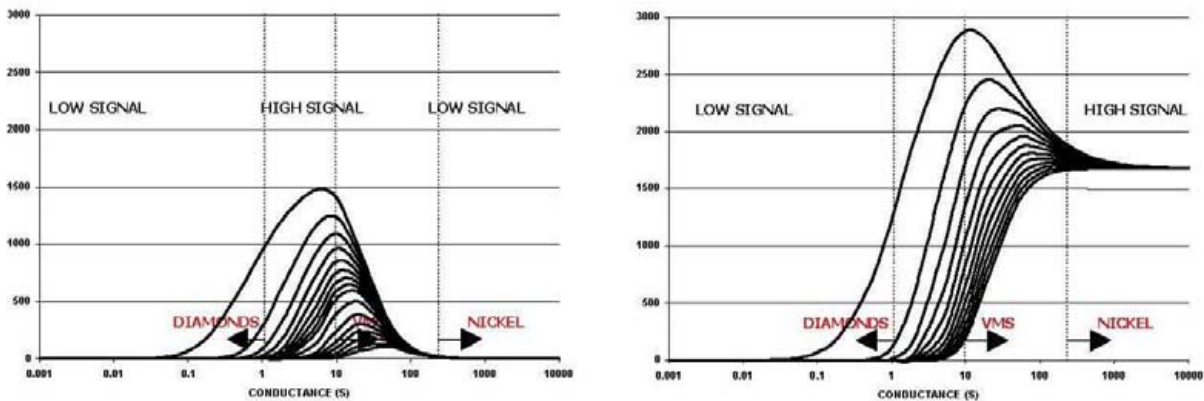


base frequency and conductance form a linear relationship when considering the peak response of any EM system, a drop in base frequency of 50% will double the conductance at which an EM system shows its peak response. If the base frequency were lowered from 150 Hz to 30 Hz there would be a fivefold increase in conductance at which the peak response of an EM occurred.

However, in the search for highly conductive targets, such as pyrrhotite-related Ni-Cu-PGM deposits, a fivefold increase in conductance range is a high price to pay because the signal level to lower conductance targets is reduced by the same factor of five. For this reason, EM systems that operate with low base frequencies are not suitable for general exploration unless the target conductance is more than 100 S, or the target is covered by conductive overburden.

Despite the excellent progress that has been made in modeling software over the past two decades, there has been little work done on determining the optimum form of an EM system for mineral exploration. For example, the optimum configuration in terms of geometry, base frequency and so remain unknown. Many geophysicists would argue that there is no single ideal configuration, and that each system has its advantages and disadvantages. We disagree.

When it comes to detecting and discriminating high-conductance targets, it is necessary to measure the pure inphase response of the target conductor. This measurement requires that the measured primary field from the transmitter be subtracted from the total measured response such that the secondary field from the target conductor can be determined. Because this secondary field is in-phase with the transmitter primary field, it must be made while the transmitter is turned on and the transmitter current is changing. The transmitted primary field is several orders of magnitude larger than the secondary field. AeroTEM uses a bucking coil to reduce the primary field at the receiver coils. The only practical way of removing the primary field is to maintain a rigid geometry between the transmitter, bucking and receiver coils. This is the main design consideration of the AeroTEM airframe and it is the only time domain airborne system to have this configuration.



The off-time AeroTEM response for the 16 channel configuration.

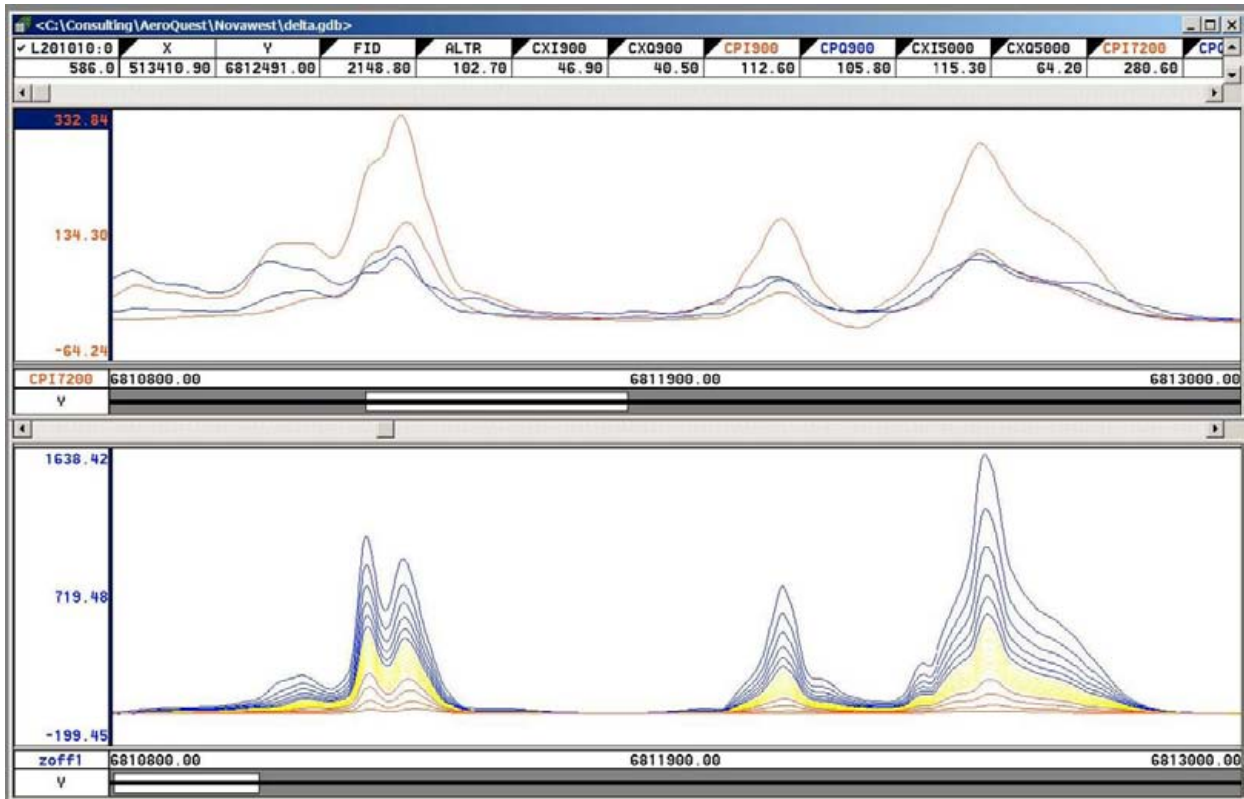
The on-time response assuming 100% removal of the measured primary field.

**Figure 4. The off-time and on-time response nomogram of AeroTEM for a base frequency of 150 Hz. The on-time response is much stronger for higher conductance targets and this is why on-time measurements are more important than lower frequencies when considering high conductance targets in a resistive environment.**

### Advantage 3 – Multiple Receiver Coils

AeroTEM employs two receiver coil orientations. The Z-axis coil is oriented parallel to the transmitter coil and both are horizontal to the ground. This is known as a maximum coupled configuration and is optimal for detection. The X-axis coil is oriented at right angles to the transmitter coil and is oriented along the line-of-flight. This is known as a minimum coupled configuration, and provides information on conductor orientation and thickness. These two coil configurations combined provide important information on the position, orientation, depth, and thickness of a conductor that cannot be matched by the traditional geometries of the HEM or fixed-wing systems. The responses are free from a system geometric effect and can be easily compared to model type curves in most cases. In other words, AeroTEM data is very easy to interpret. Consider, for example, the following modeled profile:

Figure 6 shows a comparison between the Dighem HEM system (900 Hz and 7200 Hz coplanar) and AeroTEM (Zaxis) from surveys flown in Raglan, in search of highly conductive Ni-Cu-PGM sulphide. In general, the AeroTEM peaks are sharper and better defined, in part due to the greater S/N ratio of the AeroTEM system over HEM, and also due to the modestly filtered AeroTEM data compared to HEM. The base levels are also better defined in the AeroTEM data. AeroTEM filtering is limited to spike removal and a 5-point smoothing filter. Clients are also given copies of the raw, unfiltered data.



**Figure 6. Comparison between Dighem HEM (upper) and AeroTEM (lower) surveys flown in the Raglan area. The AeroTEM responses appear to be more discrete, suggesting that the data is not as heavily filtered as the HEM data. The S/N advantage of AeroTEM over HEM is about 5:1.**

Aeroquest Limited is grateful to the following companies for permission to publish some of the data from their respective surveys: Wolfden Resources, FNX Mining Company Inc, Canadian Royalties, Nova West Resources, Aurogin Resources, Spectrem Air. Permission does not imply an endorsement of the AeroTEM system by these companies.

## APPENDIX 6: AEROTEM INSTRUMENTATION SPECIFICATION SHEET

# AEROTEM Helicopter Electromagnetic System

### System Characteristics

- Transmitter: Triangular Pulse Shape Base Frequency 150 Hz
- Tx On Time - 1,150 (150 Hz)  $\mu$ s
- Tx Off Time - 2,183 (150 Hz)  $\mu$ s
- Loop Diameter - 5 m
- Peak Current - 250 A
- Peak Moment - 38,800 NIA
- Typical Z Axis Noise at Survey Speed = 5 nT peak to peak
- Sling Weight: 270 Kg
- Length of Tow Cable: 40 m
- Bird Survey Height: 30 m nominal

### Receiver

- Two Axis Receiver Coils (x, z) positioned at centre of transmitter loop
- Selectable Time Delay to start of first channel 21.3 , 42.7, or 64.0 ms

### Display & Acquisition

- AERODAS Digital recording at 120 samples per decay curve at a maximum of 300 curves per second (27.778 $\mu$ s channel width)
- RMS Channel Widths: 52.9, 132.3, 158.7, 158.7, 317.5, 634.9  $\mu$ s
- Recording & Display Rate = 10 readings per second.
- On-board display - six channels Z-component and 1 X-component

### System Considerations

Comparing a fixed-wing time domain transmitter with a typical moment of 500,000 NIA flying at an altitude of 120 m with a Helicopter TDEM at 30 m, notwithstanding the substantial moment loss in the airframe of the fixed wing, the same penetration by the lower flying helicopter system would only require a sixty-fourth of the moment. Clearly the AeroTEM system with nearly 40,000 NIA has more than sufficient moment. The airframe of the fixed wing presents a response to the towed bird, which requires dynamic compensation. This problem is non-existent for AeroTEM since transmitter and receiver positions are fixed. The AeroTEM system is completely portable, and can be assembled at the survey site within half a day.

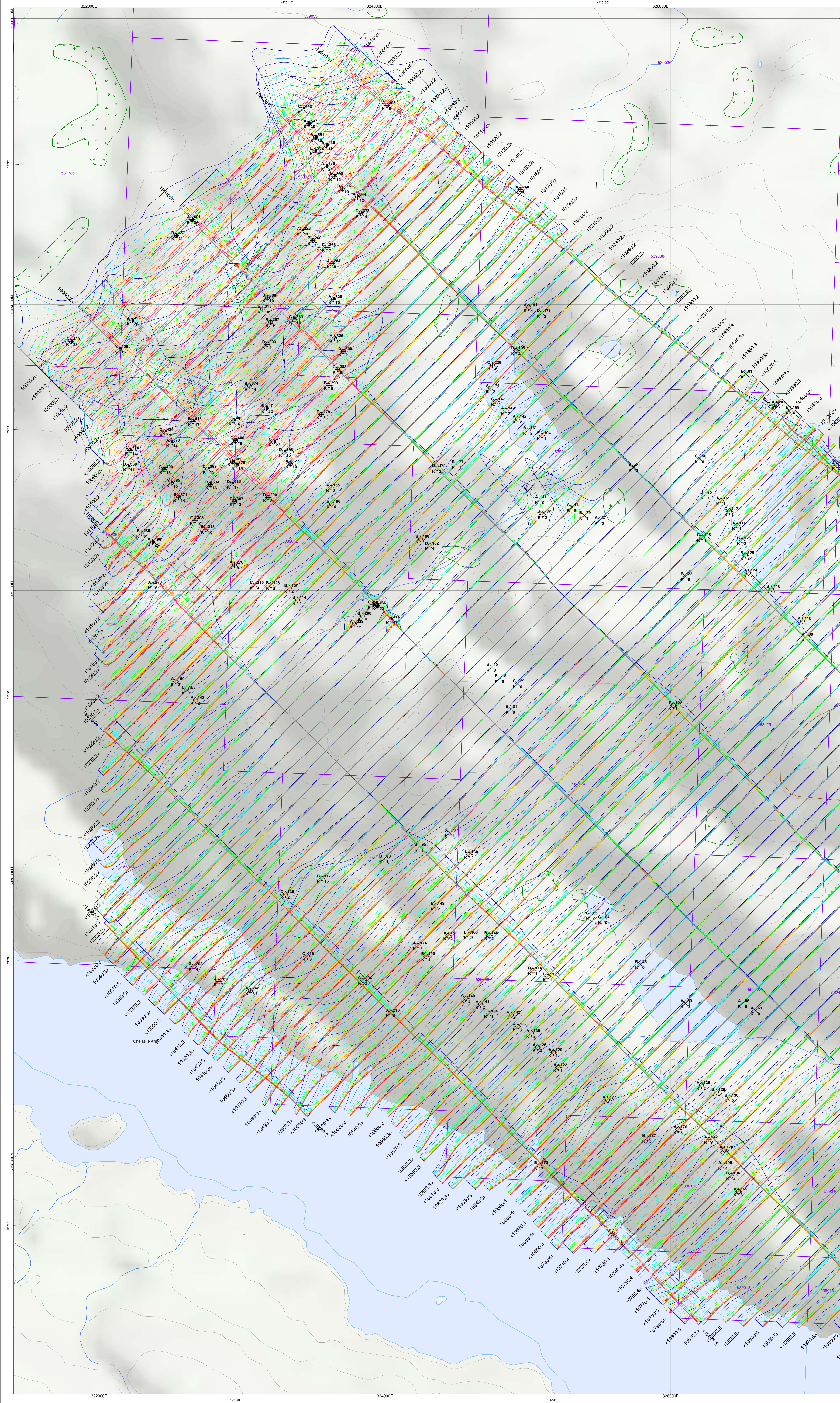


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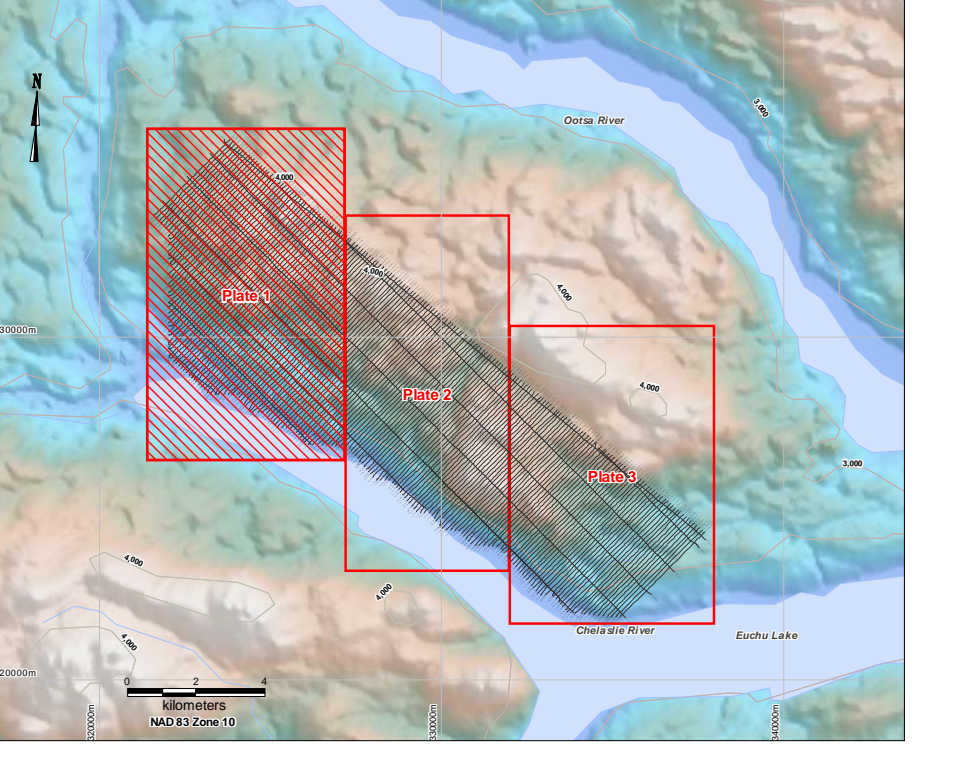
Euchu Lake

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Image © 2008 TerraMetrics

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The topographic data base was derived from 1:50,000 NRC (Natural Resources Canada) NTDB data.  
 Inset data derived from Natural Resources Canada Atlas of Canada Base Map.  
 This map accompanies the technical report entitled Report on a Helicopter-Borne Magnetic and Electromagnetic Survey, South Claims Property, Vanderhoof Area, British Columbia, by Aeroquest Limited, October 2007.  
 Grid North  
 NAD83-Zone10



- AerOTEM Profiles**  
 positive excursion to top and right, 1mm=15nT/s
- 25 Off-Time Channel
  - 26 Off-Time Channel
  - 27 Off-Time Channel
  - 28 Off-Time Channel
  - 29 Off-Time Channel
  - 210 Off-Time Channel
  - 211 Off-Time Channel
  - 212 Off-Time Channel
  - 213 Off-Time Channel
  - 214 Off-Time Channel
  - 215 Off-Time Channel

- Off-Time Anomaly Symbols**
- >50S
  - 35-50S
  - 20-35S
  - 10-20S
  - 5-10S
  - 1-5S
  - <1S
  - Cultural Sources
  - anomaly label
  - thick/thin source

**SURVEY SPECIFICATIONS**  
 Survey from: August 4 to 6, 2007  
 Traverse line spacing: 100 metres  
 Traverse line direction: 45° Azimuth (SW-NE)  
 Nominal EM bird height: 30 metres  
 Aircraft: Aerospaciale A-Star 5000G (C-FPTG)

**INSTRUMENTATION**  
 Data acquisition: ADAS & RMS DGR-33  
 Magnetometer: Geometrics G-823A cesium vapour  
 Installation: On EM bird  
 Sensitivity: .001 nanoTesla  
 Electromagnetics: AeroTEM II System (BRAVO)  
 Configuration: Towed bird

**NAVIGATION**  
 Navigation: Differential Global Positioning System (DGPS)  
 Navigation equipment: AGNAV with MD-TECH RX400p receiver  
 Radar Altimeter: Terra TRA3000/TRI-30

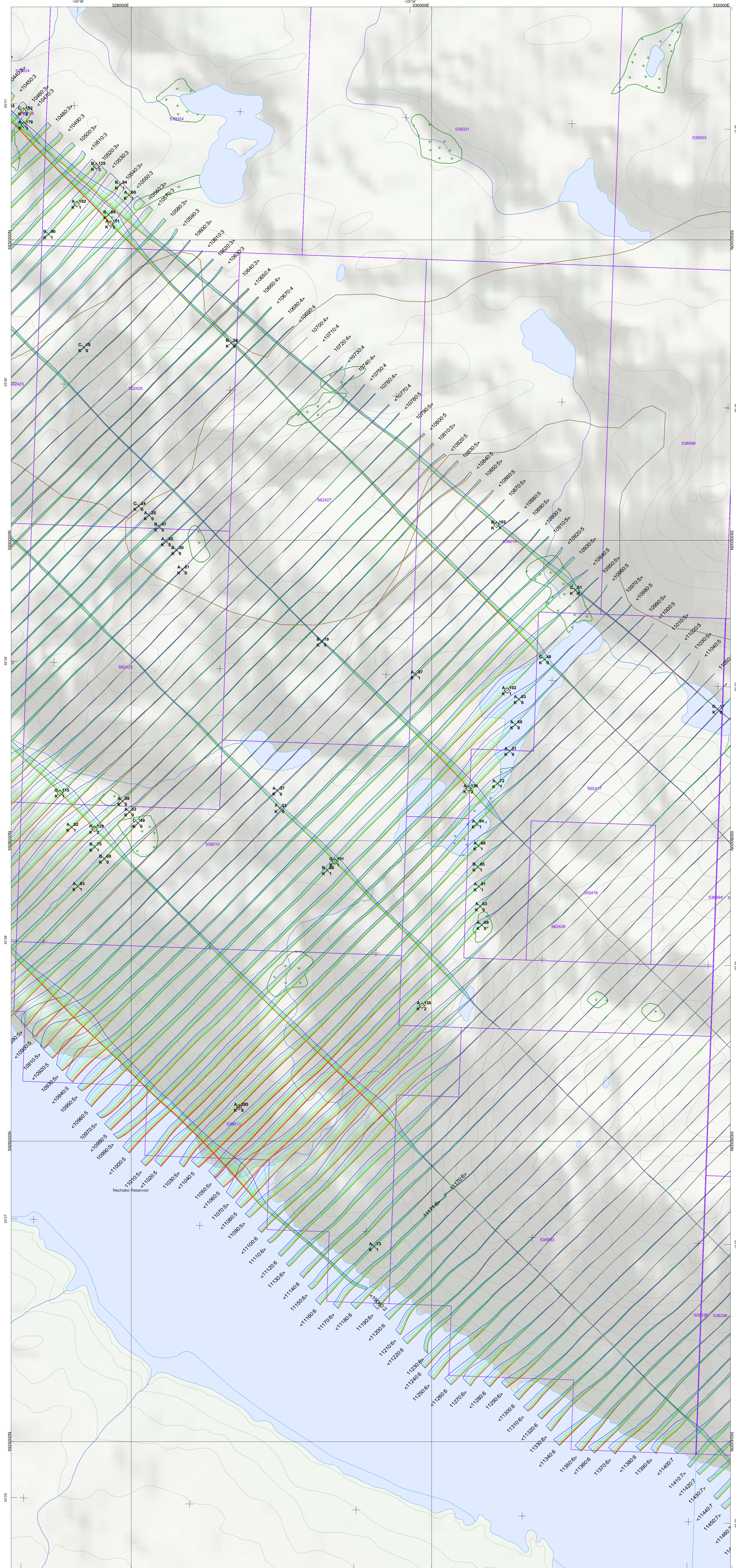
**DATA PROCESSING**  
 Magnetics: diurnal, telline and micro-leveling corrections

**POSITIONING**  
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 Major Axis: 6378137.000  
 Eccentricity: 0.081819191  
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 Projection: Universal Transverse Mercator  
 Central Meridian: 123°W (Zone 10)  
 Central Scale Factor: 0.9998  
 False Easting/Northing: 500,000m/0m

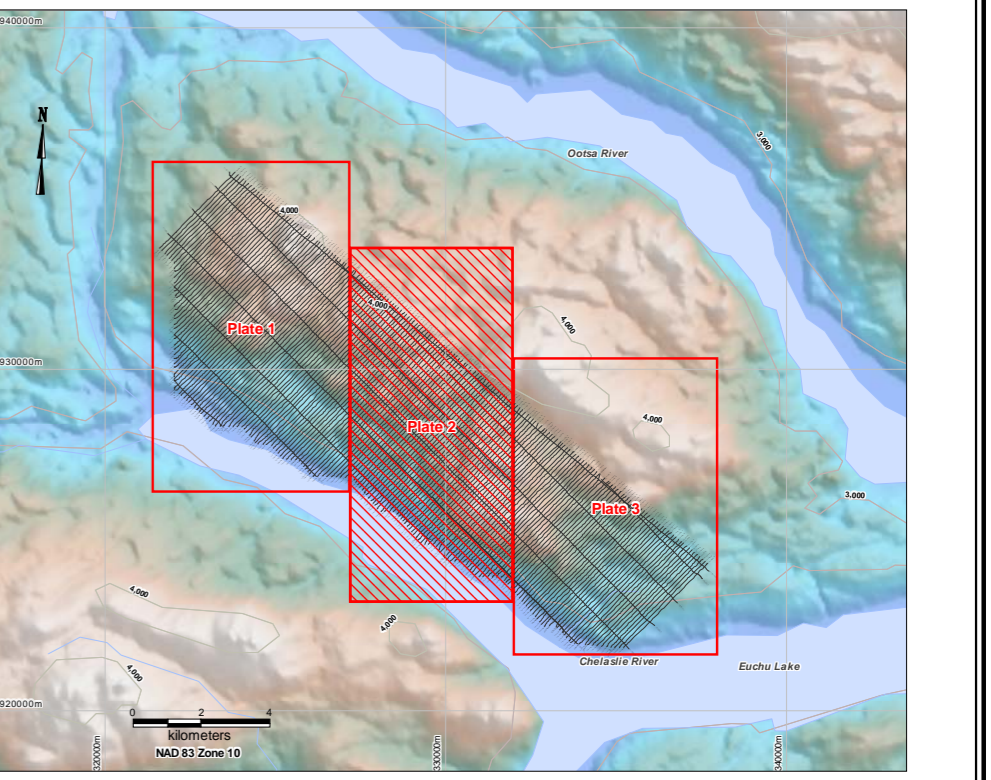
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 Vanderhoof Area, British Columbia

**AEROTEM OFF-TIME PROFILES**  
 South Claims Block, Plate 1  
 NTS 093F05, 06, 12



The topographic data base was derived from 1:50000 NRC (Natural Resources Canada) NTDB data.  
 Inset data derived from Natural Resources Canada 'Atlas of Canada Base Maps'.  
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- AeroTEM Profiles**  
 positive excursion to top and right, 1mm=15mT/s
- Z5 Off-Time Channel
  - Z6 Off-Time Channel
  - Z7 Off-Time Channel
  - Z8 Off-Time Channel
  - Z9 Off-Time Channel
  - Z10 Off-Time Channel
  - Z11 Off-Time Channel
  - Z12 Off-Time Channel
  - Z13 Off-Time Channel
  - Z14 Off-Time Channel
  - Z15 Off-Time Channel

- Off-Time Anomaly Symbols**
- >50S
  - 35-50S
  - 20-35S
  - 10-20S
  - 5-10S
  - 1-5S
  - <1S
- Cultural Sources**
- anomaly label A 125 decay constant (µs)
  - thickN source K 36 off-time conductance (S)

**SURVEY SPECIFICATIONS:**  
 Survey from: August 4 to 6, 2007  
 Traverse line spacing: 100 metres  
 Traverse line direction: 45° Azimuth (SW-NE)  
 Nominal EM bird height: 30 metres  
 Aircraft: Aerospaciale A-Star 350B2 (C-FPTG)

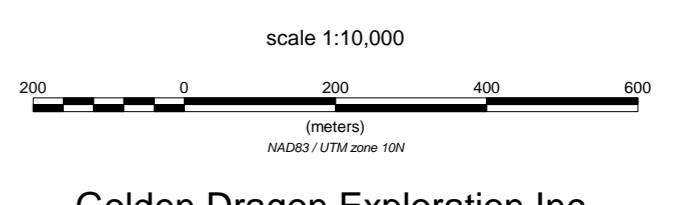
**INSTRUMENTATION:**  
 Data acquisition: ADAS & RMS DGR-33  
 Magnetometer: Geometrics G-823A cesium vapour  
 Installation: On EM bird  
 Sensitivity: 0.01 nanoTesla  
 Electromagnetics: AeroTEM II System (BRAVO)  
 Configuration: Towed bird

**NAVIGATION:**  
 Navigation equipment: AGNAV with MID-TECH RX400p receiver  
 Radar Altimeter: Terra TRA3000/TRI-30

**DATA PROCESSING:**  
 Magnetics: diurnal, tideline and micro-leveling corrections

**POSITIONING:**  
 Datum: NAD83  
 Major Axis: 6378137.000  
 Eccentricity: 0.081819191

**MAP PROJECTION:**  
 Projection: Universal Transverse Mercator  
 Central Meridian: 123°W (Zone 10)  
 Central Scale Factor: 0.9996  
 False Easting/Northing: 500,000m/0m

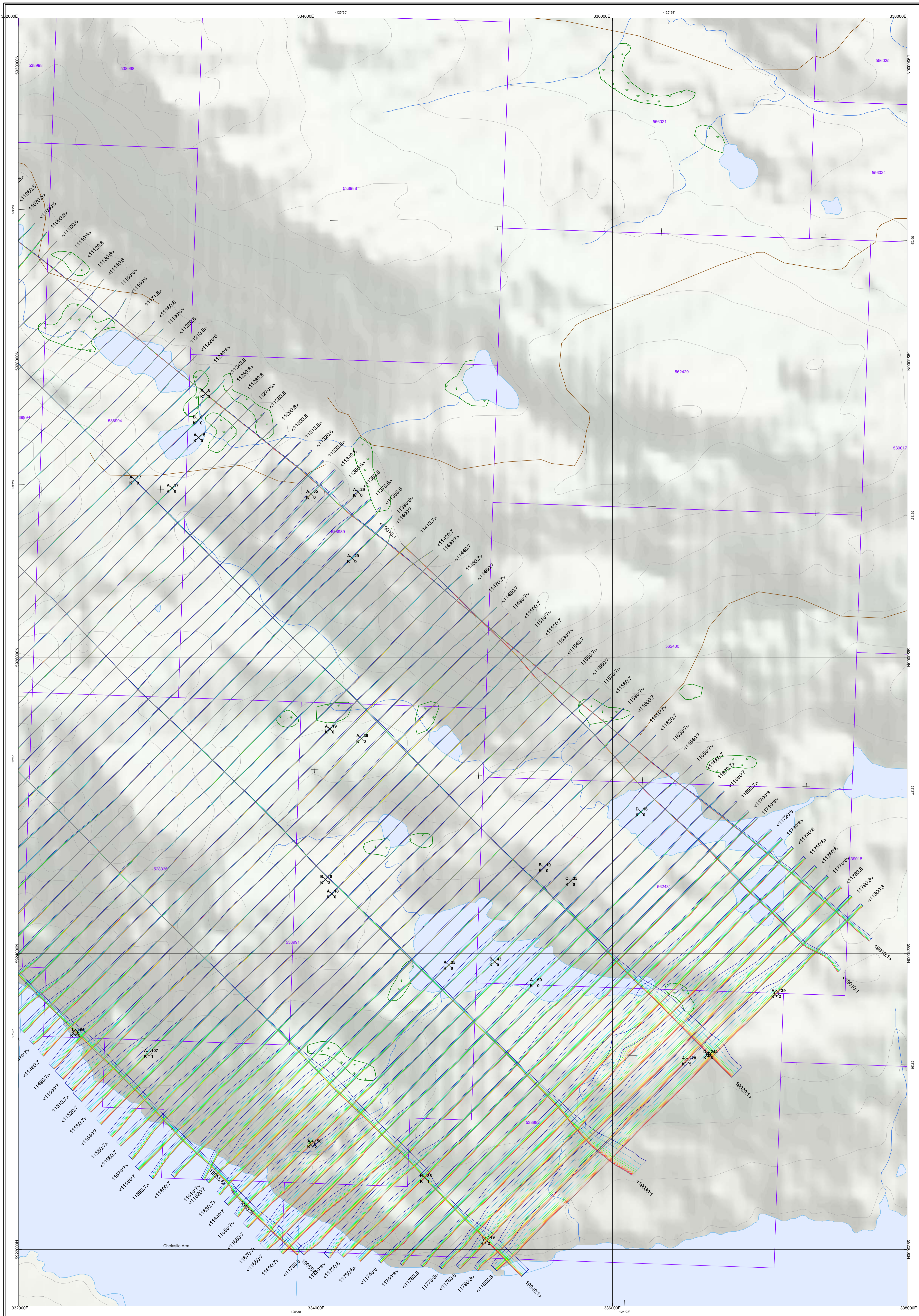


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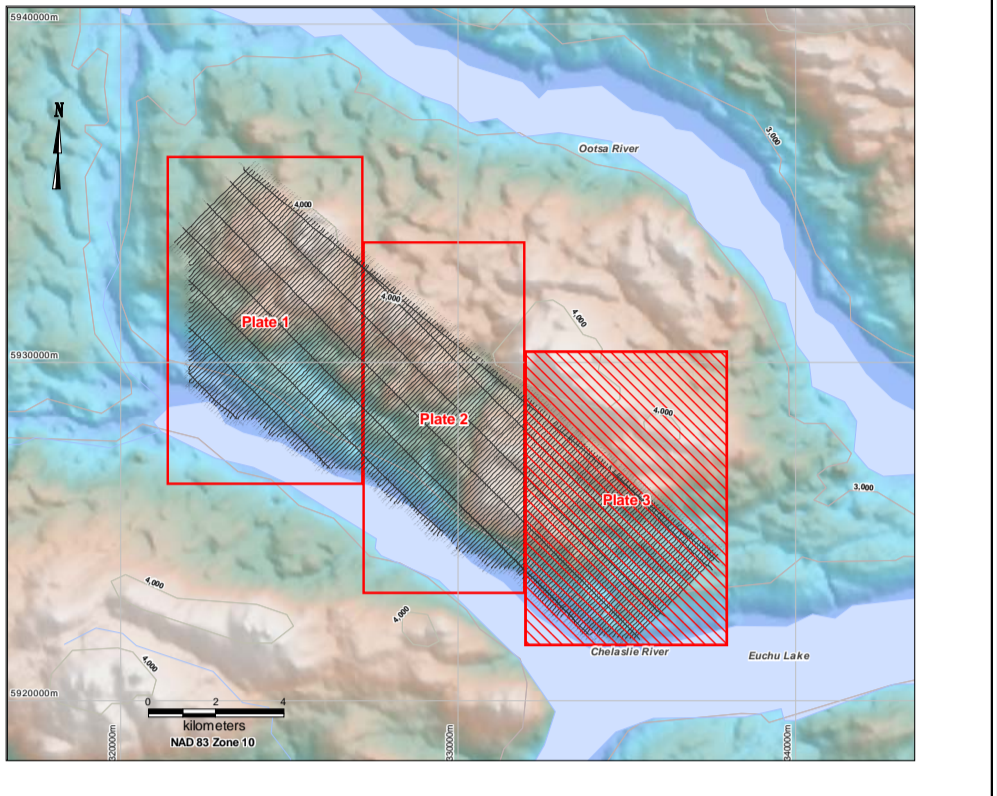
## AEROTEM OFF-TIME PROFILES

South Claims Block, Plate 2  
 NTS 093F05, 06, 12





The topographic data base was derived from 1:50000 NRC (Natural Resources Canada) NTDB data.  
 Inset data derived from Natural Resources Canada 'Atlas of Canada Base Maps'.  
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- AEROTEM Profiles**  
 positive excursion to top and right, 1mm=15nT/s
- 25 Off-Time Channel
  - 26 Off-Time Channel
  - 27 Off-Time Channel
  - 28 Off-Time Channel
  - 29 Off-Time Channel
  - 210 Off-Time Channel
  - 211 Off-Time Channel
  - 212 Off-Time Channel
  - 213 Off-Time Channel
  - 214 Off-Time Channel
  - 215 Off-Time Channel
- Off-Time Anomaly Symbols**
- >50S
  - 35-50S
  - 20-35S
  - 10-20S
  - 5-10S
  - 1-5S
  - <1S
- Cultural Sources
- anomaly label    decay constant (µs)  
 thick/n source    off-time conductance (S)

**SURVEY SPECIFICATIONS:**  
 Survey flown: August 4 to 6, 2007  
 Traverse line spacing: 100 metres  
 Traverse line direction: 45° Azimuth (SW-NE)  
 Nominal EM bird height: 30 metres  
 Aircraft: Aerospasiale A-Star 350B2 (C-FPTG)

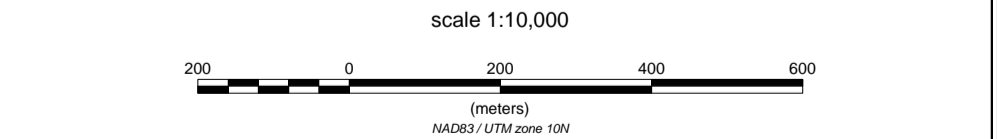
**INSTRUMENTATION:**  
 Data acquisition: ADAS & RMS DGR-33  
 Magnetometer: Geometrics G-823A cesium vapour  
 Installation: On EM bird  
 Sensitivity: .001 nanoTesla  
 Electromagnetics: AeroTEM II System (BRAVO)  
 Configuration: Towed bird

**NAVIGATION:**  
 Navigation: Differential Global Positioning System (DGPS)  
 Navigation equipment: AGNAV with MD-TECH RX400p receiver  
 Radar altimeter: Terra TRA5000/RS-30

**DATA PROCESSING**  
 Magnetics: diurnal, sideline and micro-leveling corrections

**POSITIONING**  
 Datum: NAD83  
 Major Axis: 6378137.000  
 Eccentricity: 0.081819191

**MAP PROJECTION**  
 Projection: Universal Transverse Mercator  
 Central Meridian: 123°W (Zone 10)  
 Central Scale Factor: 0.9996  
 False Easting/Northing: 500,000m/0m



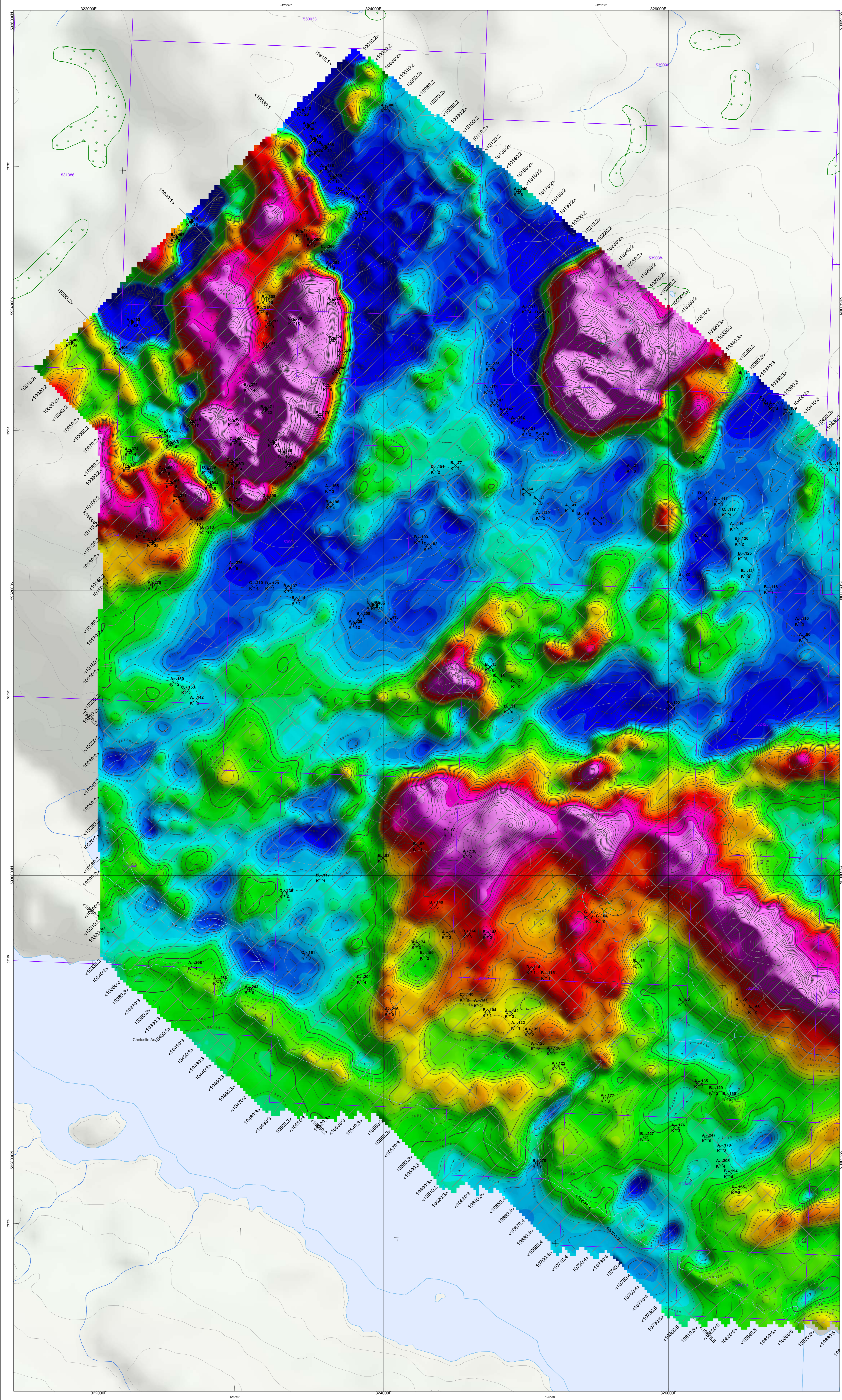
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 Vanderhoof Area, British Columbia

**AEROTEM OFF-TIME  
 PROFILES**

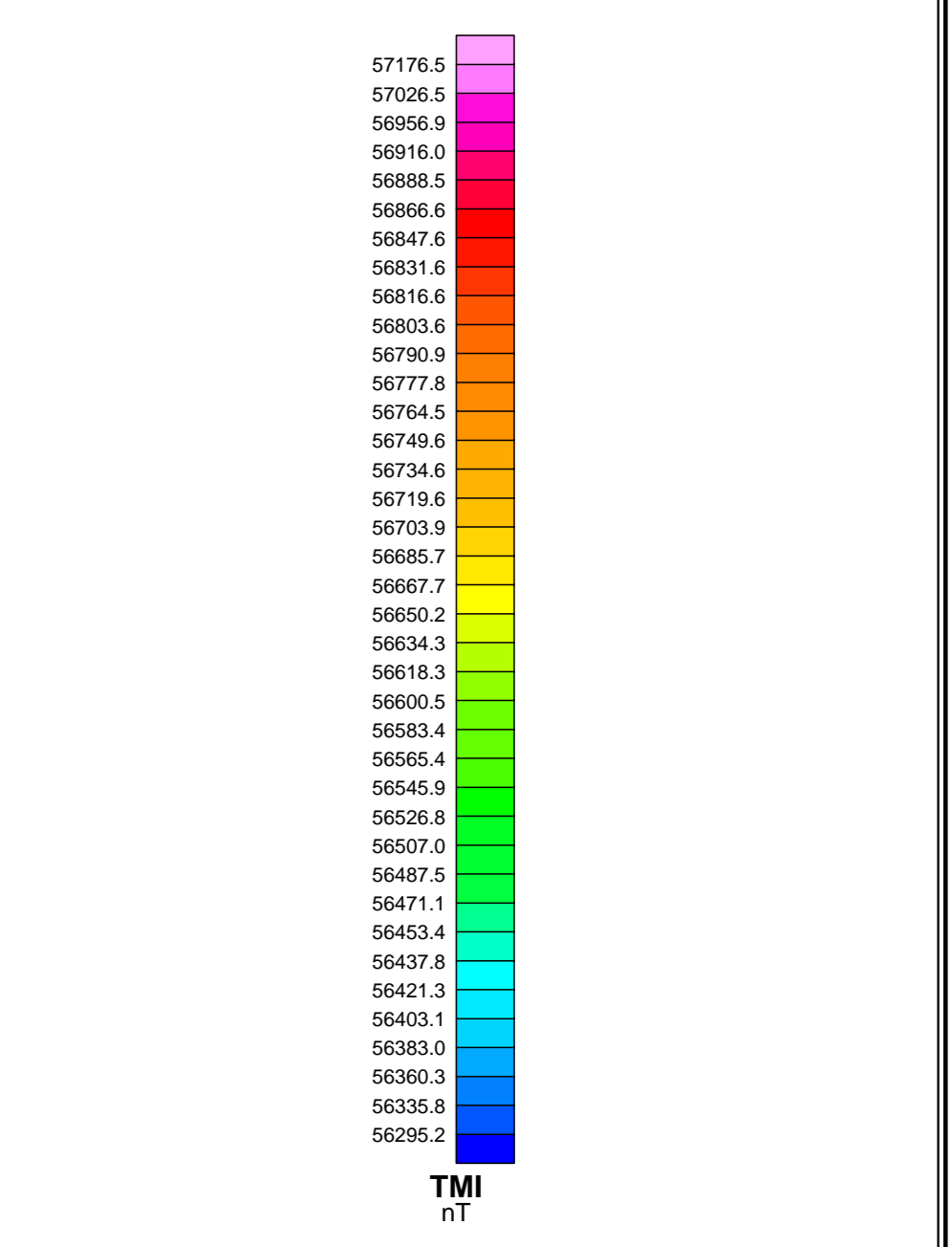
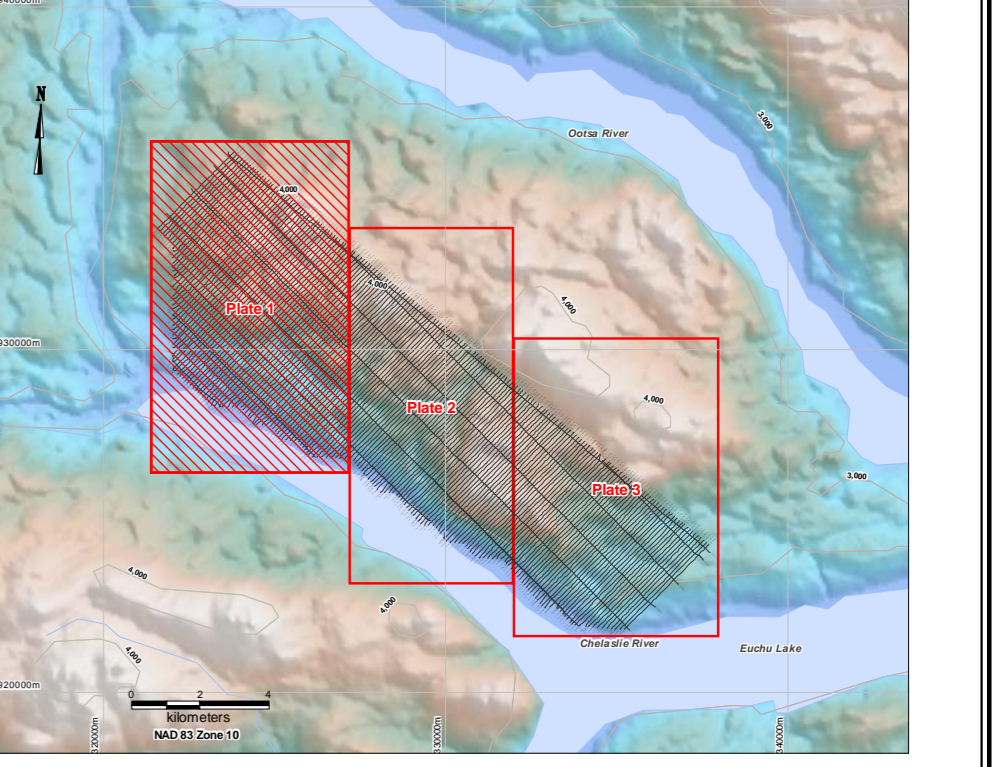
**South Claims Block, Plate 3**  
 NTS 093F05, 06, 12

**AEROGEO**  
 SERVICES AEROGEO SERVICES  
 7887 Bath Road, Mississauga, ON, CANADA L4T 3T1  
 Tel: (905) 672-9128 Fax: (905) 672-7883  
 www.aerogeomatics.ca  
 October 2007

EM South Claims



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 Inset data derived from Natural Resources Canada Atlas of Canada Base Maps.  
 This map accompanies the technical report entitled Report on a Helicopter-Borne Magnetic and Electromagnetic Survey, South Claims Property, Vanderhoof Area, British Columbia, by Aeroquest Limited, October 2007.



**TMI Contour Interval**  
 25 nT  
 125 nT  
 500 nT

**Off-Time Anomaly Symbols**

- >50S ..... ●
- 35-50S ..... ●
- 20-35S ..... ●
- 10-20S ..... ●
- 5-10S ..... ●
- 1-5S ..... ●
- <1S ..... ●

Cultural Sources ..... ⊗

anomaly label A<sub>125</sub> decay constant (μs)  
 thick thin source K<sub>32</sub> off-time conductance (S)

**SURVEY SPECIFICATIONS:**  
 Survey from: August 4 to 6, 2007  
 Traverse line spacing: 100 metres  
 Traverse line direction: 45° Azimuth (SW-NE)  
 Nominal EM bird height: 30 metres  
 Aircraft: Aeroquest A-Star 350B2 (C-FPTG)

**INSTRUMENTATION:**  
 Data acquisition: ADAS & RMS DGR-33  
 Magnetometer: Geometrics G-823A cesium vapour  
 Installation: On EM bird  
 Sensitivity: .001 nanoTesla  
 Electromagnetics: AeroTEM II System (BRAVO)  
 Configuration: Towed bird

**NAVIGATION:**  
 Navigation: Differential Global Positioning System (DGPS)  
 Navigation equipment: AGNAV with MID-TECH RX400p receiver  
 Radar Altimeter: Terra TRA3000/FRI-30

**DATA PROCESSING**  
 Magnetics: diurnal, telline and micro-leveling corrections

**POSITIONING**  
 Datum: NAD83  
 Major Axis: 6378137.000  
 Eccentricity: 0.081819191

**MAP PROJECTION**  
 Projection: Universal Transverse Mercator  
 Central Meridian: 123°W (Zone 10)  
 Central Scale Factor: 0.9998  
 False Easting/Northing: 500,000m/0m

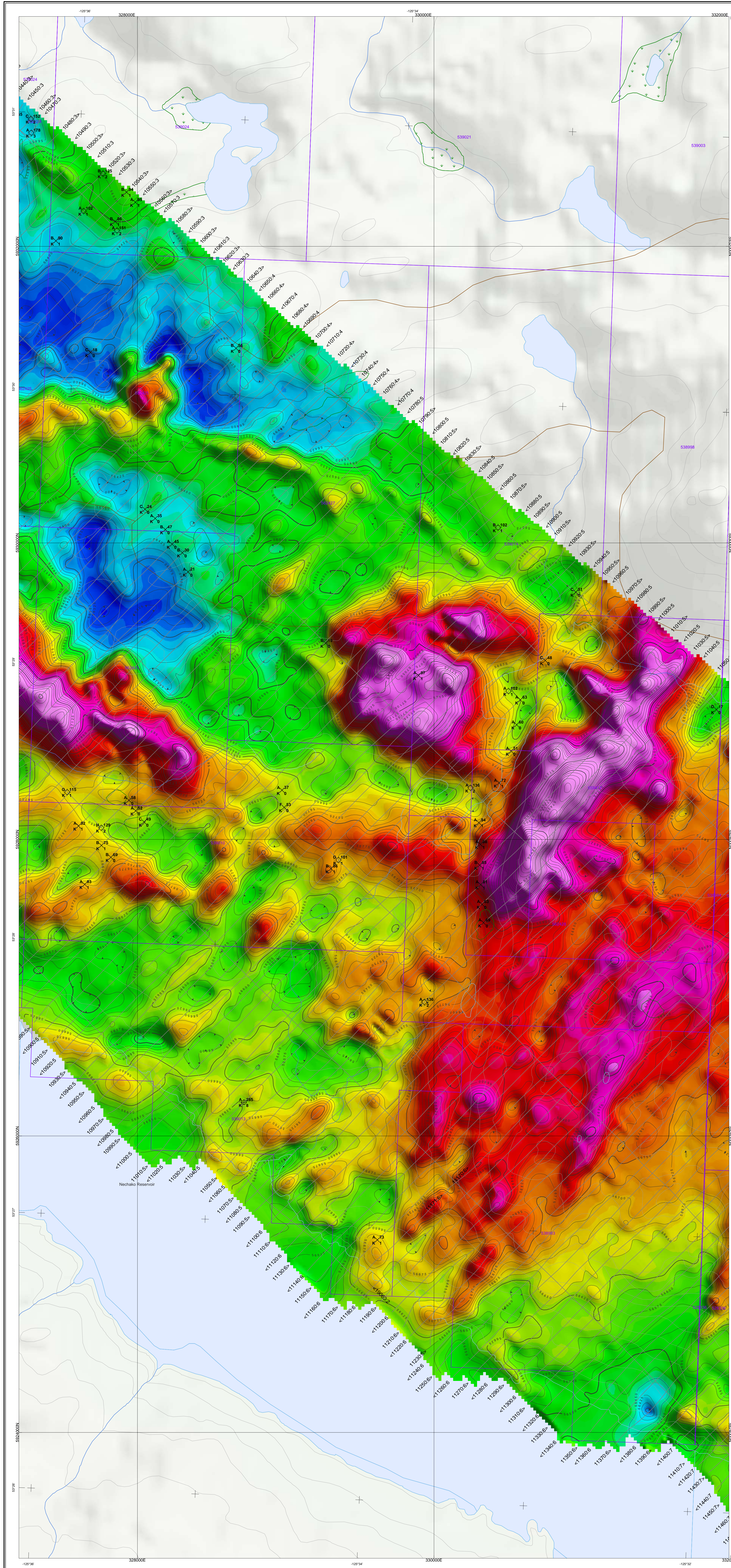
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 Vanderhoof Area, British Columbia

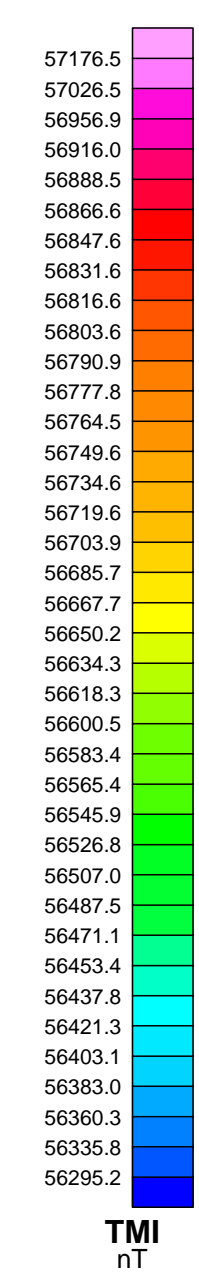
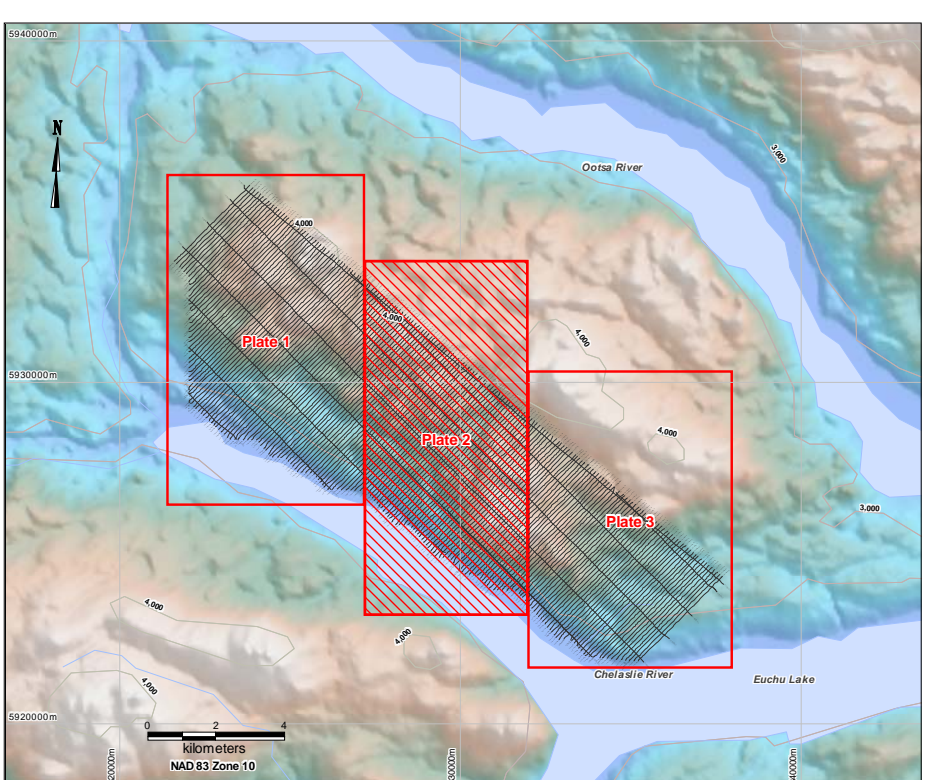
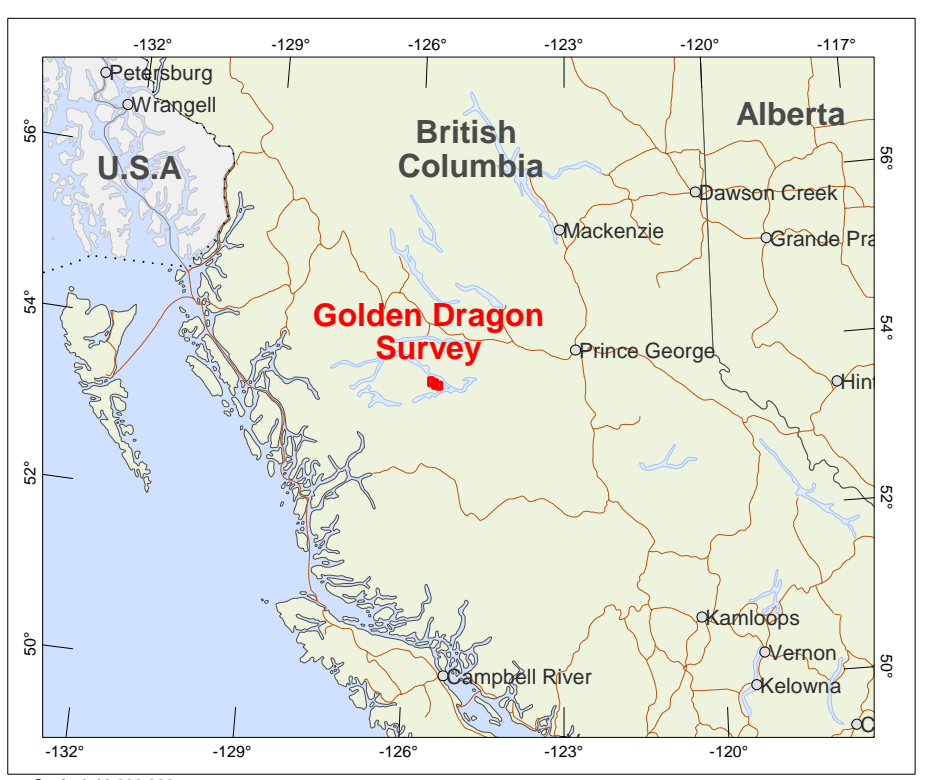
**TOTAL MAGNETIC INTENSITY**  
 South Claims Block, Plate 1  
 NTS 093F05, 06, 12







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 Inset data derived from Natural Resources Canada Atlas of Canada Base Maps.  
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**TMI Contour Interval**  
 — 25 nT  
 — 125 nT  
 — 500 nT

- Off-Time Anomaly Symbols**
- +50S ..... ●
  - 35-50S ..... ●
  - 20-35S ..... ●
  - 10-20S ..... ●
  - 5-10S ..... ●
  - 1-5S ..... ●
  - <1S ..... ●
- Cultural Sources**.....
- anomaly label A 125 decay constant (μs)
  - thick/hn source K 36 off-time conductance (S)

**SURVEY SPECIFICATIONS:**  
 Survey from: August 4 to 6, 2007  
 Traverse line spacing: 100 metres  
 Traverse line direction: 45° Azimuth (SW-NE)  
 Normal EM bird height: 30 metres  
 Aircraft: Aerostar/A-Star 350B2 (C-FP73)

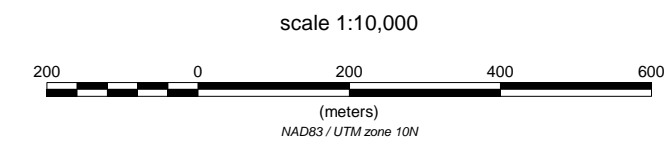
**INSTRUMENTATION:**  
 Data acquisition: ADAS & RMS DGR-33  
 Magnetometer: Geometrics G-823A cesium vapour  
 Installation: On EM bird  
 Sensitivity: .001 nanoTesla  
 Electromagnetics: AeroTEM II System (BRAVO)  
 Configuration: Towed bird

**NAVIGATION:**  
 Navigation: Differential Global Positioning System (DGPS)  
 Navigation equipment: AGNAV with MID-TECH RX400p receiver  
 Radar Altimeter: Terra TRA3000TRI-30

**DATA PROCESSING:**  
 Magnetics: diurnal, tideline and micro-leveling corrections

**POSITIONING:**  
 Datum: NAD83  
 Major Axis: 6378137.000  
 Eccentricity: 0.081819191

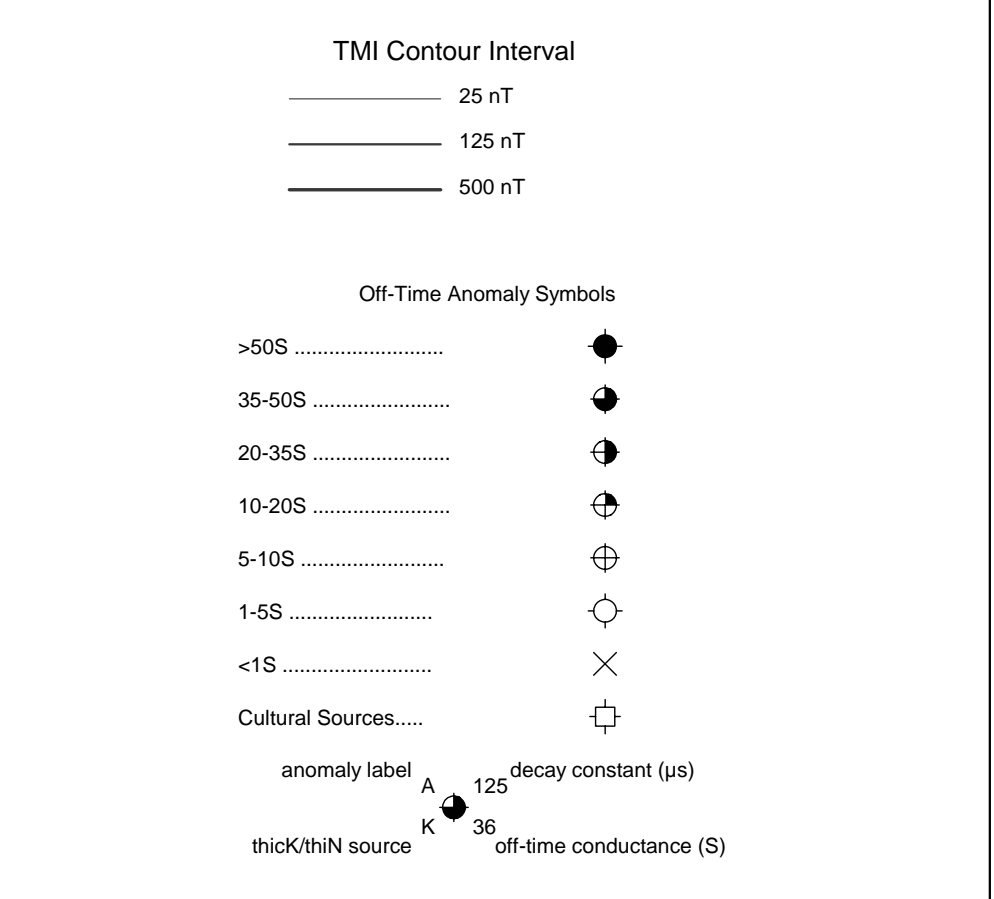
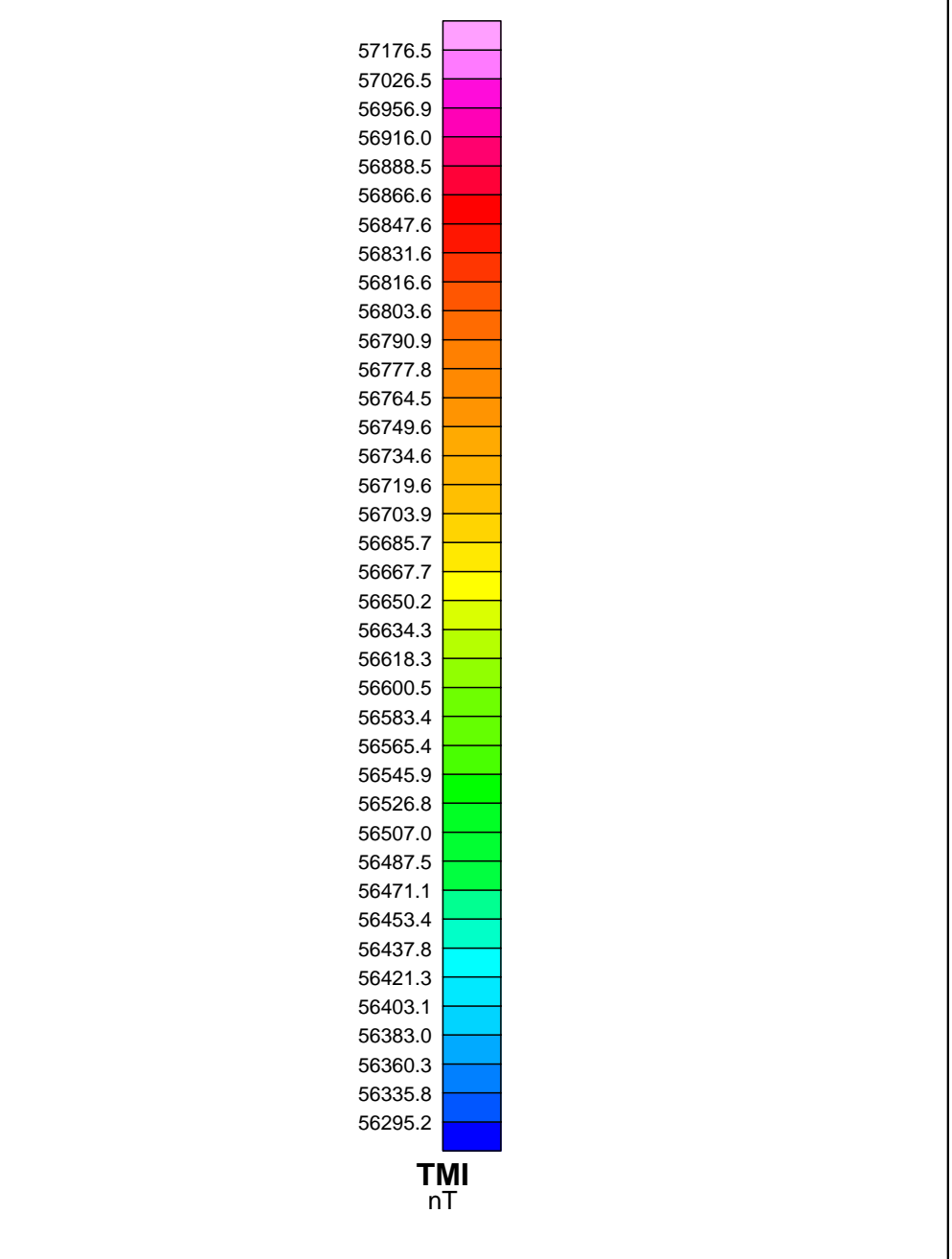
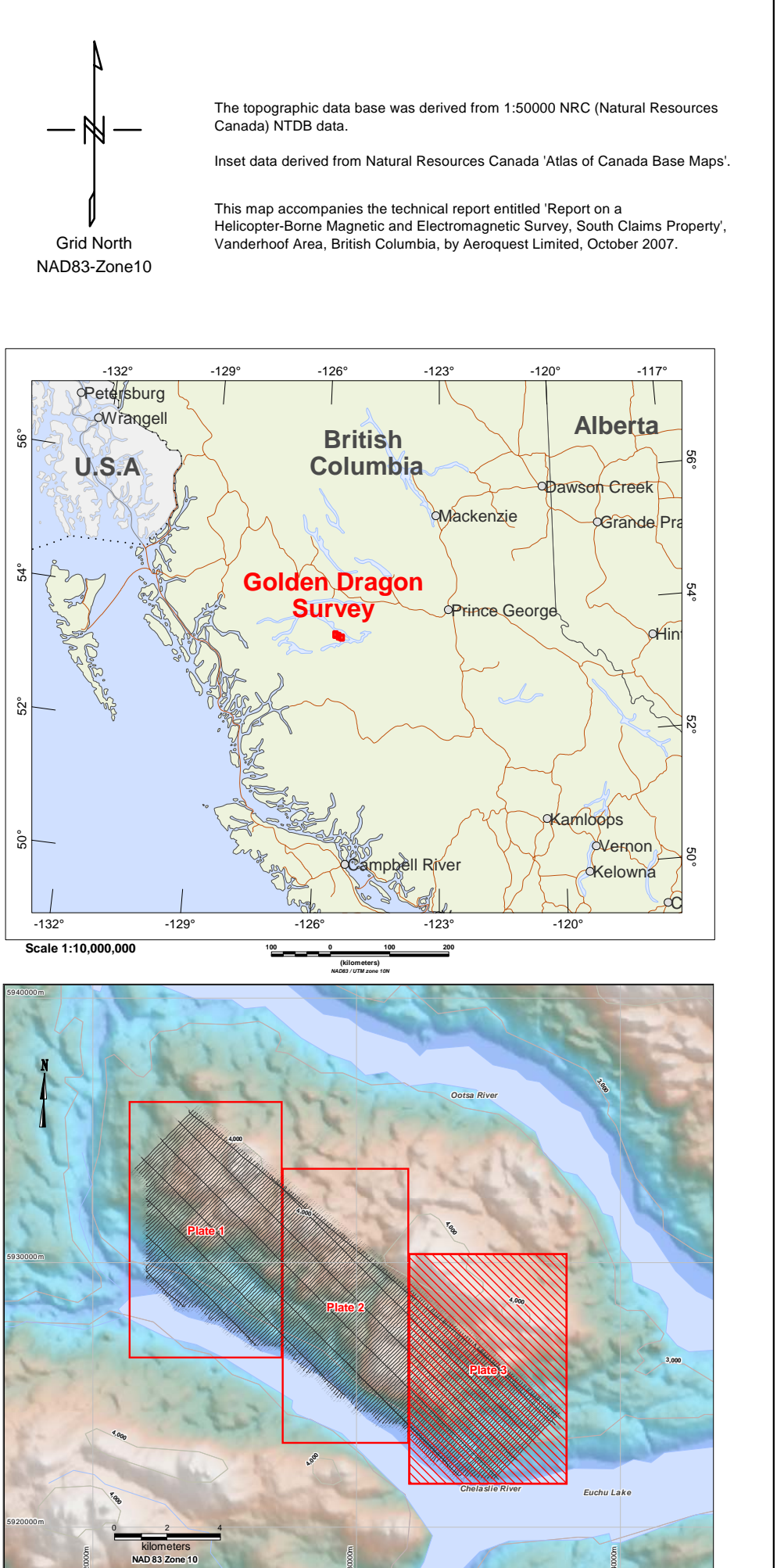
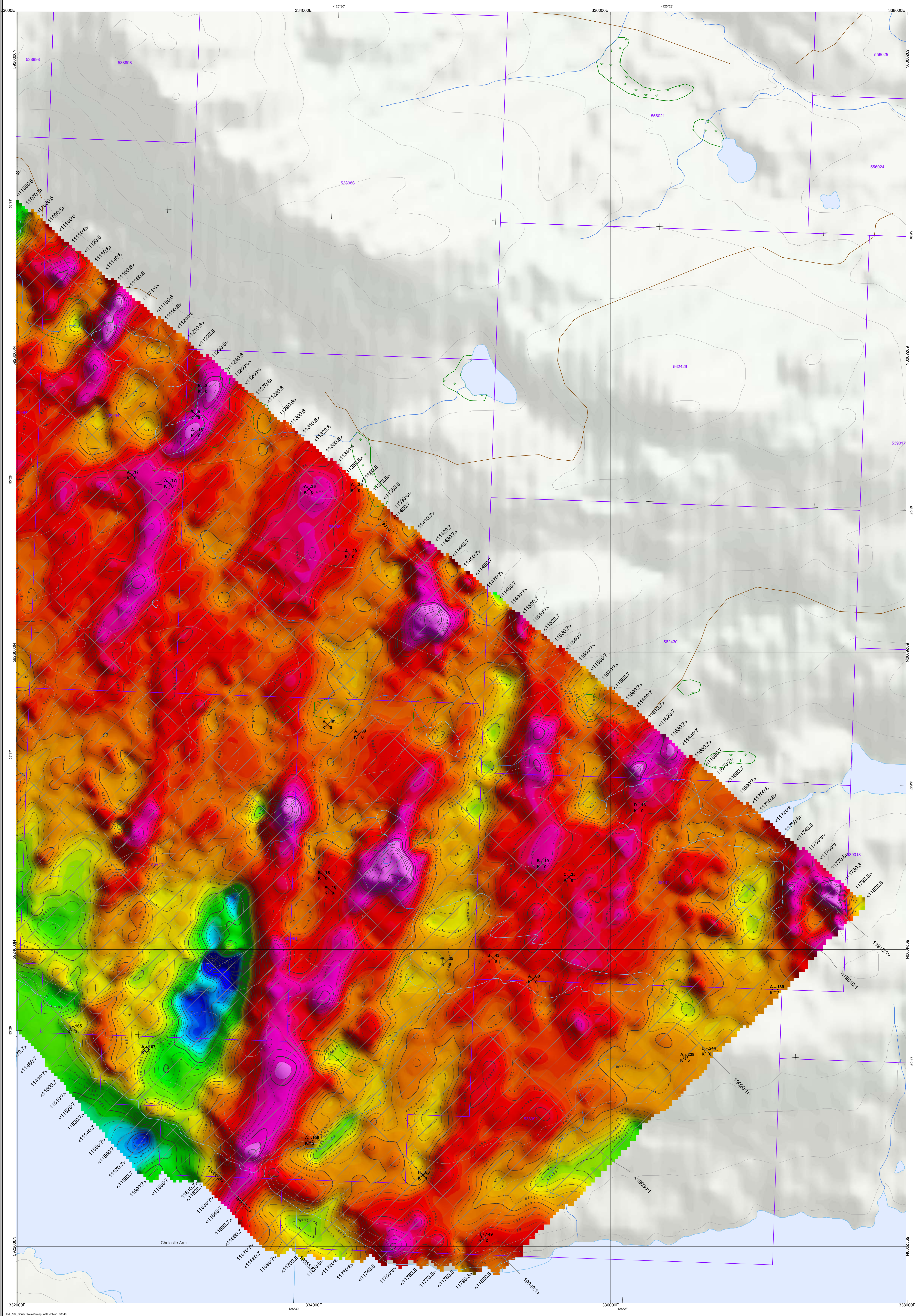
**MAP PROJECTION:**  
 Projection: Universal Transverse Mercator  
 Central Meridian: 123°W (Zone 10)  
 Central Scale Factor: 0.9996  
 False Easting/Northing: 500,000m/0m



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 Vanderhoof Area, British Columbia

**TOTAL MAGNETIC INTENSITY**  
**South Claims Block, Plate 2**  
 NTS 093F05, 06, 12





**SURVEY SPECIFICATIONS:**  
 Survey flow: August 4 to 6, 2007  
 Traverse line spacing: 100 metres  
 Traverse line direction: 45° Azimuth (SW-NE)  
 Nominal EM bird height: 30 metres  
 Aircraft: Aerospatiale A-Star 350B2 (C-FPTG)

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 Installation: On EM bird  
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 Navigation equipment: AGNAV with MID-TECH RX400p receiver  
 Radar Altimeter: Terra TRA3000/TRI-30

**DATA PROCESSING:**  
 Magnetics: diurnal, baseline and micro-leveling corrections

**POSITIONING:**  
 Datum: NAD83  
 Major Axis: 6378137.000  
 Eccentricity: 0.081819191

**MAP PROJECTION:**  
 Projection: Universal Transverse Mercator  
 Central Meridian: 122°W (Zone 10)  
 Central Scale Factor: 0.9998  
 False Easting/Northing: 500,500m/0m

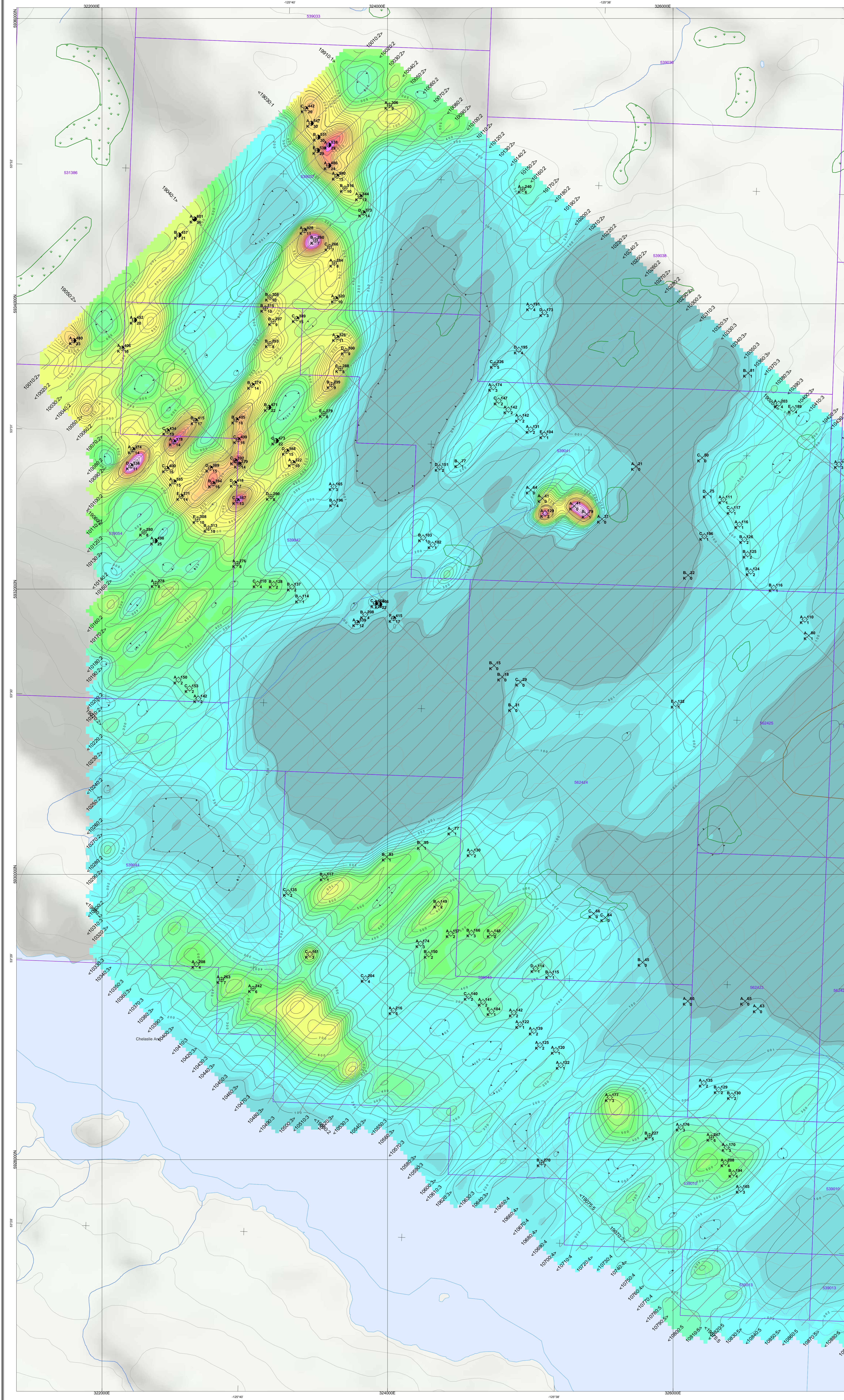
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 Vanderhoof Area, British Columbia

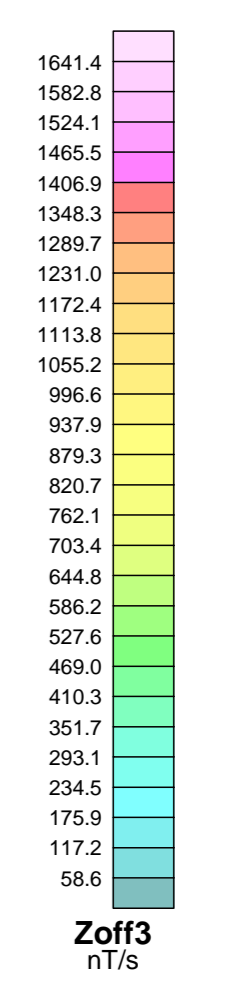
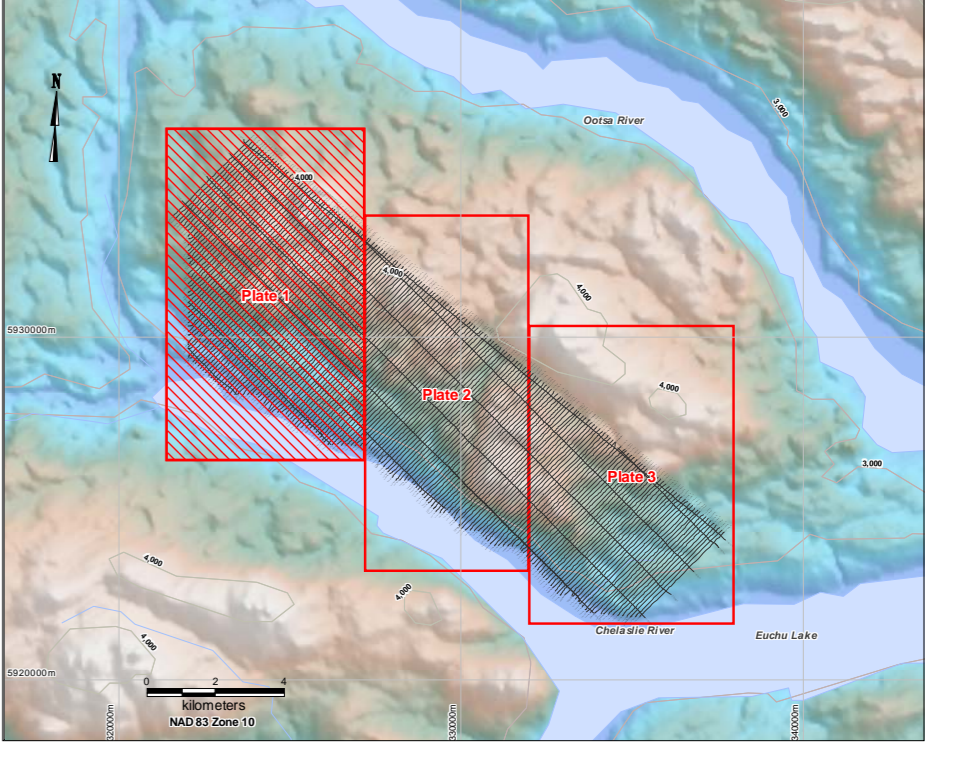
**TOTAL MAGNETIC INTENSITY**  
**South Claims Block, Plate 3**  
 NTS 093F05, 06, 12

**AEROQUEST INTERNATIONAL**  
 7897 Bath Road, Mississauga, ON, CANADA L4T 3T1  
 Tel: (905) 672-9129 Fax: (905) 672-7083  
 www.aeroquest.ca  
 October 2007

TMI South Claims



The topographic data base was derived from 1:50,000 NRC (Natural Resources Canada) NTDB data.  
 Inset data derived from Natural Resources Canada Atlas of Canada Base Maps.  
 This map accompanies the technical report entitled Report on a Helicopter-Borne Magnetic and Electromagnetic Survey, South Claims Property, Vanderhoof Area, British Columbia, by Aeroquest Limited, October 2007.  
 Grid North  
 NAD83 Zone 10

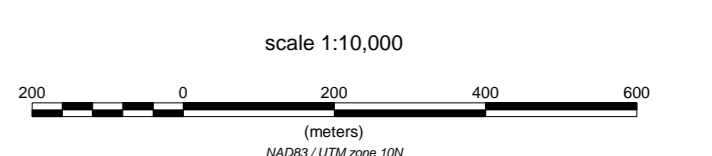


ZOFF Contour Interval  
 50 nT/s  
 100 nT/s  
 1000 nT/s

Off-Time Anomaly Symbols

- >50S ●
- 35-50S ●
- 20-35S ●
- 10-20S ●
- 5-10S ●
- 1-5S ●
- <1S ●
- Cultural Sources ●
- anomaly label ● decay constant (μs)
- thick/hin source ● off-time conductance (S)

**SURVEY SPECIFICATIONS:**  
 Survey Date: August 4 to 6, 2007  
 Traverse line spacing: 100 metres  
 Traverse line direction: 45° Azimuth (SW-NE)  
 Nominal EM bird height: 30 metres  
 Aircraft: Aerospide A-Star 300B2 (C-PTG)  
**INSTRUMENTATION:**  
 Data acquisition: ADAS & RMS DGR-33  
 Magnetometer: Geometrics G-623A cesium vapour  
 Installation: On EM bird  
 Sensitivity: .001 nanoTesla  
 Electromagnetics: AeroTEM II System (BRAVO)  
 Configuration: Towed bird  
**NAVIGATION:**  
 Navigation: Differential Global Positioning System (DGPS)  
 Navigation equipment: ACNAV with MID-TECH RX400p receiver  
 Radar Altimeter: Terra TRA3000/TRI-30  
**DATA PROCESSING**  
 Magnetics: diurnal, sideline and micro-leveling correctors  
**POSITIONING**  
 Datum: NAD83  
 Major Axis: 6378137.000  
 Eccentricity: 0.081819191  
**MAP PROJECTION**  
 Projection: Universal Transverse Mercator  
 Central Meridian: 123°W (Zone 10)  
 Central Scale Factor: 0.9996  
 False Easting/Northing: 500,000m/0m



Golden Dragon Exploration Inc.  
 Vanderhoof Area, British Columbia

## AEROTEM Z3 OFF-TIME

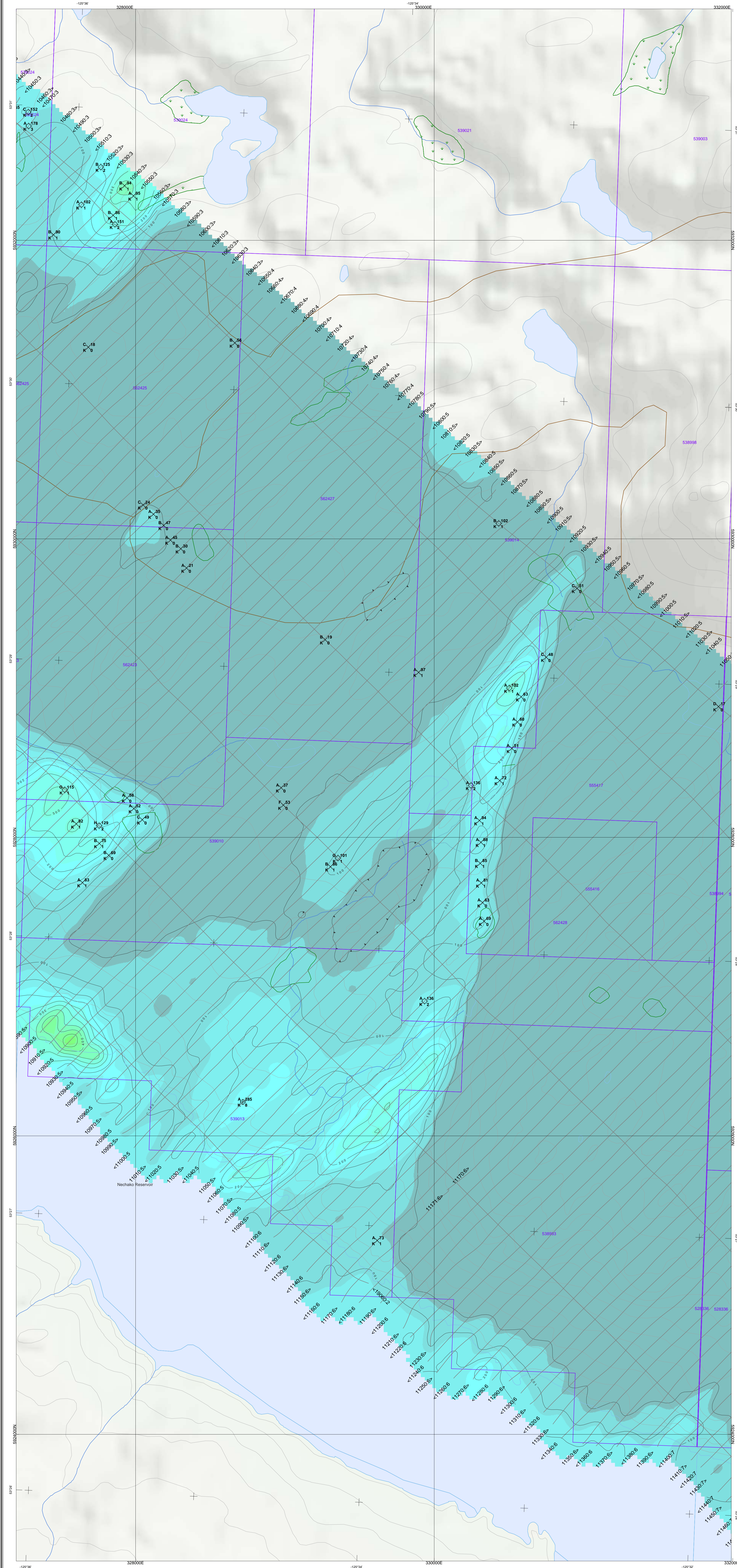
South Claims Block, Plate 1

NTS 09F05, 06, 12

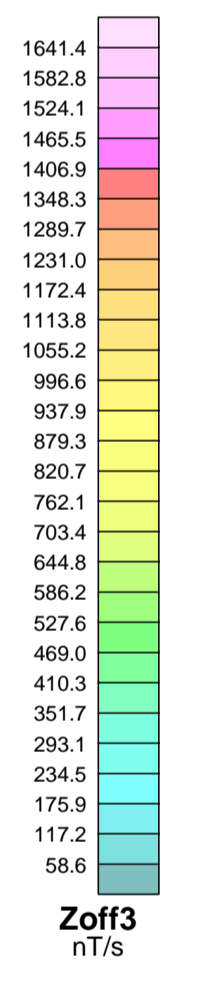
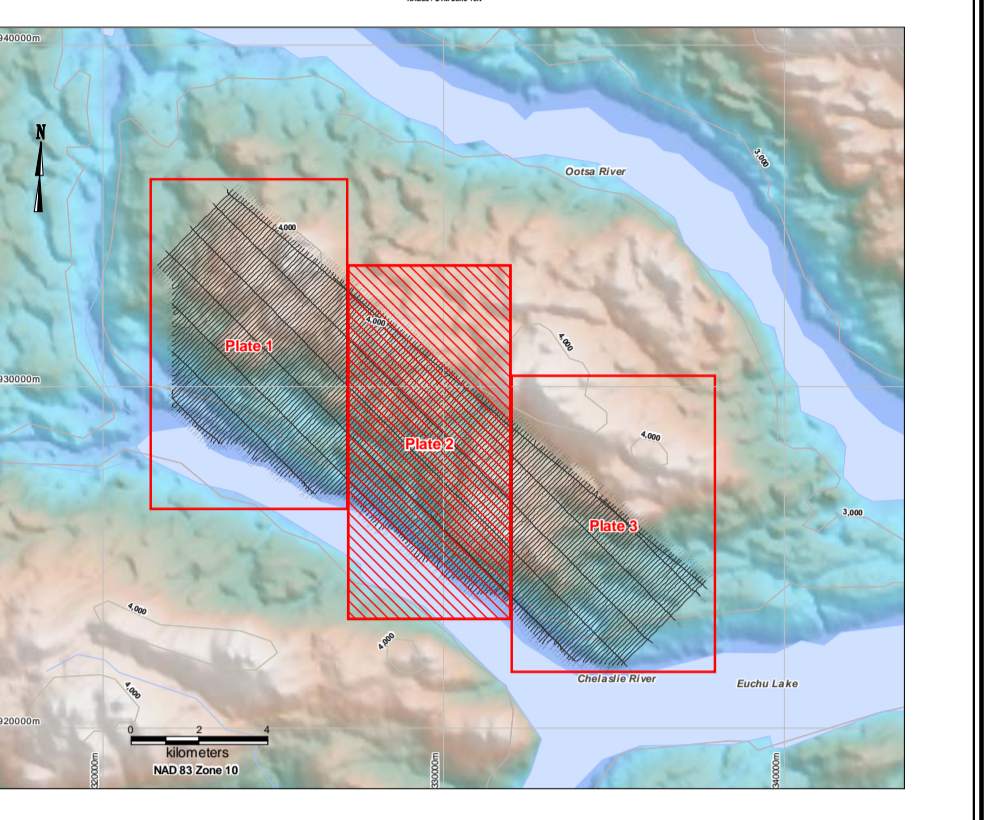


7887 Bath Road, Mississauga, ON, CANADA L4T 3T1  
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 October 2007

ZOFF South Claims



The topographic data base was derived from 1:50,000 NRC (Natural Resources Canada) NTDB data.  
 Inset data derived from Natural Resources Canada Atlas of Canada Base Map.  
 This map accompanies the technical report entitled "Report on a Helicopter-Borne Magnetic and Electromagnetic Survey, South Claims Property, Vanderhoof Area, British Columbia, by Aeroquest Limited, October 2007."  
 Grid North  
 NAD83-Zone10



**ZOFF Contour Interval**  
 — 50 nT/s  
 — 100 nT/s  
 — 1000 nT/s

**Off-Time Anomaly Symbols**

- >50S ..... ●
- 35-50S ..... ●
- 20-35S ..... ●
- 10-20S ..... ●
- 5-10S ..... ⊕
- 1-5S ..... ⊕
- <1S ..... ⊕
- Cultural Sources ..... ⊕

anomaly label A decay constant (μs)  
 K 36  
 inK/ln source K off-time conductance (S)

**SURVEY SPECIFICATIONS:**  
 Survey from: August 4 to 6, 2007  
 Traverse line spacing: 100 metres  
 Traverse line direction: 45° Azimuth (SW-NE)  
 Nominal EM bird height: 30 metres  
 Aircraft: Aerostar A-Star 300B2 (C-FPTG)

**INSTRUMENTATION:**  
 Data acquisition: ADAS & RMS DGR-33  
 Magnetometer: Geometrics G-823A cesium vapour  
 Installation: On EM bird  
 Sensitivity: .001 nanoTesla  
 Electromagnetics: AeroTEM II System (BRAVO)  
 Configuration: Towed bird

**NAVIGATION:**  
 Navigation: Differential Global Positioning System (DGPS)  
 Navigation equipment: AGNAV with MID-TECH RX400p receiver  
 Radar Altimeter: Terra TRA3000/TRI-30

**DATA PROCESSING:**  
 Magnetics: diurnal, diurnal and micro-leveling corrections

**POSITIONING**  
 Datum: NAD83  
 Map: Axis: 6378137.000  
 Eccentricity: 0.081819191

**MAP PROJECTION**  
 Projection: Universal Transverse Mercator  
 Central Meridian: 123°W (Zone 10)  
 Central Scale Factor: 0.9996  
 False Easting/Northing: 500,000m/0m

scale 1:10,000

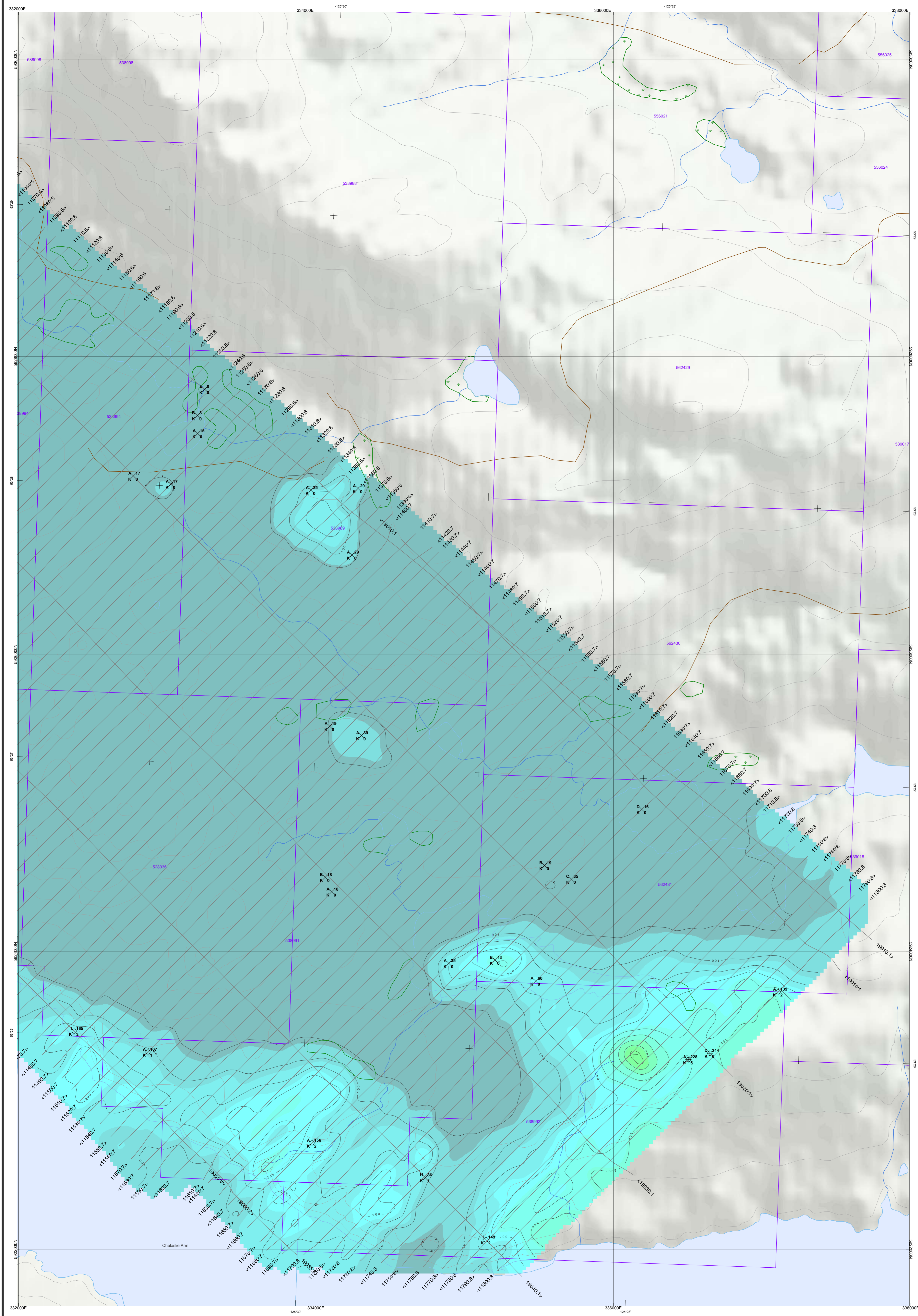
Golden Dragon Exploration Inc.  
 Vanderhoof Area, British Columbia

## AEROTEM Z3 OFF-TIME

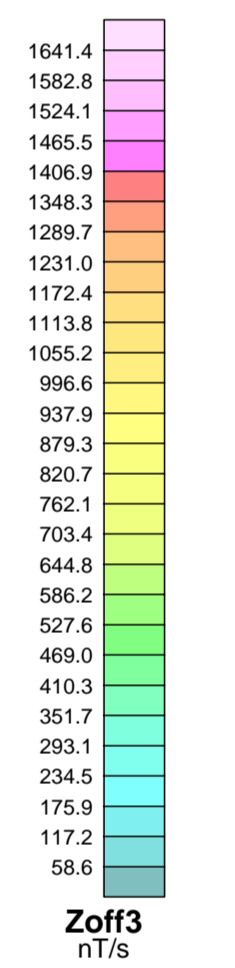
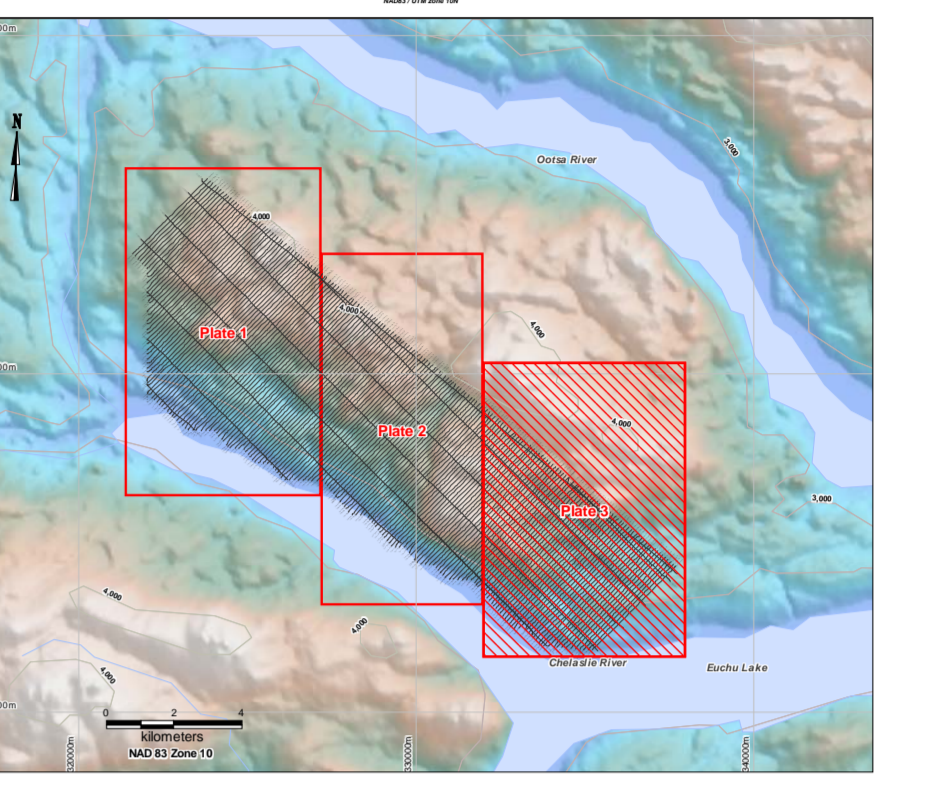
South Claims Block, Plate 2  
 NTS 093F05, 06, 12



7887 Bain Road, Mississauga, ON, CANADA L4T 3T1  
 Tel: (905) 672-9191 Fax: (905) 672-7093  
 October 2007 ZOFF South Claims



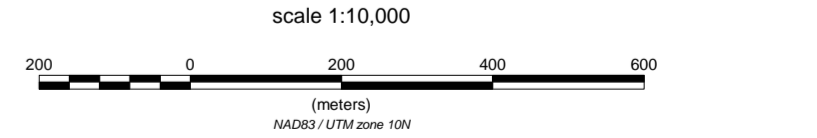
The topographic data base was derived from 1:50,000 NRC (Natural Resources Canada) NTDB data.  
 Inset data derived from Natural Resources Canada Atlas of Canada Base Maps.  
 This map accompanies the technical report entitled 'Report on a Helicopter-Borne Magnetic and Electromagnetic Survey, South Claims Property, Vanderhoof Area, British Columbia, by Aeroquest Limited, October 2007.'



ZOFF Contour Interval  
 50 nT/s  
 100 nT/s  
 1000 nT/s

Off-Time Anomaly Symbols  
 >50S .....  
 35-50S .....  
 20-35S .....  
 10-20S .....  
 5-10S .....  
 1-5S .....  
 <1S .....  
 Cultural Sources.....  
 anomaly label A 125 decay constant (μs)  
 thickN source K 360 off-time conductance (S)

**SURVEY SPECIFICATIONS:**  
 Survey flown: August 4 to 6, 2007  
 Traverse line spacing: 100 metres  
 Traverse line direction: 45° Azimuth (SW-NE)  
 Nominal EM bird height: 30 metres  
 Aircraft: Aerospasiale A-Star 350B2 (C-FPTG)  
**INSTRUMENTATION:**  
 Data acquisition: ADAS & RMS DGR-33  
 Magnetometer: Geometrics G-823A cesium vapour  
 Installation: On EM bird  
 Sensitivity: .001 nanoTesla  
 Electromagnetics: AeroTEM II System (BRAVO)  
 Configuration: Towed bird  
**NAVIGATION:**  
 Navigation: Differential Global Positioning System (DGPS)  
 Navigation equipment: AGNAV with MID-TECH RX400p receiver  
 Radar: Altimeter: Terra TRAS3000/TRI-30  
**DATA PROCESSING**  
 Magnetics: diurnal, diurnal and micro-leveling corrections  
**POSITIONING**  
 Datum: NAD83  
 Major Axis: 6378137.000  
 Eccentricity: 0.081819191  
**MAP PROJECTION**  
 Projection: Universal Transverse Mercator  
 Central Meridian: 123°W (Zone 10)  
 Central Scale Factor: 0.9996  
 False Easting/Northing: 500,000.0m



Golden Dragon Exploration Inc.  
 Vanderhoof Area, British Columbia  
**AEROTEM Z3 OFF-TIME**

**South Claims Block, Plate 3**  
 NTS 093/05, 06, 12



ZOFF South Claims

## **INTRODUCTION**

The property is located on the Nechako Plateau, approximately 90 kilometres south of Burns Lake in central British Columbia. It is underlain by Hazelton Group volcanics and sediments cut by rhyolite dykes. Reconnaissance exploration by Placer Development Ltd. and Prism Resources Ltd. in 1973 and 1980 revealed lead-zinc-arsenic soil geochemical anomalies over an area of 600 x 700 metres.

## **LOCATION, ACCESS AND GEOGRAPHY**

The property is situated on the Nechako Plateau of central British Columbia, approximately 90 kilometres south of Burns Lake and 500 kilometres north of Vancouver (Figure 1). The claims are located within the Omineca Mining Division, centred at 53' 28' north latitude and 125' 34' west longitude.

The property is accessed by logging roads from Vanderhoof and Fraser Lake. To reach it from Vanderhoof, one follows the Kenney Dam road to its termination, then follows the 500 Forest Road to a barge crossing on Intata Reach. The claims follow the northern shore of Chelaslie Arm, a branch of Euchu Lake, for four kilometres and extend north for two to five kilometres over a group of rolling hills. Euchu Lake is one of a series of artificial lakes formed behind the Kenney Dam. Upland surfaces are generally well drained with few lakes or marshes. Creek valleys are broad and marshy. Topography on the property is moderate, with elevations ranging from 850 metres on Chelaslie Arm to over 1,200 metres on the hill tops. Outcrop exposure is fairly good at higher elevations, but becomes increasingly masked by glacial till towards the valley bottoms. Overall, the property would average less than 5% outcrop.

The property is largely covered by spruce and lodgepole pine with a light undergrowth of huckleberry and alder. Approximately 10% of the property was clear-cut in the early 1980's, leaving logging slash with a light growth of shrubbery. The Bull property is subject to a continental climatic regime, with warm summers and cold winters. Snowfall is moderate with an accumulation of one to two metres during the winter.

## **REGIONAL AND PROPERTY MINING HISTORY**

### **Previous Work**

The area around the property received little exploration until the late 1960's, when several major mining companies carried out stream and lake sediment sampling surveys throughout the Nechako Plateau, searching primarily for copper-molybdenum porphyry deposits. As a result, Placer Developments Ltd. staked their MR claims in an area currently covered by the Bull 1 claim, and reconnaissance mapping and sampling were carried out in 1973. A total of 196 soil samples were taken at 120 metre intervals on lines spaced 150 or 300 metres apart and analyzed for Pb, Zn, Ag, Mo and Cu. Two well-defined, moderate-intensity, lead-zinc soil anomalies were recognized by Placer in areas underlain by oxidized quartz-feldspar porphyry and rhyolitic rocks. The larger anomaly, with peak values of 173 ppm lead and 780 ppm zinc, covered an area of 400 by 800 metres and remained open to the northeast (Buckley, 1973).

Follow-up work on one of Rio Tinto Canadian Exploration's regional lake sediment anomalies by Granges Exploration Ltd. and Cominco Ltd. led to the discovery in 1979 of the Capoose silver-lead-zinc deposit approximately thirty kilometres southeast of the Bull property. Reserves at Capoose have been estimated at 20 million tonnes grading 48 g/tonne silver and 0.5 g/tonne gold (Schroeter and Panteleyev, 1986).

Following the recognition of a major silver resource at Capoose, several nearby silver-lead-zinc

geochemical anomalies, underlain by geology similar to Capoose, were staked by BP Minerals, Prism Resources, Rio Canex and Granges. Prism staked their Precious Metal claims in 1980 to cover Placer's MR lead-zinc anomaly. They conducted reconnaissance geological mapping and sampling that year, taking a total of 218 soil, silt and rock samples from the property. Samples were analyzed for copper, lead, zinc and silver, defining a 600 by 700 metre lead-zinc soil geochemical anomaly with maximum values of 1950 ppm lead and 2760 ppm zinc. Silver values were erratic and generally low (Harivel and Livingston, 1981).

No fieldwork was carried out in 1982 on the Precious Metal claims, but the 1980 sample pulps were analyzed for gold, arsenic and molybdenum. Gold and molybdenum values were generally low in both soils and rocks; higher arsenic values in soils, to a maximum of 145 ppm, coincided with the previously-defined lead-zinc anomaly (Harivel and Livingston, 1982).

During May and June of 1992, Sleeping Gold Ltd. carried out a preliminary exploration program on the Bull property, consisting of geological mapping, prospecting and soil sampling. This program was designed to verify the reported lead-zinc-arsenic soil anomalies, locate their source and evaluate the property's potential for epithermal and volcanogenic massive sulphide mineralization. A total of 24 rock samples and 152 soil samples were taken.

**Golden Dragon Exp. Inc.  
900 Bentall II, 555 Burrard Street  
Vancouver, BC**

November 27, 2007

Statement of Costs

- For Airborne Electro Magnetometer & Magnetometer Survey over the south claim block

Payment to Aeroquest

Invoice # 1557	\$44,074.80
Invoice #1595	11,660.00
Invoice#	<u>95,475.40</u>
<b>TOTAL</b>	<b>\$151,210.20</b>

*\*Please apply excess expenditures to PAC account.*